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Food/nutrition aptitudes and dietary intake among college students and university employees: Effectiveness of a Culinary Boot Camp nutrition education program on improving current state and providing future solutions

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Food/nutrition aptitudes and dietary intake among college students and university employees: Effectiveness of a Culinary Boot Camp nutrition education program on improving current state and providing future solutions

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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

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DEDICATION

To all of my family and friends who have supported me throughout my academic journey; I could not have completed my PhD without each and every one of you. To God be the glory forever and ever!

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ABSTRACT

As higher education becomes more prominent and prevalent across the country and around the world, its presence influences many individuals in multiple different capacities. The emphasis placed on learning within this setting can be employed not only to improve mental attributes but also physical well-being. A majority of campuses are equipped with expertise and resources to enhance physical well-being and elicit health behavior change among both college students and university employees. As the overall health of these populations continues to decline, particularly in the areas of food and nutrition, it is essential to explore current behaviors as well as identify and develop future strategies that promote physical well-being within the campus setting.

Current Behaviors

College Students

A survey comprised of individual validated and reliable instruments was delivered via online survey software (Qualtrics, Provo, UT) and disseminated as a mass email to all students enrolled at a large land-grant university in the Midwest. Scores from each individual instrument were determined to measure eating competence, food/nutrition aptitudes, and dietary intake within the target population. All data analyses were conducted using Statistical Package for Social Sciences software program (IBM SPSS v24). Descriptive statistics, independent samples t-tests, and correlations were completed to assess various demographic variables, eating competence, food/nutrition aptitudes, and dietary intake among college students. Of those who participated, 615 completed the entire survey and

were included in data analyses. Participants categorized as eating competent (n=333, 54%) had significantly higher food/nutrition aptitudes ($p<0.01$) and superior dietary intake ($p\leq0.03$) compared to participants categorized as eating incompetent (n=282, 46%). All correlations between eating competence, aptitudes, and intake were identified as moderate (r=0.23-0.33) and statistically significant ($p<0.01$). Outcomes from the survey indicate marginal eating competence, food/nutrition aptitudes, and dietary intake among college students. Results also suggest a positive correlation exists between eating competence and other measured aptitudes and intake within the target population. Future research is warranted to further explore the role of eating competence as well as its connections to other food/nutrition aptitudes and dietary intake among college students.

Future Strategies

College Students

A nutrition education program, *Culinary Boot Camp* (*CBC*), was developed and delivered to students at a large land-grant university in the Midwest. Online surveys (Qualtrics, Provo, UT) composed of individual validated and reliable instruments assessed various food/nutrition aptitudes as well as dietary intake pre- to post-intervention. Again, all data analyses were completed using Statistical Package for Social Sciences software program (IBM SPSS v24). A total of 86 college students participated in *CBC*, with 71 completing pre-surveys and 46 completing post-surveys. A statistically significant change occurred within several food/nutrition aptitudes ($p\leq0.05$); those with the greatest improvements included cooking

skills/attitudes and grocery shopping self-efficacy ($p<0.01$). Trends towards change were observed within overall dietary intake, with convenience food consumption ($p=0.03$) and fruit/vegetable servings ($p=0.06$) changing most pre- to post-intervention. Results from the intervention indicate *CBC* may be an effective nutrition education program to enhance food/nutrition aptitudes and encourage better dietary intake among college students. Additional research is required to support and establish the positive outcomes and success of *CBC*.

College Students vs. University Employees

The nutrition education program *CBC* was developed and delivered to students and employees at a large Midwestern land-grant university. Online surveys (Qualtrics, Provo, UT) served as the primary evaluation tool to examine participant food/nutrition aptitudes and dietary intake pre- to post-intervention. Again, Statistical Package for Social Sciences software program (IBM SPSS v24) was used for all data analyses. Of the 86 student/92 employee participants, 71/66 completed pre-surveys and 46/50 completed post-surveys. Most student aptitudes demonstrated statistically significant improvements ($p\leq0.05$), while trends towards improvement ($p\leq0.10$) were observed within intake measures. All aptitudes and most intake measures improved significantly among employee participants ($p\leq0.02$). All participants demonstrated the greatest improvements in cooking skills/attitudes and grocery shopping self-efficacy pre- to post-intervention ($p<0.01$). Employees exhibited significantly greater improvements ($p\leq0.02$) in almost all food/nutrition aptitudes, but most dietary intake improvements were comparable between the two participant groups. Results from the intervention

suggest *CBC* is an effective nutrition education program to develop food/nutrition aptitudes and promote better dietary intake among university students and employees alike. Future research is recommended to further investigate the impact of *CBC* on food/nutrition aptitudes and dietary intake across diverse populations, both on- and off-campus.

CHAPTER 1. INTRODUCTION

Background

The increasing prominence and prevalence of higher education continues to influence many individuals in multiple different capacities. Whether a person attends college as a student, works at a university as an employee, or associates with a student or employee, the campus setting provides ample opportunities to make a positive difference in countless lives. As the primary purpose of all higher education, the emphasis and significance placed on learning can be used to not only enhance mental attributes, such as intellect and wisdom, but also expand areas of physical well-being, such as overall health status.

Equipped with the required expertise and resources to increase physical well-being among college students and university employees, the campus offers an ideal setting to elicit health behavior change in these populations. The overall health status throughout higher education continues to diminish, particularly in the areas of nutrition and physical activity. Both student and employee populations exhibit poor eating patterns and exercise practices, which is reflective of society as a whole. In order to improve physical well-being within the campus environment and eventually throughout the entire country and world, health behavior change must occur. The higher education setting offers an excellent opportunity to explore current health behaviors as well as identify and develop future strategies that promote physical well-being.

Purpose

The purpose of this dissertation was to explore the current food/nutrition behaviors among college student and university employee populations in order to identify and develop future solutions. To accomplish this purpose: 1) examination of current food/nutrition aptitudes and dietary intake occurred as well as 2) development, implementation, and evaluation of a nutrition education program entitled *Culinary Boot Camp* for a) college students and b) university employees. A literature review of previous research on food/nutrition aptitudes and dietary intake within campus populations provides strong evidence the current state of these measures will be marginal. Studies investigating the impact of similar food/nutrition interventions suggest *Culinary Boot Camp* will improve all measured food/nutrition aptitudes and dietary intake among participating college students and university employees. The findings from this dissertation will expand understanding of college student and university employee food/nutrition aptitudes and dietary intake as well as provide evidence to support or oppose a nutrition education program as a future solution to enhance these measures.

Aim 1 **–** to examine current food/nutrition aptitudes and dietary intake among a college student population.

Approach: A survey consisting of several individual instruments, all established as valid and reliable tools, was administered via an online survey system and disseminated as a mass email to all college students at a large land grant

university in the Midwest. Responses completed and collected within ten days of survey administration/dissemination were included in data analyses.

Hypothesis: The current food/nutrition aptitudes and dietary intake of college students will be marginal, with identification of these measures establishing those in need of greatest improvement.

Aim 2 – to identify if the nutrition education program *Culinary Boot Camp* improves short-term (4 weeks) and long-term (6 months) food/nutrition aptitudes and dietary among a college student population.

Approach: Surveys examining several food/nutrition aptitudes and dietary intake were collected from college student participants immediately before (pre-) and after (post-) implementation of *Culinary Boot Camp* as well as the following semester (follow-up) to explore changes in these measures over time.

Hypothesis 1: Culinary Boot Camp will significantly improve all measured food/nutrition aptitudes and dietary intake among college student participants.

Hypothesis 2: College students who participated in *Culinary Boot Camp* will have significantly higher food/nutrition aptitudes and better dietary intake at post- (4 week) and follow-up (6 month) measures compared to pre- (baseline) measures.

Aim 3 – to determine if the nutrition education program *Culinary Boot Camp* is more effective at expanding short-term (4 weeks) and long-term (6 months) food/nutrition aptitudes and dietary intake of college students or university employees.

Approach: Surveys exploring several food/nutrition aptitudes and dietary intake were collected from college student and university employee participants immediately before (pre-) and after (post-) implementation of *Culinary Boot Camp* as well as the following semester (follow-up) to examine changes in these measures over time within participant groups as well as differences between participant groups.

Hypothesis 1: Culinary Boot Camp will significantly enhance all measured food/nutrition aptitudes and dietary intake within both college student and university employee participants.

Hypothesis 2: Changes in food/nutrition aptitudes and dietary intake at post- (4 week) and follow-up (6 month) measures compared to pre- (baseline) measures will be similar between the two participant groups; *Culinary Boot Camp* will be equally effective among college student and university employee populations.

Impact

This dissertation will provide information and evidence relative to the current state of food/nutrition aptitudes and dietary intake among college students and university employees. It will also offer insight as to the impact of a nutrition education program, *Culinary Boot Camp*, on these measures within the campus setting. The findings will expand understanding of food/nutrition aptitudes and dietary intake within higher education and establish whether *Culinary Boot Camp* is an effective strategy to enhance these measures. With a steady rise in higher

education enrollment and employment, interventions to improve campus-wide physical well-being continues to emerge in research.

This dissertation will continue exploration of the higher education setting as an exceptional opportunity to implement behavior change interventions that target physical well-being, particularly in the areas of food and nutrition. Improvements of food and nutrition aptitudes among college students and university employees will likely lead to increased physical well-being within these populations. Both college students and university employees can share these positive changes in health behaviors with others to eventually extend improvements beyond the campus setting into surrounding communities as well as throughout the entire country and world.

CHAPTER 2. REVIEW OF LITERATURE

Introduction

The college campus is a place of enlightenment, innovation, engagement, and lifelong learning. It provides both students and employees with endless opportunities to grow and develop both professionally and personally. Through this growth and development, individuals can discover their purpose and work towards achieving their goals and dreams. In order to do so, the community as a whole must promote a state of health and well-being. The college campus provides an ideal setting to improve the health and well-being of countless lives influenced daily by higher education, for students and employees alike. The implementation of interventions targeting health behavior change across college campuses can lead to successful lifestyle transformations throughout this community as well as, eventually, the country and world.

College Student Wellness

Time of Transition

In the US, 16.9 million students are enrolled in higher education with most classified as young adults under the age of 25; this number is expected to increase steadily over the next 10 years (NCES, 2017). The college experience is considered a time of transition for students, as young adults move from dependence to independence in almost all areas of life. Although there is no one definition for the term transition, many scholars' perspectives can be summarized as "the ability to navigate change" (Gale & Parker, 2014). For college students, this means significant

changes in roles, responsibilities, and practices (Blichfeldt & Gram, 2013). Suddenly, young adults are tasked with the responsibility of making numerous decisions. The new role as sole provider for self can be overwhelming, leading college students to prioritize those practices perceived as most important at this specific time in their lives – academics, employment, socialization, etc. (Nelson, Kocos, Lytle, & Perry, 2009).

Young adults oftentimes overlook physical well-being as a high priority, since poor choices do not directly and immediately impact their health (Spalsbury, 2013). This is of concern, since health habits such as exercise and dietary behaviors developed during the transition from adolescence to adulthood have been found to last throughout life (Blondin et al., 2015; Downes, 2015; Matthews, Doerr, & Dworatzek, 2016). Even when college students identify physical activity and nutrition as important and strive towards improvement in these areas, their subsequent actions do not correspond with their initial enthusiasm and motivation (Swanson, 2016). This may help explain the current state of exercise and dietary habits as well as weight status among young adults.

Current Physical Well-Being of Young Adults

Health Status –

The most recent report on college student wellness indicated only 47.5% of the population rated their overall health status as being very good or excellent (American College Health Association, 2018). This suggests slightly over half of young adults attending higher education considered their health to be good, fair, or poor. This transition from adolescence to adulthood should be characterized by

optimal health status, as young adults reach maximal physiological maturity (Allen & Hopkins, 2015). Additionally, young adults do not evaluate their physical well-being based on the presence or absence of chronic disease but instead by engagement in health behaviors such as physical activity and nutrition habits (Goodwin et al., 2006). Therefore, college student assessments of their overall health status as at or below average are a significant concern when attempting to prevent chronic disease development within this population.

Physical Activity –

According to the *Physical Activity Guidelines for Americans 2018*, the current recommendation for physical activity that results in substantial health benefits is 150 minutes of moderate aerobic exercise (30 minutes 5 days per week), 75 minutes of vigorous aerobic exercise (15 minutes 5 days per week), or various combinations of the two. In addition, muscle-strengthening exercises at least two times per week is also advised (U.S. Department of Health and Human Services, 2018). Currently, only 46.2% of the college student population meets the recommended aerobic physical activity (American College Health Association, 2018), which is slightly lower than the 51.0% of American adults (Centers for Disease Control and Prevention, 2017a). Minimal information exists about participation in muscle-strengthening among college students, but less than one-third (30.2%) of all American adults participate in recommended muscle-strengthening exercises (Centers for Disease Control and Prevention, 2017a). Studies on a smaller scale have found similar or even worse results among young adults attending higher education (Downes, 2015; Pope, Hansen, & Harvey, 2017;

Racette, Deusinger, Strube, Highstein, & Deusinger, 2008; Ridner, Newton, Staten, Crawford, & Hall, 2016; Small, Bailey-Davis, Morgan, & Maggs, 2013). For instance, one study reported 86.6% of college students did not meet the aerobic exercise recommendations (Downes, 2015). As students continue throughout their college career, time spent in physical activity declines steadily (Pope et al., 2017; Racette et al., 2008; Small et al., 2013).

Nutrition –

The *2015-2020 Dietary Guidelines for Americans* encourages healthy eating patterns to support well-being and reduce the risk of chronic disease. The healthy eating pattern outlined in the recommendations includes consuming 2 ½ cup-equivalents of vegetables and 2 cup-equivalents of fruits for a 2,000 calorie per day diet; this equates to approximately five or more servings of fruits and vegetables per day for most American adults. The healthy eating pattern also proposes decreasing dietary intake of sodium, saturated fat, and added sugars (U.S. Department of Health and Human Services and U.S Department of Agriculture, 2015). The most current National College Health Assessment concluded the number of students who did not consume any fruits and vegetables (including potatoes) per day (8.4%) exceeded the number of students who met the fruit and vegetable recommendations of five or more servings per day (4.8%). The majority of young adults in the college setting consumed between 1 and 2 servings of fruits and vegetables per day (61.6%) (American College Health Association, 2018). Other studies have found college student diets to be deficient in fruits and vegetables as well (Crowe et al., 2017; Downes, 2015; Mann & Blotnicky, 2016; Small et al., 2013; Tomasone, Meikle, &

Bray, 2015). Moreover, college students' inadequate intake of fruits and vegetables does not appear to improve over time (Racette et al., 2008). One study concluded the college student diet is not only below recommended fruit and vegetable consumption but also not meeting the recommendations among all five major food groups (Mann & Blotnicky, 2016).

Poor dietary patterns among college students, such as excessive fast food consumption, contribute to a greater intake of sodium, saturated fat, and added sugars (Pelletier & Laska, 2013). One study found 50% of college students consume fast food two or more time per week (Racette et al., 2008). Yet, few studies have been conducted to evaluate overall eating patterns of college students. Some reports indicate young adults have the poorest dietary patterns when compared to all other age categories (Pelletier & Laska, 2013).

The existing research suggests the population tends to be separated into two or three general categories. One study characterized eating patterns among college students as "healthful" and "at-risk". The healthful dietary pattern included higher fruit and vegetable consumption as well as lower sodium intake and fewer calories from saturated fat and added sugars, while the at-risk dietary pattern was considered the exact opposite. Body Mass Index (BMI) was significantly correlated to eating patterns, a negative correlation with healthful behaviors and a positive correlation with at-risk behaviors (Colby et al., 2017). Another study classified college student dietary patterns as "prudent", characterized by plant-based foods such as fruits, vegetables, healthy fats, and whole grains; "western", characterized by energy-dense foods high in fat and added sugar such as red/processed meats,

refined grains, fries, and snacks; and "alcohol", characterized by high caloric drinks, especially beer and liquor. College students following the prudent eating patterns exhibited the lowest BMI and percent body fat, while those following the western dietary pattern had the highest level of chronic disease indicators (i.e. BMI, percent body fat, blood lipid biomarkers). The alcohol category had a marginal positive correlation with increased BMI and percent body fat (Blondin et al., 2015). Further evaluation of college students' overall eating patterns would be extremely beneficial for future dietary interventions among this population, since all aspects of eating are interrelated and changing one food behavior can impact others for better or worse (McNaughton, 2011).

Weight Status –

The current weight status of college students is alarming. Although the majority has a healthy BMI score between 18.5 and 24.9 kg/m^2 (61.5%), 21.8% of college students are overweight (BMI 25.0-29.9) while another 11.8% are considered obese (BMI >30.0). The mean BMI (25.20 kg/m^2) among young adults attending higher education has recently reached an overweight classification (American College Health Association, 2018). The most significant rise in overweight and obesity prevalence in America occurs between the ages of 18 and 29 (LaCaille, Dauner, Krambeer, & Pedersen, 2011). In fact, the transition from dependence to independence during the first year of college has been found to be the time period where the greatest weight gain occurs (Downes, 2015; Pope et al., 2017). While research does not support the 'Freshmen 15' legend that exists among this population, most studies conclude students' weight gain ranges between 0.73

kg (1.6 lb) to 4.5 kg (9.9 lb) throughout the first year of college (Cluskey & Grobe, 2009; de Vos et al., 2015; Deforche, Van Dyck, Deliens, & De Bourdeaudhuij, 2015; Downes, 2015; Pope et al., 2017; Vella-Zarb & Elgar, 2009; Wengreen & Moncur, 2009); few studies report no weight gain during students' freshman year (Vella-Zarb & Elgar, 2009).

Increasing weight continues throughout college, with one analysis reporting a statistically significant gain of 2.5±5.3 kg (5.5±11.7 lb) between freshmen and senior year (Racette et al., 2008). Another systematic review determined students, on average, gain 1.6 kg (3.52 lb) per year, resulting in a 1.2% increase in adiposity per year attending college (Fedewa, Das, Evans, & Dishman, 2014).

Weight gain has been shown to increase BMI significantly among college students (de Vos et al., 2015; Deforche et al., 2015; Pope et al., 2017; Racette et al., 2008). Most students who experience a substantial increase in their body weight during college move from normal to overweight BMI classification (Das & Evans, 2014). One study found 25% of students who gained ≥5% of their body weight during the first semester of college transitioned from a BMI <25.0 to a BMI >25.0; others stayed within the normal range, with the exception of a few who shifted from overweight to obese status (Wengreen & Moncur, 2009). A rapid increase in weight, adiposity, and BMI places college students at a heightened risk for several deleterious chronic health conditions later in life – hypertension, type 2 diabetes, cardiovascular disease, cancer, depression, anxiety, etc. (Centers for Disease Control and Prevention, 2018).

Conclusion –

The current physical well-being of college students, measured by overall health, physical activity, nutrition, and weight status, can be considered fair at best. Examination of exercise and dietary habits as well as weight management among this population clearly identifies a problem requiring immediate action and resolution. All indices of physical well-being are interrelated (Blondin et al., 2015; Brunt, Rhee, & Zhong, 2008; Racette et al., 2008; Ridner et al., 2016) and can be addressed through an assessment of young adults' attitudes, understanding, and perceptions about these topics. There is an urgent need to improve the physical well-being of college students in order to combat the overweight/obesity epidemic facing our nation and world (Swanson, 2016).

Young Adults' Attitudes, Understanding, and Perceptions of Physical Well-Being Indices

Attitudes and Understanding –

Several studies have examined student attitudes, understanding, and perceptions about physical activity, nutrition, and weight status during college. Research related to young adults' attitudes has found a desire to develop healthful exercise and dietary habits, but the population lacks the skills and/or support to do so (Fitzgerald, Heary, Kelly, Nixon, & Shevlin, 2013; LaCaille et al., 2011; Matthews et al., 2016; Wharton, Adams, & Hampl, 2008). Improved attitudes about these behaviors can also lead to better physical activity and nutrition behaviors (Graham & Laska, 2012; Kolodinsky, Harvey-Berino, Berlin, Johnson, & Reynolds, 2007;

Tomasone et al., 2015), as well as learning aptitudes (Gutierrez, Benna, Fernandez, Shanahan, & Cruz, 2013). Attitudes about exercise and diet habits appear to be closely associated with understanding about these topics; college students with greater understanding about physical activity and nutrition tended to have more positive attitudes about performing these behaviors (Matthews et al., 2016). Additionally, increasing an understanding about healthful exercise and dietary habits has been shown to improve health behaviors (Graham & Laska, 2012; Kolodinsky et al., 2007; Matthews et al., 2016; Misra, 2007) and learning processes (Gutierrez et al., 2013).However, many scholars and students alike believe the college population lacks sufficient attitudes and understanding about physical activity, nutrition, and weight status (Crowe et al., 2017; Das & Evans, 2014). Some studies have concluded college students who exhibit positive attitudes and increased understanding about health behaviors typically do not transform their thoughts into action (Mann & Blotnicky, 2016; Tomasone et al., 2015). Therefore, it is essential to assess more than young adult attitudes and understanding of exercise, dietary habits, and weight status; their perceptions connected to these measures of physical well-being must also be examined.

Perceptions –

Many college students perceive their current overall health status and behaviors as average, yet one study noted approximately 30% of freshmen felt less healthy than they did the year prior to attending college (de Vos et al., 2015; Mann & Blotnicky, 2016). The unanticipated challenge of establishing or maintaining a healthy lifestyle in college likely contributes to the drop in perception of overall

health status among students (Cluskey & Grobe, 2009). This may be due to the moderate to low self-efficacy scores related to engagement in regular exercise and healthful dietary habits among the population (Das & Evans, 2014).

Research suggests that although college students intend to improve health behaviors in their near future, most report not meeting recommendations (Matthews et al., 2016). Young adults do perceive the negative consequences of poor physical activity and nutrition practices relative to weight status, physical and mental well-being, quality of life, and self-esteem (Das & Evans, 2014). Still, several studies conclude the majority of college students are unconcerned about lifelong impacts of deleterious health behaviors (Cluskey & Grobe, 2009; Goodwin et al., 2006; Matthews et al., 2016). Examining perceptions associated with individual physical well-being indices can help answer the question of how to help college students understand the influence of current health behaviors on future overall health status.

Perceptions about physical activity are diverse among college students. Countless students experience difficulty establishing or maintaining exercise habits during the transition from secondary school to college due to the absence of regular and scheduled sports involvement (Cluskey & Grobe, 2009; LaCaille et al., 2011). Other perceived challenges to meeting physical activity recommendations in the college setting include lack of routine, limited time, minimal discipline, increased stress levels, and lack of motivation (Cluskey & Grobe, 2009; Fedewa et al., 2014). Students typically perceive a positive support system, such as family and friends, as well as motivation, routine, and convenience/diversity of exercise options on

campus as beneficial influences to engagement in regular exercise (LaCaille et al., 2011).

College students commonly perceive changing nutrition behaviors as a much more difficult process compared to improving physical activity behaviors (Cluskey & Grobe, 2009). Most young adults are concerned about their current dietary habits and indicate they are willing to modify them as necessary (de Vos et al., 2015), yet these perceptions are oftentimes not followed by action (Mann & Blotnicky, 2016; Tomasone et al., 2015). This may be due to misperceptions among this population. For instance, college students' perceptions of recommended fruit and vegetable intakes as well as intake of other important nutrients are significantly lower than actual recommendations (Matthews et al., 2016). Although their perception relative to the recommended quantity of fruits and vegetables was incorrect, their perception of quality was very accurate. When asked to describe a nutritious eating pattern, college students indicated consumption of fruits, vegetables, and dairy products as well as eating a variety of foods rich in vitamins and minerals at regularly scheduled times. Additionally, they described a less nutritious eating pattern as skipping meals and binging as well as consumption of high fat, high sugar, processed, and convenience foods (LaCaille et al., 2011).

In addition to the challenges listed for exercise, college students face several other obstacles when trying to follow healthy dietary habits, such as lack of meal/snack planning skills, cost, availability, accessibility, emotional eating experiences, and lack of meal/snack preparation skills (Cherry-Williams, Porter, Faulkner, & Gruber, 2016; Cluskey & Grobe, 2009; Fedewa et al., 2014; LaCaille et al.,

2011; Spalsbury, 2013). Beyond those identified for physical activity, college students commonly perceive self-regulation, self-control, positive social norm perceptions, healthful food/drink environment, and self-efficacy as beneficial influences to better nutrition practices (Cherry-Williams et al., 2016; Fitzgerald et al., 2013; LaCaille et al., 2011; Pelletier & Laska, 2013; Swanson, 2016).

The perceptions and practices associated with weight status among college students differ by gender. Although studies have determined approximately 50% of college students attempt to lose weight at some point while attending school, the majority are females who do not classify as overweight or obese based on BMI (Downes, 2015; Wharton et al., 2008). These findings are supported by evidence suggesting dieting practices to be much more common in female college students compared to their male counterparts (Wharton et al., 2008). Further research indicates dieting practices are a norm among female young adults, regardless of weight status, due to expectations of self and society (Malinauskas, Raedeke, Aeby, Smith, & Dallas, 2006). An examination of college student perceptions related to weight gain reported females fear 'becoming fat' and are significantly more concerned about weight gain, while males care more about staying 'fit' and 'tone' than weight gain (LaCaille et al., 2011). Additionally, young adult males tend to rate their overall health status much higher and have fewer health concerns than females (American College Health Association, 2018; Cluskey & Grobe, 2009; de Vos et al., 2015). Yet, multiple studies have concluded males experience significantly greater weight gain throughout college and are more often classified as overweight or obese in young adulthood (American College Health Association, 2018; Brunt et al., 2008;

Cluskey & Grobe, 2009; Wharton et al., 2008). Thus, the focus on weight gain among college students should shift from the female population to focus on the male population.

Conclusion –

Ultimately, there is a need to improve young adults' attitudes, understanding, and perceptions of physical well-being. Most students do not anticipate the enduring effects of their health choices during college (Cluskey & Grobe, 2009; Goodwin et al., 2006; Matthews et al., 2016). Interventions that focus on short-term expectations and outcomes instead of long-term risks and benefits may be more effective and produce more lasting results (Matthews et al., 2016) among the college student population. Furthermore, young adults who do make positive health choices in one area of physical well-being tend to compensate in another area (Poelman, Vermeer, Vyth, & Steenhuis, 2013). For example, young adults who consider their dietary habits as 'healthy' or 'nutritious' oftentimes do not exercise as much as others. To address the health and well-being thoughts and actions among the student population, interventions founded in health behavior change models and theories should be considered and implemented as soon as possible within the college setting.

Health Behavior Change Models and Theories within the College Student Population

Overview

Countless health behavior change theories and models have been developed and employed to help explain and facilitate change in human behaviors. It is estimated that 80 or more behavior change theories and models comprised of over 1,000 distinct constructs exist. Of these, 17 are commonly defined as health behavior change theories and models, consisting of both classical and contemporary perspectives (Cluskey & Grobe, 2009). Although 'theory' and 'model' are oftentimes considered interchangeable, the terms do have distinguishable differences in definitions. A theory constitutes "a cohesive explanation for a set of casual relations among constructs as well as between constructs and targeted behaviors." A model represents "a hypothesized set of general relations between constructs and one or more target behaviors," with the overall goal of establishing "the full range of constructs that may be relevant to one or more target behaviors" (Bartholomew & Mullen, 2011). Therefore, theories describe definite or proven cause and effect relationships while models postulate possible relationships within and between constructs and behaviors. This distinction is not always followed in the field of health behavior change (Bartholomew & Mullen, 2011; Sheeran et al., 2017), so the terms theory and model may refer to either meaning in research literature. For the purposes of this review, 'theory' and 'model' will be employed as found in the research literature.

Within the discipline of nutrition education, theories and models are considered an essential component to the framework of curriculum development, intervention, and evaluation (Bartholomew & Mullen, 2011; Murimi et al., 2017; Sheeran et al., 2017). It has been well established that, although not necessary to elicit behavior change, interventions grounded in and guided by theories and models are most successful both in the short-term and long-term (Bartholomew & Mullen, 2011; Brug, Oenema, & Ferreira, 2005; Meiklejohn, Ryan, & Palermo, 2016; Murimi et al., 2017; Sheeran et al., 2017). The most common health behavior change theories and models applied in the field include the Health Belief Model, Transtheoretical Model, and Social Cognitive Theory (Murimi et al., 2017). Theories and models recently rising in popularity across the discipline include more comprehensive explanations, such as the Socioecological Model, and non-diet approaches, such as the Competent Eating Model (Brug et al., 2005; A. C. King, 2015; Schaefer & Magnuson, 2014). A more in-depth exploration of these theories and models as well as their effectiveness among the college student population will clarify and support their importance and need within nutrition education.

Health Belief Model

Developed in the 1950s as a means to describe human health behaviors associated with failure to participate in programs that reduce disease risk through lifestyle changes (Abood, Black, & Feral, 2003) the Health Belief Model (HBM) was the first behavior change theory documented in the health field (Sheeran et al., 2017). Although originally created and still implemented as a theory to describe disease prevention, the HBM has also been applied as a theory to prompt behavior

change (Brug et al., 2005). Within the field of nutrition education, the HBM has functioned in both ways.

The HBM is founded on the principle that personal beliefs determine behaviors. In order to change a person's health behaviors, factors at the intrapersonal, or individual, level are the focus. The intrapersonal level emphasizes the influence of a person's beliefs as well as his or her knowledge, attitudes, experiences, skills, and culture on health behaviors and the capacity to change them (Hayden, 2014). The HBM consists of four primary theoretical constructs: perceived severity, perceived susceptibility, perceived benefits, and perceived barriers. Perceived severity refers to one's belief relative to the seriousness of different disease risks. Perceived susceptibility can be defined by one's assessment of his or her probability of contracting certain health conditions. Perceived benefits include one's opinions or perceptions about positive health behaviors' ability to reduce the risk of developing different diseases. Perceived barriers are described as one's opinions or perceptions relative to obstacles that prevent him or her from adopting positive health behaviors (Hayden, 2014; Rinaldi-Miles & Das, 2016).

Over the years the HBM has expanded to incorporate additional theoretical constructs important to explaining health behavior change; these include cues to action, motivating factors and self-efficacy (Das & Evans, 2014). Cues to action consist of influences, such as transformative events or media reports, which motivate or move a person to change his or her behaviors. Motivating factors, also known as modifying variables, are a person's intrapersonal components that affect whether or not a new health behavior is maintained after change; examples of

modifying variables include education and motivation. Self-efficacy, as defined in the HBM, refers to one's confidence in his or her aptitudes to change and maintain health behaviors (Hayden, 2014; Rinaldi-Miles & Das, 2016). When all primary and expanded theoretical constructs are taken into consideration, the HBM provides an exceptional framework for development, implementation, and evaluation of nutrition education interventions.

The HBM has been applied within the college student population primarily as an explanatory theory (H.-S. Kim, Ahn, & No, 2012; Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004). Numerous health behavior change studies have employed the HBM to explore perceptions of college students related to nutrition and physical activity. One study found perceived barriers and self-efficacy to be the most influential HBM constructs to predict nutrition and physical activity behavior (Von Ah et al., 2004). Further research suggested that all of the primary theoretical constructs of the HBM, when investigating healthy eating and regular exercise behaviors, were predictive of college students' BMI. Participants with higher BMIs had significantly higher perceived susceptibility, benefits, and barriers as well as lower perceived severity (McArthur, Riggs, Uribe, & Spaulding, 2018). The literature also suggests students perceive many benefits of healthy eating and regular exercise beyond physical appearance, such as increased quality of life as well as improved physical, mental, and spiritual health (Das & Evans, 2014). Oftentimes college students perceive more barriers than benefits in performing positive health behaviors, which must be overcome to transform these positive health behaviors into habit across this population (Das & Evans, 2014; H.-S. Kim et al., 2012). Commonly perceived barriers

to nutrition and physical activity behaviors among college students include lack of time, knowledge, and motivation (Das & Evans, 2014). Most studies explaining college student nutrition and physical activity behaviors through the HBM concluded future research should incorporate lessons learned to improve the outcomes of health behavior change interventions among this population (Das & Evans, 2014; H.-S. Kim et al., 2012; McArthur et al., 2018; Von Ah et al., 2004). No studies were identified that implemented the HBM as a means to encourage college student nutrition and physical activity behavior change. This is likely due to the lack of concern for overall physical well-being and disease prevention at this period in life among the population (Goodwin et al., 2006).

Transtheoretical Model

Also known as 'Stages of Change', the Transtheorectical Model (TTM) was developed by researchers Prochaska and DiClemente to describe an individual's readiness to change his or her current health behaviors and motivate him or her to do so. Different degrees of readiness are categorized into five 'Stages of Change', with each stage requiring its own distinct intervention (Liau et al., 2013). The first stage of change, pre-contemplation, can be characterized by a person's inability to recognize a need or insufficient readiness for a health behavior change. This stage typically transpires six months or more prior to the point of choosing to make a health behavior change. Contemplation, the second stage of change, categorizes individuals who recognize a health problem related to a particular behavior and begin to think about change. This stage includes consideration of making a decision and plans to perform health behavior change within the next six months. The third

stage, preparation, starts as soon as a person decides to change a health behavior and creates a plan to do so. The intent to change the health behavior occurs within the next 30 days, typically making this the shortest stage of all. Action, the fourth stage of change, denotes an individual's active process of making a behavior change to address the identified health problem. Individuals in the action stage have been performing the behavior change for less than six months. The fifth and final stage of change, maintenance, describes the point in which a person is working towards sustaining behavior change to prevent relapse. This stage typically starts six months after action occurs (Hayden, 2014). It is important to note the TTM does not explain how individuals move from one stage to the other but simply distinguishes between them (Daley & Duda, 2006).

Additional constructs within the TTM include processes of change, self-efficacy, and decisional balance (Hayden, 2014; Weller et al., 2014). Processes of change outline how health behavior change arises within different stages of change. There are ten distinct processes of change, classified as either cognitive or behavioral (Cardinal & Kosma, 2004; Kang & Kim, 2017). Cognitive processes of change include: 1) consciousness raising – awareness about health problem as well as its causes and consequences, 2) dramatic relief – ability to express emotion and react to health problems, 3) environmental reevaluation – impact of behavior change on different environments, 4) self-reevaluation – consideration of self with and without behavior change, and 5) social liberation – pursuit of options or alternatives supportive to behavior change (Hayden, 2014). Behavioral processes of change include 1) counter-conditioning – substitution of a poor health behavior for

a positive one, 2) helping relationships – development of a support system, 3) stimulus control – elimination of cues or triggers from environment, 4) reinforcement management – rewards and punishments, and 5) self-liberation – choice, belief, and commitment to change (Hayden, 2014). Research suggests all processes of change help people make transitions across different stages of change in a broad range of health behaviors (Y. Kim, 2008).

Self-efficacy, as defined by the TTM, refers to one's confidence in his or her ability to change a behavior and maintain it during challenging situations. This construct is most critical throughout preparation, action, and maintenance stages. Decisional balance signifies the balance between pros and cons an individual must weigh when making a decision to change a health behavior (Weller et al., 2014). All constructs within the TTM are essential to the theory's ability to explain and elicit health behavior change.

One central concept to the TTM is the idea that the most significant behavior change will transpire when interventions are matched to a person's or population's specific stage of change (Daley & Duda, 2006). Several studies have determined TTM-tailored interventions to be an effective way to change numerous single health behaviors, including physical activity and nutrition, as well as multiple health behaviors all at one time (Prochaska et al., 2008). Although this theory has been shown to be successful in many health behavior change interventions, it is also noted in research literature that results are oftentimes diverse and inconclusive (Liau et al., 2013; Mastellos, Gunn, Felix, Car, & Majeed, 2014). For instance, one paper reported TTM interventions targeting weight loss provide limited support for

effectiveness as well as little evidence for sustained behavior change (Mastellos et al., 2014). Another study suggested TTM interventions appear to have positive impacts on exercise outcomes but mixed effects on dietary habits (Liau et al., 2013).

Some scholars argue TTM-tailored interventions are not any more effective than non-tailored interventions ("The Transtheoretical Model of Behaviour Changes and the Scientific Method," 2006). Other researchers agree and conclude the TTM is best implemented as a representation of how health behavior change occurs rather than as an approach to promote health behavior change. Thus, this theory may not be as applicable or successful at eliciting health behavior change as once thought (Horneffer-Ginter, 2008; "The Transtheoretical Model of Behaviour Change and the Scientific Method," 2006). Nevertheless, multiple studies continue to implement the TTM as a means to motivate health behavior change. Examining implementation of TTM interventions within the college student population will provide a better perspective on the application and effectiveness within nutrition education.

Most TTM studies implemented among college students examine characteristics of or changes in physical activity behaviors. Earlier as well as more recent research has categorized physical activity within this population according to current stages of change (Horneffer-Ginter, 2008; Kang & Kim, 2017; Levy & Cardinal, 2006). One investigation of college student health behaviors reported 46% of the population to be in the preparation stage of change for physical activity. Another study identified three categories of physical activity behaviors among college students, which included stable active (action or maintenance), activity adopters (moved into action or maintenance), and perpetual preparers

(preparation) (Kang & Kim, 2017). The stable active participants engaged in significantly more physical activity as well as significantly greater processes of change compared to the other two groups.

Another investigation distinguished five different classifications of physical activity behaviors within a college student population. The groupings were characterized by different stages of change, which included stable sedentary (pre-contemplation or contemplation), stable active (action or maintenance), activity adopters (moved into action or maintenance), activity relapsers (moved into pre-contemplation or contemplation), and perpetual preparers (preparation). The stable active group participated in the most processes of change as well as demonstrated significant increases in physical activity duration. Additionally, the activity adopters exhibited the greatest increase in exercise over time (Levy & Cardinal, 2006). Both of these descriptive studies concluded categorization may be a convenient means to assess differences between stages of change but does not help define how to motivate movement from one stage to the next to improve physical activity behaviors (Kang & Kim, 2017; Levy & Cardinal, 2006).

Few studies exist that explore physical activity interventions founded in the TTM among the college student population. One study, discussed earlier, implemented a six-month exercise program and described different categories of college student physical activity behaviors based on stages of change. Over the course of the exercise program, researchers also identified cognitive processes of change and positive decisional balance (pros) to be the most important factors in development of constructive behaviors during the first six months of physical

activity adoption (Kang & Kim, 2017). Other research identified behavioral processes of change and self-efficacy as the most influential constructs among college students when increasing and maintaining positive behaviors associated with muscular fitness. This study also reported application of cognitive processes during the earlier stages of change and behavioral processes during the later stages of change are likely to be the best means to achieve lasting behavior change (Cardinal & Kosma, 2004).

Some studies have examined dietary habits within the context of the TTM among college students. A comprehensive analysis of the population's health behaviors related to diet suggests only 18% of all students to be in the preparation stage of change. The majority of college students were in the pre-contemplation (46%) and contemplation (24%) stages, suggesting the population may require additional motivation to reach the preparation stage for future behavior changes in dietary habits (Horneffer-Ginter, 2008). Other studies have explored college students' dietary habits, specifically fruit and vegetable consumption and plant-based diet practices, through application of the TTM. Again, most college students appear to be in the pre-contemplation, contemplation, or preparation stages of change (Reis, Correia, & Mizutani, 2014; Wyker & Davison, 2010). This is alarming, as the majority of TTM studies suggest college students in the earlier stages of change are much less likely to meet health-related outcomes compared to those who are in the later stages of change (Weller et al., 2014). These studies also found no correlation between college students' stages of change for fruit and vegetable consumption and plant-based dietary habits (Wyker & Davison, 2010). This is a

fundamental finding, as it implies multiple stages of change may need to be targeted to see improvement in overall eating behaviors. Ultimately, providing nutrition interventions specific to the population's stage of change is instrumental to have the most significant impact on these eating behaviors (Reis et al., 2014).

Social Cognitive Theory

As one of the most common theories implemented to change health behaviors, the Social Cognitive Theory (SCT) continues to provide the theoretical framework for countless nutrition and physical activity interventions across all populations (Fitzgerald et al., 2013; Kelly, Mazzeo, & Bean, 2013; Tougas, Hayden, McGrath, Huguet, & Rozario, 2015). Developed by Bandura in 1986, this behavior change theory proposes personal factors, behaviors, and environmental factors all interact with each other to prompt change. If one of these three factors changes, then the other two will follow change as well. The dynamic relationship between these three factors, defined as reciprocal determinism, is the central foundation for the SCT (Hayden, 2014). Constructs within this theory outline determinants of behavior change. The two most influential constructs include self-efficacy and self-regulation (Fitzgerald et al., 2013; Tougas et al., 2015). The SCT defines self-efficacy as "an individual's belief in his or her ability to perform a particular behavior" (Fitzgerald et al., 2013). Self-efficacy has been noted as the most important determining factor of behavior (Hayden, 2014). Self-regulation can be described as how individuals perceive themselves as a person as well as what they believe they can or cannot do and, as a result, change their behaviors or environment to match their perceptions and beliefs (R. C. Plotnikoff, Costigan, Karunamuni, & Lubans,

2013). Self-regulation incorporates: goal setting, time management, self-monitoring, social support, reinforcements, and relapse prevention (J. S. Hallam & Petosa, 2004). An increase in self-regulation aptitudes has been associated with greater health behavior change (J. S. Hallam & Petosa, 2004; Laska, Pelletier, Larson, & Story, 2012; Tougas et al., 2015).

Several additional constructs exist within the SCT to explain behavior change, which include: 1) modeling – learning by watching others and copying their actions, 2) expectations – the likely outcome of a behavior, 3) expectancies – the worth placed on the outcome of a behavior, 4) emotional arousal – one's expressive reaction to an experience and his or her resulting behavior, 5) behavioral capability – one's current expertise and skills compared to those required to engage in a behavior, and 6) locus of control – one's perception or belief about one's personal power over life events (Hayden, 2014). All constructs of the SCT, when combined, can significantly impact personal, behavioral, and environmental factors to cause change in each of these areas. Exploring nutrition and physical activity SCT interventions among college students will help establish the effectiveness of this theory on changing health behaviors within this particular population.

The SCT has been implemented to change both nutrition and physical activity behaviors among adolescent and young adult populations. A recent review proposed most nutrition interventions within these populations are rooted in the SCT. The article also reported a number of constructs, especially self-regulation, have the potential to help improve dietary habits throughout adolescence and young adulthood (Kelly et al., 2013). One study conducted among adolescents concluded

increased self-efficacy was strongly correlated to more nutritious eating patterns; this is an important finding, as dietary habits developed in adolescence oftentimes continue into young adulthood (Fitzgerald et al., 2013). An online culinary show intervention founded in the SCT aimed to positively impact several nutrition-related factors within a college student population. The program significantly increased nutrition comprehension as well as cooking self-efficacy among the population. However, no difference in cooking patterns, fruit/vegetable self-efficacy, and fruit/vegetable consumption were identified. Researchers suggested implementation of an in-person and interactive culinary program to elicit a more substantial impact on all measured outcomes (Clifford, Anderson, Auld, & Champ, 2009).

A comparative study emphasizing self-efficacy and self-regulation within the SCT found no differences in college student nutrition and physical activity outcomes. Two interventions with identical curriculum and distinct SCT strategies were implemented. The first attempted to enhance dietary habits and exercise through improvements in self-efficacy. The second aimed to improve nutrition and physical activity through enhanced self-regulation, specifically through better goal setting, self-monitoring, and social support skills. In both programs no difference in dietary habits was observed, while a significant decrease in exercise was noted. The investigators concluded although ineffective in bettering health behaviors, each intervention was well received by participants and should be explored further (Dennis, Potter, Estabrooks, & Davy, 2012). Another weight management intervention implemented among college students reported self-regulation to be the

most important construct to change and maintain health behaviors. Increased self-regulation was associated with decreased added sugar and total sodium intake as well as increased fruit/vegetable/fiber intake and physical activity. To achieve lifelong health behaviors, researchers suggested the population learn various self-regulation aptitudes through programs founded in the SCT (Strong, Parks, Anderson, Winett, & Davy, 2008).

As the dominant theory in physical activity research, the SCT has been used to both describe and achieve exercise behavior change within the college student population (Marmo, 2013). A systematic review determined self-efficacy to be a strong predictor of adolescent physical activity behaviors (R. C. Plotnikoff et al., 2013). One exploratory study also revealed self-efficacy to be the most influential construct when assessing messages targeted at college students to improve physical activity on campus. Communication that included self-efficacy components, such as past performances, vicarious learning, and verbal persuasion, prompted the highest motivation towards exercise behavior change among the population (Marmo, 2013). Another exploratory study found similar results, concluding self-efficacy to be significantly correlated to college student exercise behaviors. Other constructs of the SCT, specifically expectations and expectancies, were not related to participation in physical activity (Taber, 2010). One final exercise intervention rooted in the SCT improved several components within self-regulation aptitudes, including goal setting, self-monitoring, and social support, as well as increased overall physical activity within a college student population. The program also prompted significant improvements in dietary habits and stress management skills among participants.

This study concluded the SCT to be effective in changing not only exercise behaviors but also numerous other health behaviors (Ince, 2008).

Socioecological Model

As one of the more recent and rising theories in the health behavior change discipline, the Socioecological Model (SEM) provides a comprehensive explanation of health determinants through several levels of influence. This theory considers various internal and external factors and the interaction between them that impact behavior change. The intrapersonal level acts as the innermost core to the SEM. This component takes into account an individual's beliefs, knowledge, attitudes, experiences, skills, background (ethnicity, culture, values), and self-efficacy, which can all influence health behavior change. The next level focuses on interpersonal or social factors, such as family and friends, which may have a positive or negative impact on behavior change efforts. The support system an individual builds throughout life influences overall health in countless manners (Hayden, 2014).

The institutional level is the third construct within the SEM. This component incorporates all informal rules and regulations an individual encounters in his or her environment. These policies and procedures are typically enforced in school and work settings. The fourth level emphasizes community factors within an individual's environment. This component considers networks, norms, or standards that exist formally or informally and can impact health behavior change. The societal level acts as the outermost construct within the SEM. This level highlights several societal factors that can have a profound effect on health behavior change, including economics and culture as well as formal rules, regulations, policies, and procedures

(Hayden, 2014). Reflecting on and reviewing all levels of influence together helps reveal all possible factors inspiring or discouraging overall health behavior change within an individual or among an entire population.

Limited evidence exists in literature about nutrition and physical activity interventions for college students founded in the SEM. One commentary published in *Obesity* concluded more efforts must be made to target all levels of the SEM influencing the emerging adult population to combat the overweight/obesity epidemic. Potential targets at each level include: intrapersonal – motivation and lifestyle characteristics, interpersonal – support system impact on diet and exercise, institutional – improved campus nutrition and physical activity policies and procedures, community – enhanced diet and exercise environment, societal – health promotion endeavors to counteract marketing and media messages (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008). A meta-analysis of physical activity patterns among college students emphasized similar conclusions. The authors identified a lack of multi-level approaches to explain and motivate exercise behavior change within the target population. Additionally, they found a need to focus on not only physical activity but also nutrition across college student interventions to inspire holistic health behavior change (Keating, Guan, Piñero, & Bridges, 2005).

Studies employing the SEM to explain nutrition and physical activity on college campuses in the United States are not present/published in the scientific literature. Other areas of the world have used the model in this population and have reported promising results. One exploratory study conducted in Europe examined determinants of student dietary habits within the SEM. Researchers discovered

factors at all levels of the model had effects on dietary habits: intrapersonal – taste preferences, time, convenience; interpersonal – lack of parental control, new social network; institutional/community – increased food availability and accessibility; societal – marketing and media. They suggest the most effective nutrition interventions as those employing a multi-level approach (Deliens, Clarys, De Bourdeaudhuij, & Deforche, 2014). Another study in Africa assessed predictors of college students' physical activity using the SEM. Results indicate weight status and ethnicity at the intrapersonal/interpersonal levels, availability of recreation facilities at the institutional/community levels, and culture at the societal level predicted this population's exercise practices (Essiet, Baharom, Shahar, & Uzochukwu, 2017).

One final study, completed in the Middle East, determined similar outcomes with ethnicity and availability of recreation facilities as two of the primary determinants of physical activity among college students. Specifically, individuals of Caucasian descent (44.3%) and who lived in an urban area (37.7%) met physical activity guidelines significantly more so than those of Arab descent (27.3%) and who lived in a rural area (21.2%). This investigation also found personal factors, such as ethnicity, gender, or self-efficacy, to have a much greater impact on exercise patterns than environmental factors, such as availability of recreation facilities (Shuval, Weissblueth, Brezis, Araida, & DiPietro, 2009). Yet, all studies concluded with statements signifying the need for interventions targeting all levels of the SEM on college campuses in order to change student health behaviors.

Competent Eating Model

Another health behavior change theory rising in popularity in both research and practice is the Eating Competence Model (ecSatter). Similar to intuitive or mindful eating philosophies (Fung, Long, Hung, & Cheung, 2016; Mathieu, 2009; Schaefer & Zullo, 2017), this non-diet approach aims to explain as well as enhance individuals' overall nutrition and well-being through exploration of personal attitudes and behaviors about eating and food (Satter, 2007a). The ecSatter is founded on the engagement and effectiveness of biological, psychological, and social processes within the eating and food context (Satter, 2008). An individual who is "positive, comfortable, and flexible with eating and reliable about getting enough enjoyable and nourishing food" defines a competent eater (Satter, 2007a). Although contradictory to conventional practices, the ecSatter not only supports national nutrition policy such as the Dietary Guidelines and MyPlate (Satter, 2007a) but also presents professionals with ample opportunities to personalize guidance and empower individuals' relationship with eating and food (Satter, 2007b; Welsh & Saltos, 2007).

The ecSatter encompasses four interconnected constructs to describe an individual's attitudes and behaviors towards eating and food: 1) eating attitudes – ability to enjoy a positive and relaxed relationship with food while staying attuned and responsive to outward and inward food experiences; 2) food acceptance – ability to be flexible and experimental with eating to develop learned food preferences; 3) internal regulation – ability to listen to appetite as well as hunger and satiety cues to sustain physiological homeostasis; and 4) contextual skills –

ability to incorporate structure into eating and food behaviors through meal and snack planning as well as maintenance of a feeding schedule (Satter, 2007a, 2007a, 2007b). When considered as a whole, these four constructs exemplify overall eating competence.

The ecSatter Inventory (ecSI 2.0) tool, developed and validated through rigorous research processes, provides a comprehensive evaluation of an individual's eating competence and separate constructs within the model (Lohse, Satter, Horacek, Gebreselassie, & Oakland, 2007). With a total of 48 possible points, a score of 32 or higher signifies an individual as a competent eater. Unlike other theories, this survey enables researchers to assess needs, define appropriate goals, and evaluate outcomes more universally when implementing the ecSatter as the framework for nutrition and well-being interventions. Most programs applying other health behavior change theories use various tools to assess needs and evaluate outcomes, making it extremely difficult to compare methods and results across studies. The ecSatter is superior in this matter, offering one common and comprehensive evaluation tool (Lohse et al., 2007).

Several nutrition and well-being interventions employing the ecSatter and its accompanying survey have been conducted to better understand as well as change personal eating and food attitudes and behaviors amid diverse populations. Although continued research is required to determine whether traditional theories are superior or inferior to the ecSatter (Schaefer & Magnuson, 2014; Welsh & Saltos, 2007), examining interventions implemented among college students will help

establish the overall effectiveness of this non-diet approach within a specific target population.

The college experience can adversely impact eating competence in several ways. One study discovered 'eating in the absence of hunger ', a type of disinhibited eating, to be a considerable problem on campus. Instead of relying on internal regulation to sustain physiological homeostasis, students allow emotional and external factors to drive their eating patterns and practices. Exploration of factors that promote and initiate 'eating in the absence of hunger' determined anxiety and nervousness as well as sedentary time to be significantly associated with disinhibited eating habits (Arnold, Johnston, Lee, & Garza, 2015). Another study conducted among college students investigated the influence of contextual skills on eating patterns and practices. The results revealed meal and snack routines correlated significantly with more beneficial and wholesome dietary habits. Specifically, more home food preparation as well as meal and snack regularity was associated with increased fruit and vegetable consumption as well as decreased fast food consumption. Researchers concluded contextual skills appear to have a profound impact on various dietary habits of college students; suggesting emphasis on 'how we eat' instead of 'what we eat' can improve nutrition interventions within this population (Laska, Hearst, Lust, Lytle, & Story, 2015).

Several studies incorporating the ecSatter into nutrition interventions for college students exist within research literature. A systematic review of nutrition interventions concluded eating competence was one of two components in the only program that demonstrated long-term outcomes; the other component

incorporated into the program was the Health at Every Size philosophy. Researchers contribute the lasting impacts observed in this study to increased awareness and acceptance of hunger, satiety, and appetite through increased education about all eating competence constructs. All other interventions explored and examined in the systematic review only assessed/evaluated or demonstrated short-term outcomes (Deliens et al., 2016).

Multiple studies conclude increased eating competence is correlated to lower BMI scores and other positive anthropometric measures within the college student population (Clifford & Keeler, 2009; Quick et al., 2015). Additionally, higher eating competence appears to be associated with increased body weight acceptance and satisfaction amid college students (Clifford & Keeler, 2009). Conversely, one study examined eating competence scores relative to anthropometrics among freshmen and found no significant associations between eating competence and body weight, BMI, and waist circumference fluctuations over time (Hootman, Guertin, & Cassano, 2018). Many studies have also explored the relationship between eating competence and demographics. There is strong evidence to support gender differences in eating competence, with male college students exhibiting higher scores compared to females (Brown, Larsen, Nyland, & Eggett, 2013; Quick et al., 2015; Stotts et al., 2007). Results also suggest greater eating competence among Caucasian college students compared to other ethnicities or minorities on campus (Quick et al., 2015).

The connection between college students' eating competence and their nutrition and physical activity patterns and practices has also been examined. In an

adolescent population, eating competence was positively correlated to superior dietary habits, including increased fruit and vegetable consumption as well as more frequent meal and snack consumption (Tanja et al., 2015). Numerous investigations within the college student population have found higher eating competence to be associated with increased engagement in exercise (Clifford & Keeler, 2009; Quick et al., 2015; Stotts et al., 2007). Research has also explored the relationship between eating competence and other health-related indices among college students. In this population, eating competence was positively correlated with higher self-esteem (Tanja et al., 2015), as well as sleep quantity and quality (Quick et al., 2015).

Almost all studies implementing the ecSatter into health behavior change interventions among college students assessed or evaluated eating competence with the ecSI 2.0 tool. As defined earlier, a score of 32 or higher on this survey signifies an individual as a competent eater. The average scores identified within the college student population range between 29.6±8.4 and 31.0±7.0 (mean±SD) (Brown et al., 2013; Clifford & Keeler, 2009; Greene et al., 2012), which suggests only 40.9% to 47.4% of college students are considered competent eaters (Brown et al., 2013; Clifford & Keeler, 2009; Greene et al., 2012). Many studies have concluded there is a need for future nutrition and health behavior change interventions founded in the ecSatter in order to improve eating competence and overall well-being within the college student population (Brown et al., 2013; Clifford & Keeler, 2009; Quick et al., 2015; Stotts et al., 2007).

College Student Physical Activity, Nutrition, and Weight Status Interventions

Overview

Limited evidence exists about physical activity, nutrition, and weight status interventions among the college student population. Almost all reviews in this topic area conclude further research is required to determine which strategies meet young adult expectations and provide the most promising outcomes (Deliens et al., 2016; Kelly et al., 2013; Lua & Elena, 2012; R. C. Plotnikoff et al., 2015; Roy, Kelly, Rangan, & Allman-Farinelli, 2015). Intervention studies conducted in the college setting often report conflicting and inconclusive results (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015). Strategies can be considered environmental or educational; additionally, interventions are oftentimes classified as either in-person or electronic-based (Deliens et al., 2016; Kelly et al., 2013; Kicklighter, Koonce, Rosenbloom, & Commander, 2010; R. C. Plotnikoff et al., 2015; Roy et al., 2015). The most common locations for in-person physical activity, nutrition, and weight status interventions in the college setting include dining centers, recreation facilities, classrooms, and kitchen facilities. Interventions that are electronic-based tend to be via text messaging, websites, or social media (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015). Assessment of interventions implementing various approaches can help determine which strategies are best for college student learning and overall behavior change.

Environmental Interventions

The environment of college students has been found to be a primary determinant of health behaviors within the population (Cole, 2017; Fedewa et al.,

2014; LaCaille et al., 2011; Roy et al., 2015; Spalsbury, 2013; Winpenny, Penney, Corder, White, & van Sluijs, 2017). Most environmental interventions to improve physical well-being among college students occur in dining centers and recreation facilities (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015; Roy et al., 2015). Results from one investigation suggest collaborating with facilities on campus where college students eat and play can enhance environmental cues to significantly increase engagement in positive physical activity and nutrition behaviors (K. M. King et al., 2013).

Environmental interventions that focus on young adults' dietary habits are promising; almost all studies show improvements in nutrition behaviors from pre- to post- intervention (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015; Roy et al., 2015). The environmental changes employed range from added signage and labels at nourishment locations to increased accessibility and availability of healthy food options (Roy et al., 2015). A review of environmental interventions within the college student population suggests those including nutrition messaging and nutrient labeling as well as more healthy food options and portion size control show the most promise (Roy et al., 2015). A major limitation to environmental intervention efforts is the lack of long-term measurement; all studies conducted in this research realm demonstrate effectiveness short-term but cannot conclude if results last over time (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015). One additional limitation to environmental intervention endeavors is the inability to transfer knowledge and skills learned to new settings. The added signage and labels as well as increased healthy food options presented in

study settings are not always offered outside of environmental interventions; this limits the ability to continue practicing positive nutrition behavior changes acquired in study settings (Roy et al., 2015). Continued efforts in this topic area are required to determine exactly if and how environmental interventions change physical activity, nutrition, and weight status behaviors among college students.

Educational Interventions

Assessment of educational interventions within the college setting abounds, yet few studies focus on the outcomes of programs targeted to enhance students' physical well-being (Deliens et al., 2016; Kelly et al., 2013). Of the literature that does exist, all agree young adults are key to improving exercise and dietary habits as well as lowering overweight and obesity prevalence among the entire population (Deliens et al., 2016; Kelly et al., 2013; Lua & Elena, 2012; R. C. Plotnikoff et al., 2015). There is substantial diversity within development, implementation, and evaluation of physical well-being interventions involving college students. Programs can be considered in-person or electronic-based, conducted in a classroom or kitchen facility, and last anywhere from one session to four months (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015).

A comparison of in-person to electronic-based educational interventions reveals mixed results. Most research concludes in-person programs to be superior to electronic-based ones (Kelly et al., 2013; Kicklighter et al., 2010), yet one review found more success with media than face-to-face programs (Deliens et al., 2016). A combination of in-person and electronic-based interventions also shows some promise (Deliens et al., 2016; Kelly et al., 2013). Programs that occur in classrooms

and kitchen facilities tend to produce similar short-term results, from pre- to post-intervention, with both types of programs yielding improved health outcomes, including better dietary habits among college students (Bernardo et al., 2017; Deliens et al., 2016; Kelly et al., 2013; Wilson, Matthews, Seabrook, & Dworatzek, 2017).

Recent research has focused on enhancing culinary skills among college students to improve overall nutrition (Bernardo et al., 2017; Blichfeldt & Gram, 2013; Wilson et al., 2017). One study determined a considerable culinary skills deficit exists within the college setting, with over 50% of first year students reporting minimal to no meal/snack planning, preparation, and storage capabilities (Wilson et al., 2017). This is alarming, as research indicates a strong correlation between increased culinary skills and improved dietary habits (Bernardo et al., 2017; Blichfeldt & Gram, 2013; Wilson et al., 2017). Therefore, kitchen facilities may be a superior setting to the classroom to address both the lack of nutrition knowledge and culinary skills amid this population.

Further, findings support engaging and practical strategies for physical activity and weight status interventions among college students. Still, programs targeting solely dietary habits demonstrate far more significant health outcomes compared to exercise, weight management, or combination approaches (Lua & Elena, 2012; R. C. Plotnikoff et al., 2015). In regards to the time span, one review concluded educational interventions lasting a semester or less (≤12 weeks) exhibit stronger health effects than those spanning longer than a semester (R. C. Plotnikoff et al., 2015).

The diversity across intervention programs makes it extremely difficult to conclude which educational strategies best promote behavior change to improve overall physical well-being among students. Additional research is required to provide specific recommendations about the best delivery method, site, and time span for physical activity, nutrition, and weight status interventions within the college setting. Fundamental conclusions from the current literature suggest implementation of behavior change models or theories, self-efficacy, self-regulation, educational and environmental components as well as more sufficient long-term measures will lead to superior health outcomes and overall behavior change.

The majority of studies conducted in the college setting employed behavior change models or theories as the framework for interventions, an essential element of successful programs (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015). Almost all reviews of educational interventions targeting physical well-being within the college student population included a common factor of self-efficacy and self-regulation in program success; these studies consistently reported far more significant health outcomes (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015). Additionally, reviews encouraged future research to incorporate both educational and environmental components into interventions in the college setting, since students are influenced through intrapersonal impacts and interpersonal interactions as well as environmental encounters (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015).

One central limitation to results of most studies related to college student physical activity, nutrition, and weight status interventions is the lack of long-term

health outcome measures (Deliens et al., 2016; Kelly et al., 2013). Although most research concludes substantial improvements in at least one health behavior short-term, few studies assessed change over time (Deliens et al., 2016; Kelly et al., 2013; R. C. Plotnikoff et al., 2015). One review determined five out of twenty studies within this topic area examined long-term effectiveness, with only one emphasizing eating competence and other non-diet approaches demonstrating enduring effects (Deliens et al., 2016). In conclusion, the diversities and limitations within physical activity, nutrition, and weight status interventions within the college setting provides ample opportunity for continued efforts towards establishing the best strategies to improve lifelong physical well-being of students.

Employee Wellness

Balance between Work, Health, and Play

The current number of employed civilians in the United States is 155, 962,000; this equates to 62.7% of the total population participating in the workforce (U.S. Bureau of Labor Statistics, 2017b). This number is projected to increase 19% from now through 2022 (U.S. Bureau of Labor Statistics, 2017b). With over 4,000 degree granting postsecondary institutions in the US, faculty and staff comprise a significant portion of the workforce (Rinaldi-Miles & Das, 2016). This specific employment sector is also expected to grow over the next 10 years alongside the steady increase of young adults attending higher education (Hussar & Bailey, 2018). As more and more Americans enter the workforce, it is imperative to consider the impact of work on health and play.

The American employee has evolved throughout history. Unlike the strenuous agricultural and industrial positions of the past, the majority of current US workers spend the day sitting in offices or cubicles (U.S. Bureau of Labor Statistics, 2017b). Additionally, most households consist of two providers participating in the workforce instead of one as in the past (Onufrak et al., 2018). With these steady and significant changes, the American employee faces several challenges balancing work, play, and health. It is important to examine how the advancement of the workforce has affected the balance between work, play, and ultimately health.

The average full-time US worker spends 8.56 hours at work each day, while part-time employees are working 5.37 hours daily. The amount of time full-time employees spend at work exceeds time spent in all other activities of everyday life, even sleeping (U.S. Bureau of Labor Statistics, 2017a). The time demand and heavy load of work have resulted in limited opportunities for play. It can be extremely difficult for US workers to sustain additional responsibilities outside of work, such as caregiving and household chores, let alone schedule time to play (Onufrak et al., 2018; U.S. Bureau of Labor Statistics, 2017a; Winefield, Boyd, & Winefield, 2014). A lack of time for family and friends, recreational activities, and entertainment has been identified to affect both physical and psychological well-being of employees (Mazzola, Moore, & Alexander, 2017; Winefield et al., 2014). The balance between work and play among university employees creates a significant amount of conflict and stress for faculty, especially, and staff alike (Winefield et al., 2014). The longer hours and heavier loads work currently requires have caused a substantial shift in

lifestyle for the American employee (Winefield et al., 2014). This change in daily living has ultimately led to poorer health outcomes among the population.

Current Physical Well-Being of Adults

Health Status –

The most recent report on the overall physical well-being of the American population indicates 51.9% of adults 18 and older classify their health status as very good or excellent (Centers for Disease Control and Prevention, 2017a). The percent of the employee population who rate their health status as very good or excellent is somewhat worse at 43.2% (F. Geaney et al., 2015). Ratings among university employees reveals slightly better results, with 60.0% identifying their health status as very good or excellent (Rinaldi-Miles & Das, 2016). Since adult populations typically categorize their health status according to the presence or absence of chronic health conditions (Goodwin et al., 2006), these statistics suggest slightly over one-half of Americans consider themselves to have minimal chronic health conditions.

Additional physical well-being measures support the above statistics. For example, only 36.3% of the US population has elevated blood lipid levels, the most prevalent chronic health condition. Other common chronic health conditions among American adults include hypertension (30.9%), type 2 diabetes (9.1%), and cardiovascular disease (8.5%) (Centers for Disease Control and Prevention, 2017a). With the prevalence of all chronic health conditions on the rise, health care costs in the employment sector continue to increase as well (Lloyd, Crixell, Bezner, Forester, & Swearingen, 2017). This is alarming for both employers and employees, as a rise

in health care costs correlates to decreased profit and income. For the employer, poor health status in the workforce leads to increased absenteeism and reduced productivity (Alkhatib, 2015; Cooper & Barton, 2016; Leininger & Adams, 2017). Most importantly, for the employee, poor health status results in a much lower overall quality of life. Of all workers worldwide, 76% currently consider their quality of life inferior due to struggling or suffering in their physical well-being (Global Wellness Institute, 2016).

Physical Activity –

As stated earlier, current physical activity recommendations resulting in substantial health benefits include either 150 minutes of moderate aerobic exercise (30 minutes 5 days per week), 75 minutes of vigorous aerobic exercise (15 minutes 5 days per week), or various combinations of the two for American adults 18 and older. Additionally, muscle-strengthening exercises at least two times per week is advised to maintain physical well-being (U.S. Department of Health and Human Services, 2018). The most recent report on physical activity among American adults found 51.0% of the population met the minimum aerobic exercise recommendations, while only 20.3% participated in enough aerobic and muscle-strengthening exercises combined each week to sustain cardiorespiratory and musculoskeletal fitness (Centers for Disease Control and Prevention, 2017a).

Among the employee population, research results reveal 43.7% to 68.9% of workers do not engage in sufficient physical activity to meet recommendations (Almeida et al., 2014; Fiona Geaney et al., 2016; Kilpatrick et al., 2014). Specifically within the university employee population, several studies have concluded 42% to

59% do not achieve recommended aerobic exercise while up to 66% do not meet muscle-strengthening exercise recommendations (Cooper & Barton, 2016; Lloyd et al., 2017; Rinaldi-Miles & Das, 2016). One study suggested female and faculty university employees are less physically active compared to their male and staff counterparts. Among this population, lower physical activity levels were also strongly associated with decreased physical and psychological well-being scores (Cooper & Barton, 2016).

Another study among university employees categorized 67% of participants as sedentary or low active based on an average pedometer count of less than 7500 steps per day (Butler, Clark, Burlis, Castillo, & Racette, 2015). Similar sedentary behaviors have been observed among all employee populations, with one study indicating 35.5% employees report sitting an average of 6 or more hours per day (Kilpatrick et al., 2014). These findings are alarming, as research suggests even when physical activity recommendations are met, sitting for extended periods of time can still compromise overall health and physical well-being (Rinaldi-Miles & Das, 2016). The most recent report on how the American adult population spends their time reveals an average of 0.28 hours per day is spent in sports, exercise, and recreation activities while 2.77 hours per day is spent watching TV (U.S. Bureau of Labor Statistics, 2017a). With the majority of the workforce engaging in sedentary behaviors at work and play, interventions targeting physical activity and other beneficial health behaviors, such as nutrition, are needed.

Nutrition –

The *2015-2020 Dietary Guidelines for Americans* for adults is the same as for students, encouraging all to consume a healthy eating pattern to support well-being and reduce the risk of chronic disease. Again, this healthy eating pattern outlined in the recommendations includes consuming 2 ½ cup-equivalents of vegetables and 2 cup-equivalents of fruits for a 2,000 calorie per day diet, approximating to roughly five or more servings of fruits and vegetables per day for most adults. The healthy eating pattern also advises decreasing dietary intake of sodium, saturated fat, and added sugars (U.S. Department of Health and Human Services and U.S Department of Agriculture, 2015). The most recent report on the dietary habits of the American adult population found 40.1% and 22.3% consumed fruits and vegetables (including potatoes) less than one time per day, respectively (Centers for Disease Control and Prevention, 2017a) It has also been noted that only 24% of adults define their diet as "very nutritious" (Mazzola et al., 2017). The nutritional status among employees is not much better, with one study determining the mean consumption of fruits and vegetables combined to be 2.90 servings per day (Sorensen et al., 1999). Another investigation reported similar yet slightly better results with an average intake of 1.94 fruit servings per day and 2.06 vegetable servings per day within the employee population (Kanauss & Shupe, 2016). When eating patterns among employees were compared to current dietary guidelines, an equal intake of sodium as well as excess intake of saturated fat and added sugars was discovered. Further, the average consumption of fiber within the population was 20.8 grams, while recommended intake is 25 grams and 38 grams for males and females, respectively (Fiona Geaney

et al., 2016). One final investigation reported as many as 79.1% of employees were not meeting all of the current dietary guidelines (Kilpatrick et al., 2014).

The dietary habits among university employees are even worse, with 92.3% of the population reporting inadequate fruit and vegetable consumption. Although most did not meet dietary guideline recommendations, a majority of university employees indicated feeling prepared to change their behaviors to improve fruit and vegetable intake (Liau et al., 2013).

The dietary habits related to consumption of meals and snacks at home versus away from home may also need to change. Approximately one half (50.2%) of all food and beverage purchases are away from home meals and snacks. Additionally, an average of 4 to 6 meals are consumed away from home, increasing the total energy intake as food away from home to 34%; this doubles the energy intake (17%) as food away from home compared to 50 years ago (U.S. Department of Agriculture, 2016). This is alarming, as away from home meals and snacks have been shown to be much less nutrient dense compared to food and beverage consumed at home (Shields, 2009). Middle-aged adults (35-44 years old) consume the most food away from home (U.S. Department of Agriculture, 2016). This population also contributes the highest proportion of workers to the workforce (Onufrak et al., 2018), which further promotes to the detrimental imbalance between work and health. With some small changes in nutrition, such as those listed above, as well as physical activity behavior, the overweight and obesity epidemic among American adults could improve significantly.

Weight Status –

The overweight and obesity epidemic continues to increase not only in the United States, but also around the globe. It is estimated that adults 18 and over gain weight at a rate of 2 lbs (0.9 kg) per year (Strong et al., 2008). The most recent report on the weight status of American adults identified 35.3% and 30.1% of the population to be overweight and obese, respectively (Centers for Disease Control and Prevention, 2017a). These statistics are alarming, as both overweight and obesity in adulthood are correlated to increased risk of countless non-communicable diseases, such as hypertension, type 2 diabetes, cardiovascular disease, and cancer (K. Stephens, J. Cobiac, & Veerman, 2014).

The overweight and obesity epidemic negatively affects employees as well. It is estimated 52% of workers worldwide are overweight or obese (Global Wellness Institute, 2016). In the United State, 33.2% and 28.7% of employees are classified as overweight and obese, respectively (Onufrak et al., 2018). A more recent study reported 33% of employees as overweight and 36% as obese (Almeida et al., 2014). Although these statistics are slightly lower than or somewhat comparable to national averages, mean BMIs of this population suggest their weight status will lead to several deleterious health effects. Two studies identified mean BMI to be 27.6 ± 4.2 kg/m^2 and 31.6 ± 7.5 kg/m^2 in two large employee populations (Fiona Geaney et al., 2016; Kanauss & Shupe, 2016).

Overall weight status among university employees is not much better, with studies reporting the prevalence of overweight and obesity combined to be similar to the entire employee population (between 65% and 69%) (Butler et al., 2015;

Lloyd et al., 2017). Additionally, mean BMI scores have been found to fall between 22.9 ± 4.3 kg/m^2 and 25.8 ± 3.1 kg/m^2 (Alkhatib, 2015; Guo-Wei, 2014). Thus, university staff and faculty require interventions to improve their weight status similar to the entire employee population. In order to combat the overweight and obesity epidemic among adults, numerous initiatives are needed that make positive health behavior changes, such as improvements in nutrition and physical activity, more available, accessible, and easy (MacDonald & Westover, 2011).

Conclusion –

The current condition of employees' balance between work, health, and play as well as overall health, physical activity, nutrition, and weight status must change in order to create a healthier and happier workforce. All of these physical well-being indicators are interrelated; an assessment of workers' attitudes, understanding, and perceptions about these health behaviors will provide a better understanding on how to best address them. With this insight, the minimization of the overweight and obesity epidemic becomes more attainable and achievable.

Adults' Attitudes, Understanding, and Perceptions of Physical Well-Being Indices

Attitudes and Understanding –

Numerous studies have examined employee attitudes, understanding, and perceptions about physical activity, nutrition, and weight status. Research exploring attitudes related to physical well-being areas among the overall employee population has discovered a desire to engage in and take action towards behavior change (Bright et al., 2012; Kilpatrick et al., 2014). One study determined employee interest in several physical activity and nutrition topics – proper food choices,

generalized and personalized nutrition information, dietary habits to help with weight management, group fitness and weight training classes, yoga, meditation, and exercise consistency. Participants demonstrated extremely positive attitudes about these specific topic areas within physical well-being. Researchers concluded the identification of attitudes about different physical activity, nutrition, and weight status topics before beginning an intervention within a particular population will ultimately lead to the greatest behavior change (Bright et al., 2012). Another study investigated employee attitudes towards physical well-being to identify health change targets relevant to current health behaviors. Employees reported the most positive attitudes and willingness towards change in physical activity (47.7%) and nutrition (18.8%) behaviors; behavior changes addressing weight status (17.2%) were also desired within the population. The positive attitudes and willingness towards behavior change exhibited in this study suggests employees were ready to take action towards improving their physical well-being (Kilpatrick et al., 2014). Even if these positive attitudes resulted from external motivation within this population, research indicates motivation will eventually move from external to internal over time to produce lasting physical well-being behavior changes (Leininger & Adams, 2017).

Although positive attitudes about physical activity, nutrition, and weight status exist within the overall employee population, understanding of these topic areas is extremely limited. For instance, several studies have found nutrition knowledge among employees to be fair at best (F. Geaney et al., 2015; Fiona Geaney et al., 2016). One recent study reported a mean nutrition knowledge score of 66 out

of a possible 116 within the population; this finding suggests a substantial need for further education in this topic area. Specific topics noted to require the greatest amount of improvement included food groups, diet/disease relationships, and nutrient sources. Results from this study also revealed a significant positive correlation between nutrition understanding and healthful dietary habits independent of other factors (F. Geaney et al., 2015). Thus, an increase in nutrition understanding likely leads to improved dietary habits. Research has identified education alone or combined with environmental modifications to be most effective towards increasing nutrition knowledge among the overall employee population (Fiona Geaney et al., 2016).

Attitudes about physical activity, nutrition, and weight status among university employees appear to be considerably worse than the overall employee population. Several studies explored the topic area of exercise within college employees and have identified extremely poor attitudes as well as self-efficacy (Alkhatib, 2015; Butler et al., 2015). One report attributed negative attitudes and self-efficacy towards exercise to a poor physical activity culture in work settings across campus (Walker, Tullar, Taylor, Román, & Amick, 2017). Other research suggests attitudes and self-efficacy towards physical well-being topics differed depending on numerous demographic or personal factors of university employees (Beck, Hirth, Jenkins, Sleeman, & Zhang, 2016; Terrell, 2015). One survey among the population found differences between gender and employment classification; females and staff supported and attended more campus worksite wellness programs compared to males and faculty (Terrell, 2015). Mixed results about the

effect of health status on attitudes and self-efficacy relative to physical well-being exist. Some research suggests college employees with chronic health conditions, such as type 2 diabetes or hypertension, are less likely to express positive attitudes towards and participate in wellness programs (Beck et al., 2016), while other results propose the exact opposite effect on participation (Terrell, 2015).

A study related to attitudes towards physical well-being among university employees found 98% of the population to be interested in campus worksite wellness programs (Lloyd et al., 2017). Additionally, among college employees currently enrolled in wellness programs, over 90% classified them as extremely worthwhile (Terrell, 2015). A majority of university employees reported desire to improve or maintain health and ability to receive a free health assessment as their top reasons to participate in campus worksite wellness programs targeting physical activity. The biggest barriers to participation were also identified, which included schedule, pain or discomfort with exercise, difficulty getting to or going to exercise site, and disinterest in prescribed exercises. From this study, researchers found a significant positive correlation between exercise attitudes and behaviors among participants and concluded change in attitude must precede change in behavior (Butler et al., 2015).

In order to change attitudes about physical activity, nutrition, and weight status among university employees, the population must have a thorough understanding of these topic areas as well as their implications. Current research suggests further education in the campus worksite is needed. One study found college employees participating in a focus group discussion had an excellent

understanding of exercise benefits beyond physical well-being, such as lower stress levels and improved psychological well-being. Yet, uncertainty and confusion about current guidelines for physical activity among participants was described as well (Cooper & Barton, 2016). Another study exploring nutrition knowledge within university employees determined less than 50% of the population could correctly answer questions related to the association between dietary habits and chronic health condition risks as well as the current recommendations for several micronutrients and all macronutrients. Researchers also reported limited knowledge about sources of and differences between fat among the population (Abood et al., 2003). It is important to investigate not only attitudes and understanding of physical well-being topics among employees, but also their perceptions in order to comprehend how to best elicit behavior change within the population.

Perceptions –

Countless studies have been conducted to examine perceptions about physical activity, nutrition, and weight status within the overall employee population. Most research related to this topic explores perceived barriers, motivators, and benefits. One study reported workload, time constraints, high prevalence of temptations, limited healthy options, and social influences as frequently cited barriers to physical activity and nutrition behavior change in the workplace (Mazzola et al., 2017). Another study found similar results, with workload and time constraints acting as the biggest barriers for employees to engage in more healthful exercise and dietary habits; additional barriers included

rigid schedules and lack of motivation (Bright et al., 2012). The most common motivators identified by employees to encourage physical activity and nutrition behavior change in the work setting were extra time, proper planning, and purposeful decision making as well as increased availability and accessibility of healthy options. Although numerous motivators exist, the majority of employees perceive the number of barriers to far exceed these facilitators, which makes employees much less likely to engage in positive behavior change to improve their physical well-being (Mazzola et al., 2017). Many researchers conclude that barriers must and can be addressed within the workplace (Bright et al., 2012; Centers for Disease Control and Prevention, 2017b; Onufrak et al., 2018).

The overall employee population perceives countless benefits to physical well-being (Bright et al., 2012; Mazzola et al., 2017); yet a perceived absence of support, care, and concern within the work setting makes employees not nearly as apt to practice healthful exercise and dietary habits (Global Wellness Institute, 2016; Onufrak et al., 2018). One study suggested the majority of American employees do not perceive any physical activity or nutrition support at the workplace; the population also noted employers do not provide opportunities to participate in healthful exercise and dietary habits throughout the workday (Onufrak et al., 2018). Another study reported when employers demonstrate sincere care and concern for the physical well-being of their organization, the overall health of employees improves markedly. Employees who identified their employers as showing care or concern for their physical well-being exhibited higher health outcomes, lower stress levels, and superior job engagement as well as satisfaction.

The exact opposite effects were observed among employees who classified their employers as showing minimal care or concern for their overall health. With just 37% of employees categorizing employers as considerate towards physical well-being and only 25% of the population considering wellness programs to exist for the sole purpose of improving overall health instead of company outcomes, a substantial need for improvement in support at the workplace exists (Global Wellness Institute, 2016).

Examining university employee perceptions about physical activity, nutrition, and weight status reveals similar results to those found in the overall employee population. Again, the primary research focus in this topic area explores barriers, motivators, and benefits to physical well-being behavior change. Several studies within the college workplace have identified countless barriers to physical activity, from lack of time and energy to expensive exercise facility fees to limited schedule flexibility and support (Alkhatib, 2015; Cooper & Barton, 2016; Rinaldi-Miles & Das, 2016; Terrell, 2015). Barriers to participation in campus worksite wellness programs targeting physical activity, nutrition, and weight status noted by university employees included factors associated with time, interest, convenience, and current health attitudes and understanding (Beck et al., 2016). Research reports socialization, relaxation, reduced workload, schedule flexibility, and positive culture as the top motivators for physical activity within the college workplace (Cooper & Barton, 2016; Melnyk, Amaya, Szalacha, & Hoying, 2016; Rinaldi-Miles & Das, 2016; Terrell, 2015). Although, most university employees perceive their work setting

does not offer these facilitators, or any opportunity, to improve physical well-being (Cooper & Barton, 2016; Lloyd et al., 2017).

The perceived benefits of physical activity, nutrition, and weight status abound among the university employee population. One study identified the primary perceived benefits within the population to be improved physical and psychological well-being as well as enhanced energy levels and overall quality of life (Rinaldi-Miles & Das, 2016). While university employees perceive the countless benefits to physical well-being, perceived lack of support and positive culture within the college workplace oftentimes hinder the population from taking action towards healthful behavior change (Cooper & Barton, 2016; Rinaldi-Miles & Das, 2016).

A considerable amount of research suggests that both support and positive culture around physical activity, nutrition, and weight status have a substantial impact on the thoughts and actions of university employees towards improving physical well-being (Cooper & Barton, 2016; Lloyd et al., 2017; Melnyk et al., 2016; Rinaldi-Miles & Das, 2016). A recent study across three United States college campuses reported support and positive culture to be the most predictive factors for university employee participation in exercise. Researchers found even when numerous opportunities exist, university employees do not engage in physical activity during the workday due to fear of disapproval from employers and colleagues (Rinaldi-Miles & Das, 2016). Additional research reinforces these findings, indicating most college campuses have limited support and positive culture within the work setting. It was also noted that a majority of departments do not encourage healthful behaviors, nor do employers and colleagues model them (Lloyd

et al., 2017). With limited support and positive culture, university employees experience many challenges towards making healthful changes. Continued research is required though to determine the exact effects of support and positive culture on physical well-being thoughts and actions within the college workplace (Melnyk et al., 2016).

Conclusion –

There is an imperative need to enhance the physical well-being attitudes, understanding, and perceptions among the overall as well as university employee populations. Current attitudes appear to be mixed between the two populations, with overall employees exhibiting more positive thoughts and actions towards physical well-being (Bright et al., 2012; Kilpatrick et al., 2014) compared to university employees (Alkhatib, 2015; Butler et al., 2015). All employees desire physical activity, nutrition, and weight status behavior change (Bright et al., 2012; Kilpatrick et al., 2014; Lloyd et al., 2017). However, employee comprehension about these topic areas is deficient (Abood et al., 2003; Cooper & Barton, 2016; F. Geaney et al., 2015; Fiona Geaney et al., 2016). In order to elicit behavior change, an improved understanding of physical well-being must first occur. Finally, both overall and university employee populations perceive more barriers than motivators or benefits (Butler et al., 2015; Cooper & Barton, 2016; Lloyd et al., 2017; Mazzola et al., 2017). Further, they perceive a lack of support and positive culture towards physical well-being within the workplace (Cooper & Barton, 2016; Global Wellness Institute, 2016; Onufrak et al., 2018; Rinaldi-Miles & Das, 2016). These perceived limitations cause employees to minimize the importance of as well as not

take action towards improving their physical well-being. Interventions founded in health behavior change models and theories must be considered and implemented immediately within the work setting to combat the negative physical activity, nutrition, and weight status thoughts and actions among employees.

Health Behavior Change Models and Theories within the Employee Population

Overview

An earlier section entitled 'Health Behavior Change Models and Theories within the College Student Population', described the primary principles of several health behavior change models and theories to demonstrate their importance as well as need in nutrition education. The five models and theories explored included the Health Belief Model (HBM), Transtheoretical Model (TTM), Social Cognitive Theory (SCT), Socioecological Model (SEM), and Eating Competence Model (ecSatter). In addition to detailed information regarding each model and theory, the overall effectiveness of nutrition education programs incorporating the different models and theories within the college student population were examined. Now, the models and theories overall effectiveness will be considered in the context of the employee population.

Health Belief Model

Within the employee population, the HBM has been applied as both an explanatory as well as executional theory. Studies applying this model describe employees' perspectives on disease prevention or different health behaviors, as well as prompt employees to change health behaviors as a means to prevent or minimize

acute or chronic health conditions. In both cases, limited evidence exists in research literature to support or refute the effectiveness of the HBM in the context of employee wellness.

One study explored influential factors of physical activity among university employees using the HBM and determined cost as well as culture to be the biggest perceived barriers to physical activity across the population. Other findings from this exploratory research included the importance of interventions targeting immediate perceived benefits to physical activity (i.e. decreased stress) rather than future perceived threats (i.e. increased disease risk) associated with a sedentary lifestyle. The study also identified professional (i.e. supervisor and co-workers) as well as personal (i.e. family and friends) support to be critical contributors to physical activity self-efficacy and cues to action for university employees (Rinaldi-Miles & Das, 2016).

A nutrition education program for college employees founded on the HBM resulted in promising outcomes. This research integrated the HBM into development, implementation, and evaluation of all lessons to examine the effectiveness of a theory-based intervention to change dietary behaviors. Specifically, the intervention sought to improve beliefs within the population to elicit behavior change. A significant increase in perceived benefits of a more nutritious diet as well as overall nutrition knowledge was detected, but no difference in perceived barriers or notable dietary behavior change among the population was observed. Researchers concluded continued efforts must be made in

the field of nutrition education to establish the HBM as an effective theory to encourage dietary behavior change (Abood et al., 2003).

Transtheoretical Model

Several studies have implemented the TTM within the adult population to explain and execute physical activity and nutrition behavior change. One stage of change-matched exercise intervention reported significant improvements in all TTM constructs as well as greater physical activity amounts among a general adult population after eight weeks of participating in the program. This study also categorized significantly fewer participants into the pre-contemplation and contemplation stages of change (68.6% to 49.3%) and significantly more into the action and maintenance stages of change (31.5% to 50.7%) by the end of the exercise intervention (Y. Kim, 2008). Other research has examined TTM-tailored weight loss interventions in overweight and obese adults. One literature review concluded while most studies report improvements in exercise and dietary habits, only weak evidence exists to support lasting impacts on weight loss achievement and management (Mastellos et al., 2014). Another exploratory study within employee wellness found implementation of a TTM-tailored health promotion intervention resulted in significant reductions in several risk behaviors over the course of six months. Researchers concluded programs grounded in the TTM can indeed change multiple health patterns in a general employee population over time (Prochaska et al., 2008).

TTM-based interventions among university employees may provide an even greater understanding of program effectiveness in the target population. One study

evaluated how university faculty and staff stages of change impacted sign-up and completion of a physical activity competition across campus. Results suggest college employees in the preparation/action/maintenance stages were much more interested in and likely to sign-up and complete the exercise program compared to those in the pre-contemplation and contemplation stages; researchers concluded this finding emphasizes the importance of offering multiple TTM-tailored interventions in order to reach individuals in every stage of change (Walker et al., 2017). Another study among university employees found no correlation between stages of change for exercise and dietary habits with physical well-being and quality of life. Although these results were not expected, they suggest the TTM may not be the best theory to predict physical well-being and quality of life within this population. The study did determine most faculty and staff were in the preparation stage of change for both physical activity and nutrition behaviors (Liau et al., 2013).

Social Cognitive Theory

The SCT has been a dominant theory implemented to help explain and elicit health behavior change among adults. A recent systematic review on SCT interventions concluded this model provides an exceptional framework for multiple chronic health condition behavior change programs (Tougas et al., 2015). Another systematic review examining adult fruit and vegetable consumption interventions established the SCT as one of the best models to predict behavior and promote change. The most effective fruit and vegetable consumption interventions included components within self-efficacy (motivation, beliefs), self-regulation (beliefs, goal

setting), and behavioral capabilities constructs (Guillaumie, Godin, & Vezina-Im, 2010).

This theory can be successfully employed within the work setting. One study assessed long-term impact of a physical activity program on employee exercise adherence and reported significant improvements in self-regulation as well as expectations and expectancies constructs over time among intervention participants. Employees who participated in the program also experienced a slight improvement in the construct of self-efficacy as well as an increase in physical activity engagement. These findings indicate short-term SCT interventions (2 weeks) can lead to lasting behavior change (1 year) among an employee population (J. S. Hallam & Petosa, 2004).

An intervention in the work setting implementing several SCT constructs, such as self-efficacy and self-regulation, to encourage employee exercise adherence reported statistically significant improvements in self-regulation and expectations as well as a slight increase in the expectancies among program participants. All subsets within self-regulation (goal setting, time management, self-monitoring, social support, reinforcements, and relapse prevention) were also significantly improved within the intervention group; however, no significant improvements were observed in self-efficacy within the population. Researchers concluded SCT self-regulation and expectations constructs associated with physical activity behaviors can change in an employee population through implementation of a brief work setting intervention (J. Hallam & Petosa, 1998). All of the systematic reviews and studies outlined above propose the SCT to be a superior model to implement in

health behavior change interventions targeted towards adult populations, specifically those within employee wellness.

Socioecological Model

The SEM has been explored much more in depth within the adult population. The Academy of Nutrition and Dietetics strongly supports this theory as one of the best intervention strategies to treat the overweight/obesity epidemic among adults. The professional organization emphasizes the current demand for evidence-based health behavior change interventions targeting multiple levels and factors within each level of the SEM (Raynor & Champagne, 2016). Other expert groups and government agencies, such as the World Health Organization and the Centers for Disease Control, also encourage implementation of the SEM as the primary framework to guide adult overweight/obesity interventions (Terrell, 2015).

A recent study examined differences in nutrition and health-related factors at all levels of the SEM among American adults to explore their associations with dietary habits, physical activity, and weight status. Researchers found significant differences in nutrition beliefs and knowledge as well as nutrition-related health risk awareness and dietary habits by socioeconomic status categories. Additionally, significant differences were observed by ethnicity, with whites having the highest and blacks having the lowest Healthy Eating Index (HEI) scores. These findings suggest all levels of the SEM are necessary to change health behaviors, since socioeconomic status and ethnicity oftentimes infiltrate intrapersonal, interpersonal, institutional/community, and societal factors. The researchers

concluded more efforts are needed to determine the influence of complex interactions between the many SEM levels and factors (Wang & Chen, 2012).

An analysis of employee wellness among college staff and faculty discovered interesting results within all levels of the SEM. At the intrapersonal level, female gender and staff position predicted greater participation in employee wellness events. Investigation of the interpersonal level revealed about one-half of respondents preferred interventions that involved friends, family, and co-workers. At the institutional level, policies and procedures related to flex time and paid time off to attend employee wellness events impacted participation. Most respondents agreed campus recreation and dining facilities met their needs when considering institutional/community level factors. Also within the institutional/community levels, incentives predicted participation in employee wellness events. Societal level influences were not explored in this study. From these findings, the authors suggested the college work setting as an exceptional place to implement employee wellness health behavior change interventions, since improvements could address all levels of the SEM. The researchers provided ideas to target factors at all levels of the SEM, such as building a strong employee support system at the interpersonal level and creating better communication between employees and supervisors at the institutional/community level (Terrell, 2015).

A similar study applied the SEM to describe and define thoughts and actions towards healthy lifestyles and employee wellness among college faculty and staff. Overall, results suggest a positive employee wellness culture on campus as well as healthy lifestyle thoughts and actions. Several demographic factors, such as gender,

ethnicity, education, and position, influenced healthy lifestyle actions, which suggests both individual and environmental factors across all levels of the SEM act as determinants of thoughts and actions towards healthy lifestyles and employee wellness. Conclusions noted the substantial need for experimental studies and continued research targeting employee thoughts about and actions towards work setting wellness and culture (Melnyk et al., 2016).

Competent Eating Model

The number of studies exploring the ecSatter within the adult population is scarce when compared to those conducted among college students. Of the research available, most evaluated results from the ecSI 2.0 tool. One study testing the validity of this survey concluded a mean total eating competence score of 31.1±7.5 for the American adult population. This validation study also reported positive correlations between total eating competence scores and age, cooking food from scratch, fruit and vegetable consumption, and physical activity. Several negative correlations were also noted between total score and BMI, overweight/obesity incidence, weight dissatisfaction, food dislikes, feelings of hunger, restraint or disinhibition, and disordered eating characteristics (Schroer, Haupt, & Pieper, 2014).

The association between ecSI 2.0 tool scores and cardiovascular disease biomarkers has also been examined among American adults. Investigators reported a mean total eating competence score of 31.9±1.0, with females scoring higher than males in total score as well as food acceptance and internal regulation sub-scores. Further, age positively correlated with contextual skills sub-score. A statistically

significant positive correlation between eating competence and high-density lipoprotein (HDL) cholesterol as well as statistically significant negative correlations between total score and systolic blood pressure, diastolic blood pressure, and total cholesterol were also noted. Individuals considered competent eaters (scoring 32 or higher on the ecSI 2.0 tool) were five times less likely to have high low-density lipoprotein (LDL) cholesterol and seven times less likely to have high triglyceride levels (Psota, Lohse, & West, 2007).

An intervention for adult overweight/obese females founded in the principles of ecSatter reported a baseline mean total eating competence score of 26.2±1.0, with only 18% of all participants considered competent eaters (scoring a 32 or higher on the ecSI 2.0 tool). The average total scores decreased to 24.9±1.3 and the number of competent eaters increased marginally to 20% among the population after participation in the four month weight management intervention. Yet, the mean total scores increased to 31.4±1.0 and the number of competent eaters increased to 53% over a 12 month follow-up period. With these results, researchers emphasized the importance of follow-up evaluation when implementing the ecSatter in order to capture delayed influence (Lohse, Krall, Psota, & Kris-Etherton, 2018). Although the above results are promising, much more research is required to determine the effectiveness of the Eating Competence Model among adult populations, especially within the employee wellness setting.

Employee Physical Activity, Nutrition, and Weight Status Interventions

Overview

Although over one-half of all American employees have wellness programs available and accessible within the workplace (Global Wellness Institute, 2016), there is a lack of research literature related to the effectiveness of interventions targeting physical activity, nutrition, and weight status among this population. The majority of reviews conclude more studies are needed to determine the best strategies to elicit healthful behavior change amid employees ("A Recommendation to Improve Employee Weight Status Through Worksite Health Promotion Programs Targeting Nutrition, Physical Activity, or Both," 2009; Fiona Geaney et al., 2016; Gudzune, Hutfless, Maruthur, Wilson, & Segal, 2013; K. Stephens et al., 2014; R. Plotnikoff, Collins, Williams, Germov, & Callister, 2015; Rongen, Robroek, van Lenthe, & Burdorf, 2013). Furthermore, results from interventions implemented within the work setting are oftentimes unclear and uncertain about which strategies are most effective (F. Geaney et al., 2013; Lohse et al., 2018). As with college students, intervention strategies among employees can be categorized as environmental or educational and in-person or electronic-based; programs can also be classified as focusing on physical activity, nutrition, weight status, or a combination of topic areas (Anderson et al., 2009, 2009; F. Geaney et al., 2013; Gudzune et al., 2013; R. Plotnikoff et al., 2015; Schroer, Haupt, & Pieper, 2014). Assessment of intervention strategies can help establish which strategies are superior for improving employee physical well-being.

Environmental Interventions

Employees spend as much as two-thirds of their waking hours at work, making this setting a priority environment to promote and prompt improvements in exercise and dietary habits (Fiona Geaney et al., 2016). A limited number of environmental interventions within the workplace exist in the research literature (Anderson et al., 2009), yet the information published presents promising outcomes (F. Geaney et al., 2013; Fiona Geaney et al., 2016; Gudzune et al., 2013; Kanauss & Shupe, 2016; Schroer et al., 2014). Examples of environmental strategies implemented to enhance employee physical well-being include posters, media messages, lunchtime walks, and point of selection messages at locations such as stairwells and cafeterias (Gudzune et al., 2013; Kanauss & Shupe, 2016). Most studies examining the impact of changes in environment on employee health behaviors combine these strategies with an educational component.

One study compared an environmental, educational, or combination intervention at the workplace. Researchers found statistically significant decreases in sodium and saturated fat intakes as well as an increase in nutrition comprehension employing the combined environmental and educational program; environmental and educational interventions alone demonstrated smaller and non-significant results. It was concluded implementation of both environmental and educational components in the workplace might be the most effective strategy to improve employee physical well-being (Fiona Geaney et al., 2016). Another study reported similar outcomes, where a combined program significantly decreased weight and BMI and increased fruit, vegetable, and water intakes of employee

participants after a seven month intensive nutrition intervention (Kanauss & Shupe, 2016).

Several reviews support the multicomponent intervention approach, as research consistently demonstrates this method to be the most successful strategy to motivate health behavior change among the employee population, particularly when trying to improve dietary habits (F. Geaney et al., 2013; Gudzune et al., 2013; Schroer et al., 2014). One review identified a critical need for future nutrition interventions to move beyond education and intercede at multiple levels of the environment within the workplace in order to produce lasting health behavior change (F. Geaney et al., 2013). The combination approach is strongly suggested throughout research literature; therefore, it is imperative to review not only various effective environmental strategies but also successful educational interventions among the employee population.

Educational Interventions

The amount of educational interventions at the workplace far exceeds implementation of environmental strategies (Anderson et al., 2009). This surplus of programs found in research literature assists considerably in the identification of approaches that elicit health behavior change among the employee population. Yet, when comparing in-person and electronic-based programs among the employee population, results are diverse and inconclusive. One review reported superior outcomes with face-to-face interventions (K. Stephens et al., 2014), while another suggested incorporation of media contributed considerably to successful program outcomes (Gudzune et al., 2013). A review of research literature on campus

worksite wellness programs identified in-person and electronic-based interventions as equivocal in terms of effectiveness.

Rather, results suggest contact frequency appeared to impact outcomes most. More frequent contact significantly improved physical well-being measures pre- to post- intervention, regardless of whether program interaction was face-to-face or through media (R. Plotnikoff et al., 2015). Additional reviews support the importance of contact frequency when attempting to elicit health behavior change among employees (Anderson et al., 2009; Rongen et al., 2013). One review suggested interventions meeting at least weekly had almost four times more improvements in physical activity and nutrition outcomes. Researchers concluded this may indicate higher frequency helps participants stay actively engaged in the wellness program, which leads to increased effectiveness and superior results (Rongen et al., 2013) Interestingly, another review exploring contact frequency found this factor does not seem to impact workplace intervention outcomes; no differences were noted in effectiveness between weight status wellness programs lasting 2 to 5 sessions compared to those extending beyond 5 sessions (Anderson et al., 2009). A final review also suggested neither contact frequency nor duration of sessions and wellness programs correlated to the effectiveness of physical activity and nutrition interventions (Michie et al., 2009).

An additional factor found to improve nutrition and physical activity outcomes across educational interventions in the work setting was the incorporation of environmental components. As stated earlier, several studies and reviews identify this multicomponent approach to be most effective within the

employee population ("A Recommendation to Improve Employee Weight Status Through Worksite Health Promotion Programs Targeting Nutrition, Physical Activity, or Both," 2009; F. Geaney et al., 2013; Fiona Geaney et al., 2016; Gudzune et al., 2013; Kanauss & Shupe, 2016; Schroer et al., 2014). One review concluded combining personalized educational messages and materials with environmental reinforcements appeared to be the best intervention strategy among employees (Gudzune et al., 2013).

When considering educational intervention topic areas within the workplace and overall outcomes, differences appear to exist in research literature. Several reviews suggest a focus on specific topic areas has minimal influence on wellness program effectiveness (Anderson et al., 2009; Schroer et al., 2014). One article found focusing on physical activity, nutrition, or weight status topic areas individually maximized effectiveness (Schroer et al., 2014), while other reviews identified incorporation of all topic areas as the best means to cause health behavior change among employees (Anderson et al., 2009; Gudzune et al., 2013). Another review found wellness programs focusing on dietary habits or weight status through a multicomponent approach enhanced physical well-being measures significantly more than interventions focusing on exercise. However, health outcomes improved significantly more among employees who participated in physical activity wellness programs when compared to a control group (K. Stephens et al., 2014). Another review of interventions focusing on dietary habits proposed limited evidence exists to support effectiveness of environmental and/or educational nutrition wellness programs within the work setting (F. Geaney et al., 2013). The lack of consistent

conclusions within research literature hinders the ability to establish which topic area or areas are most effective to implement among the employee population.

Other factors found to enhance effectiveness of physical activity, nutrition, and weight status interventions within the workplace include individualized approaches (Gudzune et al., 2013; R. Plotnikoff et al., 2015) as well as involvement of family and the work community (Lloyd et al., 2017; Sorensen et al., 1999). Successful physical activity wellness programs for the employee population have incorporated goal setting, motivation, exercise tracking tools, team competition, and organizational changes to elicit healthful habits (R. Plotnikoff et al., 2015; Schroer et al., 2014). The most effective nutrition interventions among employees integrated in-person educational content alone or in combination with either electronic-based educational content or environmental components. Frequent face-to-face or media reminders also increased effectiveness of interventions targeting dietary habits within the work setting (R. Plotnikoff et al., 2015; Schroer et al., 2014). The greatest improvements in weight status occurred when wellness programs included both educational and environmental strategies (Gudzune et al., 2013; Schroer et al., 2014) as well as nutrition and/or physical activity components ("A Recommendation to Improve Employee Weight Status Through Worksite Health Promotion Programs Targeting Nutrition, Physical Activity, or Both," 2009; Gudzune et al., 2013). Successful weight status interventions within the work setting also provided individualized counseling to enhance participant exercise and dietary habits (Gudzune et al., 2013).

When comparing interventions between the overall employee population and university employees, an extremely limited amount of research literature exists on campus worksite wellness programs (Alkhatib, 2015; Lloyd et al., 2017; R. Plotnikoff et al., 2015). One of the few studies conducted within the college employee population examined the effects of an eight week physical activity intervention on step count, exercise self-efficacy, and several anthropometric measures. A statistically significant increase in step count among participants as well as small and promising improvements in weight status, cardiorespiratory fitness, blood pressure, blood glucose, and blood lipids among participants were observed (Butler et al., 2015). Another study implemented a six week nutrition campus worksite wellness program to examine physical-well-being benefits beyond improvements in dietary habits. Participants reported increased quality of life, decreased depression, and enhanced sleep quantity as well as quality pre to post intervention. These findings indicate the positive effects of nutrition campus worksite wellness programs include not only physical but also psychological improvements for university employees (Sutliffe et al., 2018). Although a lack of support for interventions targeting physical well-being among college employees exists, the positive impact of wellness programs observed within the overall employee population can be used to strengthen the rationale for similar interventions in the college work setting (R. Plotnikoff et al., 2015).

Both university employees and the overall employee population are in dire need of behavior change interventions to improve their overall health status and physical well-being. With exceptionally diverse and limited results outlined in

current research literature, efforts to establish strategies leading to enhanced nutrition, physical activity, and weight status among all employees must continue. The workplace provides an ideal opportunity to implement wellness programs that can positively impact not only employees but also encourage healthful behavior change within the adult population as a whole to minimize chronic disease conditions and eliminate the overweight/obesity epidemic across the country and around the world.

Conclusion

After a thorough and extensive review of research literature associated with physical well-being across the college campus, the urgency and importance of improvements in physical activity, nutrition, and weight status is apparent. Both students and employees alike must move towards healthful behavior change in these areas of physical well-being to enhance the health status of the community. Positive changes in exercise and dietary habits among the college campus population can improve weight status as well as enhance not only physical but also psychological well-being and overall quality of life. With a transformation in lifestyle behaviors among students and employees, the college campus could become the best model to illustrate successful achievement of physical well-being within their community as well as throughout the country and world. It is time to harness the endless opportunities within the college campus to make a positive and transformational difference in the physical well-being of students, employees, and, eventually, all of humanity.

CHAPTER 3. MATERIALS AND METHODS

Needs Assessment

Prior to curriculum development, a needs assessment was conducted to identify important elements to include within a nutrition education program to elicit behavior change among college students and university employees. An extensive review of literature (Chapter 2) served as the primary source for assessment of nutrition education needs within these populations; it also identified essential and beneficial factors to include in a nutrition education program to obtain the desired behavior change outcomes. The review of literature examined current physical well-being as well as food/nutrition attitudes, understanding, and perceptions of young adult and adult populations, with a focus on college students and university employees. It also explored effectiveness of behavior change models and theories as well as physical well-being interventions within the targeted populations. With the information and insight learned from the review of literature, development of relevant and effective curriculum could proceed.

Further, the Culinary Food Science Club within the Food Science and Human Nutrition (FSHN) Department offered a one-night nutrition education and culinary class entitled 'Culinary Boot Camp' to all students and employees. The high attendance and positive feedback from participants at the event demonstrated a current interest in nutrition education and culinary classes across campus. This finding further directed development of curriculum, with an aim to expand, improve, and enhance the original event.

Curriculum Development: Culinary Boot Camp

Behavior Change Models and Theories

The Social Cognitive Theory (SCT) and Eating Competence Model (ecSatter). provided the foundation for curriculum development (Hayden, 2014). The primary constructs from the SCT incorporated into curriculum development included personal factors, particularly self-efficacy and self-regulation, as well as environmental factors, especially facilitators and reinforcements. The ecSatter was integrated into curriculum development through use of the mindful eating philosophy. To continue integration of behavior change models and theories into Culinary Boot Camp, additional topics were identified to include in curriculum. The topics of goal setting and group support incorporated the SCT constructs of self-efficacy and self-regulation. Multiple mindful eating explanations and exercises acted as the primary means to feature the ecSatter in curriculum. Also, several commodity groups within the community donated cooking utensils, supplies, and resources to participants as SCT facilitators and reinforcements outside of Culinary Boot Camp.

Topic Identification

The *2015-2020 Dietary Guidelines* and its accompanying consumer translation, *MyPlate*, served as the basis for Culinary Boot Camp topics (U.S. Department of Health and Human Services and U.S Department of Agriculture, 2015). Specific recommendations identified from this federal report and public messaging/material incorporated into Culinary Boot Camp curriculum included encouragement of healthy eating patterns and habits across the lifespan to support

physical well-being and reduce the risk of chronic diseases. The recommended eating patterns and habits highlighted in curriculum include increased consumption of potassium, dietary fiber, calcium, and vitamin D through improved fruit, vegetable, whole grain, and dairy intake as well as decreased consumption of added sugars, saturated fats, and sodium. Specific subjects from the *2015-2020 Dietary Guidelines* and *MyPlate* integrated into development of curriculum included the importance of variety, how to identify/select nutrients of public health concern, practical and applicable ways to integrate all five food groups into the daily diet, and how to achieve overall healthy eating patterns and habits through a balanced plate.

The review of literature also identified deficient cooking and grocery shopping skills among young adult and adult populations. With multiple studies suggesting a positive correlation between advancement of these skills and superior nutrition status as well as overall physical well-being outcomes (Bernardo et al., 2017; Blichfeldt & Gram, 2013; U.S. Department of Agriculture, 2016; Wilson, Matthews, Seabrook, & Dworatzek, 2017), topics and activities to improve both cooking (weeks 1, 2, and 3) and grocery shopping (week 4) skills were incorporated into all four sessions. These topics and activities included discussing simple swaps, engaging in cooking demonstrations and experiences, planning meals, making grocery lists, going on a grocery store tour, and identifying/selecting nutrient dense grocery items. All topics and activities for the grocery store tour were adapted and developed from *Supermarket Savvy: Aisle-by-Aisle Teaching Modules* curriculum (McDonald, 2012).

Lessons

Culinary Boot Camp was developed as a four-week interactive experience created for college student and university employee populations. The first three sessions consisted of a 30-minute classroom lesson, 15-minute cooking demonstration, 55-minute cooking experience, and 20-minute mealtime, for a total of two hours. The fourth session included a 30-minute classroom lesson and 60-minute grocery store tour for a final session lasting one hour and 30 minutes. An outline of all four sessions can be found in Tables 1 and 2. See Appendices A, B, C, D, and E for additional in-depth information, materials, and methods implemented into all four sessions.

Curriculum Delivery: Culinary Boot Camp

Community Collaborations and Contributions

Several collaborations on and off campus were required to successfully implement Culinary Boot Camp. Collaborators on campus included the Culinary Food Science Club, the FSHN Department, Dining, Student Wellness, and Employee Wellness. Collaborators off campus consisted of registered dietitian nutritionists (RDNs) and store managers at two local grocery stores. Multiple commodity groups within the community also supported the event through generous donations of participant incentives, including cooking utensils (knives, cutting boards, measuring spoons, spatulas, thermometers, etc.), supplies (aprons, cooler bags, etc.), and resources (coupons, recipes, cookbooks, etc.); these commodity groups contributed product and monetary donations to sponsor Culinary Boot Camp as well.

Recruitment and Registration

All study procedures and protocols were approved by the governing Internal Review Board (IRB) prior to beginning recruitment and registration efforts. See Appendix F for approved study materials and methods. Student recruitment included a mass email sent to all currently enrolled students, social media posts on the Department of Food Science and Human Nutrition, Dining, and Student Wellness websites and accounts, as well as posters and fliers displayed across campus. Employee recruitment was conducted through the Employee Wellness website. Recruitment began three weeks prior to the event. Examples of recruitment content can be found in Appendices G, H, I, and J.

Student participants were enrolled using online registration services offered through campus Extension and Outreach. Student participants were required to pay a one-time 15-dollar fee to attend Culinary Boot Camp. Employee participants were enrolled online through the Employee Wellness website. Employee participants did not pay a fee to attend Culinary Boot Camp, as the Employee Wellness program covered all costs associated with the event.

A registration capacity of 50 was set for both students and employees, with a waiting list of 25 additional participants. Registration began three weeks and ended three days prior to the event. Culinary Boot Camp was held four times over the course of two years, with two student events (Fall 2017 and Spring 2019) and two employee events (Spring 2018 and Fall 2018) being offered.

Reminders

An email reminder was sent out to participants four days and one day prior to each session of Culinary Boot Camp. The reminder provided a detailed description about the upcoming session as well as any other pertinent information. See Appendix K for an example reminder email. All additional communication with participants occurred in-person at the event or via email.

Printing and Grocery Orders

Printing orders were placed for all four sessions three weeks prior to the start of Culinary Boot Camp. All grocery orders for the event were placed four days prior to the upcoming session using an online delivery system. The grocery store brought orders to campus kitchens four hours before the beginning of each evening to be organized by the coordinator and a volunteer. For a detailed outline of printing and grocery orders, please refer to Appendices L and M, respectively.

Campus Kitchen and Grocery Store Tour Preparation

All campus kitchen preparation occurred three hours up until 30 minutes prior to each Culinary Boot Camp session. The coordinator set up campus teaching kitchens with help from one to two volunteers. All cooking utensils, supplies, and resources as well as non-perishable ingredients required for the cooking experience were placed on the countertops of all kitchens to accommodate participants; perishable items needed for the cooking experience were kept in the refrigerator or freezer and placed in every kitchen by a volunteer during the classroom lesson or cooking demonstration. A total of eight to ten kitchens were set up each evening to accommodate four to five participants per kitchen. A full list of kitchen supplies for

sessions one through three can be found in Appendix N. Additionally, the two grocery store RDNs set up carts with example food products for the tours one hour before the final session. For a list of these items, see Appendix Q.

Volunteers

All Culinary Boot Camp cooking demonstrations and experiences as well as mealtime and grocery store activities were staffed by volunteers trained by the event coordinator. Volunteers for cooking demonstrations and experiences included chefs from Dining, RDNs from Dining and Student Wellness, two faculty members from FSHN Department, and students from the Culinary Food Science Club. The volunteer chefs were responsible for leading cooking demonstrations, and volunteer students were each assigned to one of the eight to ten kitchens to assist participants during the cooking experience. All other volunteers supervised the cooking experiences and guided mindful eating explanations/exercises during mealtimes. See Appendices O and P for specific topics covered in trainings. The RDNs employed at two local grocery stores volunteered to lead grocery store tours, while a graduate student volunteer taught the grocery lessons opposite of the store tours. Training content and materials for these volunteers can be found in Appendices R and E, respectively.

Order of Culinary Boot Camp Sessions

The first three sessions of Culinary Boot Camp were held on Monday evenings from 5:30 pm – 7:30 pm on campus in both classroom and kitchen settings. The first two sessions began in the classroom with a lesson taught by the event coordinator and cooking demonstration completed by a volunteer chef. A volunteer

RDN was present in the classroom at all times to answer any questions requiring professional insight. A cooking experience and mealtime followed in the kitchen. The coordinator, chef, RDN, and FSHN faculty supervised cooking experiences. One student volunteer was assigned to each kitchen to assist participants with various culinary tasks. At the end of the evening, participants engaged in a mealtime mindful eating exercise guided by one of the supervising volunteers. Participants received a reusable grocery bag filled with relevant cooking utensils, supplies, and resources from local commodity groups when leaving each of the first three Culinary Boot Camp sessions.

The third session began with the cooking experience in the kitchens, followed by the lesson and cooking demonstration in the classroom. The session concluded back in the kitchens with mealtime and a mindful eating explanation/ exercise. The third session was identical to weeks one and two; the only difference was the order of events.

The fourth session of Culinary Boot Camp was held on Monday evening from 5:30 pm – 7:30 pm at two local grocery stores. Participants were split into four groups of 12 to 13 people, with 2 groups sent to each grocery store. The first groups began at 5:30 pm with the grocery store tour, while the second groups started at 6:00 pm with the classroom lesson. At 6:30 pm, the two groups switched positions, with the first groups ending at 7:00 pm and second groups ending at 7:30 pm. The two RDNs employed at each of the grocery stores led tours, while the coordinator and a graduate student volunteer taught classroom lessons. At the end of the final evening, student and employee participants who completed all four sessions of

Culinary Boot Camp received a 15-dollar gift card to the two local grocery stores, which acted as an incentive to attend the entire event.

Evaluation

Pre-, Post-, and Follow-up Surveys

Evaluation of Culinary Boot Camp was conducted utilizing pre-, post-, and follow-up surveys of student and employee participants. A number of individual survey instruments were used to evaluate the nutrition education program. The individual survey instruments measured multiple food/nutrition aptitudes and dietary intake, including eating competence (Lohse, Satter, Horacek, Gebreselassie, & Oakland, 2007), cooking skills (Condrasky, Williams, Catalano, & Griffin, 2011), cooking attitudes (Condrasky et al., 2011), healthy eating self-efficacy (Neumark-Sztainer, Wall, Perry, & Story, 2003; Schwarzer & Renner, 2000), grocery shopping self-efficacy (Pawlak & Colby, 2009), fruit/vegetable/fiber consumption ("NutritionQuest," 2018), convenience food frequency (Brunner, van der Horst, & Siegrist, 2010), and fast food frequency (Bruening et al., 2014).

All individual instruments incorporated into the survey were tested and established as valid and reliable tools. Each of the individual survey instruments employed Likert-scale statements/questions, with a range of four to seven point scales. The points from each scale item were summed to provide a total score for each of the individual instruments. In most cases, a higher score signified more favorable or optimal food/nutrition aptitudes and dietary intake. The only exceptions were the convenience and fast food frequency scores, where a lower

score indicated more healthful eating habits. An outline of each individual survey instrument can be found in Table 3. The survey also captured various demographic variables that may influence food/nutrition aptitudes and dietary intake. All demographics incorporated into the survey can be found in Table 4. Please refer to Appendices S and T to view the pre-, post-, and follow-up surveys in their entirety.

All individual instruments were compiled into an online survey system (Qualtrics, Provo, UT) to create the overall survey that would serve as the primary evaluation tool for Culinary Boot Camp. All participating individuals were asked to acknowledge an electronic informed consent document before beginning the survey. The survey was administered to all Culinary Boot Camp student and employee participants one week prior to (pre-) as well as one day (post-) and six months (follow-up) after the event.

The survey was also administered to all college students and university employees via a mass email to provide comparison groups for the study. The comparison student and employee groups received the pre-, post-, and follow-up surveys at the same times as first year Culinary Boot Camp participants.

Culinary Boot Camp participants and individuals in the comparison group who completed pre-, post-, and follow-up surveys within ten days of administration were included in statistical analyses. As an incentive to participate, those who completed the pre-, post-, or follow-up survey were entered into a drawing to win a cookbook from one of the commodity group sponsors.

Focus Group Discussions

Two focus group discussions, one with student and the other with employee participants of Culinary Boot Camp, acted as a secondary evaluation tool for the event. All development, implementation, and evaluation processes and procedures followed Krueger methodology (Krueger, 1994). Questions to be asked in the focus groups were authored by the Culinary Boot Camp coordinator and reviewed by the research team involved in the event. A total of ten questions were presented and accepted. Please refer to Appendix U to view all focus group discussion questions.

Both focus groups occurred on campus two weeks after the final session of Culinary Boot Camp in the first year. One week prior to the focus groups, all student and employee Culinary Boot Camp participants were invited via email and asked to respond if planning to attend the event. The student discussion took place in the evening (5:30 pm – 7:00 pm), while the employee discussion occurred over the lunch hour (11:30 am – 1:00 pm). Each focus group lasted approximately 75 minutes, with a projected total time of 90 minutes. Participants were required to sign an informed consent document prior to the discussion. A free meal was also provided to participants before the start of focus groups as an incentive to attend the event.

The focus group discussions were led by the Culinary Boot camp research team. The coordinator acted as moderator for the student focus group, while a faculty member from the FSHN Department moderated the employee focus group. A graduate student from the Culinary Boot Camp research team acted as recorder for

both focus groups. All individuals who led discussions were trained using Krueger methodology to ensure understanding of appropriate processes and procedures.

Both focus groups were audio recorded. A graduate student uninvolved with Culinary Boot Camp transcribed these recordings. Additionally, detailed notes were written by the recorder as well as moderators throughout the focus group discussions; these were also transcribed by the graduate student. All transcriptions (recordings and notes) were evaluated using Krueger methodology to identify key themes.

Statistical Analyses

All quantitative data analyses were conducted via Statistical Package for Social Sciences software program (IBM, SPSS v25). An alpha level of 0.05 ($p \leq 0.05$) was set to define statistical significance, while an alpha level of 0.10 ($p \leq 0.10$) was set to designate trends. First, descriptive statistics were conducted on both college student and university employee comparison groups to explore various demographic variables associated with different food/nutrition aptitudes and dietary intake. The influence of gender was evaluated using independent sample t-tests. The influence of other student demographics (classification, race/ethnicity, and home college) was assessed using ANOVA and post-hoc tests (Tukey HSD and Bonferroni adjustments). Other employee demographics (professional position [faculty or staff], ethnicity, years of employment) were also evaluated using ANOVA and post-hoc tests (Tukey HSD and Bonferroni adjustments).

Additionally, demographics were assessed relative to participant categorization by eating competence, one of the measured food/nutrition aptitudes.

Chi square tests were applied to examine the association between eating competence categorization and age, gender, race/ethnicity, classification, and home college. The relationship between eating competence categorization and other food/nutrition aptitudes as well as dietary intake was explored through independent samples t-tests. Correlations between eating competence and other food/nutrition aptitudes as well as dietary intake were also conducted; Cohen's criteria were implemented to differentiate between weak (r=0.10), moderate (r=0.30), and strong (r=0.50) correlations.

Changes in food/nutrition aptitudes and dietary intake of Culinary Boot Camp participants over time (pre-, post-, follow-up) were examined using paired samples t-tests with post hoc adjustments (Tukey HSD and Bonferroni) as well as repeated measures ANOVA. Additionally, change scores were calculated (post- minus pre-, follow-up minus pre-) and independent samples t-tests conducted in order to explore differences in outcomes between student and employee participants. All assumptions for statistical analyses were tested (normality, equality of variance, independence), and most data met requirements. When assumptions were not met, appropriate and adjusted results were reported.

Table 1. Culinary Boot Camp Session Outline – Weeks 1, 2, and 3

Week	Classroom Lesson Title	Classroom Lesson Topics	Cooking Demonstration	Cooking Experience	Mealtime
1	Versatile Fruits & Vegetables	- goal setting - group support - mindful eating - health benefits - variety - seasonality - incorporation into daily diet	**Knife Skills** - types - uses - chopping - dicing - mincing - slicing	**F & V Salsas** - fresh tomato - roasted corn - bean - fruit **Tortilla Chips** - whole wheat - corn	- mindful eating - Q & A
2	Great Grains & Delightful Dairy	- goal setting - group support - health benefits - variety - incorporation into daily diet - individualized nutrition needs - food allergies & intolerances	**Stovetop Basics** - sautéing - stir-frying - boiling - steaming **Omelet Preparation** - safety - skills	**Student Recipes** - F & V Grilled Cheese - Build Your Own Omelets **Employee Recipes** - Scrambled Egg Muffins - Skillet Lasagna	- mindful eating - Q & A
3	Protein Power	- goal setting - group support - health benefits - variety - incorporation into daily diet - individualized nutrition needs - food safety	**Protein Preparation** - safety - types - uses - marinating - cooking - carving **Whole Chicken Cutting**	**Chili** - classic beef - white turkey - black bean & pork - edamame	- mindful eating - Q & A

Table 2. Culinary Boot Camp Session Outline – Week 4

Week	Classroom Lesson Title	Classroom Lesson Topics	Grocery Store Tour Topics	Grocery Store Tour Activities
4	Success Going to the Grocery Store	- goal setting - group support - meal planning - grocery list making	- food & beverage identification - food & beverage selection - organic vs. conventional - fresh produce - canned goods - breads, grains, & cereals - dairy - meat, poultry, & seafood - frozen items - snacks - beverages	- navigating the nutrition facts label - fresh produce ripeness/readiness - spot the sodium (canned goods, dairy) - spot the added sugars (canned goods, dairy) - is it whole grain? - favorite cereal challenge - favorite frozen item challenge - favorite snack challenge

Table 3. Individual Survey Instruments

Instrument	Number of Statements/ Questions	Likert-Scale Points	Total Possible Points	Example Statement/Question
Eating Competence (ecSI 2.0)	16	0-3 (never – always)	48* 15 – EA, CS 9 – FA, IR	"I am comfortable with my enjoyment of food & eating."
Cooking Skills	12	1-5 (not at all confident – very confident)	60	"Indicate the extent to which you feel confident… using knife skills in the kitchen."
Cooking Attitudes	4	1-5 (strongly agree – strongly disagree)	20	"I do not like cooking because it takes too much time."
Healthy Eating Self-Efficacy I	5	1-4 (not confident – very confident)	20	"I can stick to healthful food & cooking… even if I have to rethink my food choices & cooking practices."
Healthy Eating Self-Efficacy II	9	1-6 (not confident – very confident)	54	"How confident are you that you could eat healthy foods when you are... alone?"
Grocery Shopping Self-Efficacy	8	1-5 (not at all confident – very confident)	40	"How confident are you in your ability to… select foods low in saturated fat?"
Fruit, Vegetable, & Fiber Screener	10	0-5 (< 1x/week – ≥ 2x/day)	50	"About how often do you eat each of the following foods? Salad Greens."
Convenience Food Frequency Questionnaire	17	1-7 (rarely or never – daily)	119	"Indicate the frequency in which you consume… ready-to-eat meals."
Fast Food Frequency Questionnaire	5	1-6 (never – daily)	30	"How often did you eat from the following… traditional burger & fries restaurant?"

*ecSI 2.0 total score ≥ 32 = competent eater; EA – eating attitudes sub-score; CS – contextual skills sub-score; FA – food attitudes sub-score; IR – internal regulation sub-score

Table 4. Demographic Variables

Demographic Variable*	Answer Options
Age	Open-ended
Gender	Male, Female, Prefer not to specify
Race/Ethnicity	Open-ended
Current Classification (S)	Freshman, Sophomore, Junior, Senior, Graduate Student
Home College (S)	Agriculture & Life Sciences, Business, Design, Engineering, Human Sciences, Liberal Arts & Sciences, Veterinary Medicine
Professional Position (E)	Faculty, Staff, Graduate Assistant, Post-doctoral Fellow, Researcher
Years of Employment (E)	0-5 years, 6-10 years, 11-15 years, 16-20 years, 20+ years

*S – students; E – employees

CHAPTER 4. EATING COMPETENCE AMONG COLLEGE STUDENTS

A paper to be submitted to the Journal of the Academy of Nutrition and Dietetics

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ABSTRACT

***Background*:** Limited research exists about college student food/nutrition aptitudes and dietary intakes. One model to examine these measures is eating competence. Literature on eating competence relative to demographics and other measures of aptitudes/intakes is minimal, particularly within the college student population. ***Objectives*:** This study explores college student eating competence relative to demographic variables and other measures of food/nutrition aptitudes and dietary intakes. ***Study Design*:** An online survey (Qualtrics, Provo, UT) including several validated and reliable instruments was disseminated via mass email to all students enrolled at a Midwestern University. Instruments were scored to explore eating competence, food/nutrition aptitudes, and dietary intakes. ***Statistical Analyses*:** All statistical analyses were conducted using Statistical Package for Social Sciences software program (IBM SPSS v24). Descriptive statistics, independent samples t-tests, and correlations were used to examine eating competence, demographic variables, food/nutrition aptitudes, and dietary intakes. ***Results*:** A total of 615 students completed the survey and were included in data analyses; 282 (46%) participants were eating incompetent, while the other 333 (54%) eating competent.

All measured aptitudes ($p<0.01$) and intakes ($p\leq0.03$) were significantly different between incompetent and competent participants. Correlations between eating competence scores, food/nutrition aptitudes, and dietary intakes were moderate ($r=0.23$-0.33) and statistically significant ($p<0.01$). ***Conclusions*****:** Results suggest marginal eating competence, food/nutrition aptitudes, and dietary intakes among college students, especially those categorized as eating incompetent. Outcomes also indicate eating competence correlates with other measured aptitudes and intakes within the population. Further research exploring the role of eating competence during the college student transition is recommended.

INTRODUCTION

Background

Currently in the United States, 16.9 million students are enrolled in higher education with most classified as young adults under the age of 25.[1] As enrollment in higher education continues to increase, this setting provides countless opportunities to influence the physical well-being of young adults. The college experience is considered a time of transition, where students shift from a state of dependence to independence in several areas of life. A number of changes transpire in roles, responsibilities, and practices, including the duty to care for one's own physical well-being.[2] With numerous shifts in responsibilities occurring, students oftentimes become overwhelmed in their new role as sole provider, which prompts prioritization of practices perceived to be most important in the present moment – academics, employment, socialization, etc.[3] A majority of young adults do not

perceive physical well-being as a high priority, since poor choices in the present do not immediately impact their health status. Thus, responsibilities related to physical well-being are commonly overlooked within the college student population.[4] This is alarming, as research suggests health habits developed during young adulthood last throughout life.[5–7]

Research related to one component of physical well-being, food/nutrition aptitudes, suggests indifference among college students/young adults. Although studies on food/nutrition aptitudes within this population are limited, recent literature suggests most college students/young adults do not meet national recommendations for fruit and vegetable consumption.[6,8] The latest National College Health Assessment reported the percent of students who did not consume any fruits or vegetables per day (8.4%) considerably exceeded the percent who consumed $\geq$ 5 fruit and vegetable servings per day (4.8%). The majority of young adults in the college setting consumed between one and two servings of fruits and vegetables per day (61.8%).[9] The minimal research that exists on eating patterns among the population suggests college students have the poorest dietary intakes when compared to all other age categories, with higher consumption of sodium, saturated fat, and added sugars.[10]

The poor dietary intakes of college students may be correlated with the current weight status among young adults attending higher education. Based on body mass index (BMI) classification, the college student population is considered overweight, with an estimated mean of 25.2 kg/m^2. Currently, 21.8% of college students are considered overweight, while another 11.8% are obese according to

BMI classifications.[9] Several studies suggest a strong relationship between the rise in overweight/obesity and current eating patterns within the population.[5,11] The limited research literature available attributes poor dietary intakes and subsequent weight status of college students to poor food/nutrition aptitudes.[2,12,13]

One measure of food/nutrition aptitudes is eating competence. As a philosophy similar to intuitive or mindful eating practices,[14,15] the competent eating model is a non-diet approach encouraging individuals to experience a positive relationship with food and nutrition through examination of personal attitudes and behaviors towards eating. The philosophy promotes "positivity and flexibility with eating" as well as the ability to become "fully aware of energy needs".[16,17] The eating competence model consists of four constructs: 1) eating attitudes (EA) – ability to enjoy a positive and relaxed relationship with eating while staying attuned and responsive to outward and inward responses, 2) food acceptance (FA) – ability to be flexible and experiential with eating to develop learned food preferences, 3) internal regulation (IR) – ability to listen to appetite as well as hunger and satiety cues to maintain physiological homeostasis, and 4) contextual skills (CS) – ability to apply structure within the eating experience through meal and snack planning as well as continuance of a feeding schedule. When combined, these four constructs represent an individual's overall eating competence.[16,17] The ecSI 2.0 instrument was developed and validated as a comprehensive evaluation tool to measure overall eating competence as well as individual constructs among various populations, including college students.[18,19]

Objectives

In light of the limited research literature available on eating competence of college students, the primary objective of this study was to examine overall eating competence as well as its four individual constructs in this population. Secondary objectives included exploration of – 1) the influence of various demographic variables on eating competence; and 2) correlations between eating competence and other food/nutrition aptitudes as well as dietary intakes.

Materials and Methods

Study Design

This cross-sectional study of overall eating competence among college students was part of a larger intervention study examining the effectiveness of a nutrition education program to improve food/nutrition aptitudes of the population. For the purposes of this paper, the focus will be on the outcomes of a pre-survey completed by a comparison group of college students.

A survey was developed to assess college students' food/nutrition aptitudes, as well as dietary intakes, using multiple individual survey instruments. All individual instruments were tested and established as valid and reliable tools. Instruments incorporated into the survey measured various food/nutrition aptitudes, including eating competence (ecSI 2.0),[18] cooking skills,[20] cooking attitudes,[20] healthy eating self-efficacy,[21,22] and grocery shopping self-efficacy.[23] Eating competence was the only instrument with a minimum score to define adequacy; a score of ≥32 on the ecSI 2.0 tool signified eating competence, while a

score <32 denoted eating incompetence. A brief food frequency screener assessed dietary intake.[24] Prediction equations estimated daily fruit/vegetable servings as well as vitamin C, magnesium, potassium, and dietary fiber intake from participants' total scores.[25] Additional food frequency questionnaires were incorporated into the survey to assess dietary intake of convenience/fast food.[26,27]

Each of the individual survey instruments employed Likert-scale statements/questions, with a range of four to seven point scales; higher scores signified more favorable or optimal food/nutrition aptitudes as well as dietary intake, with the exception of the convenience/fast food frequency questionnaires where lower scores denoted less dietary intake. All scale items were summed to provide a total score for each of the individual instruments.

The survey also captured several demographic variables that may influence food/nutrition aptitudes as well as dietary intake. These included age (open-ended), gender (male, female, prefer not to specify), race/ethnicity (open-ended), classification (freshman, sophomore, junior, senior, graduate student), and college (Agriculture, Business, Design, Engineering, Human Sciences, Liberal Arts, Veterinary Medicine). Responses to the open-ended age question were categorized into one of six age groups. Individuals responding to the open-ended race/ethnicity question as White, Caucasian, or American were classified together in one group, while participants who identified as another race/ethnicity were collectively represented in another group.

All individual instruments were compiled into an online survey system (Qualtrics, Provo, UT). The governing Internal Review Board (IRB) approved all study protocols and procedures prior to administration the survey.

Study Population

The survey was administered using a mass email to all college students attending a large land grant university in the Midwest. All participants were asked to acknowledge an electronic informed consent document before beginning the survey. Participants who completed the entire survey within ten days of distribution were included in statistical analyses. As an incentive to participate in the survey, those who completed the entire survey were entered in a drawing to win a cookbook.

Statistical Analyses

All statistical analyses were conducted using Statistical Package for Social Sciences software program (IBM, SPSS v25). An alpha level of 0.05 ($p \leq 0.05$) was established to define significance for all statistical analyses performed on data. Descriptive statistics were completed to evaluate various demographic variables as well as overall eating competence of the pre-survey population. Participants were categorized as eating competent (ecSI 2.0 score ≥32) eating incompetent (ecSI 2.0 score <32) prior to additional statistical analyses. Descriptive statistics were used to explore eating competence relative to various demographic variables, food/nutrition aptitudes, and dietary intake. Chi square tests were used to evaluate eating competence by age group, gender, race/ethnicity, classification, and college. Independent samples t-tests were used to examine food/nutrition aptitudes and

dietary intake by eating competence. Pearson Correlations were performed between eating competence (overall score and four individual construct sub-scores) and food/nutrition aptitudes as well as dietary intake. Cohen's criteria were used to identify correlations as weak (r=0.10), moderate (r=0.30), or strong (r=0.50).[28] All assumptions were tested (normality, equality of variance, independence). Almost all data met criteria to complete statistical analyses; when criteria were not met, appropriate adjusted outcomes were reported.

Results

Study Population (Table 1-1.)

A total of 820 college students participated in the online survey. Of those who participated, 615 completed the entire survey within ten days of distribution and were included in statistical analyses representing 1.7% of the total enrolled population (n=36,321). The mean $\pm$ SD age of participants was 21.69 $\pm$ 4.75 years, with the majority in the 18-19 year (n=223, 36%) and 20-21 year (n=202, 33%) age groups. More females (n= 427, 70%) participated compared to males (n=186, 30%). Most participants reported their race/ethnicity as White, Caucasian, or American (n=516, 83%), with the remainder of the study population identifying as one of several other races/ethnicities (n=92, 16%). Student classification was evenly split – 22% freshmen (n=133), 15% sophomores (n=95), 21% juniors (n=127), 22% seniors (n=135), and 20% graduate students (n=125). Participation by students in the College of Agriculture was highest (n=150, 24%), while participation by those in the College of Veterinary Medicine was lowest (n=24, 4%).

Eating Competence

The mean ± SEM eating competence score was 32.46 ± 0.30 (out of 48 possible points). Of those who participated in the pre-survey, 54% (n=333) were considered eating competent (ecSI 2.0 score ≥32) and the other 46% (n=282) as eating incompetent (ecSI 2.0 score <32). Differences in overall score and four individual construct sub-scores by eating competence categorization (competent vs. incompetent) are depicted in Figures 1-1. and 1-2., respectively.

Demographic Variables by Eating Competence (Table 1-1.)

Examination of various demographic variables by eating competence category demonstrated no statistically significant difference by age group ($p>0.05$). A trend towards statistical significance existed between eating competence category and gender ($p=0.08$); a greater percentage of males (n=111, 33%) and lesser percentage of females (n=220, 66%) were among eating competent college students compared to those categorized as eating incompetent (n= 75, 27% and n=207, 73%, respectively). An independent samples t-test of eating competence by gender also identified a trend towards statistical significance ($p=0.06$; data not shown). All additional participant demographic information was explored by eating competence category; no statistically significant differences were noted by race/ethnicity, classification, and college when assessed by chi square tests, independent samples t-test, or ANOVA ($p>0.05$).

Food/Nutrition Aptitudes by Eating Competence (Table 1-2.)

Several food/nutrition aptitude scores (mean ± SEM) were evaluated relative to eating competence category. Participants categorized as eating competent had

significantly higher scores than those categorized as eating incompetent in all measured food/nutrition aptitudes ($p<0.01$). The most significant differences were observed in cooking attitudes, with a mean score of 15.74±0.19 among competent eaters and 14.00±0.21 among incompetent eaters (20 possible points, 9% difference). The least significant difference was in grocery shopping self-efficacy, where eating competent participants scored 34.89±0.46 and eating incompetent participants scored 28.24±0.41 (40 possible points, 6% difference).

Dietary Intake by Eating Competence (Table 1-3.)

The dietary intake of various foods and nutrients were estimated using the Block Fruit, Vegetable, & Fiber Screener instrument.[25] Participants categorized as eating competent had significantly higher estimated dietary intakes (fruit/vegetable servings, vitamin C, magnesium, potassium, and dietary fiber) compared to participants categorized as eating incompetent ($p<0.01$). Additionally, convenience/fast food dietary intakes were significantly lower (less consumption) among eating competent participants compared to eating incompetent participants ($p=0.01$ and $p=0.03$, respectively).

Correlations

Correlations between eating competence (overall and four individual constructs) and measured food/nutrition aptitudes (cooking skills, cooking attitudes, healthy eating self-efficacy, grocery shopping self-efficacy) were considered weak ($r= 0.10$) to moderate ($r=0.30$), yet demonstrated statistical significance at $p<0.01$ (data not shown). The strongest correlations were between contextual skills and healthy eating self-efficacy 1 and 2 ($r=0.40$ and $r=0.34$,

respectively) as well as between food acceptance and cooking skills (r=0.35). Weaker correlations were observed within overall eating competence as well as the individual constructs of eating attitudes and internal regulation. Specifically, no significant correlations existed between eating attitudes and healthy eating self-efficacy 1 and 2 (r=0.01, p=0.98) as well as internal regulation and cooking attitudes (r=0.06, p=0.12).

Correlations between eating competence and estimated dietary intake of various foods and nutrients (fruit/vegetable servings, vitamin C, magnesium, potassium, dietary fiber) were also weak (r=0.10) to moderate (r=0.30); however, exhibited statistical significance at $p<0.01$ (data not shown). Correlations between food acceptance and estimated dietary intakes were strongest (r=0.32-0.36). No correlations existed between internal regulation and estimated dietary intakes (r=0.07-0.08, p=0.07-0.08). Correlations between eating competence and additional measures of dietary intake (convenience/fast food frequency) did not exist, with the exception of a weak (r=0.16) and statistically significant ($p<0.01$) correlation between contextual skills and these measures.

Discussion

Study Population

Although this comparison group of the target population may be more robust due to interest in the topic area and incentive, participant demographics were similar to those of college students enrolled at the Midwestern University. The average age (21.69 $\pm$ 4.75 years) and primary age groups (18-19 years: n=233, 36%;

20-21 years: n=202, 33%) of participants reflects the higher enrollment of undergraduate students compared to graduate students at the university. Greater participation by females (70%) compared to males (30%) is typical within food and nutrition research.[19,29–32] Yet, this gender representation is somewhat opposite of the entire population at the university (43% female, 57% male). The race/ethnicity of participants (84% White/Caucasian/American, 16% other) was very similar to the entire university population (87% White/Caucasian/American, 13% other). Participants were equally distributed between student classifications, again reflecting the allocation among classes at the university. The contribution of various colleges to the study population was similar to the contribution to the entire student population; the only differences being higher participation compared to enrollment from the Colleges of Agriculture and Veterinary Medicine students as well as lower participation from the Business student population.

Eating Competence

Results suggest an imperative need to improve eating competence among college students. The mean score (32.46 ± 0.30) was marginally above the minimum score (≥32) indicating eating competence. Further, barely over half of the study population was considered eating competent (n=333, 54%). These outcomes imply minimal eating competence within the college student population as a whole. Several other studies have reported similar, or even worse, results among college students.[19,32–34] For example, one study reported a mean eating competence score of 30.70 ± 0.29, and only 47% of the study population was considered eating competent.[19]

To our understanding, this is one of the first studies to examine the four individual constructs of eating competence independently within the college student population. Our results indicate college students have marginally higher eating attitudes (11.18 ± 0.11, 75%) compared to contextual skills (9.78 ± 0.13, 65%) as well as internal regulation (6.17 ± 0.08, 69%) compared to food acceptance (5.34 ± 0.09, 59%). Again, this observation parallels results from the only other study available in research literature exploring the four individual constructs of eating competence within a college student population, where eating attitudes (11.10 ± 0.12) and internal regulation (6.20±0.08) were slightly higher than contextual skills (8.20±0.14) and food acceptance (5.20±0.09).[19] Regardless of scores from individual constructs, all four areas require advancement to improve overall eating competence among college students.

Demographic Variables by Eating Competence

Evaluation of various demographic variables (age group, gender, classification, college) revealed no statistically significant differences between eating competent and eating incompetent participants. Only a trend toward significance existed between gender and eating competence, with male college students exhibiting greater eating competence compared to their female counterparts.

Other studies exploring differences by age or age group and eating competence did not observe statistical significance among college student populations, which is comparable to findings from this study (p=0.17).[19,32] However, research conducted among adult populations has identified higher eating

competence scores among older individuals.[35,36] Additional investigation of the relationship between age or age group and eating competence is warranted, especially among college students.

Results from the current study suggest males may be categorized as eating competent more often than females (p=0.08). A greater percentage of male participants (n=111 out of 186, 60%) were considered eating competent compared to female participants (n=220 out of 427, 52%). Further investigation found males exhibited higher scores overall (33.32 ± 7.45) and within the four individual constructs (EA – 11.46 ± 2.83, CS – 10.14 ± 3.12, FA – 5.39 ± 2.26, IR – 6.34 ± 2.10) compared to females (overall – 32.08 ± 7.33, EA – 11.05 ± 2.74, CS – 9.63 ± 3.16, FA – 5.31 ± 2.17, IR – 6.09 ± 2.1.96). Moreover, differences in overall eating competence score by gender were identified as a trend towards statistical significance (p=0.06). When examining differences in eating competence by gender, most research literature supports these findings; males tend to exhibit higher food/nutrition aptitudes, including eating competence.[11,19,32] This is most likely due to both self and societal expectations females experience related to body image and weight status; female college students tend to exhibit more negative attitudes towards food and nutrition as well as complete physical well-being.[37,38] Surprisingly, multiple studies have concluded male students experience significantly greater weight gain throughout college and are more often classified as overweight or obese compared to female students; research proposes this may be due to poorer food and nutrition behaviors observed among male college students.[9,39–41] Both genders would be

benefit from improved eating competence to enhance food and nutrition attitudes as well as behaviors.

No significant differences between race/ethnicity, classification, or college and eating competence were observed. This implies future eating competence interventions completed on campuses should target the college student population as a whole instead of focusing on specific demographics. Future research should also continue to evaluate differences between various demographic variables and eating competence among college students, especially by categorization (competent vs. incompetent). In the meantime, results recommend development and implementation of interventions on campuses to improve eating competence within the entire college student population.

Food/Nutrition Aptitudes by Eating Competence

To our understanding, this is the first study to explore food/nutrition aptitudes by eating competence among a college student population. Results indicate participants categorized as eating competent had significantly higher food/nutrition aptitudes compared to those categorized as eating incompetent ($p<0.01$). This was expected, as the eating competence model and ecSI 2.0 instrument were developed to describe and measure food/nutrition aptitudes. These outcomes support the model and instrument as a means to explain and evaluate food/nutrition aptitudes. This supports prior studies examining the validation and reliability of the eating competence philosophy and the ecSI 2.0 tool.[16,18]

However, this is the first study to explore specific food/nutrition aptitudes by eating competence. More specifically, the survey primarily examined aptitudes related to contextual skills, one of the four individual constructs within the eating competence model; these included cooking skills/attitudes and grocery shopping self-efficacy. The relationship between cooking skills/attitudes and eating competence has not been documented in research, although several studies recognize a close connection between cooking skills/attitudes and improved eating behaviors (i.e. eating attitudes, contextual skills, food acceptance, internal regulation).[42–47] There is a paucity of research literature evaluating grocery shopping self-efficacy and its relationship to eating behaviors. The few studies that do exist within this field of study report a correlation between more positive food skills (i.e. grocery shopping self-efficacy being only one skill) and improved dietary intake, not necessarily better eating behaviors.[48–50] With extremely limited evidence available, further investigation of the relationship between grocery shopping self-efficacy and eating competence as well as eating behaviors is required to confirm or refute the connection between this food/nutrition aptitude and eating competence observed in this study.

The difference between healthy eating self-efficacy scores was also explored by eating competence. Again, participants categorized as eating competent had significantly higher scores compared to eating incompetent participants ($p<0.01$). This relationship is well-established within research literature, where individuals with higher eating competence exhibit increased healthy eating self-efficacy, both leading to improved eating behaviors.[16,18,51,52] Thus, improvements in eating

competence among college students will positively influence healthy eating self-efficacy and other food/nutrition aptitudes, resulting in better eating behaviors and subsequent physical well-being within the entire population.

Dietary Intake by Eating Competence

An exploration of dietary intake by eating competence category suggests eating competent college students have a significantly higher intake of fruit, vegetables, dietary fiber and various vitamins/minerals compared to eating incompetent college students ($p<0.01$). Although dietary intake of specific nutrients was estimated using the Block Fruit, Vegetable, & Fiber Screener, such a significant difference between competent and incompetent eaters implies eating competence may be an indicator of eating patterns within the college student population. To our understanding, this is the first study examining dietary intake of specific nutrients by eating competence among college students. Other studies have investigated the association between eating competence and broad eating patterns, for example meal/snack frequency, food preferences, and food frequency; results have indicated strong relationships exist.[16,18,51] One study assessed dietary intake of specific nutrients relative to eating competence among adults with one or more cardiovascular disease risk factors; the only statistically significant difference in dietary intake was increased sugar consumption among eating incompetent participants compared to their eating competent counterparts.[36] Continued research is needed to further examine the relationship between eating competence and dietary intake to support or oppose findings from this study.

Another important item to note from the dietary intake findings is the inadequate intake of fruit/vegetable servings, potassium, and dietary fiber among both competent (4.31 ± 0.10 servings/day, 3631.49 ± 50.56 mg/day, and 19.72 ± 0.34 g/day, respectively) and incompetent (3.57 ± 0.11 servings/day, 3289.23 ± 52.13 mg/day, and 17.44 ± 0.35 g/day, respectively) college students. Although mean fruit/vegetable servings consumed by competent and incompetent eaters was much higher than results from most other dietary intake studies within the population,[6,8,9,53–55] the estimation still did not meet current recommendations when one serving is converted to 0.5-cup equivalents.[56] With this conversion, the average consumption of fruits and vegetables per day would equate to approximately 2-cup equivalents, which is slightly less than half of the recommended 4.5-cup equivalents. Current potassium and dietary fiber intake among college students also did not meet national recommendations. According to the *2015-2020 Dietary Guidelines for Americans*, both are nutrients of public health concern due to low consumption across the general population.[56] Thus, interventions to increase consumption of potassium and dietary fiber implemented within the general population are also appropriate for the college student population. Previous research suggests improvements in food/nutrition aptitudes, such as eating competence, may be the best means to enhance the dietary intake of college students, since all are associated with more positive food and nutrition practices.[13,51,57] Results of this study reinforce these findings, as participants with higher eating competence exhibited higher food/nutrition aptitudes as well as dietary intake of specific nutrients.

The dietary intake of convenience and fast food were also statistically significant between eating competent and eating incompetent college students ($p=0.01$ and $p=0.03$, respectively). Participants categorized as competent reported lower consumption of convenience/fast food compared to their incompetent counterparts. Research literature exploring dietary intake by eating competence is extremely limited. To our understanding, this is the only study examining convenience and fast food consumption by eating competence. Further investigation is required to fully elucidate the relationship exists between dietary intake and eating competence, particularly among college students.

Correlations

The results from this study indicate moderate and statistically significant positive correlations between overall eating competence scores and all measured food/nutrition aptitudes (cooking skills, cooking attitudes, healthy eating self-efficacy, grocery shopping self-efficacy) among college students. These outcomes suggest the strength of the relationship between these variables to be modest but likely accurate and precise at a statistical significance level of $p<0.0001$. Of the correlations explored, cooking skills ($r=0.31$) and healthy eating self-efficacy (two instruments; $r=0.33$, $r=0.30$) had the strongest association with eating competence (overall and four individual constructs). The stronger correlations between these food/nutrition aptitudes and eating competence are likely related the similarities in measurement objectives of the individual instruments. For example, the cooking skills instrument measures one's ability to prepare meal/snacks using various methods and proficiencies, which correlates closely with contextual skills within the

eating competence philosophy and model. The healthy eating self-efficacy instruments measure one's resiliency related to making healthy eating choices and personal as well as environmental factors that impact one's food and nutrition choices. These measures are comparable to eating attitudes and food acceptance within the eating competence philosophy and model.

Surprisingly, grocery shopping self-efficacy (r=0.23) exhibited the weakest association with eating competence. The low correlation could be due to differences observed in measurement objectives. The grocery shopping self-efficacy instrument assesses one's confidence in his or her ability to identify and select items based on nutrient density. The eating competence instrument was developed to assess one's ability to experience positive relationship with food and nutrition, not necessarily his or her comprehension of nutrient density.

When exploring overall eating competence and estimated dietary intake of various foods and nutrients (fruit/vegetable servings, vitamin C, magnesium, potassium, dietary fiber), moderate (r=0.26-0.27) and statistically significant ($p<0.01$) positive correlations were identified. The relationship between eating competence and dietary intake may be attributed to the connection between attitudes (i.e. thoughts and beliefs) and behaviors. Oftentimes changes in attitude precede changes in behavior about a subject matter, such as food/nutrition. Thus, improved attitudes about food/nutrition, as measured by overall eating competence appears to correlate with improved dietary intake behaviors. However, this relationship was not observed between eating competence and convenience and fast food consumption. Again, it is possible differences in measurement objectives

likely led to the disconnect between overall eating competence and convenience/fast food frequency scores. Although this contradicts the idea of improved food/nutrition attitudes results in improved dietary intake behaviors, overall eating competence does not focus on changing specific attitudes and subsequent behaviors (i.e. convenience/fast food consumption). Instead, the model attempts to expand all food/nutrition attitudes to enhance not only dietary intake but also complete physical well-being. Therefore, the ecSI 2.0 instrument may not capture the very specific measure of convenience and fast food consumption and vice versa.

Of the four individual constructs that define overall eating competence, the strongest and most significant correlations with food/nutrition aptitudes as well as dietary intake among college students were observed within contextual skills ($r=0.26$-0.40, $p<0.01$) and food acceptance ($r=0.22$-0.36, $p<0.01$). The only exceptions occurred within convenience/fast food frequency, where weak (contextual skills) to no (food acceptance) association existed between these measures. Research has examined to some extent the relationship between contextual skills and food/nutrition aptitudes as well as dietary intake. Findings from one study suggest responsibilities and routines around meal and snack practices (i.e. contextual skills) strongly and significantly correlated to dietary habits (i.e. food/nutrition aptitudes and dietary intake).[58] There is limited evidence examining the relationship between food acceptance and food/nutrition aptitudes as well as dietary intake among college students; research is almost exclusively conducted within youth populations.[59–61] One hypothesis to support the stronger

correlations observed between these measures is the practice of food acceptance involves the application of food/nutrition aptitudes. For example, one may need to develop or expand cooking skills in order to be flexible and experiential with eating. Food acceptance also diversifies dietary habits, which has been found to improve dietary intake within both youth and adult populations.[56,59,62] Further research is required to prove or refute this proposed hypothesis.

Again, it is important to note the statistical significance of these correlations may not be of practical significance. Numerous studies have identified similar correlations between eating competence and food/nutrition aptitudes, dietary intake, and other physical well-being markers within the college student population.[32,34,51] Future research should continue to investigate the results from this study to conclude if the ecSI 2.0 instrument can be applied to correctly predict or measure food/nutrition aptitudes as well as dietary intake within diverse populations, including college students.

Strengths and Limitations

This study had several strengths as well as limitations. The demographics of participants reflected the college student population demographics enrolled at the Midwestern University. The use of valid and reliable individual survey instruments was also strength. The study evaluated various demographic variables, food/nutrition aptitudes, and dietary intake by eating competence, which has not yet been explored in research literature. One major limitation was correlational statistical analyses. As one of the weaker tests that can be conducted, the findings from these statistical analyses must be carefully interpreted. The correlations

between eating competence and measured food/nutrition aptitudes as well as dietary intake simply identify a relationship or association not necessarily causation. Other limitations include self-election to participate in the survey and lack of generalizability to the college student population nationally as well as globally.

Conclusions

The results from this survey suggest nominal eating competence, food/nutrition aptitudes, and dietary intake among college students. Overall eating competence appears to be influenced by gender as well as impact food/nutrition aptitudes and dietary intake of college students. Specifically, males are categorized as eating competent more often than females. Also, eating competent college students exhibited more positive food/nutrition aptitudes and dietary intake compared to their eating incompetent counterparts. Outcomes indicate eating competence corresponds with other measures of food/nutrition aptitudes as well as dietary intake; the positive correlations found between these indices were weak to moderate but statistically significant. Future research should continue to evaluate the connection between eating competence and various demographic variables as well as the effects of eating competence on food/nutrition aptitudes and dietary intake.

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Conflict of Interest Disclosure

The authors reported no conflict of interest.

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Table 1-1. Participant Demographic Information

Survey Item	College Students		Eating Incompetent[1]		Eating Competent[2]		Signi-ficance[3] (p=)
	Sample Size (n=)	Percent (%)	Sample Size (n=)	Percent (%)	Sample Size (n=)	Percent (%)	
Participants (n=)	615	100	282	100	333	100	-
Age (years)							
18-19	223	36	110	39	113	34	0.17
20-21	202	33	91	32	111	33	
22-23	72	12	37	13	35	11	
24-25	35	5	13	5	22	6	
26-29	41	7	12	4	29	9	
30+	42	7	19	7	23	7	
Gender							
Male	186	30	75	27	111	33	0.08
Female	427	70	207	73	220	66	
Prefer Not to Specify	2	<1	0	0	2	<1	
Race/ Ethnicity							
White, Caucasian, American	511	83	239	85	272	82	0.53
Other	96	16	39	14	57	17	
Prefer Not to Specify	8	1	4	1	4	1	
Classification							
Freshman	133	22	65	23	68	20	0.20
Sophomore	95	15	42	15	53	16	
Junior	127	21	62	22	65	20	
Senior	135	22	67	24	68	20	
Graduate Student	125	20	46	16	79	24	

Table 1-1. (continued)

Survey Item	College Students		Eating Incompetent[1]		Eating Competent[2]		Signi-ficance[3] (p=)
	Sample Size (n=)	Percent (%)	Sample Size (n=)	Percent (%)	Sample Size (n=)	Percent (%)	
College							
Agriculture	150	24	72	26	78	24	0.75
Business	40	6	15	5	25	7	
Design	20	5	15	5	14	4	
Engineering	139	23	59	21	80	24	
Human Sciences	102	17	48	17	54	16	
Liberal Arts	129	21	64	23	65	20	
Veterinary Medicine	24	4	8	3	16	5	

[1]Eating Incompetent defined as ecSI 2.0 score < 32.
[2]Eating Competent defined as ecSI 2.0 score ≥ 32.
[3]Statistical Significance p ≤ 0.05 (two-tailed); chi-square test.

Table 1-2. Food/Nutrition Aptitudes by Eating Competence Category

Food/Nutrition Aptitude	Possible Points (out of)	Eating Incompetent[1] Mean±SEM	Eating Competent[2] Mean±SEM	Significance (p=)[3]
Eating Competence (ecSI 2.0)	48	26.05 ± 0.26	37.90 ± 0.24	<0.01
Eating Attitudes	15	9.27 ± 0.14	12.79 ± 0.10	<0.01
Contextual Skills	15	7.65 ± 0.15	11.58 ± 0.13	<0.01
Food Acceptance	9	4.24 ± 0.12	6.28 ± 0.11	<0.01
Internal Regulation	9	4.89 ± 0.11	7.25 ± 0.08	<0.01
Cooking Skills	60	43.70 ± 0.53	48.26 ± 0.47	<0.01
Cooking Attitudes	20	14.00 ± 0.21	15.74 ± 0.19	<0.01
Healthy Eating Self-efficacy 1	20	13.62 ± 0.16	15.06 ± 0.15	<0.01
Healthy Eating Self-efficacy 2	54	30.41± 0.52	34.89 ± 0.46	<0.01
Grocery Shopping Self-efficacy	40	28.24 ± 0.41	30.56 ± 0.37	<0.01

[1]Eating Incompetent defined as ecSI 2.0 score < 32.
[2]Eating Competent defined as ecSI 2.0 score ≥ 32.
[3]Statistical Significance p ≤ 0.05 (two-tailed); independent samples t-test.

Table 1-3. Dietary Intake by Eating Competence Category

Dietary Intake (FFQs)	RDA[1]	Eating Incompetent[2] Mean±SEM	Eating Competent[3] Mean±SEM	Significance (p=)[4]
Convenience Food[5]	-	43.3 ± 0.74	40.38 ± 0.71	0.01
Fast Food[6]	-	9.38 ± 0.17	8.91 ± 0.15	0.03
Fruit & Vegetable Servings	2 c. & 2.5 c. equivalents	3.57 ± 0.11	4.31 ± 0.10	<0.01
Vitamin C (mg/day)	90/75	130.42 ± 2.86	149.19 ± 2.74	<0.01
Magnesium (mg/day)	400/310	349.09 ± 5.44	384.51 ± 5.30	<0.01
Potassium (mg/day)	4700	3289.23 ± 52.13	3631.49 ± 50.56	<0.01
Dietary Fiber (g/day)	34/28	17.44 ± 0.35	19.72 ± 0.34	<0.01

[1]RDA: Recommended Dietary Allowance; RDA for fruit/vegetable servings based on a 2,000 Calorie/day diet; all other RDAs for males/females 19-30 years.
[2]Eating Incompetent defined as ecSI 2.0 score < 32.
[3]Eating Competent defined as ecSI 2.0 score ≥ 32.
[4]Statistical Significance $p \leq 0.05$ (two-tailed); independent samples t-test.
[5]Convenience Food: out of 127 possible points; lower score indicates lower dietary intake.
[6]Fast Food: out of 30 possible points; lower score indicates lower dietary intake.

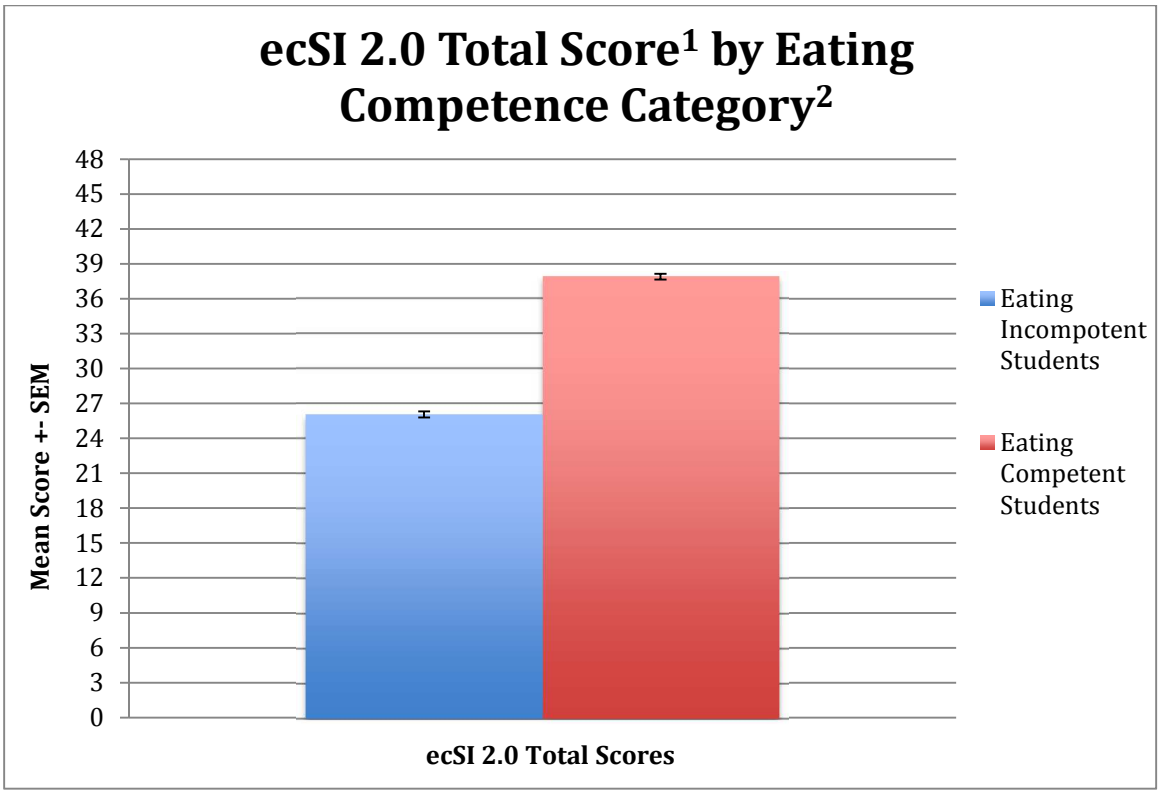

Figure 1-1. ecSI 2.0 Total Score by Eating Competence Category

[1]ecSI 2.0 total score: out of 48 possible points.
[2]Categories: eating incompetent defined as ecSI 2.0 score < 32; eating competent defined as ecSI 2.0 score ≥ 32.

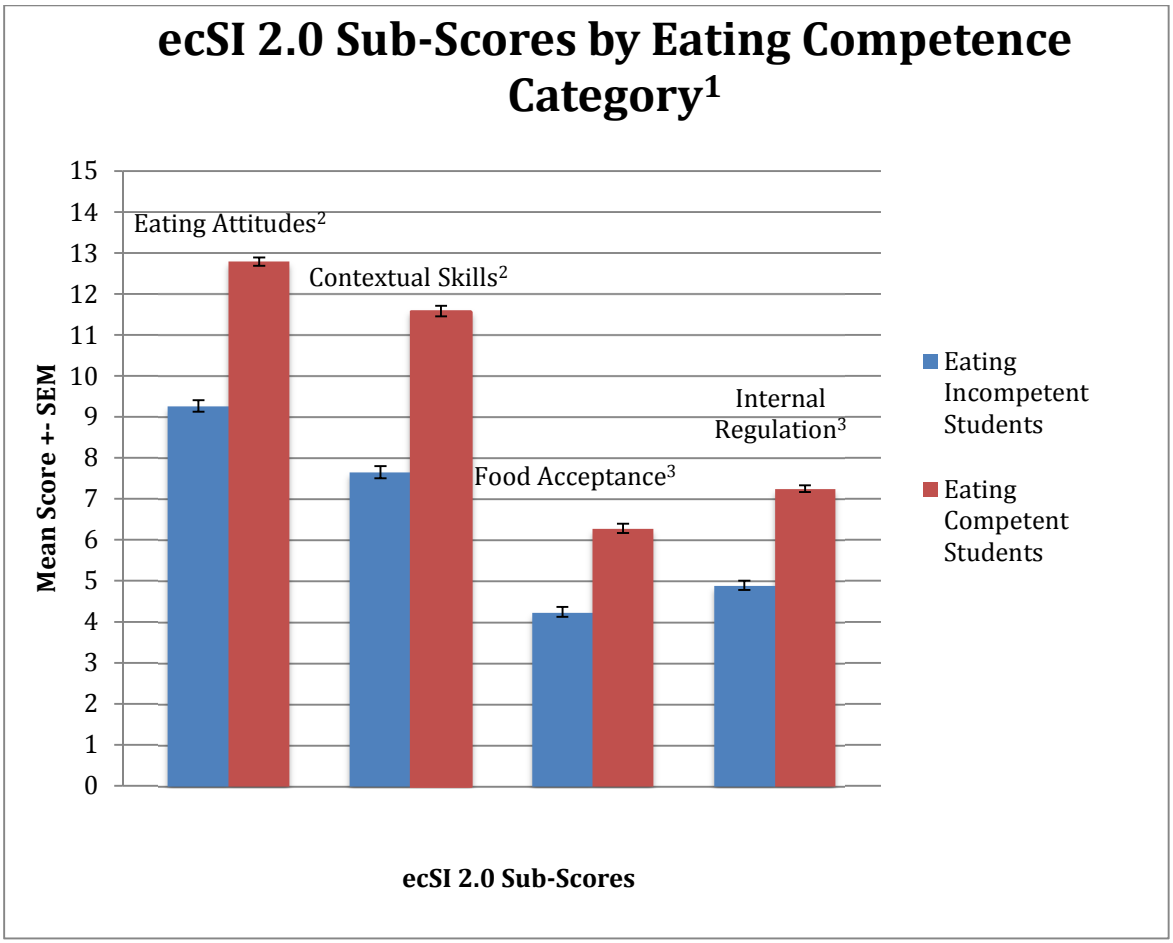

Figure 1-2. ecSI 2.0 Sub-Scores by Eating Competence Category

[1]Categories: eating incompetent defined as ecSI 2.0 score < 32; eating competent defined as ecSI 2.0 score ≥ 32.
[2]Eating Attitudes/Contextual Skills sub-scores: out of 15 possible points.
[3]Food Acceptance/Internal Regulation sub-scores: out of 9 possible points.

CHAPTER 5. EFFECTS OF A *CULINARY BOOT CAMP* INTERVENTION ON FOOD/NUTRITION APTITUDES AND DIETARY INTAKE OF COLLEGE STUDENTS

A paper to be submitted to the Journal of American College Health

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Abstract

Introduction: College is characterized by transition, students shifting from dependence to independence in numerous roles/responsibilities. Deficiencies in food/nutrition aptitudes and dietary intake exist, as reflected by declining physical well-being and poor eating patterns/practices within the population. Studies examining interventions to improve food/nutrition aptitudes and dietary intake among college students are limited. ***Methods:*** A nutrition education program, *Culinary Boot Camp* (*CBC*), was developed and delivered to college students at a land-grant university. Online surveys assessed food/nutrition aptitudes and dietary intake pre-/post-intervention. ***Results:*** Of 86 *CBC* participants, 71 completed pre-surveys and 46 completed post-surveys. Change in several food/nutrition aptitudes was statistically significant ($p \leq 0.05$); aptitudes with the greatest change included cooking skills/attitudes and grocery shopping self-efficacy ($p < 0.01$). The most significant change in dietary intake included convenience food consumption ($p = 0.03$) and fruit/vegetable servings ($p = 0.06$) ***Conclusions:*** Results suggest *CBC* is an effective nutrition education program to improve food/nutrition aptitudes and dietary intake among college students.

Introduction

Background

For most students, college is considered a state of transition from dependence to independence. This includes caring for overall physical well-being through development of countless health practices, such as food/nutrition. The impact of physical well-being and food/nutrition is oftentimes overlooked in college, as students must learn several new roles, responsibilities, and practices.[1,2] Not surprisingly, college students tend to prioritize those perceived to be most important in the present moment – academics, employment, and socialization. Overall physical well-being and food/nutrition are not perceived as pertinent.[2,3] This is alarming, as health practices including food/nutrition established during the transition from adolescence to adulthood have been found to last throughout life.[4,5]

The most recent nationwide report on college student wellness indicated only 47.5% of the population rated their overall health as very good or excellent. The majority of college students also were within normal classification for Body Mass Index (61.5%, BMI 18.5-24.9kg/m^2), a weight measure commonly employed to assess physical well-being. Yet, the prevalence of overweight (BMI 25.0-29.9kg/m^2) and obesity (BMI >30.0kg/m^2) continues to rise (21.8% overweight, 11.8% obese) each year In fact, the mean BMI (25.20kg/m^2) within the population has now reached overweight classification.[6]

Research suggests the rise in overweight/obesity observed among college students strongly correlates with their current food/nutrition aptitudes, dietary intake and overall eating patterns.[4,7] Only 4.8% of the population consumes five or

more fruit/vegetable servings per day, while 8.4% do not consume any fruits/vegetables at all.[6] Multiple studies conclude college student diets are not only deficient in fruits/vegetables but also nutrient-dense food from all five major food groups.[8,9] Although few studies have examined overall eating practices of the population, research suggests young adults have the poorest nutrition when compared to all other age categories.[8,10] Additional research indicates considerable deficits in food/nutrition aptitudes such as eating competence, cooking skills, and healthy eating self-efficacy.[11–14] These deficits greatly contribute to poor eating patterns within the population; several studies suggest food/nutrition aptitudes are strongly associated with dietary intake and overall eating patterns.[11–17]

Objective

The primary objective of this study was to evaluate a nutrition education program, *Culinary Boot Camp* (*CBC*), on improving food/nutrition aptitudes and dietary intake among college students. A secondary objective explored the influence of various demographic variables on food/nutrition aptitudes and dietary intake.

Materials and Methods

Development of CBC

Implementation of the nutrition education program *CBC* and all related research activities occurred at a land-grant university in the Midwest. Approval from the governing Institutional Review Board (IRB) was received prior to implementation.

Development of *CBC* began with inspiration from a one-night nutrition education and culinary class offered to all college students/employees through the Culinary Food Science Club. The overwhelming response established an interest in a nutrition education and culinary class across campus. An extensive literature review on food/nutrition aptitudes and dietary intake of college students/employees was completed to further establish the need for an intervention. These findings guided development and delivery of an expanded *CBC* event, with the overall goal of improving several food/nutrition aptitudes and dietary intake among college students and employees. This paper will focus on development, implementation, and evaluation of *CBC* for the college student population.

The *CBC* curriculum applied the Social Cognitive Theory (SCT)[18] and Eating Competence Model (ecSatter)[19] as well as the *2015-2020 Dietary Guidelines* and its consumer translation *MyPlate*.[20] Both personal and environmental factors from the SCT were integrated into curriculum. Examples of personal factors applied from the SCT into *CBC* include self-efficacy and self-regulation, which were incorporated through goal setting and group support activities. Different environmental factors employed throughout *CBC* include facilitators and motivators, which were integrated primarily through provision of cooking utensils, supplies, and recipes/resources and gift cards to local grocery stores.

The ecSatter is a food/nutrition philosophy that emphasizes building a positive relationship with food through personal reflection on overall eating perspectives and practices. It encompasses four individual constructs: 1) eating attitudes, 2) contextual skills, 3) food acceptance, and 4) internal regulation. The

ecSatter was implemented through application of the mindful eating philosophy, which included explanations and exercises of mindful eating components at classroom lessons and mealtimes. Participants were also encouraged to practice mindful eating outside of *CBC* and share their experiences with one another each week during the classroom lesson or mealtime.

The *2015-2020 Dietary Guidelines* provided the principal recommendations to encourage healthy eating patterns across the lifespan that support physical well-being and reduce the risk of chronic diseases. All five food groups outlined in *MyPlate* were also incorporated along with associated topics such as moderation and variety, nutrients of public health concern, and achievement of overall healthy eating patterns through a balanced plate.

Other topics implemented into *CBC* curriculum were cooking and grocery shopping skills/self-efficacy. These topics have been identified of interest by the target population with considerable opportunity for improvement.[12,21] All sessions contained traditional didactic content as well as experiential learning activities to enhance cooking and grocery shopping skills/self-efficacy. The content was covered primarily within cooking demonstrations/experiences.

Delivery of CBC

CBC was delivered as a four-week interactive experience for college students. The first three sessions were two hours in length and included a 30-minute classroom lesson, 15-minute cooking demonstration, 55-minute cooking experience, and 20-minute mealtime. The fourth session was one hour and 30 minutes in length

and included a 30-minute classroom lesson and 60-minute grocery store tour. Table 1 provides an outline of all four sessions.

Prior to delivery of each session, all *CBC* support staff (faculty, registered dietitian nutritionists [RDNs]) or volunteers (chefs, students) were trained in their roles and responsibilities by the coordinator. The first three sessions took place in university classroom kitchens. Each started with a lesson taught by the coordinator and cooking demonstration performed by a University Dining chef. One of two campus RDNs was also present to answer any questions requiring professional insight. For the cooking experience, participants were divided into 8-10 groups of 3-5 individuals. The coordinator, support staff, and chef supervised all cooking experiences. A student volunteer was present in each kitchen to assist participants with various culinary tasks throughout the experience. At the end of each session, participants took part in a mealtime and mindful eating exercise guided by the coordinator or RDN. Participants received a reusable grocery bag filled with relevant cooking utensils, supplies, and recipes/resources from local commodity groups at the conclusion of each of the first three *CBC* sessions.

The fourth session of *CBC* took place at two local grocery stores. Participants were divided into four groups of 10-13 people, with two groups at each grocery store. The first group started with the grocery store tour, while the second group began with the classroom lesson; the two groups then switched. The RDN employed at each grocery store led tours, while the coordinator and/or a graduate student taught classroom lessons. Participants who completed all four *CBC* sessions received

a 15-dollar gift card to the grocery stores at the end of the final session as an incentive.

Study Sample/Population

Two *CBC* events were offered to all college students, one in Fall 2017 and the other in Spring 2019. All advertisement, recruitment and registration began three weeks prior and ended three days before the first session. Marketing efforts included a mass email sent to all currently enrolled students, social media posts on the Department of Food Science and Human Nutrition, University Dining, and Student Wellness websites/accounts, as well as posters/ fliers displayed across campus. A capacity of 50 participants was set for *CBC*, with an additional 25-person waiting list. Participants paid a one-time 15-dollar fee to attend the event.

Measures

CBC was evaluated using pre-, post-, and follow-up surveys. Several individual survey instruments were included to assess various food/nutrition aptitudes (eating competence,[22] cooking skills/attitudes,[23] healthy eating self-efficacy,[24,25] grocery shopping self-efficacy[26]) as well as dietary intake (convenience/fast food frequency questionnaires,[27,28] brief fruit/vegetable/fiber screener[29]). Instruments used to evaluate personal factors within the SCT were cooking skills/attitudes, healthy eating self-efficacy, and grocery shopping self-efficacy; environmental factors within the SCT were assessed using convenience/fast food frequency questionnaires. Behavior change arising from change in personal/environmental factors was evaluated with the brief fruit/vegetable/fiber screener. Eating competence was assessed using the ecSI 2.0

individual survey instrument, which was developed as a comprehensive evaluation tool to assess overall eating competence as well as individual constructs of the model.[22] The instruments to evaluate cooking and grocery shopping included cooking skills/attitudes and grocery shopping self-efficacy tools.

All individual survey instruments were tested and established as valid and reliable tools. Each of the instruments employed Likert-scale statements/questions, with a range of four to seven point scales. The points from each scale item were summed to provide a total score for each individual instrument, with more favorable or optimal food/nutrition aptitudes and dietary intake signified by higher scores; the exception being convenience/fast food frequency questionnaires, where lower scores indicated less consumption. The ecSI 2.0 was the only individual instrument to establish a minimum score to define sufficiency or deficiency for the food/nutrition aptitude being evaluated; a score ≥32 denotes eating competence, while a score <32 designates eating incompetence. The brief fruit/vegetable/ fiber screener employed prediction equations to estimate daily fruit/vegetable servings as well as vitamin C, magnesium, potassium, and dietary fiber intake from total scores. Table 2 provides an overview of all individual survey instruments. The survey also captured various demographic variables – age, gender, and race/ethnicity (open-ended) as well as classification and college (multiple choice).

The survey was administered using an online survey system (Qualtrics, Provo, UT). All participants were asked to acknowledge an electronic informed consent document prior to completing the survey. The survey was administered to all *CBC* participants one week before (pre-) as well as one day (post-) and six

months (follow-up) after the event. Researchers clearly communicated all surveys as optional to *CBC* participants; completion of surveys was not necessary to take part in the *CBC* program. All individuals who completed the entire pre-survey within ten days of distribution were included in statistical analyses. Both post- and follow-up surveys were matched to corresponding pre-survey using university ID numbers. If *CBC* participants did not complete post- or follow-up surveys, pre-survey scores were used in place of these measures to conduct intent to treat analysis. Only pre- and post-survey statistical analyses will be discussed in this paper, as data collection from follow-up surveys is still underway.

Statistical Analysis

Statistical analyses were completed using Statistical Package for Social Sciences software program (IBM, SPSS v25). An alpha level of 0.05 ($p \leq 0.05$) was set to signify statistical significance, while an alpha level of 0.10 ($p \leq 0.10$) signified a trend. Descriptive statistics were performed to explore various demographic variables of student *CBC* participants. Independent samples t-tests were conducted to examine the influence of demographics on food/nutrition aptitudes and dietary intake measures as well as corresponding change scores (post- minus pre-). Paired samples t-tests with post-hoc adjustments (Bonferroni) were performed to evaluate change in aptitudes and intake pre- to post- intervention.

Results

A total of 86 college students participated in the two *CBC* events; 71 completed pre-surveys within ten days of distribution, and only 46 participants

completed both pre- and post-surveys. Those not completing post-surveys (n=25) were included in all statistical analyses; pre-survey scores acted as post-survey scores to complete intent to treat analysis. The average age of *CBC* participants was 21.75±4.32 years, with a majority in the 18-19 years (n=21, 30%) and 20-21 years (n=24, 34%) age groups. *CBC* attendees were primarily female (n=46, 65%), and most identified themselves as White/Caucasian/American (n=49, 69%). Additionally, participants were predominantly classified as juniors (n=23, 32.50%) and seniors (n=18, 25.50%). The majority of *CBC* participants were completing their studies in the College of Engineering (n=19, 27%), Human Sciences (n=15, 21%), or Liberal Arts (n=17, 24%). Please refer to Table 2-3 for detailed demographics of *CBC* attendees. Noteworthy is the high retention rate (85%) for all four of the *CBC* sessions.

CBC participant change scores were examined by various demographic variables (age, gender, race/ethnicity, classification, college) to explore potential associations. Independent samples t-tests and ANOVA identified no statistically significant outcomes ($p>0.05$). When examining raw change score data and paired samples t-test results, several statistically significant improvements were observed.

The food/nutrition aptitude with smallest change score relative to total possible points was eating competence (0% increase); no statistical significance was noted pre- to post-intervention for this measure ($p=0.68$). However, the individual construct score of contextual skills did exhibit a trend towards statistical significance ($p=0.09$). Surprisingly, two other individual construct scores (eating attitudes, internal regulation) decreased from pre- to post-intervention.

Food/nutrition aptitudes with the greatest improvements in comparison to total possible points included cooking skills (6% increase), cooking attitudes (19% increase), and grocery shopping self-efficacy (10% increase); all measures improved significantly ($p<0.01$) pre- to post-intervention. Both measures of healthy eating self-efficacy demonstrated statistically significant differences ($p\leq0.05$) pre- to post-intervention. However, healthy eating self-efficacy I decreased ($p<0.01$), while healthy eating self-efficacy II increased ($p=0.05$).

Dietary intake with the greatest change pre- to post-intervention included estimated fruit/vegetable servings ($p=0.06$) and convenience food frequency ($p=0.03$; consumption of both increased. All additional estimated intake scores from the brief fruit/vegetable/fiber screener (vitamin C, magnesium, potassium, dietary fiber) exhibited a positive trend ($p\leq0.10$). The dietary intake measure with the least change pre- to post-intervention was fast food frequency ($p=0.65$), where a slight increase in consumption occurred. Please see Table 2-4 to view all food/nutrition aptitudes as well as dietary intake pre-, post-, and change scores of *CBC* participants.

Discussion

Descriptive statistics of various demographic variables provide an indication of those college students most interested in nutrition education and culinary classes. The average age (21.75±4.32 years) and largest age group (30% 18-19 years, 34% 20-21 years) of *CBC* participants suggests the traditional college student audience attended the event; national reports indicate the typical age range of this population to be 18-24 years (79%).[6] The majority of *CBC* participants were female and

White/Caucasian/American, a common finding within college student nutrition education programs.[30–34] In contrast, more upperclassmen (72% juniors, seniors, graduate students) participated in the event and surveys compared to underclassmen (28% freshmen, sophomores), which is opposite of similar studies in research literature. However, the majority of interventions and surveys in research literature specifically target underclassmen and exclude upperclassmen.[30–32,35–37] The current results suggest all college students, regardless of classification, are interested in nutrition education and culinary classes. *CBC* participants represented all colleges on campus, with the greatest percentages coming from both related fields (15% College of Human Sciences) and unrelated fields (19% College of Engineering, 17% College of Liberal Arts). Again, this suggests students across campus are interested in nutrition education and culinary classes. Limited research literature exists that evaluates participation of students by discipline, but many studies occur within populations studying related fields (nutrition, exercise physiology, health sciences, etc.).[30,32,35,36] Our findings suggest marketing strategies targeting students in all classifications/colleges on campus is fitting and may increase overall participation in nutrition education programs.

Surprisingly, there was no significant difference in food/nutrition aptitudes and dietary intake change scores by various demographic variables. There is a lack of research literature examining the effects of demographics on pre- to post-intervention outcomes. The limited studies that do exist indicate differences in outcomes by gender as well as classification.[35,38] Although most research suggests females have higher motivation as well as positive attitudes/behaviors related to

food/nutrition,[32,33] one study evaluating differences in outcomes by gender found males reported greater improvement in general health pre- to post-intervention.[38] When exploring differences by classification, another study found considerably high attritions rate among freshmen participants, which may impact intervention outcomes.[35] The lack of differences in change scores by demographics indicates *CBC* is equally effective for all college students. Further investigation of differences in pre- to post-intervention outcomes by various demographic variables is recommended to confirm or refute these findings.

Change in eating competence scores among *CBC* participants were not significantly different pre- to post-intervention (0.21±0.52 points, 0% increase, p=0.68). This finding was somewhat surprising, as this aptitude was another primary topic for the nutrition education program. To emphasize eating competence throughout the nutrition education program, a mindful eating explanation/exercise occurred in one classroom lesson and mindful eating exercises were applied within each of three mealtimes; thus, a greater impact was expected. Although limited, other studies evaluating eating competence among college students report a similar small change in scores over time.[38,39] Additional studies suggest long-term measures may be a better indicator of intervention effects on eating competence compared to short-term measures.[40,41] Improvements in this food/nutrition aptitude oftentimes occur progressively; so pre- to post-measures (four weeks) may be too brief to see any significant differences. Thus, evaluation of eating competence over an extended period of time is recommended. Future statistical analyses on data collection from

follow-up surveys (six months) will likely be more reflective of *CBC*'s impact on participants' eating competence.

Despite the lack of improvement in overall eating competence, a positive trend was observed within the contextual skills construct (p=0.09). This construct focuses on the ability to develop and maintain structure within meal/snack planning and preparation (i.e. cooking and grocery shopping aptitudes). This finding is promising, as the two other principal objectives of *CBC* included improvement of cooking and grocery shopping skills/self-efficacy. Again, long-term measures will hopefully help reinforce or refute this finding from short-term measures.

The majority of other food/nutrition aptitudes of *CBC* participants exhibited considerable improvements pre- to post-intervention. This suggests the nutrition education program improved most targeted food/nutrition aptitudes among college students. The greatest improvement occurred in cooking skills (3.89±0.64 points, 6% increase, $p<0.01$), cooking attitudes (3.79±0.68 points, 19% increase, $p<0.01$) and grocery shopping self-efficacy (4.03±0.90 points, 10% increase, $p<0.01$). These results are especially encouraging, as these aptitudes were primary topics implemented into *CBC* curriculum. Development of cooking skills/attitudes were emphasized throughout the cooking demonstrations/experiences during the first three sessions, while grocery shopping self-efficacy was accentuated through the store tour and meal planning/grocery list making lesson during the fourth session. Results suggest the *CBC* curriculum was effective in producing desired outcomes.

Opposite effects were observed within healthy eating self-efficacy measures pre- to post- intervention. Surprisingly, the healthy eating self-efficacy I instrument

exhibited a statistically significant decrease ($p<0.01$), while healthy eating self-efficacy II instrument depicted a statistically significant increase ($p=0.05$) among *CBC* participants. Although both instruments were developed to assess healthy eating self-efficacy, the specific confidences measured were comparatively different. The first instrument measured one's resiliency relative to making healthy eating choices, while the second instrument asked about personal and environmental factors that may impact one's food/nutrition choices.[24,25] The significant decrease identified within healthy eating self-efficacy I may be attributed to the scheduling of *CBC*, which began (pre-survey) at the start of the academic semester and ended (post-survey) near mid-semester exams. Research literature suggests resiliency in regards to performing many positive health habits decreases with time constraints and additional stress, which most likely occur while preparing for important exams.[2,13,17,42] The significant increase found within healthy eating self-efficacy II can be credited to its close connection with the SCT, one of the primary behavior change theories implemented into *CBC* curriculum. The nutrition education program aimed to improve personal and environmental factors through incorporation of goal setting and group support activities as well as provision of cooking supplies and gift cards. This finding indicates the SCT was effectively integrated into *CBC* curriculum.

Estimated intake of fruit/vegetable servings, vitamin C, magnesium, potassium, and dietary fiber exhibited positive trends ($p\leq0.10$). Although only a trend, the improvement in estimated fruit/vegetable servings is encouraging; this finding suggests *CBC* not only improved participant attitudes but also behaviors related to food/nutrition. Similar nutrition education and culinary classes have

demonstrated mixed results; almost all found increased fruit/vegetable consumption following an intervention, but a few studies also reported decreased consumption.[11,31–33] Continued research is required to conclude whether or not nutrition education and culinary classes are effective at expanding fruit/vegetable consumption among college students, as national reports propose an increase is very much needed.[6,43]

To our knowledge, this is the first study to examine the impact of a nutrition education and culinary class on dietary intake of various micronutrients. Several other studies have explored the influence of similar interventions on dietary intake of macronutrients (kcals, carbohydrates, fat, protein) or specific food groups (fruits, vegetables, whole grains).[31–34] The effect of *CBC* and similar nutrition education programs on intake of other essential nutrients, particularly those identified a public health concern (i.e. potassium, dietary fiber), is critical to ensure interventions change not only food/nutrition attitudes but also behaviors of the target populations. Continued research, especially long-term, is required to determine the effectiveness of *CBC* on improving participant dietary intake of various essential micronutrients.

A statistically significant increase in convenience food frequency was observed (p=0.03). pre- to post-intervention. This finding was somewhat surprising; the increase in cooking/grocery shopping aptitudes, as observed among *CBC* participants, has previously been associated with a decrease in convenience food consumption.[27] Additional research literature exploring the relationship between cooking/grocery shopping aptitudes and convenience food consumption is limited.

One hypothesis to explain the observed increase is the scheduling of *CBC*. The beginning of the nutrition education program (pre-survey) paralleled the beginning of the academic semester, while the end (post-survey) occurred close to mid-semester exams. Several studies suggest an increase in convenience food consumption among college students with time constraints and additional stress, which arise while studying for exams.[9,13,17,44] Exploration of the relationship between cooking/grocery shopping aptitudes as well as environmental factors (i.e. time, stress) and convenience food frequency is recommended to identify if *CBC* and similar nutrition education programs can decrease consumption regardless of external circumstances.

The only dietary intake measure exhibiting little difference pre- to post-intervention was fast food frequency ($p=0.65$). A decrease in consumption was expected to correspond with the observed increase in cooking/grocery shopping aptitudes, as previous research suggests a strong inverse relationship between fast food frequency and these aptitudes. [10,16] However, it appears *CBC* had no effect on this particular dietary intake habit among college students. No other studies have examined the effects of a nutrition education and culinary class on fast food consumption. Further investigation is warranted to determine if long-term outcomes from *CBC* and similar interventions demonstrate a decrease in fast food consumption due to incorporation of cooking/grocery shopping aptitudes over time.

Limitations

Multiple limitations exist within this study. All *CBC* participants chose to participate in the intervention and surveys. Lack of randomization may limit the

generalizability of the results. *CBC* participants were likely more motivated and willing to improve food/nutrition aptitudes as well as dietary intake. Another important limitation to consider is subject response bias. There is a possibility that survey responses reflect what *CBC* participants believed researchers wanted to receive. This is a prominent limitation identified within subjective pre- to post-intervention outcomes. One final study limitation to note is evaluation of only short-term measures. As data collection from follow-up surveys is ongoing, future investigation of long-term outcomes is recommended; long-term measures appear to be a much better indicator of effectiveness, so it is critical to interpret these short-term results cautiously.

Strengths

This study also exhibited many strengths. *CBC* development incorporated several behavior change theories/models into curriculum. Numerous studies and reviews suggest this strategy elicits superior behavior change outcomes compared to interventions lacking or integrating only one theory/model.[45–47] *CBC* delivery involved an active and engaging experience at each session, which research literature also suggests to be most effective when attempting to achieve behavior change.[46,48] *CBC* occurred over a brief time period with high contact frequency. This strategy is preferred among college students as well as produces similar outcomes to prolonged interventions.[13,49–51] Finally, consideration of intent to treat within statistical analyses substantially increases the strength of study outcomes.

Conclusion

Results from this study suggest *CBC* is an effective nutrition education program that improves several food/nutrition aptitudes and dietary intake among college students. The greatest improvements in food/nutrition aptitudes occurred in cooking skills/attitudes and grocery shopping self-efficacy. The only aptitude that did not exhibit a significant improvement was eating competence. Additionally, all dietary intake measures demonstrated statistically significant or trends towards significant increases, with the exception of fast food frequency. These findings suggest continued implementation of *CBC* on campus would be advantageous for all college students to enhance their aptitudes and dietary intake required to achieve better food/nutrition practices.

Yet, future research is needed to explore different strategies that may lead to greater improvements in eating competence; this would include continued evaluation of differences between short-term and long-term measures. Future research should also continue to examine the effectiveness of this nutrition education program and similar interventions on improving food/nutrition aptitudes and dietary intake among college students to reinforce the conclusions from this study. Implementation of *CBC* or similar interventions across campuses nationwide and around the world has the potential to enhance the overall physical well-being of college students through improvements in food/nutrition aptitudes and dietary intake.

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Declaration of Interest Statement

All authors report no declarations of interest.

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Table 2-1. Culinary Boot Camp Session Outline

Week	Classroom Lesson Title	Classroom Lesson Topics	Cooking Demonstration/ Grocery Store Tour Topics	Cooking Experience/ Grocery Store Tour Activities	Mealtime
1	Versatile Fruits & Vegetables	- goal setting - group support - mindful eating - health benefits - variety - seasonality - incorporation into daily diet	**Knife Skills** - types - uses - chopping - dicing - mincing - slicing	**F & V Salsas** - fresh tomato - roasted corn - bean - fruit **Tortilla Chips** - whole wheat - corn	- mindful eating - Q&A
2	Great Grains & Delightful Dairy	- goal setting - group support - health benefits - variety - incorporation into daily diet - individualized nutrition needs - food allergies & intolerances	**Stovetop Basics** - sautéing - stir-frying - boiling - steaming **Omelet Preparation** - safety - skills	**Student Recipes** - F & V Grilled Cheese - Build Your Own Omelets **Employee Recipes** - Scrambled Egg Muffins - Skillet Lasagna	- mindful eating - Q&A
3	Protein Power	- goal setting - group support - health benefits - variety - incorporation into daily diet - individualized nutrition needs - food safety	**Protein Preparation** - safety - types - uses - marinating - cooking - carving **Whole Chicken Cutting**	**Chili** - classic beef - white turkey - black bean & pork - edamame	- mindful eating - Q&A

Table 2-1. (continued)

Week	Classroom Lesson Title	Classroom Lesson Topics	Cooking Demonstration/ Grocery Store Tour Topics	Cooking Experience/ Grocery Store Tour Activities
4	Success Going to the Grocery Store	- goal setting - group support - meal planning - grocery list making	- food & beverage identification - food & beverage selection - organic vs. conventional - fresh produce - canned goods - breads, grains, & cereals - dairy - meat, poultry, & seafood - frozen items - snacks - beverages	- navigating the nutrition facts label - fresh produce ripeness/readiness - spot the sodium (canned goods, dairy) - spot the added sugars (canned goods, dairy) - is it whole grain? - favorite cereal challenge - favorite frozen item challenge - favorite snack challenge

Table 2-2. Individual Survey Instruments

Instrument	Number of Statements/ Questions	Likert-Scale Points	Total Possible Points	Example Statement/Question
Eating Competence (ecSI 2.0)	16	0-3 (never – always)	48[1] 15 – EA, CS 9 – FA, IR	"I am comfortable with my enjoyment of food & eating."
Cooking Skills	12	1-5 (not at all confident – very confident)	60	"Indicate the extent to which you feel confident… using knife skills in the kitchen."
Cooking Attitudes	4	1-5 (strongly agree – strongly disagree)	20	"I do not like cooking because it takes too much time."
Grocery Shopping Self-Efficacy	8	1-5 (not at all confident – very confident)	40	"How confident are you in your ability to… select foods low in saturated fat?"
Healthy Eating Self-Efficacy I	5	1-4 (not confident – very confident)	20	"I can stick to healthful food & cooking… even if I have to rethink my food choices & cooking practices."
Healthy Eating Self-Efficacy II	9	1-6 (not confident – very confident)	54	"How confident are you that you could eat healthy foods when you are... alone?"
Fruit, Vegetable, & Fiber Screener	10	0-5 (< 1x/week – ≥ 2x/day)	50	"About how often do you eat each of the following foods? Salad Greens."
Convenience Food Frequency	17	1-7 (never – daily)	127	"Please indicate the frequency in which you consume these convenience food items: ready-to-eat meal"
Fast Food Frequency	5	1-6 (never – daily)	30	"In the past month, how often did you eat something from the following types of restaurants: pizza place"

[1]ecSI 2.0 total score ≥ 32 = competent eater; EA – eating attitudes sub-score; CS – contextual skills sub-score; FA – food attitudes sub-score; IR – internal regulation sub-score.

Table 2-3. CBC[1] Participant Demographic Information

Survey Item	Sample Size (n=)	Percentage (%)
Participants	71	100
Age (years)		
18-19	21	30
20-21	24	34
22-23	15	22
24-25	4	6
26-29	3	4
30+	3	4
Gender		
Male	24	34
Female	46	65
Prefer Not to Specify	1	1
Race/Ethnicity		
White, Caucasian, American	49	69
Other	20	28
Prefer Not to Specify	2	3
Classification		
Freshman	13	18
Sophomore	7	10
Junior	23	33
Senior	18	26
Graduate Student	10	14
College		
Agriculture	10	14
Business	8	11
Design	2	3
Engineering	19	27
Human Sciences	15	21
Liberal Arts	17	24
Veterinary Medicine	0	0
Sessions Attended (n=46)		
1	1	2
2	1	2
3	5	11
4	39	85

[1]Culinary Boot Camp

Table 2-4. Food/Nutrition Aptitudes and Dietary Intake: CBC[1] Participant Pre-, Post-, and Change Scores[2]

Survey Item	CBC Pre-Score (mean±SEM)	CBC Post-Score (mean±SEM)	CBC Change Score (mean±SEM)	Significance (p=)[3]
Eating Competence	32.49±1.06	32.59 ± 0.98	0.21 ± 0.52	0.68
Eating Attitudes	11.37±0.39	11.15±0.39	-0.17±0.19	0.38
Contextual Skills	9.39±0.39	9.83±0.39	0.44±0.25	**0.09**
Food Acceptance	5.46±0.27	5.59±0.25	0.13±0.18	0.49
Internal Regulation	6.15±0.25	6.01±0.24	-0.14±0.15	0.36
Cooking Skills	40.86±0.83	44.75±0.86	3.89±0.64	**<0.01**
Cooking Attitudes	8.96±0.39	12.75±0.56	3.79±0.68	**<0.01**
Grocery Shopping Self-Efficacy	26.57±0.84	30.86±0.76	4.03±0.90	**<0.01**
Healthy Eating Self-Efficacy I	14.52±0.30	13.17±0.29	-1.35±0.25	**<0.01**
Healthy Eating Self-Efficacy II	31.39±0.78	32.82±0.88	1.42±0.72	**0.05**

Table 2-4. (continued)

Survey Item	CBC Pre-Score (mean±SEM)	CBC Post-Score (mean±SEM)	CBC Change Score (mean±SEM)	Significance (p=)[3]
Block FFQ Fruit & Vegetable Servings	3.90±0.20	4.34±0.244	0.44±0.23	**0.06**
Block FFQ Vitamin C (mg/day)	141.92±5.21	152.86±6.40	10.62±5.70	**0.07**
Block FFQ Magnesium (mg/day)	372.70±9.97	392.16±11.96	18.66±10.02	**0.07**
Block FFQ Potassium (mg/day)	3511.34±95.19	3703.12±115.36	184.67±99.19	**0.07**
Block FFQ Dietary Fiber (g/day)	17.43±0.62	18.61±0.76	1.14±0.63	**0.08**
Convenience FFQ	42.94±1.44	46.64±1.76	3.77±1.73	**0.03**
Fast Food FFQ	9.66±0.34	9.86±0.44	0.20±0.45	0.65

[1]Culinary Boot Camp; participant sample size (n=71); participants completing pre-/post-surveys (n=46); participants included as intent to treat (n=25)
[2]change score = post-score minus pre-score
[3]statistical significance p≤0.05; statistical trend p≤0.10; paired samples t-test pre-/post-scores

CHAPTER 6. IMPACT OF A CULINARY BOOT CAMP EXPERIENCE ON FOOD/NUTRITION APTITUDES AND DIETARY INTAKE OF UNIVERSITY STUDENTS AND EMPLOYEES

A paper to be submitted to the American Journal of Preventive Medicine

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Abstract

Introduction: The current physical well-being among the American adult population is of concern. A considerable increase in prevention efforts is appearing within the education and employment settings, yet a lack of research literature related to the effectiveness of these interventions within student and employee populations exists. Both food/nutrition aptitudes and dietary intake significantly impact physical well-being. The primary objective of this study was to evaluate and compare the effectiveness of a *Culinary Boot Camp (CBC)* on improving food/nutrition aptitudes and dietary intake among university students and employees. ***Methods*****:** A nutrition education program was developed and delivered to students and employees at a Midwestern university. Online surveys examining food/nutrition aptitudes and dietary intake pre- to post-intervention served as the primary evaluation tool. ***Results*****:** A majority of student change scores (post – pre) exhibited statistically significant or trends towards improvements. All food/nutrition aptitudes and most dietary intake measures among employees

improved significantly (p≤0.02). The greatest change scores were observed within cooking skills/attitudes and grocery shopping self-efficacy (p<0.01) among both populations. Almost all food/nutrition aptitude change scores (post minus pre) of employees were significantly greater than those of students (p≤0.02), while most dietary intake improvements were comparable between the two intervention groups (p≥0.10). ***Conclusions*****:** *CBC* is an effective nutrition education program that improves food/nutrition aptitudes and dietary intake among university students and employees. Future research should continue to explore and compare effectiveness of this nutrition education program as well as similar interventions on improving aptitudes and intake within university student and employee populations.

Introduction

The current state of physical well-being among the American adult population is of concern. The most recent report on overall health status in the United States (US) revealed only 51.9% of adults 18 and older classified their health as very good or excellent.[1] Research indicates the majority of this population categorizes their health status according to the presence or absence of disease,[2] which suggests slightly over half of American adults consider themselves to have minimal chronic health conditions. Yet, the prevalence of several chronic health conditions among adults 18 and older continues to rise. Current incidence of chronic health conditions that are expected to increase progressively over time include: overweight (35.3%), obesity (31.6%), elevated blood lipid levels (36.3%),

hypertension (30.9%), type 2 diabetes (9.1%), and cardiovascular disease (8.5%).[1] The projected rise of these chronic health conditions and subsequent healthcare costs within the US population warrants improved prevention efforts.

Prevention efforts are increasing considerably within education and employment sectors. As enrollment in higher education continues to rise, universities have recognized the demand for health-promoting services and responded through development and expansion of these resources on campus.[3–5] In the US, over half of all employees have wellness programs available and accessible within the workplace.[6] The increase of health-promoting services and wellness programs is strongly supported by educators and employers alike as a primary course of action to reduce ever increasing chronic health conditions and healthcare costs associated with poor student and employee physical well-being.[4,7–10]

Although colleges and worksites provide excellent opportunities to implement prevention efforts, there is a lack of research literature related to the effectiveness of interventions targeting physical well-being within these particular settings. Several reviews conclude more studies must be completed to determine the best strategies to elicit positive physical well-being behavior change among students and employees, since results from interventions applied in colleges and worksites are oftentimes deemed unclear and uncertain.[3–5,11–15]

One area of physical well-being targeted within college health-promotion and worksite wellness programming is food/nutrition. Although numerous universities and workplaces have implemented interventions to improve eating patterns/ practices among students and employees, recent reviews suggest limited evidence is

available to support the overall effectiveness of these environmental and/or educational food/nutrition wellness programs in these settings.[4,12,16] Studies examining various food/nutrition aptitudes and dietary intake within the populations report very poor eating patterns/practices. Research has identified substantial deficits in food/nutrition aptitudes such as eating competence, cooking skills, and dietary self-efficacy exists among students and employees alike.[17–24] This is alarming, as countless studies suggest food/nutrition aptitudes are strongly associated with intake and overall eating patterns/ practices.[21,22,25–29] Results also indicate inadequate fruit, vegetable, and fiber intake as well as suboptimal eating patterns among students and employees.[3,11,30–36] For instance, one assessment reported only 4.8% of college students consume five or more fruit/vegetable servings per day and 8.4% do not consume any fruits/vegetables at all.[34] Other studies among this population have discovered deficiencies not only in fruit/vegetable consumption but also nutrient-dense choices from all five major food groups.[35,36] Research within the worksite setting identified as many as 79.1% of employees were not meeting all current dietary guidelines.[33] Another study has found sodium intake equaled and saturated fat/added sugars intake exceeded current dietary guidelines among this population.[11] The eating patterns/practices of students and employees signify an imperative need for improvements in food/nutrition aptitudes and dietary intake among the populations.

The primary objective of this study was to examine the impact of a nutrition education program, *Culinary Boot Camp* (*CBC*), on improving various food/nutrition

aptitudes among university students and employees. A secondary objective included evaluation of effectiveness between university students and employees

Methods

Development and Delivery of CBC

The nutrition education program, *CBC*, as well as all related research activities were implemented at a large Midwestern land grant university. The governing Internal Review Board (IRB) approved all protocols and procedures prior to implementation. Please refer to *Manuscript 2* for all additional details regarding development and delivery of *CBC*.

Study Sample/Population

Two *CBC* events were offered to each of the two populations – Fall 2017 and Spring 2019 for students, Spring 2018 and Fall 2018 for employees. All university students and employees were eligible to attend the nutrition education program. All advertisement, recruitment, and registration efforts for *CBC* began three weeks prior and ended three days before the event. Marketing for students included mass email, social media posts on several Department websites (Food Science and Human Nutrition, Dining, Student Wellness). Marketing for employees was accomplished using the Employee Wellness website. A registration capacity was set at 50 participants for each event, with a waiting list of 25 additional participants. All student participants paid a one-time 15-dollar feed to attend the nutrition education program. Participation in *CBC* was free for university employees, as Employee Wellness covered all costs associated with the event.

Measures

To measure the effectiveness of *CBC*, pre-, post-, and follow-up surveys were collected from student and employee participants. Several individual survey instruments, assessing multiple food/nutrition aptitudes and dietary intake, were used to evaluate the nutrition education program. These included 1) eating competence,[37] 2) cooking skills/attitudes,[38] 3) healthy eating self-efficacy,[39,40] 4) grocery shopping self-efficacy,[41] 5) fruit/vegetable/fiber intake,[42] 6) convenience food frequency,[43] and 7) fast food frequency.[44] All instruments were tested and established as valid and reliable tools. Each of the instruments employed Likert-scale statements/questions, with a range of four to seven point scales. The points from each scale item were summed to provide a total score for each of the instruments. A higher score signified more favorable or optimal food/nutrition aptitudes and dietary intake, except within convenience and fast food frequency where a lower score denoted lower consumption. The only instrument with a minimum score to differentiate sufficiency and inadequacy was the eating competence ecSI 2.0 tool; eating competence is defined as a score ≥32, while eating incompetence is distinguished as a score a score <32. All other food/nutrition aptitudes were compared to total points possible. Measures of dietary intake included a fruit/vegetable/fiber intake screener that applied prediction equations to estimate from total scores daily consumption of fruits/vegetables as well as other important micronutrients, including fiber. Again, convenience and fast food frequency were compared to total points possible. The survey also captured several

demographic variables – age, gender, and race/ethnicity (open-ended) as well as classification and college/years of employment (multiple choice).

All individual instruments were compiled into an online survey system (Qualtrics, Provo, UT) to create an overall survey to serve as the primary evaluation tool for *CBC*. All student and employee participants were asked to acknowledge an electronic informed consent document before beginning the survey. The survey was administered to *CBC* participants one week prior to (pre-) as well as one day (post-) and six months (follow-up) after the event. Participants were not required to fill out surveys to attend the nutrition education program; all surveys were clearly communicated as optional. All student and employee participants who completed the entire pre-survey within ten days of distribution were included in statistical analyses. All survey scores (pre-, post-, follow-up) were matched using university ID numbers. If participants completed a pre-survey but did not contribute post- and/or follow-up surveys, scores from their pre-surveys were applied in place to perform intent to treat analysis. For the purposes of this paper, measures from pre- and post-survey statistical analyses will be discussed; follow-up survey data collection is still in progress.

Statistical Analysis

All statistical analyses were conducted via Statistical Package for Social Sciences software program (IBM, SPSS v25). Alpha levels of 0.05 ($p \leq 0.05$) and 0.10 ($p \leq 0.10$) were set to denote statistical significance and trends, respectively. First, descriptive statistics were performed on collected data to examine various demographic variables of student and employee *CBC* participants. Next, differences

in food/nutrition aptitudes and dietary intake measures within the two separate participant populations (students and employees) were explored by conducting paired samples t-tests with post-hoc adjustments (Bonferroni). Finally, change scores were computed (post- minus pre-) to perform independent samples t-tests in order to evaluate differences in outcomes between the two participant populations.

Results

CBC participants included a total of 86 students and 92 employees. The number of students (n= 71) and employees (n=66) who completed the pre-survey within ten days of distribution and were included in statistical analyses far exceeded the amount who also contributed post-surveys (n=46 and n=50, respectively). The majority of student participants were within the age groups of 18-19 years (n=21, 30%) and 20-21 years (n=24, 34%), while employee participants were primarily within the age groups of 26-35 years (n=19, 29%) and 36-45 years (n=18, 27%). Demographics identified more female (n= 46, 65% students; n=59, 89% employees) and White/Caucasian/American (n=49, 69% students; n=53, 80% employees) participation among students and employees compared to males (n=24, 34%; n=7, 11%) and other races/ethnicities (n=20, 28%; n=9, 14%). Most student *CBC* participants were classified as juniors (n=23, 32.5%) or seniors (n=18, 25.5%) and studied in the Colleges of Engineering (n=19, 27%), Human Sciences (n=15, 21%), or Liberal Arts (n=17, 24%). A majority of employee *CBC* participants were classified as staff (n=58, 88%) and reported 0-5 years of employment (n=36, 54%).

Please refer to Table 3-1. for full details related to various demographic variables of *CBC* participants.

Evaluation of paired samples t-tests revealed statistically significant improvement in almost all food/nutrition aptitudes and dietary intake measures of student *CBC* participants. The greatest improvements were observed within cooking skills/attitudes and grocery shopping self-efficacy ($p<0.01$). The only food/nutrition aptitudes and dietary intake measures exhibiting no difference pre- to post-intervention among students included eating competence ($p=0.68$) and its individual constructs as well as fast food frequency ($p=0.65$). When examining results from paired samples t-tests of employee CBC participants, a majority of food/nutrition aptitudes and dietary intake measures demonstrated statistically significant improvements. All food/nutrition aptitudes, except the individual eating competence constructs of eating attitudes ($p=0.08$) and internal regulation ($p=0.88$), demonstrated statistical significance ($p\leq0.02$). All dietary intake scores also improved significantly among employees ($p\leq0.02$), with the exception of estimated vitamin C ($p=0.31$) and convenience food frequency ($p=0.54$). Please see Tables 3-2. and 3-3. to review all food/nutrition aptitudes and dietary intake pre-, post-, and change scores of student and employee *CBC* participants.

Independent samples t-tests identified significant differences in several change scores of food/nutrition aptitudes between student and employee *CBC* participants. A trend towards statistical significance existed within eating competence change scores ($p=0.08$), with employees exhibiting greater improvements than students. A similar statistically significant difference was found

within the individual eating competence construct of eating attitudes (p=0.05); these findings were identical following post hoc adjustments for multiple comparisons. Additional individual constructs did not distinguish statistically significant differences between student and employee outcomes (p>0.05). The food/nutrition aptitude change scores of employees were also significantly greater than change scores of students in the areas of cooking skills/attitudes and healthy eating self-efficacy (p≤0.02); again, results remained significant after post hoc adjustments for multiple comparisons. The only other food/nutrition aptitude change score that did not demonstrate a statistically significant difference between student and employee outcomes was grocery shopping self-efficacy (p=0.37). Please refer to Table 3-2. for all food/nutrition aptitude change scores and related statistical significance between the two groups.

Evaluation of dietary intake by independent samples t-tests also revealed some statistically significant differences between change scores of student and employee CBC participants. Within the fruit/vegetable/fiber screener, a significant difference in change scores for vitamin C was found (p<0.01), with students increasing consumption and employees decreasing consumption pre- to post-intervention. Additional measures within the fruit/vegetable/fiber screener did not demonstrate statistically significant differences between student and employee outcomes (P>0.05). A significant difference in change scores of convenience food frequency was also identified between the two groups (p=0.03); students increased consumption, while employees decreased consumption. Finally, no differences were observed between fast food frequency change scores of students and employees

pre- to post-intervention. Please see Table 3-3. to review dietary intake change scores of *CBC* participants as well as differences between student and employee outcomes.

Discussion

The various demographic variables and corresponding descriptive statistics assist in identification or inference of university students and employees most interested in nutrition education programs. The age groups with greatest *CBC* participation included 18-19/20-21 years among students and 26-35/36-45 years among employees, which indicates younger individuals attended the event more than older individuals. Additional nutrition education programs targeting students and employees have noted higher motivation, interest, and participation among younger individuals.[4,5,10,13,15,45] Most *CBC* participants were female and White/Caucasian/American, which again is typical among nutrition education programs within education and employment settings.[3-5,11,31,45-47]

Student *CBC* participants were primarily classified as juniors or seniors; this finding is uncommon within the target population, as research interventions tend to focus on underclassmen and overlook upperclassmen.[5,45,48–51] The results from this study suggest it may be important to include all classifications not only to increase participation in nutrition education programs but also meet the needs of the entire college student population. Additionally, students from all colleges on campus participated in *CBC*, with the highest percentages from both related (Human Sciences) and unrelated (Engineering, Liberal Arts) fields. Scientific literature

looking at participation by college is limited, but several studies implement physical well-being interventions among students studying related fields (i.e. nutrition, health sciences).[45,48–50] Again, nutrition education programs should target all college students instead of only those studying related fields based on outcomes from this study. Employee *CBC* participants were predominantly classified as staff and worked five or fewer years at the university. Several studies within university worksites have identified similar findings, with more staff and new hires supporting and attending wellness events on campus.[46,47] With multiple reviews identifying a need for improved physical well-being among all university employees,[4,46,47] the results from this study suggest enhanced recruitment efforts should be made to increase participation of faculty and established employees in worksite nutrition education programs.

All *CBC* participants exhibited considerable improvements in most food/nutrition aptitudes and dietary intake pre- to post-intervention. Among students, one of the only food/nutrition aptitudes that did not demonstrate a statistically significant difference was eating competence (p=0.68). This finding was surprising, as the eating competence model was extensively incorporated into *CBC* curriculum through mindful eating explanations and exercises. Additional interventions measuring eating competence among college students denote minor change scores over time as well.[52,53] Research suggests long-term measures of eating competence may be a better marker of intervention effects compared to short-term measures,[54,55] which may explain these results. Evaluation of future measures (follow-up surveys) will likely provide a more accurate reflection of eating

competence outcomes. The most statistically significant improvements pre- to post-intervention were observed in cooking skills/attitudes and grocery shopping self-efficacy ($p<0.01$). These outcomes are promising, as two primary topic areas within *CBC* curriculum were cooking and grocery shopping; cooking was prioritized through cooking demonstrations/ experiences, and grocery shopping was emphasized during classroom lessons and store tours. It appears *CBC* curriculum was effective at incorporation of these topic areas.

Surprisingly, the two healthy eating self-efficacy instruments demonstrated opposite intervention effects among students. The first scale identified a statistically significant decrease in healthy eating self-efficacy ($p<0.01$), and the second a statistically significant increase ($p=0.05$). Both instruments were developed to measure healthy eating self-efficacy, but each measured distinctly different confidences; this may explain the observed findings. The first instrument evaluated resiliency relative to making healthy eating choices.[40] Results from this instrument may be due to *CBC* timing, with the event beginning at the start of the semester (pre-survey) and ending during mid-semester (post-survey). Research has indicated a decrease in resiliency related to health habits oftentimes occurs with decreased time and increased stress, both of which likely existed as college students prepared for mid-semester exams.[19,56,57] The second instrument evaluated personal and environmental factors associated with food/nutrition choices,[39] which are two primary components within the SCT. With this behavior change theory as a foundation for *CBC* curriculum, the nutrition education program targeted improvement of personal and environmental factors through several different

activities (goal setting, group support) and resources (cooking supplies, recipes, gift cards). Thus, the statistically significant increase observed within the second instrument suggests *CBC* curriculum effectively implemented the SCT and impacted associated factors.

Most dietary intake measures demonstrated trends towards statistically significant improvements pre- to post-intervention among student *CBC* participants. From the fruit/vegetable/fiber screener, all student dietary intake measures exhibited trends ($p \leq 0.08$), suggesting the nutrition intervention program was somewhat effective at improving eating behaviors within this population. Other studies examining the impact of nutrition education and culinary classes on short-term dietary intake demonstrate similar results, yet research literature also indicates long-term dietary intake measures are required to confirm or refute these findings. [3,5,10,45]The convenience and fast food frequencies were the only measures with negative outcomes. Convenience food frequency identified a significant increase ($p=0.03$). This result, again, may be due to timing issues; the events started simultaneous with Fall/Spring semesters (pre-surveys) and finished during mid-semesters (post-surveys). Research has found higher convenience food consumption with decreased time and increased stress, which expectantly occurs while studying for mid-semester exams.[19,27,36] Fast food frequency also increased, but the finding was insignificant ($p=0.65$).

Employee *CBC* participants improved in all measured food/nutrition aptitudes pre- to post-intervention ($p \leq 0.02$). This outcome suggests the nutrition education program enhanced all targeted topic areas within this population. The

food/nutrition aptitude with the least significant change score was eating competence (p=0.02). Again, this was a primary topic areas covered throughout *CBC* curriculum. While the lower change score implies a marginal impact, similar results exist in research literature examining eating competence interventions; one study even reported a slight drop in eating competence across short-term measures.[52,54,55] Again, studies suggest long-term measures of eating competence better reflect intervention outcomes; therefore, it is strongly recommended to evaluate this food/nutrition aptitude over an extended period of time.[54,55] Thus, exploration of future measures (follow-up surveys) will likely elicit even better outcomes. The most significant change scores occurred in cooking skills/attitudes, grocery shopping self-efficacy, and healthy eating self-efficacy ($p<0.01$). These findings are promising, since, as stated above, all three were primary topic areas implemented into *CBC* curriculum.

Examination of employee dietary intake also demonstrated statistically significant improvements. Within the fruit/vegetable fiber screener, a significant increase in consumption of fruit/vegetable servings as well as magnesium, potassium, and dietary fiber was identified ($p\leq0.01$); the only insignificant measure was vitamin C (p=0.31). Additional research assessing the effects of nutrition education programs on short-term dietary intake among employees has identified similar results; these studies also suggest long-term outcomes be evaluated to support or oppose these findings.[11–13,31] The only other employee dietary intake measure with an insignificant outcome was convenience food frequency (p=0.54). Although a more significant decrease was expected due to a significant increase in

cooking/grocery shopping,[21,26,29] this is the first study to examine effects of a nutrition education program on convenience food consumption; future research is needed to determine if similar nutrition education and culinary classes produce similar results. The fast food frequency measure exhibited a significant decrease pre- to post- intervention; this was expected due to the close association between increased cooking/grocery shopping skills/self-efficacy and fast food consumption.[21,26,29] Again, continued investigation is recommended to evaluate the impact of similar nutrition education programs on fast food consumption, as this is the first study to explore the relationship.

When comparing food/nutrition aptitudes pre- to post-intervention between student and employee *CBC* participants, change scores of employees were considerably greater than students. These results indicate this nutrition education program may be more effective at improving food/nutrition aptitudes among university employees compared to students. Eating competence demonstrated trend towards statistical significance in the difference between student and employee change scores ($p=0.08$). This trend can be explained by earlier findings identifying an insignificant student change score and statistically significant employee change score. Although cooking skills/attitudes improved significantly among students and employees, results indicate these food/nutrition aptitudes increased significantly more among employees ($p=0.02$ and $p=0.01$, respectively). This finding may be due to limited accessibility and availability of locations to practice cooking skills and subsequently develop better cooking attitudes among students, as it is one of the most common barriers identified by students in research

literature;[19,57–59] this barrier is identified much less often among employee populations.[14,60] The only food/nutrition aptitude exhibiting no significant difference between student and employee change scores was grocery shopping self-efficacy ($p=0.37$), which suggests *CBC* was equally effective at improving this measure among both populations. The two instruments measuring healthy eating self-efficacy significantly more improvements among employees compared to students ($p<0.01$). Within the first instrument, student change scores decreased significantly while employee change scores increased significantly; these outcomes likely led to the significant difference observed in change scores. Improvements in change scores from the second instrument were statistically significant for students and employees ($p=0.05$, $p<0.01$), but the change score was considerably higher among employees (4.99 ± 0.96) compared to students (1.42 ± 0.72); again, this probably produced the observed outcomes.

Evaluation of differences in dietary intake change scores between student and employee *CBC* participants revealed nearly no statistically significant outcomes. The only dietary intake change score difference was identified within vitamin C consumption; the trends towards a significant increase among students ($p=0.07$) and insignificant decrease ($p=0.31$) among employees likely led to this statistically significant result. All other dietary intake measures demonstrated no statistically significant differences or trends in change scores of students and employees ($p>0.10$), suggesting *CBC* was equally effective at improving eating behaviors within both populations.

To our understanding, this is the first study to compare the effectiveness of a nutrition education program on improving food/nutrition aptitudes and dietary intake between university students and employees. Results from several other studies among students or employees suggest interventions within university settings are effective at improving countless measures of physical well-being, including those related to food/nutrition.[3–5,10,13,45,61] With such positive and statistically significant findings from *CBC*, future research should implement this nutrition education program or similar ones within university settings and continue evaluation of effectiveness at improving various food/nutrition aptitudes and dietary intake among both students and employees. Based on this study, *CBC* may be a more effective intervention for university employees versus students; again, continued research efforts are required to confirm or refute these outcomes.

Strengths

Several strengths existed within this study. First, *CBC* was developed applying multiple theoretical frameworks. Many studies and reviews suggest this strategy elicits the greatest behavior change compared to interventions lacking or implementing only one theoretical framework.[10,62–64] Additionally, *CBC* was delivered as an engaging nutrition education program. Again, research literature indicates active or experiential learning to be most effective when trying to prompt behavior change.[21,63,65,66] *CBC* was held over a short period of time with high frequency, which has also been identified as preferential within student and employee populations due to time constraints while still producing equal outcomes.[10,15,67–69]

Limitations

This study also encompassed several limitations. First, *CBC* participation and control was not randomized. Individuals chose to participate in the nutrition education program as well as complete pre- and post-surveys. This may reduce the generalizability of the results, as individuals participating in the event and completing surveys were likely more motivated and willing to change their food/nutrition aptitudes and dietary intake. Another limitation to note is subject response bias. There is a possibility that *CBC* participants reported responses they believed researchers would prefer to receive on pre- and post-surveys. This is a common limitation noted within subjective pre- to post-intervention results. One major limitation of this study is the current report of only short-term results. As stated earlier, data collection from follow-up surveys is still underway. It is critical to evaluate short-term results carefully, as these may not be a predictive measure of lasting behavior change; long-term outcomes appear to be a much better indicator.

Conclusions

The results from this study indicate *CBC* is an effective nutrition education program that improves food/nutrition aptitudes and dietary intake among university students and employees. An additional finding from this study include identification of greatest improvements in cooking skills/attitudes and grocery shopping self-efficacy within both populations after participation in *CBC*. This outcome suggests continued implementation of the nutrition education program within the university setting would be extremely beneficial to improve specific contextual skills to

support physical well-being. Also, *CBC* may be more effective among university employees compared to students. Future research should continue to compare the effectiveness of *CBC* as well as similar interventions on improving food/nutrition aptitudes and dietary intake between the two populations. With similar nutrition education programs implemented in university settings across the country and around the globe, overall physical well-being of students and employees could increase greatly through improved food/nutrition aptitudes and dietary intake.

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Tables

Table 3-1. CBC[1] Participant Demographic Information

Survey Item		Students		Employees	
		Sample Size (n=)	Percentage (%)	Sample Size (n=)	Percentage (%)
Participants		71	100	71	100
Age (years)					
18-19	18-25	21	30	3	5
20-21	26-35	24	34	19	29
22-23	36-45	15	22	18	27
24-25	46-55	4	6	14	21
26-29	56-65	3	4	11	17
30+	66+	3	4	1	1
Gender					
Male		24	34	7	11
Female		46	65	59	89
Prefer Not to Specify		1	1	0	0
Race/Ethnicity					
White, Caucasian, American		49	69	53	80
Other		20	28	9	14
Prefer Not to Specify		2	3	4	6
Classification					
Freshman	Faculty	13	18	8	12
Sophomore	Staff	7	10	58	88
Junior	Graduate Assistant	23	32.50	0	0
Senior	Post-Doc	18	25.50	0	0
Graduate Student	Researcher	10	14	0	0

Table 3-1. (continued)

Survey Item	Students		Employees	
	Sample Size (n=)	Percentage (%)	Sample Size (n=)	Percentage (%)
College				
Agriculture	10	14	-	-
Business	8	11	-	-
Design	2	3	-	-
Engineering	19	27	-	-
Human Sciences	15	21	-	-
Liberal Arts	17	24	-	-
Veterinary Medicine	0	0	-	-
Years of Employment (years)				
0-5	-	-	36	54
6-10	-	-	8	12
11-15	-	-	9	14
16-20	-	-	6	9
21+	-	-	7	11
Sessions Attended[2]				
1	1	2	1	2
2	1	2	2	4
3	5	11	13	26
4	39	85	34	68

[1]Culinary Boot Camp
[2]Students (n=46); Employees (n=50)

Table 3-2. Food/Nutrition Aptitudes: CBC[1] Participant Pre-, Post-, and Change[2] Scores

Survey Item	Points Possible (out of)	Student (n=71)			Employee (n=66)			Significance[4] (p=)
		Pre- (mean± SEM)	Post- (mean± SEM)	Change[3] (mean± SEM)	Pre- (mean± SEM)	Post- (mean± SEM)	Change[3] (mean± SEM)	
Eating Competence	48	32.49±1.06	32.59±0.98	0.21±0.52	29.21±0.99	31.09±0.79	**1.88±0.78**	0.08
Eating Attitudes	15	11.37±0.35	11.15±0.34	-0.17±0.19	10.11±0.34	10.56±0.28	0.46±0.26*	0.05
Contextual Skills	15	9.39±0.41	9.83±0.38	0.44±0.26*	8.59±0.38	9.55±0.30	**0.96±0.31**	0.20
Food Acceptance	9	5.46±0.27	5.59±0.25	0.13±0.18	4.92±0.25	5.36±0.22	**0.44±0.19**	0.24
Internal Regulation	9	6.15±0.25	6.01±0.24	-0.14±0.15	5.59±0.24	5.62±0.22	0.03±0.20	0.50
Cooking Skills	60	40.86±0.83	44.75±0.86	**3.89±0.64**	42.11±0.94	48.47±1.04	**6.36±0.83**	0.02
Cooking Attitudes	20	8.96±0.39	12.75±0.56	**3.79±0.68**	13.29±0.44	15.02±0.39	**1.73±0.36**	0.01

Table 3-2. (continued)

Survey Item	Points Possible (out of)	Student (n=71)			Employee (n=66)			Significance[4] (p=)
Grocery Shopping Self-Efficacy	40	26.57±0.84	30.86±0.76	**4.03±0.90**	27.45±0.76	32.52±0.79	**5.06±0.72**	0.37
Healthy Eating Self-Efficacy I	20	14.52±0.30	13.17±0.29	**-1.35±0.25**	13.27±0.29	14.64±0.32	**1.36±0.25**	<0.01
Healthy Eating Self-Efficacy II	54	31.39±0.78	32.82±0.88	**1.42±0.72**	31.23±1.02	36.21±1.12	**4.99±0.96**	<0.01

[1]Culinary Boot Camp
[2]change score= post-score minus pre-score
[3]paired samples t-tests within student and employee change scores; **statistical significance p≤0.05**; *trend towards statistical significance p≤0.10
[4]independent samples t-tests between student and employee change scores; statistical significance p≤0.05; *trend towards statistical significance p≤0.10

Table 3-3. Dietary Intake: CBC[1] Participant Pre-, Post-, and Change[2] Scores

Survey Item	RDA[3]/ Points Possible (out of)	Student (n=71)			Employee (n=66)			Significance[5] (p=)
		Pre- (mean± SEM)	Post- (mean± SEM)	Change[4] (mean± SEM)	Pre- (mean± SEM)	Post- (mean± SEM)	Change[4] (mean± SEM)	
Fruit/ Vegetable Servings	2c./2.5c. eq.	3.90±0.20	4.34±0.24	0.44±0.23*	3.99±0.21	4.41±0.21	**0.42±0.16**	0.94
Vitamin C (mg/day)	90/75	141.92± 5.21	152.86± 6.40	10.62± 5.70*	140.31± 4.92	136.13± 5.72	-4.18± 4.11	<0.01
Magnesium (mg/day)	400/310	372.70± 9.97	392.16± 11.96	18.66± 10.02*	302.39± 9.30	332.80± 10.86	**30.41± 6.72**	0.33
Potassium (mg/day)	4700	3511.34± 95.19	3703.12± 115.36	184.67± 99.19*	2915.21± 89.41	3216.12± 104.37	**300.92± 66.55**	0.33
Dietary Fiber (g/day)	34/28	17.43±0.62	18.61±0.76	1.14±0.63*	13.52±0.63	15.53±0.73	**2.02±0.45**	0.26
Convenience Food Frequency	127	42.94±1.44	46.64±1.76	**3.77±1.73**	43.73±1.18	43.35±1.26	-0.38±0.62	0.03
Fast Food Frequency	30	9.66±0.34	9.86±0.44	0.20±0.45	9.42±0.29	9.00±0.25	**-0.42±0.18**	0.26

[1]Culinary Boot Camp

[2]change score= post-score minus pre-score

[3]RDA: Recommended Dietary Allowance; RDA for fruit/vegetable servings based on a 2,000 Calorie/day diet; all other RDAs for males/females 19-30 years.

[4]paired samples t-tests within student and employee change scores; **statistical significance p≤0.05**; *trend towards statistical significance p≤0.10

[5]independent samples t-tests between student and employee change scores; statistical significance p≤0.05; *trend towards statistical significance p≤0.10

CHAPTER 7. CONCLUSION

This dissertation explored the current state of food/nutrition aptitudes and dietary intake among college student and university employee populations as well as to identified and developed future solutions. The three specific aims of this dissertation were: 1) to examine current food/nutrition aptitudes and dietary intake among a college students; 2) to identify if the nutrition education program *Culinary Boot Camp* improves short-term (4 weeks) and long-term (6 months) food/nutrition aptitudes and dietary intake among a college students; and 3) to determine if the nutrition education program *Culinary Boot Camp* is more effective at expanding short-term (4 weeks) and long-term (6 months) food/nutrition aptitudes and dietary intake of college student or university employee participants.

Aim 1

Examination of current food/nutrition aptitudes and dietary intake of college students suggest nominal eating competence, cooking skills/attitudes, healthy eating self-efficacy, and grocery shopping self-efficacy as well as negative eating patterns among the population. These findings support our hypothesis for aim one. Additionally, various demographic variables and eating competence categorization appear to impact other food/nutrition aptitudes and dietary intake. Several positive correlations between eating competence and other food/nutrition aptitudes as well as dietary intake were also found to be moderate but statistically significant. Future research should continue to evaluate the effects of demographics on eating

competence as well as the impact of eating competence on other food/nutrition aptitudes and dietary intake.

Aim 2

Results suggest the nutrition education program *CBC* is an effective intervention to improve food/nutrition aptitudes and dietary intake among college students. The greatest improvements occurred in cooking skills/attitudes and grocery shopping self-efficacy. The only measures that did not improve significantly or demonstrate a trend were eating competence and fast food frequency. These results support our first and second hypotheses for aim two and indicate continued implementation of *CBC* on campus would be beneficial for all college students to enhance their food/nutrition aptitudes and dietary intake in order to develop better eating patterns and practices. Future research is required, though, to confirm or refute these findings.

Aim 3

Results indicate *CBC* is an effective nutrition education program to expand food/nutrition aptitudes and dietary intake among college student and university employee participants. The aptitudes and intake demonstrating the greatest improvements within both groups included cooking skills/attitudes, grocery shopping self-efficacy, and fruit/vegetable servings. Additionally, *CBC* may be a more effective intervention for university employees compared to college students. Most food/nutrition aptitudes improved significantly more within the employee

participant group; but almost all dietary intake improvements between the two participant groups were similar. These results fully support our first hypothesis and partially support our second hypothesis for aim three and suggest continued implementation of *CBC* across the entire campus setting would be extremely beneficial to improve food/nutrition aptitudes and dietary intake necessary to promote overall physical well-being. Again, future research is needed to continue evaluation of *CBC* effectiveness and impact on improving food/nutrition aptitudes and dietary intake among diverse populations, within the campus setting and beyond, to confirm or refute these positive outcomes.

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APPENDIX A.

CULINARY BOOT CAMP

4-week core curriculum

Iowa State University
Department of Food Science & Human Nutrition

Core Curriculum Outline

4-week program. 1 session per week. 2-hour (120-minute) sessions.

- **Week 1: Versatile Fruits & Vegetables**
  - Fruit & Vegetable Salsas
    - Fresh Tomato
    - Black Bean
    - Roasted Corn
    - Fruit
  - Homemade Tortilla Chips
    - Baked Whole Wheat
    - Classic Corn

- **Week 2: Great Grains & Delightful Dairy**
  - Grilled Cheeses (with fruit) and Build Your Own Omelets (with vegetables)
  - Skillet Lasagna & Personal Pan Pizzas (with added fruits and vegetables)

- **Week 3: Protein Power**
  - Various Types of Chili
    - Classic Beef
    - Easy White Turkey
    - Black Bean & Pork
    - Edamame

- **Week 4: Success Going to the Grocery Store**
  - Grocery Store Tour

Primary Purposes & Application within the Social Cognitive Theory:

- Personal Factors: Participants will-
  - develop competent/mindful eating
  - enhance cooking self-efficacy
  - improve grocery shopping self-efficacy
  - expand healthful eating habits
    - ↑ fruit and vegetable intake
    - ↑ fiber intake
- Environmental Factors: Participants will-
  - increase visits to the grocery store
  - increase home food preparation
  - decrease convenience food consumption
  - decrease fast food consumption

These different factors will ultimately lead to positive behavior change among participants.

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Week 1: Versatility Found in Fruits and Vegetables

Learning Objectives within the Social Cognitive Theory:
The outcomes of Lesson 1 include-

- Personal Factors: Participants will be able to –
  - relay information about MyPlate and recite all 5 food groups.
  - write SMART goals to improve self-regulation processes and overall well-being.
  - put into practice mindful eating skills.
  - explain the importance of eating fruits and vegetables everyday.
  - select fresh produce items that are in season for optimal savings and flavor.
  - discuss differences between fresh, canned, dried, and frozen produce items.
  - describe diverse ways to prepare fruits and vegetables to add variety to their diets.
  - apply proper technique and handling of knives.
  - differentiate between the terms chop, cut, dice, and mince.
  - demonstrate how to read a recipe card and make appropriate measurements while cooking.
- Environmental Factors: Participants will be able to –
  - implement concepts discussed during Lesson 1 with educational pieces given to them throughout the evening.
    - SMART goals handout
    - produce seasonality magnets
  - build a meal or snack that meets MyPlate recommendations with resources received at the end of Lesson 1.
    - MyPlate placemat
    - recipe cards
  - practice cooking skills using culinary utensils provided to them at the end of Lesson 1.
    - knives
    - cutting boards
    - aprons

Time: 120 minutes total

- 30-minute learning lesson
  - goal setting
  - mindful eating
  - versatile fruits & vegetables
- 15-minute cooking description/demonstration
  - knife skills
- 45-minute cooking experience
  - fruit & vegetable salsas with homemade tortilla chips
- 30-minute mealtime

- mindful eating

Materials & Preparation:

- Lesson 1 PowerPoint slideshow
- computer
- projector screen
- donated products → MYPLATE PLACEMAT, KNIVES, CUTTING BOARDS, APRONS
- SMART Goals Handout
- pens and pencils
- Mindful Eating Exercise
- narrative
- 50 clementines
- napkins
- Produce Seasonality Magnet
- Chef's Instructions
- Recipe Cards
- Fresh Tomato Salsa
- Bean Salsa
- Roasted Corn Salsa
- Fruit Salsa
- Baked Tortilla Chips
- Recipe Supplies (every other kitchen)
- Kitchen 1 – fresh tomato and roasted corn salsas
- cooking utensils
- 2 chef knives
- 2 paring knives
- measuring cups (1/4, 1/2, 3/4, 1 c.)
- measuring spoons (tsp. and T.)
- salt and pepper shakers
- 4 mixing bowls
- 2 stirring/serving spoons
- 1 oven
- 2 hot pads
- nonstick cooking spray
- pizza cutter
- baking sheet
- cooling rack
- food items
- 2 c. frozen whole kernel corn, thawed
- 4-6 Roma tomatoes
- 1 white onion
- ½ green pepper
- 4 jalapeno peppers

- 4 garlic cloves
- 1 c. fresh cilantro
- 2 limes
- ½ c. + 2T. salad oil
- 6 whole wheat or corn tortillas

- Kitchen 2 – bean and fruit salsas
  - cooking utensils
    - 2 chef knives
    - 2 paring knives
    - measuring cups (1/4, 1/2, 3/4, 1 c.)
    - measuring spoons (tsp. and T.)
    - salt and pepper shakers
    - 4 mixing bowls
    - 2 stirring/serving spoons
    - 1 oven
    - 2 hot pads
    - nonstick cooking spray
    - pizza cutter
    - baking sheet
    - cooling rack
  - food items
    - 1 can black beans
    - 1 c. frozen shelled edamame, thawed
    - 1 c. frozen whole kernel corn, thawed
    - 3 Roma tomatoes
    - 4 jalapeno peppers
    - ½ green pepper
    - ½ red pepper
    - 4 garlic cloves
    - ¼ c. fresh cilantro
    - 1 lime
    - ½ lb. fresh cucumber (1 small cucumber)
    - ½ lb. fresh pineapple (½ small pineapple)
    - ½ red onion
    - ½ c. + 2 tsp. salad oil
    - 6 whole wheat or corn tortillas
  - Mealtime
  - serving spoons
  - plates
  - glasses
  - napkins
  - to-go boxes

Concepts:

- Lesson Introduction
  - MyPlate – "illustrates the five food groups that are building blocks for a healthy diet using a familiar image – a place setting for a meal."
- Goal Setting
  - SMART Goals – "specific, measurable, achievable, relevant, and time-bound" ambitions/aspirations.
- Mindful Eating
  - Mindful Eating – "allowing yourself to become aware of the positive and nurturing opportunities that are available through food selection and preparation by respecting your own inner wisdom."
- Versatile Fruits & Vegetables
  - RBC – red blood cell.
  - biologically active – ability to affect the body's physiology or function.
  - Seasonality – buying fresh produce in its peak season for the best savings and flavor.
  - Fresh – "produce picked in season and sold at stores raw."
  - Frozen – "produce picked and rapidly chilled, a process to preserve various fresh fruits and vegetables."
  - Canned – "produce picked and rapidly packed into cans, often with added sodium or sugar, a process to preserve various fresh fruits and vegetables."
  - Dried – "produce picked and rapidly dehydrated (water removed), a process to preserve various fresh fruits and vegetables."
- Cooking Demonstration/Description
  - Ready-to-eat – no preparation necessary, eat immediately.
  - Cutting Edge – bottom edge of the blade, can be flat and tapered, or serrated.
  - Point – very end of the blade, used to pierce foods, make incisions, and cut small items.
  - Tip – first few inches of the blade, used to cut small or delicate items.
  - Spine – top of the blade, grip with thumb and forefinger.
  - Bolster – where the blade meets the handle, thick strip of steel, protects hand if the knife slips.
  - Heel – last few inches of the blade, used to cut through large, tough or hard foods.
  - Rivets – hold handle to the tang, need to be tight to prevent injury, snags on clothing, and growth of microorganisms.
  - Handle – many types of materials, important that it is comfortable in your hand.
  - Butt – end of the handle.
  - Tang – metal that continues from the blade through the handle, some knives only have a partial tang, provides weight on the back half of the knife for stability and durability.
  - Chop – cut into small pieces.
  - Cut – make smaller in size, separate into segments.

  - Dice – cut into small square-shaped pieces, uniform in size (about ¼ inch).
  - Mince – cut or chop into extremely small pieces.
- Cooking Experience
  - Pound – common weight unit used when purchasing produce items, fruits and vegetables typically priced per pound, often abbreviated lb.
  - Cup – common measuring unit used in most recipes, often abbreviated c.
  - Tablespoon – common measuring unit used when cooking with herbs and spices, often abbreviated T.
  - To taste – add spices, herbs, and seasonings according to personal preference, no measurement needed.
  - Mix – combine ingredients using a fork or spoon.
  - Rinse – wash food under cool running water.
  - Drain – put food into a strainer or colander; pour liquid out of a pot by shifting the lid slightly away from the edge of the pan.
  - Thaw – slowly change from a frozen state to a liquid state.
  - Teaspoon – common measuring unit used when cooking with herbs and spices, often abbreviated tsp.
  - Preheat – heat oven to desired temperature before putting food in to bake.
  - Bake – to cook by dry heat, usually in the oven.

Procedure:

- **Lesson Introduction (3 minutes)**
  - Welcome
  - Introductions – instructor, chef, and RDN
  - About Culinary Boot Camp
    - 4-week interactive experience
      - first 3 lessons – discuss 5 different food groups within MyPlate and associated topics, cooking description/demonstration, cooking experience
        - ❖ distribute MYPLATE PLACEMATS
      - final lesson – take a grocery store tour with trained dietitians
        - ❖ discuss $15 HyVee gift card
    - additional topics covered throughout the program → goal setting, mindful eating, produce seasonality, food purchasing/preparing/storing, meal planning, making lists for getting groceries
    - overall goals of the program → improve cooking and grocery shopping skills, enhance contextual skills within the competent eating model
  - Pre- and Post- Assessments
    - remind participants to complete at the beginning and end of Culinary Boot Camp
      - 10 minutes or less

    - optional
    - research purposes only
    - enables self-evaluation
- **Goal Setting (5 minutes)**
    - Discuss participants' goals submitted during registration
        - tailor program to goals as much as possible
    - Give time to set 1-2 SMART goals
        - specific, measurable, achievable, relevant, time-bound
        - discuss with a partner
- **Mindful Eating (7 minutes)**
    - Definition –
        - allowing yourself to become aware of the positive and nurturing opportunities that are available through food selection and preparation by respecting your own inner wisdom
        - incorporating all your senses in choosing to eat food that is both satisfying to you and nourishing to your body
        - acknowledging responses to food (likes, dislikes, neutral) without judgment
        - becoming aware of physical hunger and satiety to help direct your decisions to begin and end eating.
    - Mindfulness → can and should be applied beyond just eating
        - planning, purchasing, preparing, storing, cleaning, etc.
    - Mindful Eating Exercise
        1. choose a simple, easy to handle food
            - example – clementines
        2. set the food in front of you
        3. focus on relaxing
            - take a deep breath, filling your lungs with air and expanding your chest; repeat this exercise until you feel relaxed
        4. concentrate on the food without tasting it
            - look at it – the color, the contours
            - listen to it – think how it will sound when you taste it
            - smell it – inhale the food with your eyes, your ears, and your nose
        5. note any physical changes taking place in your body
            - are you feeling hungry or anxious to start eating?
            - is your mouth watering while waiting to eat?
        6. take one bite
            - immediately describe what you're thinking to a partner
        7. bite again
            - notice how the food moves in your mouth, how your chewing begins and progresses, the swallowing, how the food moves to the back of your throat
        8. again describe what you're thinking to a partner
            - what physical changes are happening?
            - describe your feelings

9. bite again
    - this time, intentionally control how the food moves in your mouth
    - describe your feelings
10. bite again
    - notice the flavor and the taste sensations.
    - describe your feelings
11. bite again
    - describe the texture
    - does it sound as you thought it would?
    - what physical changes are happening?
    - describe your feelings
12. bite once more
    - quit eating
    - describe your feelings about quitting
13. describe your feelings if they have changed from the first bite
    - discuss with a partner

- **Versatile Fruits & Vegetables (15 minutes)**
    - Packed with Powerful Nutrients
        - provide many nutrients our bodies need
        - vitamin A - supports healthy eyes and skin, helps fight infections/illness
        - vitamin C - encourages healing and building new body tissues
        - potassium – benefits blood pressure and hydration
        - folic acid - regenerates new RBCs to carry oxygen throughout the body
        - fiber – promotes bowel movements and feeling full
        - phytonutrients – biologically active compounds found in various fruits and vegetables that may have different effects on and benefits to the body
            - non-essential nutrients
            - examples – antioxidants, flavonoids, phytochemicals, flavones, isoflavones, catechins, anthocyanidins, carotenoids, polyphenols
    - Benefits Beyond Nutrition
        - variety – choose fruits and vegetables from countless colors and flavors
            - melons – cantaloupe, honeydew, watermelon
            - berries – blackberries, blueberries, cherries, cranberries, raspberries, strawberries
            - other – apples, bananas, grapes, kiwi, lemons, limes, mangoes, nectarines, oranges, peaches, pears, tangerines
            - 100% fruit juices – apple, cranberry, grape, orange, pineapple, pomegranate
            - dark green – arugula, bok choy, broccoli, collard greens, kale, mixed or mustard greens, romaine lettuce, spinach, swiss chard

- red and orange – carrots, peppers, pumpkin, squashes, sweet potatoes, tomatoes, yams
- starchy veggies – cassava, corn, green peas, green lima beans, plantains, potatoes, taro
- beans and peas – black beans, black-eyed peas, chickpeas, kidney beans, lentils, navy beans, pinto beans, soy beans, split peas, white beans
- others – asparagus, avocado, brussels sprouts, cabbage, cauliflower, celery, cucumbers, eggplant, green beans, mushrooms, onions, yellow squash, zucchini
- **IT TAKES SEVEN TO TEN TRIES BEFORE YOU ARE ABLE TO DETERMINE WHETHER YOU LIKE A NEW FOOD NOT.**

▪ live longer
- "Eating a diet rich in vegetables and fruits as part of an overall healthy diet may reduce risk for heart disease, including heart attack and stroke".
- "Eating a diet rich in some vegetables and fruits as part of an overall healthy diet may protect against certain types of cancers".
- "Diets rich in foods containing fiber, such as some vegetables and fruits, may reduce the risk of heart disease, obesity, and type 2 diabetes".

▪ stay stronger
- "Eating vegetables and fruits rich in potassium as part of an overall healthy diet may lower blood pressure, and may also reduce the risk of developing kidney stones and help to decrease bone loss".

▪ enjoy eating
- can enhance flavor, color, and fun at meals and snacks

○ Purchasing Produce

▪ seasonality – select in-season options for **OPTIMAL SAVINGS AND FLAVOR**
- Spring – apricots, asparagus, broccoli, collard greens, cooking greens, lettuce, mushrooms, peas, radishes, rhubarb, spinach, strawberries, swiss chard
- Summer – apricots, bell peppers, blackberries, blueberries, cantaloupe, cherries, collard greens, corn, cucumbers, eggplant, green beans, honeydew melon, kiwis, lima beans, mangos, nectarines, okra, peaches, plums, raspberries, strawberries, summer squash/zucchini, tomatillos, tomatoes, watermelon
- Fall – brussels sprouts, cauliflower, collard greens, cooking greens, cranberries, ginger, grapes, green beans, kale, lettuce, mangos, mushrooms, parsnips, peas, pears, potatoes, pumpkins, radishes, raspberries, rutabagas, spinach, sweet potatoes/yams, swiss chard, winter squash

- Winter – brussels sprouts, grapefruit, kale, leeks, lemons, oranges, pears, potatoes, pumpkins, rutabagas, sweet potatoes/yams, winter squash
- Year-Round – apples, avocado, bananas, beets, cabbage, carrots, celery, garlic, onions, pineapple, turnips
- SEASONALITY MAGNET
  - ❖ hang on refrigerator to review produce at home
  - ❖ promote in-season purchasing

▪ try fresh, frozen, canned, or dried varieties – all are nutritious and delicious
- fresh – best to buy in-season items
- frozen – picked and packaged at peak production, have a very high nutrient value
- canned – look for "packed in 100% juice" fruit and "low-sodium" vegetable options
- dried – smaller portion sizes due to shrinkage

○ Packing in Produce
▪ incorporate different categories, colors, and flavors throughout the day and week
▪ fun with fruit
- fresh – grab a whole fruit for breakfast on the go
- frozen – add frozen berries to oatmeal or yogurt
- canned – pack snack size peaches in 100% juice, spread applesauce on toast instead of jelly
- dried – make a trail mix

▪ vary your vegetables
- consume raw and cooked varieties
- incorporate into soups, rice, pastas, and casseroles
- add fun flavors – season with herbs and spices

▪ add spreads and dips
- fruit – almond butter, yogurt
- vegetables – salad dressing, hummus
- both – peanut butter, cottage cheese

- **Cooking Description/Demonstration (15 minutes)**

○ Preparing Fresh Produce
▪ first wash your hands
- soap and warm water

▪ always clean produce before preparing
- fruit/vegetable brush
- rinse with cool running water

▪ frozen produce
- ready-to-eat

▪ canned produce
- rinse to remove excess sugar/sodium

- dried produce
  - ready-to-eat
- always clean cooking surfaces and utensils after every single use

- Discuss Knives
  - parts –
    - cutting edge – bottom edge of the blade, can be flat and tapered, or serrated
    - point – very end of the blade, used to pierce foods, make incisions, and cut small items
    - tip – first few inches of the blade, used to cut small or delicate items
    - spine – top of the blade, grip with thumb and forefinger
    - bolster – where the blade meets the handle, thick strip of steel, protects hand if the knife slips
    - heel – last few inches of the blade, used to cut through large, tough or hard foods
    - rivets – hold handle to the tang, need to be tight to prevent injury, snags on clothing, and growth of microorganisms
    - handle – many types of materials, important that it is comfortable in your hand
    - butt – end of the handle
    - tang – metal that continues from the blade through the handle, some knives only have a partial tang, provides weight on the back half of the knife for stability and durability
  - kinds of knives
    - chef's knife
      - ❖ purposes – everyday preparation, very versatile
      - ❖ what we will use as our primary cooking utensil this evening
    - others
      - ❖ utility – everyday preparation, very versatile
      - ❖ paring – cutting small fruits and vegetables with ease
      - ❖ boning – breaking down poultry or butterflying meats
      - ❖ bread – slicing meats, poultry, seafood, warm breads, and cakes
      - ❖ butcher – segmenting and trimming large cuts of poultry or meat
      - ❖ carving – slicing meat and poultry as well as large fruits and vegetables
      - ❖ cheese – slicing hard cheese and spreading soft cheese
      - ❖ meat cleaver – cutting and separating meat/poultry from bones
      - ❖ santoku – similar to the chef's knife but with a drop point for added precision
      - ❖ steak/table – cut any food at the table (steak, salad, bread, etc.)

- ❖ vegetable cleaver – slicing, chopping, and dicing fruits/vegetables
- knife **SAFETY**
  - **S –** Securely hold your knife. Grip the top of the blade firmly between your thumb and forefinger. Cut things on a flat surface like a cutting board. Do not cut things while you hold them in your hand.
  - **A –** Anchor all cutting boards to ensure they don't slip. If your cutting board easily slides on the counter, put a damp cloth underneath it, this will help it grip.
  - **F –** Fingertips should be curled back. Hold foods with fingertips tucked under away from the knife.
  - **E –** Eyes on the knife! When using a knife, try to avoid distractions and keep your eyes on what you're doing. It is also a good idea to keep knives where they are clearly visible, for example, do not put a knife in a sink full of dirty dishes where someone may not know it is there.
  - **T –** Take your time. Don't rush with a knife.
  - **Y –** Yield to falling knives. If a knife slips out of your hand or falls from the counter, let it drop. Do not attempt to catch it. This is why it is a good idea to wear closed toe shoes in the kitchen.
- proper technique and handling
  - description –
    - ❖ pinch blade with thumb and first finger
    - ❖ wrap other three fingers around the handle close to the blade
    - ❖ keep the fingers on your guide hand curled under
    - ❖ if you can hear the knife you're doing it wrong!
  - demonstration –
    - ❖ onion – in half, cut tip off, cut towards root but not through, then parallel to root
    - ❖ pepper – demo cutting circle from top and then cutting off bottom and opening up
    - ❖ tomato – cut in half and cut off stem and use same technique as onion
    - ❖ cilantro – demo mincing, removing stems

- **Cooking Experience (45 minutes)**
  - Explain recipes (5 minutes)
    - everyone will prepare various fruit and vegetable salsas with homemade tortilla chips
    - each kitchen is equipped with all the cooking utensils and tools required to make the recipes
      - sitting out on countertops
      - please do not go into drawers or cabinets
    - work in groups of 4-6
    - be safe when working with knives

- remember the skills discussed earlier
- volunteers will be cleaning up the kitchens
  - no need to do dishes, wipe down countertops, etc.
  - please be considerate and try not to make too much of a mess

- Make Salsas and Tortilla Chips (40 minutes)
  - follow recipes
  - Fresh Tomato Salsa
    - ingredients:
      - 1 ½ pounds Roma tomatoes, seeded, ¼" dice
      - ¾ cup onion, ¼" dice
      - ½ cup fresh cilantro, chopped
      - 3 Tablespoons fresh lime juice
      - 2 Tablespoons salad oil
      - 2 medium fresh jalapeno peppers, seeded, minced
      - 1 garlic clove, minced
      - salt & pepper to taste
    - directions:
      - clean, cut, & mix all ingredients in a medium bowl
      - season, cover, and chill.
  - Bean Salsa
    - ingredients:
      - 2 cups black beans canned, rinsed and drained
      - 1 cup frozen edamame, thawed
      - 1 cup onion, ¼" dice
      - 1 cup frozen whole kernel corn, thawed
      - ½ cup green peppers, ¼" dice
      - ½ cup red peppers, ¼" dice
      - 1 cup Roma tomato, seeded, ¼" dice
      - ¼ cup garlic, minced
      - 4 medium fresh jalapeno peppers, seeded, minced
      - ½ cup salad oil
      - ¼ cup fresh lime juice
      - salt & pepper to taste
    - directions:
      - clean, cut, & mix all ingredients in a medium bowl
      - season, cover, and chill
  - Roasted Corn Salsa
    - ingredients:
      - 2 cups frozen whole kernel corn
      - 1 cup Roma tomato, seeded, ¼" dice
      - 1 cup onion, ¼" dice
      - ½ cup green pepper, ¼" dice
      - 2 Tablespoons garlic, minced
      - 2 medium fresh jalapeno peppers, seeded, minced
      - ½ cup salad oil

- ❖ ¼ cup fresh lime juice
- ❖ ½ cup fresh cilantro, chopped
- ❖ salt & pepper to taste

- directions:
  - ❖ clean, cut, & mix all ingredients in a medium bowl
  - ❖ season, cover, and chill

- Fruit Salsa
  - ingredients:
    - ❖ ½ pound fresh cucumber, ¼" dice
    - ❖ ½ pound fresh pineapple, ¼" dice
    - ❖ 2 medium fresh jalapeno peppers, seeded, minced
    - ❖ 3 Tablespoons red onion, ¼" dice
    - ❖ ¼ cup fresh cilantro
    - ❖ 2 teaspoons salad oil
    - ❖ 2 teaspoons fresh lime juice
  - directions:
    - ❖ clean, cut, & mix all ingredients in a medium bowl
    - ❖ season, cover, and chill
- Baked Tortilla Chips
  - ingredients:
    - ❖ nonstick cooking spray
    - ❖ 6 8-inch whole wheat or 4-inch corn tortillas
    - ❖ salt (optional)
  - directions:
    - ❖ preheat oven to 400°F
    - ❖ lightly grease a baking sheet with cooking spray
    - ❖ spray tops of tortillas and lightly salt (optional)
    - ❖ cut tortillas into 8 wedges using a knife or pizza cutter (like cutting a pizza) and place on greased baking sheet
    - ❖ bake for 8-12 minutes, until crisp and light brown; watch closely so the chips don't burn
    - ❖ remove from baking sheet and cool on paper towels or cooking rack
- instructor, chef, and volunteers walk through kitchens to watch and assist participants

- **Mealtime (28 minutes)**
  - Eat all together
  - Walk participants through mindful eating exercise
    - additional practice for future meals/snacks
    - see instructions above
  - Questions?
- **Lesson Conclusion (2 minutes)**
  - Introduction to next week's lesson
    - Great Grains & Delightful Dairy
  - Thank You

- Distribute donated products to participants → KNIVES, CUTTING BOARDS, APRONS
- Homework
  - try one new fruit or vegetable with your friends/family this week

Assessment:
To assess learning quality the instructor will:

- listen to participants' questions and conversations throughout the lesson and meal.
- look at participants' SMART goals.
- evaluate participants' mindful eating practices.
- observe participants' culinary skills in the kitchen, especially knife skills –
  - cutting
  - chopping
  - mincing
  - dicing
- watch participants' preparation of produce during the cooking experience.

Overall evaluation will be tested at the conclusion of Culinary Boot Camp; participants will complete post- assessments to compare outcomes to pre-assessment scores.

Lesson Resources:
Fruits & Veggies More Matters (website).
http://www.fruitsandveggiesmorematters.org/

Iowa State University Extension and Outreach Publications (references and recipes, website). http://www.extension.iastate.edu/

Satter E. *Treating the Dieting Casualty*. Madison, WI: Ellyn Satter Associates. 1998.

The Center for Mindful Eating (website).
https://thecenterformindfuleating.org/Principles-Mindful-Eating

The Cookery: Glossary of Cooking Terms (website).
https://www.d.umn.edu/~alphanu/ cookery/home.html

The Cookery: Glossary of Food Terms (website).
https://www.d.umn.edu/~alphanu/ cookery/home.html

USDA ChooseMyPlate (website). http://www.choosemyplate.gov

USDA SNAP-Ed Seasonal Produce Guide (website).
https://snaped.fns.usda.gov/seasonal-produce-guide

Extension Activities:

- Classic Hummus Demonstration
  - 1-2 volunteers will prepare dish
  - cooking supplies:
    - measuring spoons (tsp. and T.)
    - measuring cups (1/4, 1/2, 3/4, 1 c.)
    - colander
    - pressure cooker or can opener
    - food processor or blender
    - serving bowl
    - serving spoon
  - ingredients:
    - 2 garlic cloves
    - ½ c. dried garbanzo beans/chickpeas*
    - ¾ tsp. salt
    - ¼ c. tahini (sesame paste)
    - 3 T. lemon juice
    - 2-4 T. liquid from garbanzo beans/chickpeas
    - 4 dashes hot sauce
    - various fresh vegetables, for dipping → carrots, peppers, broccoli, cauliflower, grape tomatoes
  - directions:
    - soak and cook garbanzo beans/chickpeas* according to these general instructions –
      - soak legumes overnight.
      - drain legumes, then cook in fresh water.
      - season cooking water with ½ tsp. salt per cup of dried legumes.
      - reduce foaming by adding 1 T. fat per cup of dried legumes.
      - fill pressure saucepan 1/3 full and always add fat to reduce foaming
      - cook under 15 lbs. pressure; begin timing after pressure is reached; bring saucepan slowly to operating pressure and reduce pressure gradually (do not cool under running) to avoid mushiness and loss of skins.
      - cook at 15 lbs. pressure for 15 minutes.
    - turn on a food processor fitted with a steel blade or a blender and drop garlic cloves down the feed tube; process until it is minced.
    - add the rest of the ingredients to the food processor or blender and process until the hummus is coarsely pureed; taste, for seasoning purposes.
    - serve chilled or at room temperature.

      * can substitute 1 c. canned garbanzo beans/chickpeas for ½ c. dried legumes.
  - participants will watch demonstration and taste product during meal time.

- Silken Tofu Dip Demonstration
  - 1-2 volunteers will prepare dish
  - cooking supplies:
    - measuring spoons (tsp. and T.)
    - measuring cup (1 c.)
    - zester
    - juicer
    - chef's knife
    - cutting board
    - blender or food processor
    - serving bowl
    - serving spoon
  - ingredients:
    - 1 package (10 oz.) silken tofu, drained
    - 2 tsp. grated lemon zest
    - 1 lemon, juiced
    - 4 garlic cloves, chopped
    - 1 c. water
    - 2 tsp. Worcestershire sauce
    - 3 T. grated parmesan cheese
    - salt and pepper, to taste
    - various fresh vegetables, for dipping → carrots, peppers, broccoli, cauliflower, grape tomatoes
  - directions:
    - combine silken tofu, lemon zest and juice, garlic, water, Worcestershire sauce, parmesan cheese, salt and pepper in a blender or food processor; blend until smooth.
    - if the consistency is too thick, add more water.
  - participants will watch demonstration and taste product during meal time.

Week 2: Great Grains and Delightful Dairy

Learning Objectives within the Social Cognitive Theory:
The outcomes of Lesson 2 include-

- Personal Factors: Participants will be able to –
  - explain the health benefits associated with eating whole grains and dairy products daily.
  - incorporate whole grains and dairy products into their diets.
  - distinguish whole grains from refined grains.
  - choose whole grains instead of refined grains at meals and snacks.
  - include dairy products with other food items at meals and snacks.
  - add dairy products in place of less healthful options in recipes.
  - differentiate food allergy from food intolerance.
  - define gluten and lactose.
  - examine differences between Celiac Disease, wheat allergy, and gluten intolerance.
  - discuss differences between galactosemia and lactose intolerance.
  - demonstrate how to read a recipe card and make appropriate measurements while cooking.
  - describe the importance of accuracy in the kitchen.
  - summarize portioning.
  - Students will be able to –
    - apply safety and sanitation practices when preparing eggs.
    - prepare perfect omelets.
    - put into practice proper sautéing and pan-frying skills.
  - Employees will be able to–
    - apply safety and sanitation practices when preparing eggs.
    - cook pasta al dente.
- Environmental Factors: Participants will be able to –
  - plan how to handle food allergies and food intolerances that may emerge in their physical and social environments.
  - make meals and snacks that include whole grains and dairy products with recipes and other resources obtained at the end of Lesson 2.
    - recipe cards
    - dairy recipes/resources
  - practice cooking skills using culinary utensils provided to them at the end of Lesson 2.
    - measuring spoons
    - spatulas
    - pizza cutters
    - aprons

Time: 120 minutes total

- 30-minute learning lesson
  - great grains and delightful dairy

- food allergies and food intolerances
- 15-minute cooking description/demonstration
  - students – egg safety and sanitation, preparing a perfect omelet, sautéing and pan-frying basics
  - employees – egg safety and sanitation, pasta basics
  - all – measurement skills
    - conversions
      - gallon, quarts, cups, tablespoon, teaspoon
    - accuracy
      - important in the kitchen to make the most accurate and delicious dishes
    - portions
      - remember everything in moderation
- 45-minute cooking experience
  - students – build your own egg omelets and fruit & vegetable grilled cheeses
  - employees – scrambled egg muffins and pasta basics
- 30-minute mealtime
  - mindful eating

Materials & Preparation:

- Lesson 2 PowerPoint slideshow
- computer
- projector screen
- donated products → MEASURING SPOONS, SPATULAS, APRONS, PIZZA CUTTERS, DAIRY RECIPES/RESOURCES
- Chef's Instructions
- Recipe Cards
- Students
  - Build Your Own Egg Omelet
  - Grilled Cheeses
- Employees
  - Scrambled Egg Muffins
  - Skillet Lasagna
- Recipe Supplies
- Students
  - cooking utensils (per kitchen)
    - 2 small mixing bowls
    - 2 whisks
    - 2 chef knives
    - 2 small cutting boards
    - 2 small fry pans
    - 4 spatulas
    - 2 medium fry pans
    - 2 butter knives

- 2 paring knives
- 2 medium cutting boards
- apple corer
- measuring cups (1/4, 1/2, 3/4, 1 c.)
- measuring spoons (tsp. and T.)

  - food items (per kitchen)
    - 8 eggs
    - 1 c. shredded cheese
    - various vegetables → bell peppers, mushrooms, onion, spinach, tomato, salsa
    - 4 slices cinnamon raisin bread
    - 4 slices whole wheat bread
    - 2 T. butter or soft margarine spread
    - 4 slices cheese → American **or** mozzarella
    - 2 small apples or pears **or** 1 small zucchini and 1 red bell pepper or tomato

- Employees
  - cooking utensils (per kitchen)
    - measuring cups (1/4, 1/2, 3/4, 1 c.)
    - measuring spoons (tsp. and T.)
    - 2 chef knives
    - 2 cutting boards
    - 2 skillets
    - 2 spatulas
    - 1 collander
    - 1 large spoon
    - 1 oven
    - 2 hot pads
    - 1 muffin tin
    - 1 medium mixing bowl
    - 1 whisk
    - 1 bread & butter knife or fork
  - food items (per kitchen)
    - 1 medium zucchini
    - ½ onion
    - 3 c. (24 oz) pasta spaghetti or pasta sauce
    - 2 cloves garlic
    - 1 c. water
    - 8 oz egg noodles
    - 1 package (10 oz) frozen chopped spinach, thawed
    - 1 package mushrooms, fresh or canned (optional)
    - 1 container (12 oz) low fat cottage cheese
    - ½ c. shredded mozzarella cheese
    - 2 c. chopped vegetables (broccoli, peppers, mushrooms, onion)

        - 6 eggs
        - ¼ tsp. salt
        - ¼ tsp. black pepper
        - ¼ tsp. garlic powder
        - ½ c. shredded cheddar cheese
        - non-stick cooking spray
    - Mealtime
- serving spoons
- forks
- plates
- glasses
- napkins
- to-go boxes

Concepts:

- Lesson Introduction
    - SMART Goals – "specific, measurable, achievable, relevant, and time-bound" ambitions/aspirations.
    - Mindful Eating – "allowing yourself to become aware of the positive and nurturing opportunities that are available through food selection and preparation by respecting your own inner wisdom."
- Great Grains and Delightful Dairy
    - RBC – red blood cell
    - RDN – registered dietitian nutritionist
    - Whole Grains – contain the entire grain kernel (bran, germ, endosperm).
    - Refined Grains – remove bran and germ from grain kernel through a milling process (endosperm)
    - Leavening – yeast or baking soda/powder added to breads and other baked goods that generates air while cooking which causes these products to rise.
    - Fortified –
- Food Allergies and Intolerances
    - Allergy – an immune system reaction that affects several organs in the body and leads to a range of signs and symptoms. A specific protein within certain food items will commonly cause food allergies. An allergic reaction to food can be extremely severe or even life threatening.
    - Intolerance – a reaction to food that is typically less serious than an allergy and oftentimes limited to digestive problems.
    - Digestive Enzyme – substance produced by living organisms that are secreted in the digestive tract to help break down food eaten for easier absorption.
    - Irritable Bowel Syndrome – A chronic condition that affects the intestinal tract without damaging bowel tissue; common signs and symptoms include bloating, gas, diarrhea, and constipation.

  - Gluten – general name for proteins found in wheat, rye, and barley that act as the glue to hold foods together to help maintain their shape.
  - Celiac Disease – A serious autoimmune disorder that can develop in genetically predisposed individuals distinguished by the ingestion of gluten, a protein found in wheat and other related grains, resulting in damage to the small intestine.
  - Wheat Allergy – a severe allergic reaction to foods containing wheat, which can lead to anaphylaxis and life-threatening situations.
  - Intolerance – A condition in which people experience similar signs and symptoms as celiac disease patients but do not test positive for the autoimmune disorder.
  - Lactose – natural sugar found in milk.
  - Galactosemia – A rare group of genetic disorders that causes an inability to metabolize the sugar galactose; most cases are fatal without immediate medical attention.
  - Lactose Intolerance – gastrointestinal disturbance that occurs after an individual consumes and amount of lactose greater than what can be digested and absorbed within the body.
- Cooking Demonstration/Description
  - Salmonella – bacteria commonly found in food products that are prepared improperly; causes severe foodborne illness
  - Pasteurization – the practice of heat processing liquid or solid food to destroy pathogenic microbes (bacteria) to make products safe for consumption.
  - Foodborne Illness – a disease that comes from consuming contaminated food or drink.
  - Sauté – cook in a small amount of oil or water and stir continuously.
  - Pan-Fry – cook in a small amount of oil or water without stirring.
  - Al Dente – “tender but firm”.
  - Gallon – liquid measuring unit, 1 gallon = 4 qt. or 16 c., milk sold in gallons, typically abbreviated gal.
  - Quart – liquid measuring unit, 1 qt. = 4 c., typically abbreviated qt.
  - Cup – common measuring unit used in most recipes, often abbreviated c.
  - Tablespoon – common measuring unit used when cooking with herbs and spices, 1 T. = 3 tsp. often abbreviated T.
  - Teaspoon – common measuring unit used when cooking with herbs and spices, often abbreviated tsp.
  - Accuracy – the degree to which a measurement matches the appropriate amount or standard.
- Cooking Experience
  - Stir – to combine ingredients with a spoon, fork, or mixer.
  - Spread – to cover one food item with another food item, usually with a knife.
  - Pound – common weight unit used when purchasing produce items, fruits and vegetables typically priced per pound, often abbreviated lb.

- Ounce – common weight unit used when packaging food items, dry goods priced per ounce, often abbreviated oz.
- Boil – heat liquid until bubbles break on the surface or cook in boiling water.
- Simmer – cook at a temperature just below the boiling point. Bubbles form slowly but do not reach the surface.
- Thaw – slowly change from a frozen state to a liquid state.
- Preheat – heat oven to desired temperature before putting food in to bake.
- Bake – to cook by dry heat, usually in the oven.

Procedure:

- **Lesson Introduction (5 minutes)**
  - Review SMART goals
    - group and individual
  - Review mindful eating
    - ask participants –
      - what is it?
      - did anyone practice mindful eating outside of Culinary Boot Camp this past week?
  - Review Lesson 1 – Versatile Fruits and Vegetables
    - ask participants to recall information or skills learned throughout Lesson 1
    - ask participants –
      - did anyone share new information or practice new skills outside of Culinary Boot Camp?
        - ❖ what information/skill?
      - did anyone try a new fruit or vegetable?
        - ❖ please expand on the experience
- **Great Grains and Delightful Dairy (15 minutes)**
  - Grains
    - benefits to eating grains everyday
      - provide many nutrients our bodies need
      - fiber – promotes bowel movements and feeling full
      - B-vitamins – maintain metabolism and nervous system function
      - folic acid (a B vitamin) – regenerates new RBCs to carry oxygen throughout the body
      - iron – carries oxygen throughout the body
      - magnesium and selenium – minerals that build bones and readily release energy from muscles
    - variety – wheat, oats, rye, barley, corn, rice, amaranth, millet, potato, quinoa, tapioca, buckwheat, sorghum
      - ask participants to share any others not listed above
    - consider your grain consumption

- recommended intake differs depending on age and overall physical activity
- talk to a RDN to receive detailed information about your nutritional needs

▪ whole and refined grains: what's the difference?
- whole grains – contain the entire grain kernel
  - ❖ bran, germ, endosperm
  - ❖ provide wholesome nutrition
- refined grains – remove bran and germ from grain kernel through a milling process
  - ❖ give products a finer texture and longer shelf life
  - ❖ milling process also removes fiber, B vitamins, and iron
  - ❖ endosperm contains minimal nutrients

▪ SIMPLE SWAPS – ways to increase whole grain consumption
- substitute a whole grain product for a refined product
  - ❖ white bread → whole wheat bread
  - ❖ white rice → brown rice
  - ❖ regular pasta → whole wheat pasta
- add whole grains to mixed dishes
  - ❖ barley in vegetable soups or stews
  - ❖ amaranth in a casserole
  - ❖ quinoa in a stir-fry
- substitute whole wheat flour or oat flour for up to half of the flour in pancake, waffle, or muffin recipes
  - ❖ may require a little more leavening
- try rolled oats or a crushed unsweetened whole grain cereal as breading instead of panko crumbs or cracker pieces
- freeze leftover whole grains; heat and serve later on for a quick side dish

○ Dairy

▪ benefits to dairy consumption
- provide many nutrients our bodies need
- calcium – builds bones/teeth and maintains bone mass; dairy is primary source of calcium in American diets.
- potassium – may help maintain healthy blood pressure; higher amounts in milk and yogurt products
- vitamin D – maintains proper levels of calcium and phosphorus to help bones stay strong; fortified in milk and yogurt products; other fortified food sources include OJ and breakfast cereals
- protein – complete protein source, great protein option for vegetarians; high protein dairy products include cottage cheese and Greek yogurt

▪ variety – milk, yogurt, cheese, pudding, frozen yogurt, ice cream
- try to select low-fat or fat-free options
- other non-dairy sources of calcium

- ❖ cannot be classified as dairy products but considered a dietary substitute for those who choose not to consume this food group
- ❖ fortified juices, cereals, breads, and milks
- ❖ canned fish
- ❖ soy products
- ❖ some nuts
- ❖ beans and leafy greens

▪ SIMPLE SWAPS – ways to incorporate dairy into your day

- milk
  - ❖ include milk or other calcium-fortified milks as a beverage at meals
  - ❖ add milk to your coffee to make a delicious cappuccino or latte
  - ❖ include milk in your soup and stew recipes
  - ❖ add milk instead of water to oatmeal and other hot cereals
- yogurt
  - ❖ make a dip for fruits or vegetables from yogurt
  - ❖ replace butter, cream cheese, and sour cream in recipes with yogurt
    - 4 T. butter = 1 c. yogurt
    - 1 lb. cream cheese = 1 lb. yogurt
    - 1 c. sour cream = 1 c. yogurt
  - ❖ make a fruit and vegetable smoothie with yogurt
- cheese
  - ❖ top casseroles, soups, stews, or vegetables with shredded cheese
  - ❖ pair fruit and cheese for a simple and nutritious snack
- make pudding, frozen yogurt, or ice cream your choice of dessert

- **Food Allergies and Intolerances (10 minutes)**
  - Definitions
    - Allergy – an immune system reaction that affects several organs in the body and leads to a range of signs and symptoms. A specific protein within certain food items will commonly cause food allergies. An allergic reaction to food can be extremely severe or even life threatening.
    - Intolerance – a reaction to food that is typically less serious than an allergy and oftentimes limited to digestive problems. Common causes include:
      - absence of a digestive enzyme to fully break down a food
      - Irritable Bowel Syndrome
      - sensitivity to food additives
      - recurring stress or psychological factors
      - Celiac Disease
  - Gluten
    - definition – general name for proteins found in wheat, rye, and barley

- glue that holds food together to help maintain its shape
- found in many types of foods → wheat, rye, barley, oats (cross-contamination), cereals, malt, beer, food coloring, soups, salad dressings, sauces, medicine

▪ Celiac Disease (autoimmune disorder) – A serious autoimmune disorder that can develop in genetically predisposed individuals distinguished by the ingestion of gluten, a protein found in wheat and other related grains, resulting in damage to the small intestine. When injury to the gastrointestinal tract occurs, nutrients cannot be absorbed properly. This can cause multiple deficiencies as well as numerous medical signs and symptoms. Although not a true food allergy, this disease shares similar characteristics because it involves the immune system.
- wheat allergy – a severe allergic reaction to foods containing wheat, which can lead to anaphylaxis and life-threatening situations

▪ Intolerance – A condition in which people experience similar signs and symptoms as celiac disease patients but do not test positive for the autoimmune disorder. Individuals are diagnosed with this "intolerance" when removing gluten from the diet resolves the body's physiological signs and symptoms.
- considered non-celiac wheat sensitivity since researchers are not certain that gluten is the root cause

○ Lactose

▪ definition – natural sugar found in milk

▪ Galactosemia (allergy) – A rare group of genetic disorders that causes an inability to metabolize the sugar galactose; most cases are fatal without immediate medical attention.
- must remove all sources of galactose and lactose in the diet
- lactose = glucose + galactose
- ABSOLUTELY NO DAIRY

▪ Intolerance – gastrointestinal disturbance that occurs after an individual consumes and amount of lactose greater than what can be digested and absorbed within the body; signs and symptoms may be mild to severe and typically transpire 30 minutes to 2 hours after consuming dairy products. Other conditions, such as IBS and Celiac Disease, have similar signs and symptoms, so diagnosis can be difficult. Adults experience lactose intolerance more often than children since bodies produce less of the enzyme needed to metabolize the natural sugar with age. People can still consume dairy products with lactose intolerance. Options include:
- lactose-free milk and ice cream
- naturally lower in lactose → cottage cheese, some cheese (cheddar, Swiss, mozzarella), yogurt (Greek, live and active cultures)

- lactase enzyme
- INCORPORATE DAIRY PRODUCTS BACK INTO YOUR DIET TO BUILD TOLERANCE

- **Cooking Description/Demonstration (15 minutes)**
  - students
    - egg safety and sanitation
      - common source of salmonella
        - ❖ bacteria commonly found in food products prepared improperly
        - ❖ causes severe foodborne illness
      - preparing
        - ❖ wash with hot soapy water both before and after handling raw eggs
          - hands, utensils, equipment, and work surfaces
        - ❖ cook eggs completely until yolk and white are firm
          - scrambled – eggs should not be runny
        - ❖ all dishes that contain egg should be cooked to 160°F
          - use a thermometer to determine doneness
        - ❖ purchase pasteurized egg products when a recipe requires raw or undercooked eggs
      - serving
        - ❖ serve eggs and dishes containing egg immediately after cooking
        - ❖ keep hot egg dishes hot and cold egg dishes cold
          - serve smaller portions hot eggs and reheat as necessary
          - keep cold eggs refrigerated until it is time to serve
          - egg dishes should not sit out for more than 2 hours at most
    - preparing a perfect omelet
      - beat eggs together in a bowl prior to pouring into skillet or fry pan
      - heat the skillet or fry pan before adding eggs
      - spray skillet or fry pan with non-stick cooking spray to prevent sticking
      - pour beaten eggs into heated skillet or fry pan and allow to cook without stirring for 1-2 minutes
      - lift edges of eggs with a spatula and let uncooked egg flow underneath cooked egg
      - add filling when eggs are almost cooked
      - fold omelet over when eggs are firm and slide onto a plate to serve
    - sautéing and frying basics
      - sauté – cook in a small amount of oil or water and stir continuously
        - ❖ typically less fat and medium cooking temperatures
      - pan-fry – cook in a small amount of oil or water without stirring
        - ❖ typically more fat and low cooking temperatures
      - cooking method that brings out the flavor in many foods

- tips and techniques
  - ❖ chop ingredients evenly into bite-size pieces
    - faster cooking
    - easier consumption
  - ❖ do not crowd the chopped ingredients in the skillet
    - food will steam instead of brown
    - cook in batches if necessary
  - ❖ select an appropriate size skillet
    - too big – fat or oil will burn
    - too small – food will steam instead of brown
  - ❖ add the fat or oil and heat the skillet before adding food
    - slow and steady heat
    - fat or oil should sizzle but not smoke or burn
  - ❖ add foods that take the most time to cook to the skillet first
  - ❖ test doneness
    - most fruits and vegetables will take 5-7 minutes (al dente)
    - check meat and poultry temperature with a thermometer to determine cook time
  - ❖ do not press down on the food
    - will brown with appropriate amount of fat and heat
    - will lose a lot of moisture

- employees
  - egg safety and sanitation
    - common source of salmonella
      - ❖ bacteria commonly found in food products prepared improperly
      - ❖ causes severe foodborne illness
    - preparing
      - ❖ wash with hot soapy water both before and after handling raw eggs
        - hands, utensils, equipment, and work surfaces
      - ❖ cook eggs completely until yolk and white are firm
        - scrambled – eggs should not be runny
      - ❖ all dishes that contain egg should be cooked to 160°F
        - use a thermometer to determine doneness
      - ❖ purchase pasteurized egg products when a recipe requires raw or undercooked eggs
    - serving
      - ❖ serve eggs and dishes containing egg immediately after cooking
      - ❖ keep hot egg dishes hot and cold egg dishes cold
        - serve smaller portions hot eggs and reheat as necessary
        - keep cold eggs refrigerated until it is time to serve
        - egg dishes should not sit out for more than 2 hours at most
  - pasta basics

- many shapes and sizes
  - ❖ holes or ridges – chunky sauces
  - ❖ thin and delicate – light sauces
  - ❖ thick and durable – heavy sauces
- shape and size determines cooking time
  - ❖ al dente – "tender but firm"
  - ❖ larger and denser pasta – longer cooking time
  - ❖ follow the recipe or box to prepare pasta the right way
- cooking time makes pasta bigger and heavier
  - ❖ bigger – 2-3 times the original size
  - ❖ heavier – double or triple original weight
  - ❖ follow the recipe to prepare the right amount of pasta and minimize food waste
- general rule for boiling pasta
  - ❖ 1 lb. pasta = 1 gallon water + 1 tsp. salt (optional) + 1 tsp. oil

- all – measurement skills
  - conversions
    - 1 gallon = 4 qt. = 16 c.
    - 1 qt. = 4 c.
    - 1 c. = 16 T.
    - 1T. = 3 tsp.
  - accuracy
    - always use the measuring utensil closest to the amount required in a recipe
      - ❖ example 1: ¾ c. = ½ c. + ¼ c.
        - NOT ¼ c. + ¼ c. + ¼ c.
      - ❖ example 2: 4 tsp. = 1 T. + 1 tsp.
        - NOT 1 tsp. + 1 tsp. + 1 tsp. + 1 tsp.
    - important in the kitchen to make the most accurate and delicious dishes
  - portions
    - remember everything in moderation

- **Cooking Experience (45 minutes)**
  - Explain recipes (5 minutes)
    - everyone will prepare egg omelets and grilled cheeses (students) **or** skillet lasagnas and personal pan pizzas (employees)
    - each kitchen is equipped with all the cooking utensils and tools required to make the recipes
      - sitting out on countertops
      - please do not go into drawers or cabinets
    - work in groups of 4-6
    - be safe when working with eggs, sautéing, and frying (students) **or** practice boiling pasta al dente, kneading and rolling pizza dough (employees)
      - remember the skills discussed earlier

- make sure measurements are accurate
  - very important skill
- volunteers will be cleaning up the kitchens
  - no need to do dishes, wipe down countertops, etc.
  - please be considerate and try not to make too much of a mess

- Students – Make Build Your Own Egg Omelets and Grilled Cheeses (40 minutes)
  - follow recipes
  - Build Your Own Egg Omelet
    - ingredients (per person):
      - ❖ non-stick cooking spray
      - ❖ 2 eggs, beaten
      - ❖ 3-4 T. total of one or more of the following: shredded cheese, chopped bell peppers, sliced mushrooms, chopped onion, spinach, diced tomato, salsa
      - ❖ butter or oil, for sautéing vegetables
    - directions:
      - ❖ heat a small frying pan over medium high heat. spray with non-stick cooking spray and pour in beaten eggs.
      - ❖ lift edges of eggs with a spatula. tip frying pan to let uncooked egg flow underneath cooked egg.
      - ❖ add 3-4 T filling when eggs are almost done.
      - ❖ fold omelet over to form a half moon shape when eggs are firm.
      - ❖ slide onto a plate and serve hot.
      - ❖ if sautéing vegetables:
        - heat a small frying pan over medium high heat. put a dab of butter or oil into frying pan and pour in prepared vegetables.
        - stir occasionally until vegetables are cooked through and browned, about 5 minutes.
  - Grilled Cheeses
    - ingredients (per kitchen):
      - ❖ 8 slices cinnamon raisin or whole wheat bread
      - ❖ 2 T. butter or soft margarine spread
      - ❖ 4 slices American cheese **or** mozzarella cheese
      - ❖ 2 small apples or pears, thinly sliced **or** 1 zucchini and 1 red bell pepper or tomato, thinly sliced
      - ❖ ground cinnamon **or** fresh basil, optional
    - directions:
      - ❖ spread one side of each bread slice lightly with butter or margarine
      - ❖ place four slices of bread on a griddle or skillet (butter or margarine side down). top each with one cheese slice.
      - ❖ arrange fruit slices **or** vegetable slices over the cheese. top with the other four bread slices (butter or margarine side up).

- ❖ place griddle or skillet over medium heat. cook 2-3 minutes. turn and cook 2-3 minutes more or until bread is golden and cheese is melted.

- Employees – Make Scrambled Egg Muffins and Skillet Lasagnas (37 minutes)
  - follow recipes
  - Scrambled Egg Muffins (per kitchen)
    - ingredients:
      - ❖ 2 c. vegetables (broccoli, peppers, mushrooms, onion), washed and diced
      - ❖ 6 eggs
      - ❖ ¼ tsp. salt
      - ❖ ¼ tsp. black pepper
      - ❖ ¼ tsp. garlic powder
      - ❖ ½ c. cheddar cheese, shredded
      - ❖ non-stick cooking spray
    - directions:
      - ❖ pre-heat oven to 350°F.
      - ❖ spray a muffin tin with non-stick cooking spray
      - ❖ add chopped vegetables to the muffin tin.
      - ❖ beat eggs in a bowl with a whisk. stir in salt, black pepper, and garlic powder.
      - ❖ pour eggs into the muffin tin and bake 20-25 minutes.
      - ❖ remove the tin from the oven during the last 3 minutes of baking. sprinkle the cheese on top of the muffins and return the tin to the oven.
      - ❖ bake until the internal temperature reaches 160°F or a knife inserted near the center comes out clean.
  - Skillet Lasagna (per kitchen)
    - ingredients:
      - ❖ ½ lb zucchini
      - ❖ ½ onion, chopped (about ½ c.)
      - ❖ 3 c. spaghetti or pasta sauce
      - ❖ 2 cloves garlic, minced **or** ¼ teaspoon garlic powder
      - ❖ 1 c. water
      - ❖ 1 bag (8 ounces) egg noodles
      - ❖ 1 package (10 ounces) frozen chopped spinach, thawed
      - ❖ 1 package mushrooms, fresh or canned (optional)
      - ❖ 1 container (12 ounces) low fat cottage cheese
      - ❖ ½ c. mozzarella cheese, shredded
    - directions:
      - ❖ cook zucchini and onion in a large skillet or electric fry pan. stir to prevent sticking. cook until zucchini and onion are browned, about 5 minutes.

- ❖ add spaghetti sauce, garlic, and water. bring ingredients in the skillet or fry pan to a boil.
- ❖ add uncooked noodles. stir and cover with lid. turn down the heat and cook 5 minutes.
- ❖ add thawed spinach to the skillet. add mushrooms if you like. cover and simmer 5 minutes.
- ❖ spoon cottage cheese over the top. sprinkle with mozzarella cheese. put the lid on and let it heat another 5 to 10 minutes until heated through and noodles are tender.
- ❖ do not stir the dish once the cheese has melted.

        - instructor, chef, and volunteers walk through kitchens to watch and assist participants
- **Mealtime (28 minutes)**
    - Eat all together
    - Walk participants through mindful eating exercise
        - additional practice for future meals/snacks
        - see instructions located in Lesson 1 outline
    - Questions?
- **Lesson Conclusion (2 minutes)**
    - Introduction to next week's lesson
        - Protein Power
    - Thank You
    - Distribute donated products to participants → MEASURING SPOONS, SPATULAS, APRONS, PIZZA CUTTERS, DAIRY RECIPES/RESOURCES
    - Homework
        - try one of the grain or dairy simple swaps with your friends/family this week

Assessment:

To assess learning quality the instructor will:

- listen to participants' questions and conversations throughout the lesson and meal.
- evaluate participants' mindful eating practices.
- observe participants' culinary skills in the kitchen, especially –
    - students
        - egg safety and sanitation
        - preparing omelets
        - sautéing and pan-frying
    - employees
        - egg safety and sanitation
        - preparing pasta al dente
    - all
        - measurement skills
        - accuracy

- watch participants' preparation of grain and dairy products during the cooking experience.

Overall evaluation will be tested at the conclusion of Culinary Boot Camp; participants will complete post- assessments to compare outcomes to pre-assessment scores.

Lesson Resources:

AllRecipes (website). http://allrecipes.com/

Celiac Disease Foundation (website). https://celiac.org/celiac-disease/

FDA Egg Safety: what you need to know (website). https://www.fda.gov/food/resourcesforyou/consumers/ucm077342.htm

Galactosemia Foundation (website). http://www.galactosemia.org/understanding-galactosemia/

Iowa State University Extension and Outreach Publications (references and recipes, website). http://www.extension.iastate.edu/

Mayo Clinic Diseases and Conditions (website). http://www.mayoclinic.org/diseases-conditions

Midwest Dairy Association (website). https://www.midwestdairy.com/nutrition-and-health

The Cookery: Glossary of Cooking Terms (website). https://www.d.umn.edu/~alphanu/ cookery/home.html

University of Minnesota Extension and Outreach Basic Principles for Preparing Pasta (website). https://www.extension.umn.edu/family/health-and-nutrition/toolkits-and-resources/great-trays/docs/basic-principles-for-preparing-pasta.pdf

University of Tennessee Extension and Outreach Sauté Tips and Techniques (website). https://extension.tennessee.edu/Pages/default.aspx

USDA ChooseMyPlate (website). http://www.choosemyplate.gov

Extension Activity:

- Edamame Pesto Demonstration
  - 1-2 volunteers will prepare dish
  - cooking supplies:
    - scale

- measuring spoons (tsp. and T.)
- measuring cups (1/8, 1/4, 1/2, 3/4, 1 c.)
- blender or food processor
- serving bowl
- serving spoon

- ingredients:
  - 10 oz. frozen edamame, thawed
  - ½ c. fresh basil, washed
  - ½ c. fresh spinach, washed
  - 2 ¼ tsp. garlic, chopped
  - 1 ½ oz. walnuts
  - 2 ¼ oz. or ½ c. parmesan cheese, canned
  - 2 T. Tabasco sauce
  - 1 ½ tsp. table salt
  - ½ tsp. black pepper
  - 6 ¼ oz. or 7/8 c. olive oil
  - cooked and chilled pasta, for serving
- directions:
  - combine edamame, basil, spinach, garlic, walnuts, cheese, Tabasco sauce, salt, and pepper in a blender or food processor; blend until well combined.
  - while blending, add olive oil slowly.
  - blend until smooth.
  - refrigerate and serve chilled over pasta.
- participants will watch demonstration and taste product during meal time.

Week 3: Protein Power

Learning Objectives within the Social Cognitive Theory:
The outcomes of Lesson 3 include-

- Personal Factors: Participants will be able to –
  - identify the numerous nutrients protein provides.
  - recognize the important roles protein performs within the body.
  - select from a diverse array of protein options.
  - define the term vegetarian and various ways to add protein into this diet.
  - describe the temperature danger zone, the dangers associated with it, and ways to avoid it during food purchasing, preparing, and storing.
  - apply food safety practices when making meals and snacks.
  - prevent cross contamination.
  - prepare different protein products.
    - searing
    - browning
    - draining
    - rinsing
  - operate a slow cooker safely and correctly.
  - cook meals and snacks in a slow cooker.
  - convert recipe ingredients and directions from stovetop to slow cooker.
  - demonstrate how to read a recipe card and make appropriate measurements while cooking.
- Environmental Factors: Participants will be able to –
  - implement concepts discussed during Lesson 3 with educational pieces given to them throughout the evening.
    - Vary Your Protein Routine Handout
    - Healthy Eating for Vegetarians Handout
    - Internal Temperature Guide Handout
  - prepare meals and snacks that include several different protein sources with recipes and other resources obtained at the end of Lesson 3.
    - recipe cards
    - beef recipes/resources
    - pork recipes/resources
    - soy recipes/resources
  - incorporate food safety skills into purchasing, preparing, and storing of protein products with information learned and tools supplied at the end of Lesson 3.
    - thermometers
    - coolers
  - practice cooking skills using culinary utensils provided to them at the end of Lesson 3.
    - meat brushes
    - aprons
    - cookbooks

Time: 120 minutes total

- 30-minute learning lesson
  - protein power
  - food safety
  - meal planning
- 15-minute cooking description/demonstration
  - slow cooker skills
  - preparing protein
- 45-minute cooking experience
  - different types of chili
    - classic beef
    - easy white turkey
    - black bean & pork
    - edamame
- 30-minute mealtime
  - mindful eating

Materials & Preparation:

- Lesson 3 PowerPoint slideshow
- computer
- projector screen
- donated products → THERMOMETERS, COOLERS, MEAT BRUSHES, APRONS, COOKBOOKS, BEEF RECIPES/RESOURCES, PORK RECIPES/RESOURCES, SOY RECIPES/RESOURCES
- Vary Your Protein Routine Handout
- Healthy Eating for Vegetarians Handout
- Internal Temperature Guide Handout
- Chef's Insturctions
- Recipe Cards
- Classic Beef Chili
- Easy White Turkey Chili
- Black Bean & Pork Chili
- Edamame Chili
- Recipe Supplies (every other kitchen)
- Kitchen 1 – classic beef, easy white turkey
  - cooking utensils
    - 2 knives
    - 2 cutting boards
    - 2 crockpots or 2 large saucepans
    - spatula
    - 2 colanders
    - can opener
    - measuring cups (1/4, ½, ¾, 1 c.)
    - measuring spoons (tsp. and T.)

- 2 stirring/serving spoons
- food items
  - 1 T. olive oil
  - ½ lb. ground beef
  - 1 lb. ground turkey
  - 2 medium onions
  - 2 cloves garlic
  - 5 ¼ c. low-sodium chicken broth
  - 1 can (16 oz.) kidney beans
  - 1 can (16 oz.) tomato sauce
  - 3 cans (15 oz.) cannellini beans (white kidney) beans
    - 2 cans (4 oz.) chopped green chiles
  - 1-2 T. chili powder
  - 1 T. dried oregano
  - 1 tsp. ground cumin
  - 2 pinches cayenne pepper
  - salt
  - ¼ c. chopped fresh cilantro
- Kitchen 2 – black bean & pork, edamame
  - cooking utensils
    - 2 knives
    - 2 cutting boards
    - 2 crockpots or 2 large saucepans
    - spatula
    - can opener
    - measuring cups (1/4, ½, ¾, 1 c.)
    - measuring spoons (tsp. and T.)
    - 2 stirring/serving spoons
  - food items
    - nonstick cooking spray
    - 1 T. olive oil
    - 1 lb ground pork
    - 2 c. edamame, prepared and shelled
    - 1 medium red or green bell pepper
    - 1 medium white onion
    - 2 medium yellow onions
    - 10 cloves garlic
    - 2 cans (15 oz.) low-sodium black beans
    - 2 cans (14 ½ oz.) can diced tomatoes
    - 1 ½ T. ground cumin
    - 1 T. + 2 tsp. dried oregano
    - 1 T. chili powder
    - 1 tsp. lime juice
    - salt

    - water
  - Mealtime
- serving spoons or ladles
- chili toppings → shredded cheese, sour cream, chives, crackers, spinach, corn, etc.
- spoons
- bowls
- glasses
- napkins
- to-go bowls

Concepts:

- Lesson Introduction
  - SMART Goals – "specific, measurable, achievable, relevant, and time-bound" ambitions/aspirations.
  - Mindful Eating – "allowing yourself to become aware of the positive and nurturing opportunities that are available through food selection and preparation by respecting your own inner wisdom."
- Protein Power
  - Cartilage – tough, fibrous, and elastic connective tissue found throughout the body in places such as surrounding joints and comprising the external ear.
  - Enzyme – substance produced by living organisms that are secreted to help with numerous biological processes throughout the body.
  - Hormone – substance produced by living organisms that are secreted to signal specific actions within the body.
  - RBC – red blood cell.
  - Biochemical Reaction – transformation of one molecule into another molecule in the body.
  - EPA and DHA – eicosapentaenoic acid and docosahexanoic acid; omega-3 polyunsaturated fatty acids found in oily fish and seafood; important to several functions within the body.
  - RDN – registered dietitian nutritionist.
  - Vegetarian – an individual who chooses not to eat some animal products (i.e. dairy, poultry, eggs, meat, seafood)
  - Poultry – includes chicken, turkey, and duck muscle.
  - Meat – includes beef, pork, and lamb muscle.
  - Legumes – a family of foods that come from a specific type of plant; examples include beans, peas, lentils, soy, and peanuts.
  - Seafood – includes fish and shellfish.
- Food Safety
  - Temperature Danger Zone – the range of temperature, 40°F - 140°F, at which bacteria begin to multiply most rapidly; hot and cold foods held within this temperature range are much more likely to develop dangerous levels of bacteria and lead to foodborne illness outbreaks.

  - Rest – allowing time for meats to stand away from heat and sit a few minutes after cooking to redistribute and reabsorb juices.
  - Perishable – food that easily decays or turns bad.
- Cooking Description/Demonstration
  - Marinate – "to flavor and moisturize meat, poultry, seafood, or vegetables by soaking them in or brushing them with a liquid mixture of seasonings defined as a marinade; dry marinade mixtures composed of salt, pepper, herbs, or spices may also be rubbed into meat, poultry, or seafood."
  - Season – to add salt, pepper, herbs, or spices to food to provide flavor.
  - Tofu – bean curd made from mashed soybeans; typically incorporated into meals and snack as a meat substitute.
- Cooking Experience
  - Pound – common weight unit used when purchasing produce items, fruits and vegetables typically priced per pound, often abbreviated lb.
  - Ounce – common weight unit used when packaging food items, dry goods priced per ounce, often abbreviated oz.
  - Tablespoon – common measuring unit used when cooking with herbs and spices, 1 T. = 3 tsp. often abbreviated T.
  - Teaspoon – common measuring unit used when cooking with herbs and spices, often abbreviated tsp.
  - Cup – common measuring unit used in most recipes, often abbreviated c.
  - Chop – cut into small pieces.
  - Mince – cut or chop into extremely small pieces.
  - Rinse – wash food under cool running water.
  - Drain – put food into a strainer or colander; pour liquid out of a pot by shifting the lid slightly away from the edge of the pan.
  - Stir – to combine ingredients with a spoon, fork, or mixer.
  - Simmer – cook at a temperature just below the boiling point. Bubbles form slowly but do not reach the surface.
  - Boil – heat liquid until bubbles break on the surface or cook in boiling water.
  - Thaw – slowly change from a frozen state to a liquid state.
  - Sauté – cook in a small amount of oil or water and stir continuously.

Procedure:

- **Lesson Introduction (5 minutes)**
  - Review SMART goals
    - group and individual
  - Review mindful eating
    - ask participants –
      - what is it?
      - did anyone practice mindful eating outside of Culinary Boot Camp this past week?
  - Review Lesson 2 – Great Grains and Delightful Dairy

        - ask participants to recall information or skills learned throughout Lesson 2
        - ask participants –
            - did anyone share new information or practice new skills outside of Culinary Boot Camp?
                - ❖ what information/skill?
            - did anyone try a grain or dairy simple swap?
                - ❖ please expand on the experience
    - **Protein Power (12 minutes)**
        - benefits to eating protein everyday
            - provide many nutrients our bodies need
            - protein – function as building blocks for bones, muscles, cartilage, skin, blood, enzymes, hormones, vitamins, and minerals
- protein can also provide calories, but this is a secondary function
- carbohydrate's and fat's primary function is to provide calories (i.e. energy)
        - B vitamins – participate in many functions throughout the body
- help with energy release
- play a vital role in nervous system function
- aid in the formation of RBCs
- help build tissues
        - Iron – carries oxygen in the blood.
        - Magnesium – builds bones and helps release energy from muscles
        - Zinc – needed in biochemical reactions and helps the immune system
        - EPA and DHA – omega 3 fatty acids found in some seafood; may help reduce the risk of heart disease.
    - consider your protein consumption
        - recommended intake differs depending on age and overall physical activity
        - talk to a RDN to receive detailed information about your individual nutritional needs
    - variety → dairy, poultry, eggs, meat, beans, peas, legumes, nuts, seeds, seafood, soy products
        - VARY YOUR PROTEIN ROUTINE HANDOUT
        - read through concepts and ask participants to share any other ideas
    - vegetarian options → as above
        - HEALTHY EATING FOR VEGETARIANS HANDOUT
        - discuss your diet with a RDN to ensure adequate nutrition
    - **Food Safety (8 minutes)**
        - avoid the Temperature Danger Zone!
            - 40°F - 140°F
        - keep hot foods hot…
            - time and temperature
- cook and reheat foods thoroughly
                - ❖ especially meat, poultry, seafood, and eggs
            - use a thermometer to ensure doneness

- ❖ meat (steaks, chops, and roasts) – 145°F with a minimum rest of 3 minutes
- ❖ meat (ground) – 160°F
- ❖ poultry – 165°F
- ❖ seafood – 145°F
- ❖ eggs – 160°F
- ❖ leftovers and casseroles - 165°F
- ❖ INTERNAL TEMPERATURE GUIDE HANDOUT

- maintain temperature of hot foods prior to serving
  - ❖ ≥ 140°F
- hot foods should not sit at room temperature for more than 2 hours

- … and keep cold foods cold!
  - time and temperature

- refrigerate all cooked and perishable food promptly after serving
  - ❖ ≤41°F
- put perishable items in coolest part of refrigerator
  - ❖ example → milk and eggs on back shelf instead of in door

- do not store food too long even in the refrigerator
  - ❖ eat within a week
- store cold goods in a cooler when transporting from grocery store to home
- do not thaw frozen food at room temperature!

- cross contamination
  - separate raw and cooked foods

- use different equipment and utensils
- especially important when working with meat, poultry, seafood, and eggs
  - separate protein and produce
- prepare with different equipment and utensils
  - ❖ designate knives and cutting boards for specific food items in the kitchen
- store on different shelves in the refrigerator
  - ❖ protein on bottom
  - ❖ produce on top

- always remember to wash your hands before, during, and after handling food!

- **Slow Cooker Skills (5 minutes)**
  - safety
    - use fresh thawed ingredients, not frozen
    - add chunks or pieces of protein rather than large cuts, roasts, and whole portions
    - prepare protein and vegetables with separate knives and cutting boards to avoid cross contamination
    - cook on high 1 hour and then turn down to low
    - only use recipes that add a liquid to the slow cooker

        - check internal temperature of dishes to make certain food reaches 160°F
        - do not delay starting time
        - keep the lid on at all times while a meal is slowly cooking
    - tips
        - plan ahead and prep protein and vegetables the night before
            - much easier and more efficient meal planning
        - cut root vegetables into smaller chunks
            - cook completely through
        - cut tender vegetables into larger pieces
            - prevent overcooking
            - or put in slow cooker the last hour
        - brown protein before adding to the slow cooker
        - fill slow cooker 1/2 – 2/3 full to ensure proper heating
    - recipes
        - most meals are adaptable to the slow cooker
            - recipes simmered on stovetop simplest to convert
            - reduce liquid 1/3 – 1/2 and lengthen cooking time
- **Cooking Description/Demonstration (15 minutes)**
    - preparing protein
        - meat, poultry, and seafood
            - choose lean cuts – marinate and season for flavor
            - select seafood 2x per week – coat with whole wheat crackers or oatmeal and bake in the oven to add a little crunch
        - beans & legumes
            - make dips – hummus example
            - mix into soups, stews, and casseroles
        - nuts & seeds
            - make sauces – pesto example
            - sprinkle atop different dishes
                - ❖ steamed vegetables with slivered almonds
                - ❖ ice cream with peanuts or pistachios
                - ❖ salad with walnuts or pecans
        - soy and other vegetarian options
            - create delicious veggie burgers – mix together soybeans, vegetables, and spices
            - incorporate tofu into stir-frys
        - 1A. how to sear cuts and brown ground products

- start with a heavy skillet, a little oil, and high heat
- pat dry meat or poultry and season accordingly
    - ❖ skip step if protein is marinated
- preheat skillet
    - ❖ medium heat
    - ❖ prevent sticking
- add oil to skillet

- ❖ canola or corn works well

- drop in meat or poultry and turn up temperature to high heat
  - ❖ use a tongs
  - ❖ do not overcrowd skillet → cook protein in batches
  - allow to cook on one side until meat or poultry does not stick to the skillet
    - ❖ indicates searing or browning is complete
  - turn meat or poultry over to the other side to cook through
    - ❖ check with a thermometer to ensure doneness

AND

- 1B. how to drain and rinse ground products

- when ground meat or poultry is cooked through, pick up skillet and bring to a colander set on top of a glass bowl
- scrape ground product into colander with a spatula
- pour hot water over meat or poultry
- chill glass bowl with fat and water mixture in the refrigerator; let sit for a few hours
- once chilled, skim the surface of the glass bowl with a large spoon to remove fat
- throw chilled fat drippings into the garbage.

OR

- 2A. how to cut a whole chicken or turkey

- different purchasing options
  - ❖ dark or white meat → when to select each type
  - ❖ boneless and/or skinless → ready to prepare, best cooking methods (pan fry, grill, bake, slow cooker, etc.)
  - whole chicken – more economical/cost effective
  - step-by-step cutting process
    - ❖ With chicken breast side up, pull each leg away from body, then slice through skin between breast and drumstick.
    - ❖ Turn chicken on its side. Bend each leg back until thighbone pops out of its socket. Cut through joint and skin to detach leg completely.
    - ❖ With chicken on its side, pull each wing away from body. Cut through joint and remove wing.
    - ❖ Lift up chicken and cut downward through rib cage and then shoulder joints to separate breast from back (save back for stock).
    - ❖ Place breast skin side down. Split center bone using a chopping motion, then slice through meat and skin to separate into 2 pieces.
    - ❖ To cut breast halves into quarters, turn each skin side up and cut in half diagonally through bone.
    - ❖ To divide the legs, turn each skin side down and cut through joints (along white fat line) to separate thigh from drumstick.

- ❖ You should end up with 6 to 10 parts, depending on whether you divided the breast halves and legs.
- de-boning techniques (if time allows)
- meal ideas
  - ❖ casseroles
  - ❖ soups or stews
  - ❖ chicken salad
- purchase in bulk and store excess to save money

AND

- 2B. how to prepare a flank steak
  - lean cuts of meat typically end in –loin or –round
  - marinate and season for flavor
  - flank steak – more economical/cost-effective
  - best cooking methods to maintain or add flavor
    - ❖ tenderization techniques
    - ❖ other cooking methods beyond grilling
    - ❖ slow cooker
  - meal ideas
    - ❖ stir fry
    - ❖ fajitas
    - ❖ shredded BBQ sandwiches

- **Cooking Experience (45 minutes)**
  - Explain recipes (5 minutes)
    - everyone will prepare 2 different types of chili

- classic beef, easy white turkey, black bean & pork, edamame
- assigned by kitchen
  - each kitchen is equipped with all the cooking utensils and tools required to make the recipes
- sitting out on countertops
- please do not go into drawers or cabinets
  - work in groups of 4-6
  - practice food safety when making these recipes
- remember the skills discussed earlier
- do not cross contaminate proteins and vegetables
  - volunteers will be cleaning up the kitchens
- no need to do dishes, wipe down countertops, etc.
- please be considerate and try not to make too much of a mess
  - Make Different Types of Chili (40 minutes)
    - follow recipes
    - Classic Beef Chili
      - ingredients:
        - ❖ ½ lb. lean ground beef
        - ❖ 1 small onion, chopped
        - ❖ 1 can (16 oz.) kidney beans (light or dark)
        - ❖ 1 can (16 oz.) tomato sauce

- 1-2 T. chili powder
- directions:
  - cook ground beef and onion together in a large saucepan; once cooked, transfer mixture to colander set over a glass bowl and rinse with warm water to remove grease; return to saucepan.
  - add the kidney beans, tomato sauce, and chili powder to the saucepan.
  - cook over medium heat until all ingredients are heated through.
  - divide chili among 4 bowls and serve.

- Easy White Turkey Chili

- ingredients:
  - 1 T. olive oil
  - 1 lb. lean ground turkey
  - 1 large onion, chopped
  - 2 cloves garlic, minced
  - 5 ¼ c. reduced sodium chicken broth
  - 3 cans (15 oz.) cannellini (white kidney) beans, rinsed and drained
  - 2 cans (4 oz.) chopped green chiles
  - 1 T. dried oregano
  - 1 tsp. ground cumin
  - 2 pinches cayenne pepper
  - ¼ c. chopped fresh cilantro
  - ½ c. shredded Monterey Jack cheese
- directions:
  - heat olive oil in a large saucepan over medium heat; cook ground turkey, onion, and garlic in hot oil until the turkey is completely browned, 6-10 minutes.
  - add the chicken broth, cannellini beans, green chiles, oregano, cumin, and cayenne pepper to the saucepan; bring mixture to a simmer.
  - cook over medium heat until all ingredients are heated through, 20-30 minutes.
  - divide cilantro among 4 bowls; ladle chili over cilantro and top with ¼ of cheese; serve immediately.

- Black Bean & Pork Chili

- ingredients:
  - nonstick cooking spray
  - 1 lb. ground pork
  - 1 medium red or green bell pepper, chopped
  - 1 medium onion, chopped
  - 4 cloves garlic, minced
  - 1 ½ tsp. ground cumin
  - 2 cans (15 oz.) low-sodium black beans, rinsed and drained

- ❖ 1 can (14 ½ oz.) diced tomatoes, **not** rinsed or drained
- ❖ 1 c. water
- ❖ 2 tsp. dried oregano
- ❖ ½ tsp. salt, optional
- ❖ 1 tsp. lime juice
- ❖ ½ c. shredded cheddar cheese
- ❖ 4-6 flour tortillas, optional

- directions:
  - ❖ coat a heavy, large covered pot with nonstick cooking spray; heat over medium high heat.
  - ❖ add ground pork, bell pepper, onion, garlic, and cumin; cook and stir until meat is brown and vegetables are tender; drain off fat.
  - ❖ stir black beans, undrained tomatoes, water, oregano, and salt into the mixture in the pot; bring to a boil; reduce heat.
  - ❖ simmer, covered for 30 minutes; simmer, uncovered an additional 15 minutes more or until chili is desired consistency.
  - ❖ stir in lime juice.
  - ❖ ladle chili into 4 soup bowls; sprinkle individual servings with cheddar cheese; serve with tortillas, if desired.

▪ Edamame Chili

- ingredients:
  - ❖ 1 T. olive oil
  - ❖ 2 medium yellow onions, chopped
  - ❖ 6 cloves garlic, minced
  - ❖ 1 can (14 ½ oz.) diced tomatoes, **not** rinsed or drained
  - ❖ 1 T. dried oregano
  - ❖ 1 T. cumin
  - ❖ 1 T. chili powder
  - ❖ 2 c. prepared, shelled edamame
- directions:
  - ❖ heat oil in a heavy, large covered pot over medium high heat.
  - ❖ add onions and garlic and sauté until translucent, about 5 minutes.
  - ❖ stir in the can of tomatoes and sauté 3-4 more minutes.
  - ❖ add the oregano, cumin, and chili powder; sauté another 2 minutes.
  - ❖ stir in the edamame and bring the entire mixture to a boil.
  - ❖ reduce heat to low and let simmer 30-45 minutes.
  - ❖ divide chili among 4 bowls and serve.

- **Mealtime (28 minutes)**
  - Eat all together
  - Walk participants through mindful eating exercise
    - additional practice for future meals/snacks

        - see instructions located in Lesson 1 outline
    - Questions?
- **Lesson Conclusion (2 minutes)**
    - Introduction to next week's lesson
        - Success Going to the Grocery Store
    - Thank You
    - Distribute donated products to participants → THERMOMETERS, COOLERS, MEAT BRUSHES, APRONS, COOKBOOKS, BEEF RECIPES/RESOURCES, PORK RECIPES/RESOURCES, SOY RECIPES/RESOURCES
    - Homework
        - prepare a new protein dish you have not made before with your family and friends; try to incorporate food safety and meal planning skills learned throughout this lesson.

Assessment:

To assess learning quality the instructor will:

- listen to participants' questions and conversations throughout the lesson and meal.
- evaluate participants' mindful eating practices.
- examine participants' food safety habits while making different types of chili.
    - wash hands
    - separate knives and cutting boards
        - raw and cooked foods
        - protein and produce
    - check temperature of dishes to ensure doneness
    - keep hot foods hot and cold foods cold!
- observe participants' culinary skills in the kitchen, especially –
    - browning ground meat and poultry
    - draining and rinsing ground products
    - slow cooker skills
- watch participants' preparation of protein during the cooking experience.
    - ground beef, turkey, and pork
    - edamame
    - kidney beans & black beans

Overall evaluation will be tested at the conclusion of Culinary Boot Camp; participants will complete post- assessments to compare outcomes to pre-assessment scores.

Lesson Resources:

AllRecipes (website). http://allrecipes.com/

Fight Bac Partnership for Food Safety Education (website). http://www.fightbac.org/

Iowa State University Extension and Outreach Publications (references and recipes, website). http://www.extension.iastate.edu/

The Cookery: Glossary of Cooking Terms (website). https://www.d.umn.edu/~alphanu/ cookery/home.html

USDA ChooseMyPlate (website). http://www.choosemyplate.gov

USDA Food Safety Education (website). https://www.fsis.usda.gov/wps/portal/fsis/ topics/food-safety-education/get-answers/food-safety-fact-sheets

Extension Activity:

- Perfect Pulled Pork Demonstration
  - 1-2 volunteers will prepare dish
  - cooking supplies:
    - scale
    - measuring spoons (tsp. and T.)
    - measuring cups (1/8, 1/4, 1/2, 3/4, 1 c.)
    - small mixing bowl
    - slow cooker
    - large cutting board or platter
    - carving knife
    - serving tongs
  - ingredients:
    - 5 lb. boneless blade pork roast
    - 1 ½ tsp. smoked paprika
    - 2 tsp. black pepper
    - 1 tsp. cayenne pepper
    - 1 tsp. dried thyme
    - 1 tsp. garlic powder
    - ½ tsp. salt
    - 1 c. water
    - soft sandwich buns, for serving
  - directions:
    - combine all the seasonings in a small mixing bowl and rub evenly over roast.
    - place meat in a slow cooker; add water; cover and cook on low for 6-8 hours or high for 4-5 hours, until pork is extra tender.
    - remove pork from slow cooker, place on a large cutting board or platter, and allow to rest for 10-15 minutes.
    - pull, slice, or chop to serve over sandwich buns; serve with barbeque sauce.
  - participants will watch demonstration and taste product during meal time.

Week 4: Success Going to the Grocery Store

Learning Objectives within the Social Cognitive Theory:

The outcomes of Lesson 4 include-

- Personal Factors: Participants will be able to –
  - discuss several meal planning strategies.
  - design a 5 day meal plan.
  - examine ways to enhance a grocery list.
  - write a weekly grocery list.
  - navigate a nutrition facts label.
  - summarize changes to appear on the new nutrition facts label.
  - select fresh produce with respects to seasonality, variety, and ripeness.
  - differentiate organic and conventional agricultural practices.
  - pick out cuts of meat, poultry, and seafood that are lean and of the appropriate serving size.
  - differentiate whole grains and refined grains.
  - explain the whole grains stamp
    - good source of whole grains
    - excellent source of whole grains
  - define moderate-high dietary fiber, low-fat, low-sodium, and low-sugar.
  - choose low-fat, low-sodium, and low-sugar options.
    - cereals
    - canned goods
    - snack foods
    - drinks
    - dairy products
    - frozen section
  - recognize added sodium and sugar terms.
  - describe reduced sodium and lightly salted.
  - relay nutritional concerns associated with low-fat options.
    - added salt
    - added sugar
  - discern natural sugars from added sugars.
  - identify pros and cons to non-dairy alternatives.
  - develop a nutritious meal or snack with foods from the frozen section.
- Environmental Factors: Participants will be able to –
  - make a meal plan and grocery list looking at store weekly ads and checking household food supply.
  - implement concepts discussed during Lesson 4 with educational pieces given to them throughout the evening.
    - 5 Day Meal Planning Worksheet
    - Grocery List Worksheets
  - practice grocery shopping skills with the $15 HyVee gift card provided to them at the end of Lesson 4.

Time: 90 minutes total

- 3-minute introduction
  - review and recap
- 24-minute learning lesson
  - making a meal plan
  - generating a grocery list
- 60-minute grocery store tour
  - navigating the nutrition facts label
  - fresh produce
  - meat
  - breads and grains
  - cereals
  - canned goods
  - snack foods
  - drinks
  - dairy products
  - frozen section
- 3-minute conclusion/closing
  - thank you
  - gift cards
  - post-assessments

Materials and Preparation:

- Lesson 4 PowerPoint slideshow
- computer
- projector screen
- donated products → $15 HYVEE GIFT CARD
- 5 Day Meal Planning Worksheet
- Grocery List Worksheets
- Pens and Pencils
- Grocery Store Tour Instructions
- Grocery Store Tour Note Cards

Concepts:

- Making a Meal Plan
  - Weekly Ad – advertisements placed in newspapers and posted on websites by local retailers to highlight sale items each week.
  - Cycle Menu – planning meals and snacks that rotate through and repeat after a certain time frame; typically found in foodservice settings.
  - Batch – quantity of food produced at one time.
  - Bulk – large quantity of food produced all at one time; typically most is stored for later meals and snacks.
  - Leftovers – uneaten food at the end of a meal or snack; can be consumed as a later meal or snack.

  - Slow Cooker – large electric pot that cooks food slowly over a long period of time.
  - 100% Whole Grain – food product completely prepared with grains that contain the entire grain kernel (bran, germ, endosperm).
  - Reduced Fat – a minimum of 25% decrease in fat content compared to the original food product.
  - Reduced Sodium – a minimum of 25% decrease in sodium content compared to the original food product.
  - MyPlate – "illustrates the five food groups that are building blocks for a healthy diet using a familiar image – a place setting for a meal."
- Generating a Grocery List
  - Weekly Inventory – complete list of items compiled each week to establish existing amount and requirement to replenish supplies/stock.
  - Staple Foods – food items kept in one's kitchen at all times; examples include flour, sugar, cereals and grains, canned goods, frozen goods, herbs and spices, etc.
  - Out of Stock –unavailable items at the present time.
  - Readily Available – items easily obtainable at the present time
  - Impulse Shopping – purchasing items based on emotions and feelings instead of logic.
  - MyPlate – "illustrates the five food groups that are building blocks for a healthy diet using a familiar image – a place setting for a meal."
- Grocery Store Tour
  - Serving Size – the portion of food product listed on the nutrition facts label in which all other nutritional information is established.
  - Calorie – measure of energy required to raise 1 gram of water 1°C; unit used to determine total energy found in food products.
  - 'Low' – <5% total Daily Value, according to the Nutrition Facts Label.
  - Saturated Fat – one type of fat in food products; characterized as solid at room temperature; considered less nutritious and harmful to health; typically found in animal products.
  - Sodium – an element and electrolyte added to several food products; primary purposes include flavor enhancement and preservation; when consumed in excess, can cause numerous health concerns such as high blood pressure.
  - Added Sugar – sugar added to foods such as table sugar (sucrose) or honey
  - 'High' – >20% total Daily Value, according to the Nutrition Facts Label.
  - Unsaturated Fat – one type of fat in food products; characterized as liquid at room temperature; considered more nutritious and helpful to health; typically found in plant products.
  - Dietary Fiber – indigestible portion of food products from plants; plays an important role in the digestive tract by normalizing bowel movements maintaining bowel health; may have additional health benefits such as

lowering cholesterol levels; nutrient of public health concern due to low consumption in the average diet.

- Potassium – an element and electrolyte found naturally in several food products, particularly plants; when consumed at an adequate level, can lead to health benefits such as lower blood pressure; nutrient of public health concern due to low consumption in the average diet.
- Calcium – mineral found primarily in dairy and dark leafy green food products; an essential nutrient to build strong bones and teeth as well as maintain bone mass; nutrient of public health concern due to low consumption in the average diet.
- Vitamin D – vitamin not found naturally in but added to many food products; an essential nutrient to maintain calcium status and strong bones; nutrient of public health concern due to low consumption in the average diet.
- Seasonality – buying fresh produce in its peak season for the best savings and flavor.
- Ripe – food products, specifically plants such as produce and grains, ready to harvest and consume.
- FDA – U.S. Food and Drug Administration; a federal agency of the United States Department of Health and Human Services responsible for regulating the trade and safety within the food and drug industries.
- RDN – Registered Dietitian Nutritionist.
- Organic Agriculture– an ecological approach to growing crops characterized by the absence of pesticides, herbicides, and fertilizers; no difference in safety or nutrition when compared to conventional agricultural practices.
- Conventional Agriculture– an economical approach to growing crops characterized by the application of pesticides, herbicides, and fertilizers; no difference in safety or nutrition when compared to organic agricultural practices.
- Pesticides – a substance applied to cultivated plants to prevent insects and other harmful organisms from damaging or destroying the crop.
- Fertilizers – a substance applied to cultivated plants to promote growth and health of the crop.
- Yield – total amount produced.
- Ecological – protecting the environment; more conscientious about the effects towards the earth and typically more sustainable practices.
- Economical – costing and spending less money; more affordable and typically more efficient practices.
- 100% Organic – all content is certified organic
- Organic – at least 95% of product is organic
- Made with Organic Ingredients – a minimum of 70% ingredients are organic
- Meat – includes beef, pork, and lamb muscle.
- Poultry – includes chicken, turkey, and duck muscle.
- Seafood – includes fish and shellfish.

- Omega-3s – polyunsaturated fatty acids found in oily fish and seafood as well as some plant-based food products; important to several functions within the body; includes ALA, EPA, and DHA.
- Ounce – common weight unit used when packaging food items, dry goods priced per ounce, often abbreviated oz.
- Sustainably Sourced – producing or harvesting food products in a way that does not damage or deplete resources.
- Low Sodium – <140mg per serving; <600mg per serving for frozen foods.
- Nitrates/Nitrites – preservatives added to food products, particularly processed meats, to enhance color and prolong shelf life; produce nitrosamines in the body which, when in excess, can lead to cancer development.
- Moderate-High Dietary Fiber – ≥ 2.5g to 5g or more
- 100% Whole Grain – food product completely prepared with grains that contain the entire grain kernel (bran, germ, endosperm).
- Whole Grains Stamp – symbol created by the Whole Grains Council to highlight food products with significant amounts of dietary fiber.
- Good Source of Whole Grains – ≥ 8g whole grains per serving; set by the whole grains council.
- Excellent Source of Whole Grains – ≥ 16g whole grains per serving; set by the whole grains council.
- Low-fat – <3g per serving; <30% total Calories per serving for frozen foods.
- Low-sugar – <10g per serving; minimal added sugars per serving for frozen foods.
- Added Sugar Terms – words that indicate some form of sugar is added to a food product; sucrose, honey, corn syrup, fructose, molasses, and malt syrup.
- Reduced Sodium –at least 25% less sodium than the regular product.
- Lightly Salted – at least 50% less salt than the regular product.
- Caffeine – substance found in several food products, particularly coffee and tea, that acts as a stimulant to the central nervous system.
- Taurine – an amino acid found in animal muscle; when consumed in excess, can enhance skeletal muscle mass and affect the central nervous system; an ingredient typically listed on energy drink labels.
- Ginseng – an herb common in East Asian culture accredited with having multiple medicinal purposes; although little scientific evidence exists, could potentially increase energy levels, improve cognitive function, minimize inflammation, and so on; an ingredient typically listed on energy drink labels.
- Gingko – an herb common in East Asian culture accredited with having multiple medicinal purposes; although little scientific evidence exists, could potentially slow the progression of dementia as well as help treat several other public health concerns; an ingredient typically listed on energy drink labels.

- Guarana – a Latin American plant that contains caffeine and is commonly added to beverages to enhance stimulatory effects; an ingredient typically listed on energy drink labels.
- "Energy" – Calories.
- "Electrolytes" – ions such as sodium, potassium, or calcium that are important for proper bodily functions and biological processes; one primary purpose is hydration status and fluid shifts within an organism.
- Moderate-High Intensity Exercise – activity that increases heart rate and breathing, makes it difficult to talk, and causes you to break a sweat after 5-10 minutes
- Fat-free – food products that contain no fat content.
- Natural Sugar – sugar naturally found in foods such as dairy (lactose) and fruit (fructose).
- Nutritious – nourishing; helps achieve good health and growth.

Procedure:

- **Lesson Introduction (3 minutes)**
  - Review SMART goals
    - group and individual
  - Review mindful eating
    - ask participants –
      - what is it?
      - did anyone practice mindful eating outside of Culinary Boot Camp this past week?
  - Review Lesson 3 – Protein Power
    - ask participants to recall information or skills learned throughout Lesson 3
    - ask participants –
      - did anyone share new information or practice new skills outside of Culinary Boot Camp?
        - ❖ what information/skill?
      - did anyone practice food safety skills? prepare a new protein dish?
        - ❖ please expand on the experiences
- **Making a Meal Plan (14 minutes)**
  - helpful and healthful tips
  - check weekly ads
    - make a meal plan that highlights sale items
    - save money
    - diversify diet
  - plan for the week ahead
- cycle menus
- retrieve recipes prior to dinnertime preparation
- make meals in batches/bulk (leftovers)
- freeze foods
- slow cooker/crockpot

        - be prepared for all sorts of situations
- pack snacks → backpack, car, purse, desk drawer, etc.
- stock up on the basics →
    - ❖ cupboard – 100% whole grain pasta or cereal, packaged biscuit baking mix, brown rice, quinoa, lentils, beans, reduced fat and reduced sodium soups and sauces, canned produce, canned tuna and chicken, potatoes, onions, salsa, herbs and spices, condiments, cooking oil, non-stick cooking spray
    - ❖ refrigerator and freezer – fresh produce (ready-to-eat baby carrots, salad mixes), frozen produce, tortillas, 100% whole grain bread/bagels/English muffins, cheese (grated and sliced), yogurt, cottage cheese, milk, eggs, butter or margarine, cooked and sliced meat/poultry/fish/seafood, prepared 100% whole grain pasta/ brown rice/quinoa
- have simple meal solutions on hand at all times → nutritious strategies
    - ❖ packaged mixes/dishes – use only ½ the butter or margarine and ½ the seasoning packet to reduce fat and sodium
    - ❖ canned soups and sauces – add canned or frozen vegetables
    - ❖ frozen entrées – use only ½ the sauce or seasoning packet to reduce fat and sodium
    - ❖ frozen pizza – add chopped fresh vegetables before baking
    - look to see what is in your kitchen before heading out the door
- for fast food/fine dining
- to get groceries
    - 5 DAY MEAL PLANNING WORKSHEET
        - ask participants to complete in class
- meals → include 4 or 5 food groups
- snacks → include 2 or 3 food groups
- out of class activity if lesson time is limited
        - ideas to share with participants
- Breakfast Parfait → layer fresh or frozen berries, plain or vanilla yogurt, and 100% whole grain cereal in a bowl; serve with 2 slices of cooked turkey bacon.
- Cheese and Chicken Tortillas → combine pre- sliced and cooked chicken and shredded cheese atop a 100% whole grain tortilla in a skillet coated with non-stick cooking spray; fold over tortilla; cook 3-4 minutes; flip; cook an additional 3-4 minutes; serve with salsa.
- Fast Stir Fry → combine frozen mixed vegetables and frozen shrimp in a skillet with cooking oil; add herbs and spices; cook 5-10 minutes; add prepared instant brown rice; serve with a glass of milk.
        - see MyPlate for additional meal plan strategies
- home page → popular topics → healthy eating on a budget → create a grocery game plan
    - **Generating a Grocery List (10 minutes)**
    - helpful and healthful tips
        - look through kitchen cupboards

- keep track with a weekly inventory
- add staple foods that are almost out of stock
- make a meal plan that features readily available items

▪ read recipes selected to use in upcoming meals and snacks
- purchase all required ingredients
- prevent a second trip to the store

▪ organize grocery list according to the store layout
- decrease time in the store and impulse shopping

▪ place grocery list on the refrigerator door or similar location
- write down items as supply runs out

o GROCERY LIST WORKSHEETS
▪ ask participants to complete in class
- provide weekly ad as a guide
- out of class activity is lesson time is limited

▪ see MyPlate for additional grocery list strategies

- home page → popular topics → healthy eating on a budget → create a grocery game plan
  - **Grocery Store Tour (60 minutes)**
  - o Instructions
    - ▪ everyone will travel as a group throughout the grocery store
    - ▪ several different topics will be emphasized during the tour
      - Nutrition Facts Labe
      - fresh produce
- meat
- breads and grains
- cereals
- canned goods
- snack foods
- drinks
- dairy products
- frozen section
    - ▪ please participate in all aisle activities
  - o Navigating the Nutrition Facts Label
    - ▪ AISLE ACTIVITY
      - ask all participants to select a food item from the shelf and follow along while discussing the Nutrition Facts Label
    - ▪ Important Items to Highlight
      - Serving Size
        - ❖ all information provided on the label based on one serving
        - ❖ size is important when looking at nutrition facts
      - Calories
        - ❖ number of calories for listed serving size
        - ❖ consume 3 servings = calories x 3
      - Select Food Items Low in…

- ❖ Saturated Fat
- ❖ Sodium
- ❖ Added Sugars*
- ❖ 'low' is considered food items with ≤ 5% DV

- Select Food Items High in…
  - ❖ Unsaturated Fat
  - ❖ Dietary Fiber
  - ❖ Potassium*
  - ❖ Calcium
  - ❖ Vitamin D*
  - ❖ 'high' is considered food items with ≥ 20% DV

***items to appear on New Nutrition Facts Label**

- New Nutrition Facts Label
  - ❖ bigger and bolder serving size and calories
  - ❖ no calories from fat
  - ❖ include
  - ❖ added sugars
  - ❖ potassium
  - ❖ vitamin D
  - ❖ no vitamin A or C
  - ❖ improved definition of %DV

- Fresh Produce
  - seasonality – select in-season options for **OPTIMAL SAVINGS AND FLAVOR**
  - variety – choose fruits and vegetables of all shapes, colors, and sizes

- add one new fruit or vegetable to your cart each week
  - ripeness – depends on when produce will be consumed
- right away – ripe and ready-to-eat
- next day – somewhat ripe but not too soft
- end of the week – firm (without any give) and/or green
  - nutrition information – not listed on all produce
- check a valid and reliable source
  - ❖ FDA
  - ❖ RDN

- most fruits and vegetables
  - ❖ increased vitamins and minerals
  - ❖ decreased calories

- organic vs. conventional – what's the difference?
  - growing and production practices –
    - ❖ organic – restricts use of pesticides and fertilizers, lesser yields, ecologically-friendly
    - ❖ conventional – use of pesticides and fertilizers, larger yields, economically-friendly
  - safety – the same with thorough washing of all produce items
  - price –

- ❖ organic – increased cost
- ❖ conventional – decreased cost
- nutrition – organic and conventional products are identical in nutrient composition
- looking at labels
  - ❖ 100% organic – all content is certified organic
  - ❖ organic – at least 95% of product is organic
  - ❖ made with organic ingredients – a minimum of 70% ingredients are organic
- Why switch to organic?
  - ❖ reduce exposure to pesticide and fertilizer residues
  - ❖ protect the environment

▪ highlight items
- in-season vs. out-of-season produce
- organic banana vs. conventional banana

o Meat, Poultry, and Seafood
▪ select lean options
- meat – cuts that end in –loin or –round
- poultry – skinless
- seafood – naturally lower in fat, fatty items higher in "healthy fats" (omega- 3s)
- ground products – 93% lean or greater
  - ❖ can also choose lesser percentage and rinse/drain at home

▪ purchase appropriate serving size
- 1 serving meat or poultry = 4-5 oz. raw
- 1 serving fish = 4 oz. raw or 1 fillet/steak
- 1 serving shellfish = 7 medium pieces or 2 oz. cooked

▪ highlight items
- meat – sirloin, bottom round roast, tenderloin, chops, Canadian bacon
- poultry – breast, tenders, thighs, ground products
- seafood – salmon*, mackerel*, tuna*, mahi mahi, shrimp, crab
  - ❖ *high in omega-3s
  - ❖ check for sustainably sourced products

▪ deli options
- look for low sodium and no nitrates or nitrites
- highlight items – Applegate Naturals, Hormel Natural Choice, Hillshire Farm Naturals

o Breads and Grains
▪ check the nutrition facts label
- pay attention to serving size – 1 or 2 slices?
- low in sodium – 140 mg or less
- moderate to high in dietary fiber – 2.5 to 5g or more

▪ look at the ingredients list
- 100% whole grains

- first ingredient – whole wheat, brown rice, whole oat, corn
- spot the whole grains stamp
  - good source – 8g or more
  - excellent source – 16g or more
- highlight items
  - Sara Lee soft and smooth whole grain white bread vs. Sara Lee classic honey wheat bread vs. Sara Lee classic 100% whole wheat bread
  - superstars – brown rice, quinoa, corn tortillas, barley

- Cereals
  - check the nutrition facts label
    - low in fat – 3g or less
    - low in sugar – 10g or less
    - moderate to high in dietary fiber – 2.5g to 5g or more
  - look at the ingredients list
    - first is whole grain
      - ❖ whole wheat, brown rice, whole oat, corn
      - ❖ spot the whole grains stamp
    - last is added sugar
      - ❖ terms include sucrose, honey, corn syrup, fructose, molasses, and malt syrup
      - ❖ do not purchase cereals with sugar terms as one of the first three on the ingredients list
  - same guidelines for hot cereals and breakfast or granola bars
  - AISLE ACTIVITY
    - ask all participants to select their favorite cereal from the shelf and determine if it meets identified criteria
    - ask participants to find a cereal that may be similar to their favorite but achieves set criteria
  - highlight items
    - fat – KIND granola vs. Shredded Wheat
    - sugar – Froot Loops vs. Cheerios
    - dietary fiber – Rice Krispies vs. All Bran
    - superstars – Shredded Wheat, Cheerios, All Bran, Grape Nuts, Wheaties, Kashi cereals, Original oatmeal
- Canned Goods
  - check the nutrition facts label
    - low in sodium – 140mg or less
    - low in sugar – 10g or less
  - look at the ingredients list
    - no salt added
      - ❖ terms include “sodium ” and “salt”
    - no sugar added
      - ❖ terms include sucrose, honey, corn syrup, fructose, molasses, and malt syrup

- no sauces added
  - ❖ increase sodium, fat, and sugar content
- highlight items
  - sodium – HyVee black beans vs. HyVee no salt added black beans
    - ❖ can rinse most regular canned products to remove some sodium
    - ❖ reduced sodium – at least 25% less sodium than the regular product
    - ❖ lightly salted – at least 50% less salt than the regular product
  - sugar – Mott's applesauce vs. Mott's natural applesauce
    - ❖ can rinse most regular canned products to remove some sugar
  - sauce (sodium, fat, and sugar) – Green Giant cream style sweet corn vs. Green Giant whole kernel sweet corn vs. Green Giant whole kernel sweet corn 50% less sodium

o Snack Foods
- check the nutrition facts label
  - SERVING SIZE IS IMPORTANT!
  - low fat – 3g or less
  - low sodium – 140 mg or less
  - low sugar – 10g or less
- look at the ingredients list
  - some low fat or fat free snack options may increase sodium and sugar content to maintain flavor

- spot the whole grains stamp for better snacking benefits
  - AISLE ACTIVITY
    - ask all participants to select their favorite snack from the shelf and determine if it meets identified criteria
    - ask participants to find a snack that may be similar to their favorite but achieves set criteria
  - highlight items
    - fat – original Nilla wafers vs. low fat Nilla wafers, regular microwave popcorn vs. air-popped popcorn
    - sodium and sugar – Planter's dry roasted peanuts vs. Planter's honey roasted peanuts vs. Planter's unsalted dry roasted peanuts
    - superstars – air-popped popcorn, unsalted nuts and seeds, graham crackers, rice cakes, baked potato and tortilla chips

o Drinks
- check the nutrition facts label
  - sugar – typically all added sugars, empty calories
    - ❖ exception is 100% fruit or vegetable juice
  - caffeine – excess can become addicting
    - ❖ everything in moderation
- look at the ingredients list
  - sugar terms include sucrose, honey, corn syrup, fructose, molasses, and malt syrup

- other ingredients that have similar stimulatory effects as caffeine when combined include taurine, ginseng, gingko, and guarana
- limit sugar sweetened beverages
  - soda, lemonade, sports drinks*, sweet teas, etc.
    *can provide energy and electrolytes to enhance sports performance (moderate-high intensity, 60 minutes or more)
- limit caffeinated beverages
  - coffee with sugar and creamer, cappuccinos*, frappuccinos*, chai tea, energy drinks*, etc.
    *contains various types of added sugars
- highlight items
  - superstars – diet soda, sparkling water, Gatorade G2, Powerade 0, green/herbal/black teas, plain coffee, lattes
  - DRINK WATER!

- Dairy Products
  - check the nutrition facts label
    - low-fat or fat-free options
      - ❖ unless using full-fat dairy as daily fat allowance
    - low sodium – 140mg or less
      - ❖ cheese
    - low sugar – 10g or less
      - ❖ flavored milk or yogurt
  - look at the ingredients list
    - added salt terms include "sodium " and "salt"
    - added sugar terms include sucrose, honey, corn syrup, fructose, molasses, and malt syrup
    - some low fat or fat free dairy products may increase sodium and sugar content to maintain flavor
  - AISLE ACTIVITY
    - ask all participants to select a full-fat cheese and low-fat or fat-free cheese from the shelf and compare fat and sodium content
      - ❖ as fat decreases sodium increases and vice versa
    - ask all participants to select a flavored yogurt and a plain yogurt counterpart from the shelf and compare sugar content
      - ❖ need to subtract natural sugar in plain yogurt from total sugar in flavored yogurt to determine added sugar
  - highlight items
    - non-dairy alternatives – most options have less protein and more fat compared to milk, oftentimes contain added sugars
      - ❖ fat-free milk – 8g protein, 0g fat, no added sugars (all natural)
      - ❖ original soy milk – 6g protein, 1.5g fat, minimal added cane sugar
      - ❖ original almond milk – 1g protein, 2.5g fat, added cane sugar
      - ❖ original coconut milk – 0g protein, 5g fat, added cane sugar

- superstars – 1% or fat-free milk, plain yogurt, Greek yogurt (½ sodium, low lactose), hard cheese (low-fat or low-sodium or both, low lactose), Fairlife products (lactose-free)

- Frozen Section
  - check the nutrition facts label
    - low in fat – less than 30% total Calories
    - low in sodium – less than 600mg
    - low in sugar – watch added sugar, check ingredients list for terms
  - look at the ingredients list
    - some low fat or fat free frozen items may increase sodium and sugar content to maintain flavor
    - added salt terms include "sodium " and "salt"
    - added sugar terms include sucrose, honey, corn syrup, fructose, molasses, and malt syrup
  - everything in moderation
    - save frozen foods for extremely busy days
    - add other items to frozen meals and snacks to make them more nutritious
      - ❖ see ideas below
  - AISLE ACTIVITY
    - ask all participants to select their favorite frozen food and determine if it meets identified criteria
    - ask all participants what they could add to the various frozen meals and snacks to make it more nutritious. Some ideas include:
      - ❖ steamed vegetables mixed in with a frozen entrée
      - ❖ green garden salad served with pizza
      - ❖ baby carrots and hummus served with chicken nuggets
      - ❖ frozen berries mixed in with ice cream
  - highlight items
    - produce –
      - ❖ as nutritious as fresh fruits and vegetables
      - ❖ select options without added sauces or syrups to minimize fat, sodium, and sugar content
    - entrées and pizzas – watch fat and sodium content, spot the whole grains stamp
      - ❖ superstar entrées – Kashi, evol, Amy's*, Healthy Choice Café Steamers, Lean Cuisine*
        *some products may contain excess fat and/or sodium
      - ❖ superstar pizzas – Kashi, Amy's, DiGiorno thin crust*, frozen crusts
        *some products may contain excess fat and/or sodium
    - meat, poultry, fish, and seafood –
      - ❖ minimize breaded and fried products
      - ❖ try some meat alternatives such as Morningstar products or Boca burgers

- ❖ superstars – Tyson grilled and ready chicken breast strips, Tyson naturals grilled chicken nuggets, turkey burgers, tilapia/salmon/cod fillets, cooked shrimp
- desserts – watch fat and sugar content
  - ❖ superstars – Nestle Outshine fruit and veggie bars, Dole dippers, frozen yogurt, Enlightened ice cream bars, Breyer's snack size ice cream cups, Edy's slow churned ice cream

- **Conclusion/Closing (3 minutes)**
  - Thank You
  - Distribute donated products to participants → $15 HYVEE GIFT CARDS
  - Homework
    - Pre- and Post- Assessments
      - remind participants to complete at the end of Culinary Boot Camp
        - ❖ email will be sent with a link to the survey tonight as well as 6 months from now
        - ❖ 10 minutes or less
      - optional
      - research purposes only
      - enables self-evaluation
    - continue to practice culinary and grocery shopping skills as well as mindful eating
    - enjoy each and every experience with food and nutrition!

Assessment:

To assess learning quality the instructor will:

- listen to participants' questions and conversations throughout the lesson and grocery store tour.
- look at participants' written meal plans.
- survey participants' written grocery lists.
- observe participants' grocery shopping skills while taking the grocery store tour, especially –
  - ability to navigate the nutrition facts label
  - how to select fresh produce
    - seasonality
    - ripeness
  - ability to pick out cuts of meat, poultry, and seafood
    - lean
    - serving size
  - how to distinguish whole grains and refined grains
  - ability to choose low-fat, low-sodium, and low-sugar options
    - cereals
    - canned goods
    - snack foods
    - drinks
    - dairy products
    - frozen section

Overall evaluation will be tested at the conclusion of Culinary Boot Camp; participants will complete post- assessments to compare outcomes to pre-assessment scores.

Lesson Resources:
Fareway Supermarket Tour (packet).

HyVee Aisles Online (website). https://www.hy-vee.com/grocery/

Iowa State University Extension and Outreach Publications (references and recipes, website). http://www.extension.iastate.edu/

Supermarket Savvy: aisle-by-aisle teaching module (packet).

USDA ChooseMyPlate (website). http://www.choosemyplate.gov

US Food and Drug Administration: Changes to the Nutrition Facts Label (website). http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm385663.htm#whats_different.

Extension Activity:

- HyVee HealthMarket Makeover
  - ask participants to go through the HealthMarket areas and select 5 different grocery items.
  - challenge participants to explore the various other areas of the store and find 5 grocery items with equal or greater nutritional value as their HealthMarket counterparts.
  - have participants compare not only nutrition but also cost between grocery items.
  - Examples:
    - Annie's Organic Bunny Grahams
      - nutrition – 4.5g fat, 70mg sodium, 2g dietary fiber, 9g sugar
      - cost – $2.99 (7.5 oz.)
    - **vs.** Chocolate Teddy Grahams
      - nutrition – 4g fat, 115mg sodium, 2g dietary fiber, 8g sugar
      - cost – $3.29 (10 oz.)
    - Cascadian Farm Organic Chocolate Chip Chewy Granola Bar
      - nutrition – 3.5g fat, 95mg sodium, 1g dietary fiber, 12g sugar
      - cost – $3.50 (6 ct.)
    - **vs.** Quaker Chocolate Chip Chewy Granola Bar
      - nutrition – 3.5g fat, 70mg sodium, 1g dietary fiber, 7g sugar
      - cost – $2.98 (8 ct.)
    - Muir Glen Organic Garlic Roasted Pasta Sauce
      - nutrition – 0g fat, 260mg sodium, 2g dietary fiber, 6g sugar

- cost – $3.99 (25.5 oz.)

- **vs.** Barilla Roasted Garlic Pasta Sauce
  - nutrition – 1g fat, 400mg sodium, 3g dietary fiber, 7g sugar
  - cost – $2.79 (24 oz.)
- Ancient Harvest Gluten-Free Organic Supergrain Pasta- Elbows
  - nutrition – 1g fat, 4mg sodium, 4g dietary fiber, 1g sugar
  - cost – $3.39 (8 oz.)
- **vs.** Barilla Whole Grain 100% Whole Wheat Pasta- Elbows
  - nutrition – 1.5g fat, 0mg sodium, 6g dietary fiber, 2g sugar
  - cost – $0.88 (16 oz.)

APPENDIX B. CLASSROOM LESSON 1 POWERPOINT PRESENTATION

Welcome to Culinary Boot Camp!

Iowa State University Food Science & Human Nutrition

Overview of Culinary Boot Camp

- 4-week interactive experience
  - Week 1- Week 3: MyPlate
    - Versatile Fruits & Vegetables
    - Grand Grains & Delightful Dairy
    - Protein Power
  - Week 4: Grocery Store Tour
    - Success Going to the Grocery Store

HyVee

Outcomes of Culinary Boot Camp

- Improve cooking and grocery shopping skills
- Enhance competent eating skills
- Pre- and Post- assessments
  - Thank You!

Overview of Lesson 1

- Goal Setting
- Mindful Eating
- Versatile Fruits & Vegetables

Goal Setting

- Submitted Goals
  - recorded at registration
  - tailor Culinary Boot Camp to your goals
- SMART Goals
  - specific, measurable, achievable, relevant, time-bound
  - write 1-2 SMART goals for Culinary Boot Camp
  - discuss with a friend

Mindful Eating: What is it?

Principle 1:

- "Allowing yourself to become aware of the positive and nurturing opportunities that are available through food selection and preparation by respecting your own inner wisdom."

Principle 2:

- "Incorporating all your senses in choosing to eat food that is both satisfying to you and nourishing to your body."

Mindful Eating: What is it?

Principle 3:
- "Acknowledging responses to food (likes, dislikes, neutral) without judgment"

Principle 4:
- "Becoming aware of physical hunger and satiety to help direct your decisions to begin and end eating."

Mindful Eating Exercise

Clementines!

Versatile Fruits & Vegetables

Packed with Powerful Nutrients

- Vitamin A
- Vitamin C
- Potassium
- Fiber
- Phytonutrients

Benefits Beyond Nutrition: Variety

- Fruits
  - Melons
  - Berries
  - Other
  - 100% fruit Juices
- Vegetables
  - Dark Green
  - Red and Orange
  - Starchy
  - Beans and Peas
  - Others

IT TAKES 7-10 TRIES BEFORE YOU ARE ABLE TO DETERMINE WHETHER YOU LIKE A NEW FOOD OR NOT!

Benefits Beyond Nutrition: Live Longer

- Eating foods that contain **fiber**, such as fruits and vegetables, as part of an overall healthy diet may reduce risk for various diseases, including:
  - heart disease
    - heart attack
    - stroke
  - certain types of cancer
  - obesity
  - type 2 diabetes

Preparing Fresh Produce

- First wash your hands
- ALWAYS clean produce before preparing
  - fruit/vegetable brush
  - rinse with cool running water

Preparing Frozen, Canned, & Dried Produce

- Frozen
  - ready-to-eat
- Canned
  - rinse to remove excess sugar and sodium
- Dried
  - ready-to-eat

Cooking Description & Demonstration

Chef Tom Keinert

Knife Skills

- Proper Technique and Handling
- SAFETY
- Demonstration

Different Cutting Terms

- **Chop:** cut into small pieces
- **Cut:** make smaller in size, separate into segments
- **Dice:** cut into small square-shaped pieces, uniform in size
  - about ¾ inch
- **Mince:** cut or chop into extremely small pieces

*always clean cooking surfaces and utensils after every single use

Cooking Experience

Fruit & Vegetable Salsas with Homemade Tortilla Chips

Instructions

- Everyone will prepare various fruit and vegetable salsas with homemade tortilla chips.
  - assigned by kitchen
- Each kitchen is equipped with all the cooking utensils and tools required to make the recipes.
  - sitting out on countertops
  - do not go into drawers or cabinets
- Please work in groups of 4-6.
- BE SAFE WHEN WORKING WITH KNIVES!

*Volunteers will be cleaning up the kitchen. Please be considerate and try not to make too much of a mess.

Menu

KITCHEN 1
- Fresh Tomato Salsa
- Roasted Corn Salsa

KITCHEN 2
- Bean Salsa
- Fruit Salsa

KITCHENS 1 & 2
- Baked Tortilla Chips

Meal Time

- We will all eat together
- Mindful Eating Exercise
- Questions?

Next Monday Night

- Great Grains and Delightful Dairy
  - build your own egg omelets
  - fruit & vegetable grilled cheeses

OR
- scrambled egg muffins
- skillet lasagna

THANK YOU!

- Please pick up the many cooking utensils donated by our kind sponsors:
  - knives
  - cutting boards
  - aprons
- This Week: try a new fruit or vegetable with your family and friends!

Sponsors

APPENDIX C. CLASSROOM LESSON 2 POWERPOINT PRESENTATION

Welcome Back to Culinary Boot Camp!

Iowa State University Food Science & Human Nutrition

Review & Recap

- SMART Goals
- Mindful Eating
- Week 1: Versatile Fruits & Vegetables

Overview of Lesson 2

- Great Grains
- Delightful Dairy
- Food Allergies & Food Intolerances

Great Grains:

Benefits to Eating Grains Everyday

Nutritious…

- Benefits to Eating Grains Everyday –
  - Fiber
  - B vitamins
  - Iron
  - Magnesium and Selenium

…and Delicious!

- Variety –
  - wheat, oats, rye, barley, corn, rice, amaranth, millet, potato, quinoa, tapioca, buckwheat, sorghum

Consider Your Grain Intake

- recommended intake differs depending on age and overall activity
- talk to a registered dietitian to receive detailed information about individual nutrition needs

Whole and Refined Grains:
what's the difference?

Whole Grain:

- bran, germ, endosperm – all 3 parts included
- provide wholesome nutrition
  - more fiber, B vitamins, iron

Refined Grain:

- milling process removes bran and germ
  - final products
    - finer texture
    - longer shelf life
- endosperm – minimal nutrients

Whole and Refined Grains:
what's the difference?

Simple Swaps:

ways to add whole grains to your daily diet

Delightful Dairy:

Benefits to Dairy Consumption

Nutritious...

- Benefits to Dairy Consumption –
  - Calcium
  - Potassium
  - Vitamin D*
  - Protein

Nutritious…

- Dairy Products are the primary source of calcium and vitamin D in the American diet.
- "Consumption of dairy products is correlated with improved bone health and reduced risk of osteoporosis; this is most important during childhood and adolescence when bone mass is being built."
- "Intake of dairy products is also linked to reduced risk of cardiovascular disease and type 2 diabetes as well as lower blood pressure."

…and Delicious!

- Variety –
  - milk, yogurt, cheese, pudding, frozen yogurt, ice cream
- Try to select low-fat or fat-free options
- Other non-dairy sources of calcium

Simple Swaps:

ways to incorporate dairy into your day

Food Allergies & Food Intolerances:

What's the Difference?

Food Allergy:

- Immune system reaction to food
  - typically related to a specific protein
- range of signs and symptoms
- extremely severe –
  - life threatening

Food Intolerance:

- localized reaction to food
  - typically limited to digestive problems
- common causes –
  - absence of digestive enzyme
  - sensitivity to additives
  - other medical conditions
- less severe –
  - not life threatening

Gluten

- What is it?
- Celiac Disease – autoimmune disorder
- Wheat Allergy
- Gluten Intolerance

Lactose

- What is it?
- Galactosemia – food allergy
  - really rare
- Lactose Intolerance

Cooking Description & Demonstration

Chef Darren Johnson

Cooking Description & Demonstration

Chef Darren Johnson

Egg Safety and Sanitation

- common source of salmonella
- wash hands!
- cook eggs completely – 160°F
- purchase pasteurized egg products
- keep HOT eggs HOT and COLD eggs COLD

Preparing a Perfect Omelet:

cooking demonstration

Pasta Basics

- many shapes and sizes
- shape and size determines cooking time
  - al dente
  - follow recipe or directions on box to prepare pasta correctly
- cooking time makes pasta bigger and heavier
- general rule for boiling pasta
  - 1 pound pasta = 1 gal. water (+ 1 tsp. salt + 1 tsp. oil, optional)

Sautéing and Frying Basics

- difference between definitions
- cooking methods that bring more flavor to food
- tips and techniques

Measurement Skills

- Conversions
  - 1 gallon = 4 qt. = 16 c.
  - 1 quart = 4 c.
  - 1 cup = 16 T.
  - 1 Tablespoon = 3 tsp.

Measurement Skills

- Accuracy
  - use the measuring utensil closest to the amount required in a recipe
  - examples
- Portions
  - everything in moderation!

Cooking Experience

Build Your Own Egg Omelet
and
Fruit & Vegetable Grilled Cheeses

Cooking Experience

Scrambled Egg Muffins
and
Skillet Lasagna

Instructions

- Everyone will prepare egg omelets and grilled cheeses
- each kitchen is equipped with all the cooking utensils and tools required to make the recipes
  - sitting out on countertops
  - do not go into drawers or cabinets
- Please work in groups of 4-6
- MAKE SURE MEASUREMENTS ARE ACCURATE!

Instructions

- Everyone will prepare scrambled egg muffins and skillet lasagna
- each kitchen is equipped with all the cooking utensils and tools required to make the recipes
  - sitting out on countertops
  - do not go into drawers or cabinets
- Please work in groups of 4-6
- MAKE SURE MEASUREMENTS ARE ACCURATE!

Meal Time

- We will all eat together
- Mindful Eating Exercise
- Questions?

Next Monday Night

Protein Power:
chili cook off!

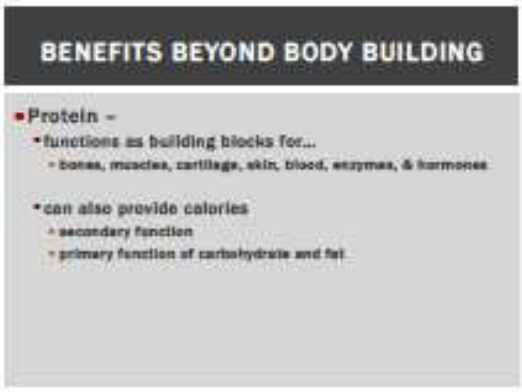
THANK YOU!

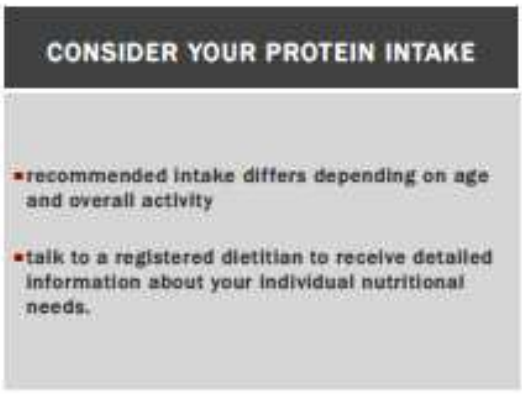
- Please pick up the many cooking utensils donated by our generous sponsors:
  - measuring spoons
  - spatulas
  - aprons
  - dairy recipes and resources
- This Week: try one of the grain or dairy simple swaps with your friends and family!

Sponsors

Midwest Dairy Association
Iowa State University
Iowa Pork Producers Association
Hy-Vee
Soybean Council
Iowa Department of Agriculture
Iowa Egg Council
Iowa Turkey Federation
Beef Industry Council

APPENDIX D. CLASSROOM LESSON 3 POWERPOINT PRESENTATION





VARIETY IN PROTEIN PRODUCTS

- dairy, poultry, eggs, meat, beans, peas, legumes, nuts, seeds, seafood, soy products
- VARY YOUR PROTEIN ROUTINE!

VEGETARIAN PROTEIN PRODUCTS

- dairy, eggs, beans, peas, legumes, nuts, seeds, soy products
- vegetarian vs. vegan
- HEALTHY EATING FOR VEGETARIANS!

- discuss your diet with a registered dietitian to ensure adequate nutrition

FOOD SAFETY TIPS:

1. AVOID THE TEMPERATURE DANGER ZONE

- the range of temperature at which bacteria begin to multiply most rapidly.
- 40°F - 140°F

2. KEEP HOT FOODS HOT...

- cook and reheat foods thoroughly
- use a thermometer to ensure doneness
- maintain temperature of hot foods prior to serving
- hot foods should not sit at room temperature for more than 2 hours

3. ...AND KEEP COLD FOODS COLD

- refrigerate all cooked and perishable food promptly after serving
- put perishable items in the coolest part of the refrigerator
- do not store food too long even in the refrigerator
- store cold goods in a cooler when transporting from grocery store to home
- do not thaw frozen food at room temperature

4. AVOID CROSS CONTAMINATION

- separate raw and cooked foods
  - use different equipment and utensils
- separate protein and produce
  - use different equipment and utensils
  - store on different shelves in the refrigerator
    - protein on bottom
    - produce on top

5. REMEMBER TO WASH YOUR HANDS

- before, during, and after handling food!

SLOW COOKER SKILLS

- safety
- tips
- recipes

SLOW COOKER SAFETY

- use FRESH OR THAWED INGREDIENTS instead of frozen
- ADD CHUNKS OR PIECES OF PROTEIN rather than large cuts, roasts, and whole portions
- AVOID CROSS CONTAMINATION – prepare protein and produce with separate knives and cutting boards
- do not forget to ADD LIQUID to slow cooker recipes

SLOW COOKER SAFETY (CONT.)

- do not delay starting time
- cook on HIGH 1 HOUR and then TURN DOWN TO LOW
- check internal temperature of dishes to make certain food reaches 160°F
- KEEP THE LID ON AT ALL TIMES while a meal is slowly cooking

SLOW COOKER TIPS

- PLAN AHEAD – prepare protein and produce the night before
- cut root vegetables into smaller chunks
- cut tender vegetables into larger pieces
- BROWN PROTEIN before adding it to the slow cooker
- FILL 1/2 to 2/3

SLOW COOKER RECIPES

- most meals are adaptable to the slow cooker:
  - recipes simmered on stovetop simplest to convert
  - reduce liquid 1/3 to ½ and lengthen cooking time
- Resources:
  - ISU SPEND SMART EAT SMART website
  - USDA website

COOKING DESCRIPTION & DEMONSTRATION

Chef Sean Dougan

PREPARING MEAT AND POULTRY

- choose lean cuts
  - marinate and season for extra flavor

PREPARING MEAT AND POULTRY

- how to sear cuts and brown ground products
  - all you need is a heavy skillet, a little oil, and high heat
- Simple Steps:
  1. pat dry meat or poultry and season accordingly
  2. preheat skillet
  3. add oil to skillet
  4. drop in meat or poultry and turn up temperature to high heat
  5. allow to cook on one side until meat or poultry does not stick
  6. turn meat or poultry over to other side and cook through
     - do not forget your thermometer!

PREPARING MEAT AND POULTRY

- how to drain and rinse ground products
  - all you need is a glass bowl, colander, spatula, and hot water
- Simple Steps:
  1. pick up skillet and bring to colander set on top of glass bowl
  2. scrape ground product into colander with a spatula
  3. pour hot water over meat or poultry
  4. chill glass bowl with fat and water mixture in the refrigerator; let sit for a few hours
  5. skim the surface of glass bowl with a large spoon to remove fat
  6. throw chilled fat drippings into the garbage

PREPARING MEAT AND POULTRY

- how to cut a whole chicken or turkey
  - all you need is a cutting board and a sharp carving or chef knife & fork
- Simple Steps:
  1. first, place chicken on cutting board with knife and fork nearby; wash your hands.
  2. with chicken breasts facing up, pull each leg away from the body and slice through the skin between the breasts and legs.
  3. turn chicken on its side, bend each leg back until the thighbone pops out of the socket, and cut through to detach legs completely.
  4. continuing with chicken on its side, pull each wing away from the body and cut through to detach wings.

PREPARING MEAT AND POULTRY

- how to cut a whole chicken or turkey (cont.)
- Simple Steps (cont.):
  5. lift the chicken from the cutting board and cut downwards through the rib cage and shoulders to separate the front from the back; save the back for another use, such as chicken stock.
  6. place chicken breasts skin side down and split the center bone by chopping into two; slice through meat and skin completely to separate.
  7. cut chicken breast halves into fourths by turning each skin side up and slicing in half diagonally through the bone.
  8. divide chicken legs by turning each skin side down and cutting through sockets as well as fat to separate into thigh from drumstick.
  9. finish by seasoning and cooking chicken as well as cleaning and sanitizing work area and utensils.

COOKING EXPERIENCE

Chili:

classic beef

easy white turkey

black bean & pork

edamame

INSTRUCTIONS

- Everyone will prepare two different types of chili
  - assigned by kitchen
- Each kitchen is equipped with all the cooking utensils and tools required to make the recipes
  - sitting out on countertops
  - do not go into drawers or cabinets
- Please work in groups of 4-6
- PRACTICE FOOD SAFETY WHEN MAKING CHILI!

MEAL TIME

- We will all eat together
- Mindful Eating Exercise
- Questions?

NEXT MONDAY NIGHT

Success Going to the Grocery Store

THANK YOU!

- Please pick up the many cooking utensils as well as recipes & resources donated by our charitable sponsors
  - thermometers
  - coolers
  - meat brushes
  - aprons
  - cookbooks
  - recipes & resources – beef, pork, soy
- This Week:
  - try to incorporate food safety skills learned throughout this lesson
  - prepare a new protein dish you have not made before with your family and friends

APPENDIX E. CLASSROOM LESSON 4 POWERPOINT PRESENTATION

Generating a Grocery List:
Helpful and Healthful Tips

Helpful and Healthful Tips

1. look through kitchen cupboards
2. read recipes selected to use in upcoming meals and snacks
3. organize grocery list according to store layout
4. place grocery list on refrigerator door

GROCERY LIST WORKSHEETS

- SPEND SMART, EAT SMART

GROCERY LIST WORKSHEETS

- try to fill out one for a trip to the grocery store that matches meal plan
- search the weekly ad for additional guidance

Another Option: HyVee Aisles Online

HyVee aisles online

Navigating the New Nutrition Facts Label:

Several Changes Coming Soon...

- Bigger and Bolder
  - serving size
  - Calories
- Realistic Serving Sizes
- No Calories From Fat
- Include:
  - added sugars
  - potassium
  - vitamin D
- Remove:
  - vitamins A and C
- Improved Definition of %DV

Grocery Store Tour:

Jolene O'Gorman, RD, LD
Ames West HyVee Store

Grocery Store Tour:

Katie Squires, RD, LD
Ames Lincoln Center HyVee Store

Instructions:

- Everyone will travel as a group throughout the grocery store
- Several different topics will be emphasized during the tour:
  - Nutrition Facts Label
  - Fresh Produce
  - Meat
  - Breads and Grains
  - Canned Goods
  - Snack Foods
  - Drinks
  - Dairy Products
  - Frozen Section
- Please Participate in ALL aisle activities!

Thank You!

- If you have attended all 4 Culinary Boot Camp lessons, please pick up a $15 HyVee gift card after completing the grocery store tour.
- Post-Assessments
  - this week and a month follow up
  - Thank you!
- Homework:
  - continue to learn and practice culinary and grocery shopping skills as well as mindful eating
  - enjoy each and every experience with food and nutrition!

APPENDIX F. IRB APPROVAL DOCUMENTATION

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
2420 Lincoln Way, Suite 202
Ames, Iowa 50014
515 294-4566

Date: 7/27/2017

To: Dr. Jessica Young
220 MacKay Hall

CC: Ruth Litchfield
1104 HNSB
Erica Beirman
215 MacKay

From: Office for Responsible Research

Title: Culinary Boot Camp

IRB ID: 17-336

Study Review Date: 7/27/2017

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (1) Research conducted in established or commonly accepted education settings involving normal education practices, such as:
  - Research on regular and special education instructional strategies; or
  - Research on the effectiveness of, or the comparison among, instructional techniques, curricula, or classroom management methods.

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where
  - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
  - Any disclosure of the human subjects' responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

The determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**

- **You must carry out the research as described in the IRB application.** Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

  Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

  Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. **Only the IRB or designees may make the determination of exemption**, even if you conduct a study in the future that is exactly like this study.

Please be aware that **approval from other entities may also be needed.** For example, access to data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.**

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.

APPENDIX G. RECRUITMENT EMAIL: STUDENT CULINARY BOOT CAMP

CALLING ALL ISU STUDENTS!

Do you enjoy **food** and **cooking**? Do you want to **enhance your culinary skills** and **have fun** while doing so?

If you answered "yes" to either question, the upcoming **Culinary Boot Camp** is just for you!

Come experience four exciting nights of food, nutrition, and cooking that will help give you the skills needed to become a culinary expert and competent eater. You will learn how to make many delicious dishes with chefs from ISU Dining, including:

- Fruit & Vegetable Salsas with Homemade Corn Tortilla Chips
- Build Your Own Egg Omelets and Fruit & Vegetable Grilled Cheeses
- Various Chilis (classic beef, vegetarian, white turkey, and edamame)

You will also have the opportunity to take a grocery store tour with local dietitians who will offer some helpful tips and strategies while shopping for food.

So, what are you waiting for? **Sign up today** and join us **for an unforgettable time** at Culinary Boot Camp!

Registration Information:

Who: all ISU students

What: Culinary Boot Camp

Where: MacKay Hall and Ames HyVee Grocery Stores

When: Monday evenings January 28 and February 4, 11, 18 from 5:30-7:30 pm

Register now: http://bit.ly/StudentCulinary

Please contact Jessica Szczepanski at jry@iastate.edu with any questions about the event.

APPENDIX H. RECRUITMENT POSTER: STUDENT CULINARY BOOT CAMP

Come ***expand your cooking skills*** in a fun environment and ***enjoy delicious food*** at Culinary Boot Camp!

All ISU students are welcome to attend!

Monday evenings in January & February
5:30 - 7:30 p.m., MacKay Hall

Jan. 28 - fruit and vegetable salsas with homemade tortilla chips

Feb. 4 - build your own omelets and grilled cheeses

Feb. 11 - chili cook-off

Feb. 18 - grocery store tour

Don't delay! Register today:
http://bit.ly/StudentCulinary

Sponsored by: Iowa Egg Council, Iowa Pork Producers Association, Iowa State University Department of Food Science and Human Nutrition, Be Iowa State, Iowa Turkey Federation, Midwest Dairy Association, Iowa Beef Industry Council, Hy-Vee Employee Owned, Iowa Department of Agriculture and Land Stewardship, ISU Dining

APPENDIX I. RECRUITMENT FLYER: STUDENT CULINARY BOOT CAMP

Come expand your cooking skills in a fun environment and enjoy delicious food at… Culinary Boot Camp!

Who: All ISU Students

What: Culinary Boot Camp

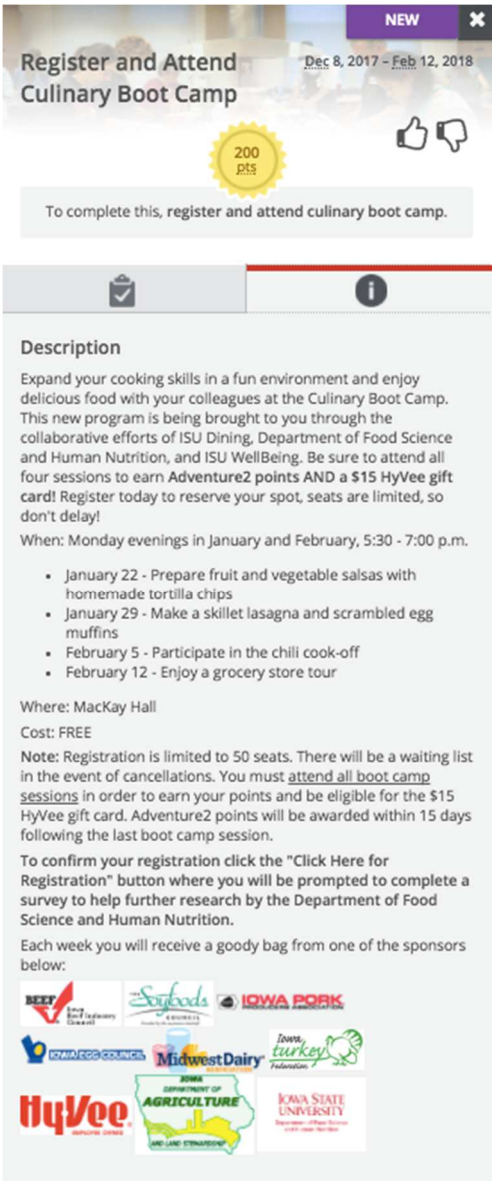
Where: MacKay Hall and Ames HyVee Grocery Stores

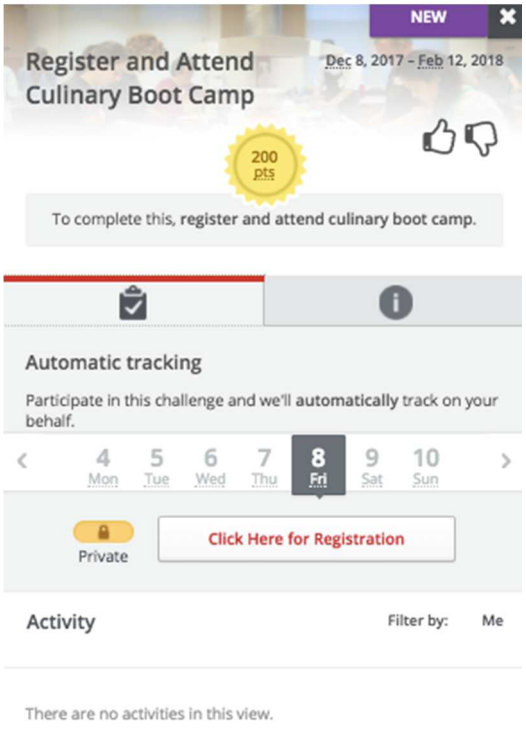
When: Monday evenings January 28 and February 4, 11, 18 from 5:30-7:30 pm

Register Now: http://bit.ly/StudentCulinary

Please contact Jessica Szczepanski at jry@iastate.edu with any questions about the event.

APPENDIX J. RECRUITMENT ADVERTISEMENTS AND LINKS: EMPLOYEE CULINARY BOOT CAMP





APPENDIX K. PARTICIPANT REMINDER EMAILS

Culinary Boot Camp Reminder – NEXT MONDAY NIGHT, January 29

Hi all,

Thank you for a fun and exciting first evening of Culinary Boot Camp. This is just a reminder email that we will meet again next **Monday** night (**January 29**) at **5:30 pm** in **MacKay 213** (same classroom as this past Monday's lesson).

We will be talking about the grains and dairy group in on MyPlate. We will be making scrambled egg muffins and skillet lasagnas with various fruits and vegetables. Please arrive promptly at 5:30 pm, so we can start the lesson on time. This coming week we will try our best to be done by 7:30 pm (sorry class went a little late Monday).

I am looking forward to seeing you all next Monday evening!

Have a nice weekend,

Jessica
Jessica Szczepanski, BS Movement Science
PhD Student, Dept. of Food Science & Human Nutrition
Iowa State University
211 MacKay Hall, Ames, IA 50011
jry@iastate.edu

Culinary Boot Camp Reminder

Hi Participants,

I just wanted to send out one more reminder email about Culinary Boot Camp tomorrow evening. The session will begin at **5:30 pm** in **MacKay 213**.

We will be learning about **grains and dairy** as well as making **scrambled egg muffins and skillet lasagna**. Please try to arrive on time so we can start as soon as possible. We will try our best to be done by 7:30 pm.

Wishing you all a nice night,

Jessica
Jessica Szczepanski, BS Movement Science
PhD Student, Dept. of Food Science & Human Nutrition
Iowa State University
211 MacKay Hall, Ames, IA 50011
jry@iastate.edu

APPENDIX L. PRINTING ORDERS

Goals Worksheet –

Culinary Boot Camp SMART Goals:
specific, measurable, attainable, relevant, time-bound

Goal #1 –

_____

_____

_____

Goal #2 –

_____

_____

_____

Protein Alternatives Worksheets –

USDA
United States Department of Agriculture

10 tips Nutrition Education Series

MyPlate MyWins

Based on the Dietary Guidelines for Americans

Vary your protein routine

Protein foods include both animal (meat, poultry, seafood, and eggs) and plant (beans, peas, soy products, nuts, and seeds) sources. We all need protein—but most Americans eat enough, and some eat more than they need. How much is enough? Most people, ages 9 and older, should eat 5 to 7 ounces* of protein foods each day depending on overall calorie needs.

1 Vary your protein food choices

Eat a variety of foods from the Protein Foods Group each week. Experiment with beans or peas, nuts, soy, and seafood as main dishes.

2 Choose seafood twice a week

Eat seafood in place of meat or poultry twice a week. Select a variety of seafood, including those that are higher in oils and low in mercury, such as salmon, trout, and herring.

3 Select lean meat and poultry

Choose lean cuts of meat like round or sirloin and ground beef that is at least 93% lean. Trim or drain fat from meat and remove poultry skin.

4 Save with eggs

Eggs can be an inexpensive protein option and part of a healthy eating style. Make eggs part of your weekly choices.

5 Eat plant protein foods more often

Try beans and peas (kidney, pinto, black, or white beans; split peas; chickpeas; hummus), soy products (tofu, tempeh, veggie burgers), nuts, and seeds. They are lower in saturated fat and some are higher in fiber.

* What counts as an ounce of protein foods? 1 ounce lean meat, poultry, or seafood; 1 egg; ¼ cup cooked beans or peas; ½ ounce nuts or seeds; or 1 tablespoon peanut butter.

6 Consider nuts and seeds

Choose unsalted nuts or seeds as a snack, on salads, or in main dishes. Nuts and seeds are a concentrated source of calories, so eat small portions to keep calories in check.

7 Keep it tasty and healthy

Try grilling, broiling, roasting, or baking—they don't add extra fat. Some lean meats need slow, moist cooking to be tender—try a slow cooker for them. Avoid breading meat or poultry, which adds calories.

8 Make a healthy sandwich

Choose turkey, roast beef, canned tuna or salmon, or peanut butter for sandwiches. Many deli meats, such as regular bologna or salami, are high in fat and sodium—make them occasional treats only.

9 Think small when it comes to meat portions

Get the flavor you crave but in a smaller portion. Make or order a small turkey burger or a "petite" size steak.

10 Check the sodium

Check the Nutrition Facts label to limit sodium. Salt is added to many canned foods—including soups, vegetables, beans, and meats. Many processed meats—such as ham, sausage, and hot dogs—are high in sodium. Some fresh chicken, turkey, and pork are brined in a salt solution for flavor and tenderness.

Center for Nutrition Policy and Promotion
USDA is an equal opportunity provider, employer, and lender.

Go to ChooseMyPlate.gov for more information.

DG TipSheet No. 6
June 2011
Revised October 2016

10 tips
Nutrition Education Series

healthy eating for vegetarians

10 tips for vegetarians

A vegetarian eating pattern can be a healthy option. The key is to consume a variety of foods and the right amount of foods to meet your calorie and nutrient needs.

1 think about protein

Your protein needs can easily be met by eating a variety of plant foods. Sources of protein for vegetarians include beans and peas, nuts, and soy products (such as tofu, tempeh). Lacto-ovo vegetarians also get protein from eggs and dairy foods.

2 bone up on sources of calcium

Calcium is used for building bones and teeth. Some vegetarians consume dairy products, which are excellent sources of calcium. Other sources of calcium for vegetarians include calcium-fortified soymilk (soy beverage), tofu made with calcium sulfate, calcium-fortified breakfast cereals and orange juice, and some dark-green leafy vegetables (collard, turnip, and mustard greens; and bok choy).

3 make simple changes

Many popular main dishes are or can be vegetarian—such as pasta primavera, pasta with marinara or pesto sauce, veggie pizza, vegetable lasagna, tofu-vegetable stir-fry, and bean burritos.

4 enjoy a cookout

For barbecues, try veggie or soy burgers, soy hot dogs, marinated tofu or tempeh, and fruit kabobs. Grilled veggies are great, too!

5 include beans and peas

Because of their high nutrient content, consuming beans and peas is recommended for everyone, vegetarians and non-vegetarians alike. Enjoy some vegetarian chili, three bean salad, or split pea soup. Make a hummus-filled pita sandwich.

6 try different veggie versions

A variety of vegetarian products look—and may taste—like their non-vegetarian counterparts but are usually lower in saturated fat and contain no cholesterol. For breakfast, try soy-based sausage patties or links. For dinner, rather than hamburgers, try bean burgers or falafel (chickpea patties).

7 make some small changes at restaurants

Most restaurants can make vegetarian modifications to menu items by substituting meatless sauces or non-meat items, such as tofu and beans for meat, and adding vegetables or pasta in place of meat. Ask about available vegetarian options.

8 nuts make great snacks

Choose unsalted nuts as a snack and use them in salads or main dishes. Add almonds, walnuts, or pecans instead of cheese or meat to a green salad.

9 get your vitamin B_{12}

Vitamin B_{12} is naturally found only in animal products. Vegetarians should choose fortified foods such as cereals or soy products, or take a vitamin B_{12} supplement if they do not consume any animal products. Check the Nutrition Facts label for vitamin B_{12} in fortified products.

10 find a vegetarian pattern for you

Go to www.dietaryguidelines.gov and check appendices 8 and 9 of the *Dietary Guidelines for Americans, 2010* for vegetarian adaptations of the USDA food patterns at 12 calorie levels.

USDA United States Department of Agriculture
Center for Nutrition Policy and Promotion

Go to www.ChooseMyPlate.gov for more information.

DG TipSheet No. 8
June 2011

Food Safety Resource –

Safe Cooking Guidelines

SAFE MINIMUM INTERNAL TEMPERATURES as measured with a food thermometer	
Beef, pork, veal and lamb (roast, steaks and chops)	145 °F with a three-minute "rest time" after removal from the heat source
Ground meats	160°F
Poultry (whole, parts or ground)	165°F
Eggs and egg dishes	160°F; but cook eggs until both the yolk and the white are firm; scrambled eggs should not be runny
Leftovers	165 °F
Finfish	145 °F

GUIDELINES FOR SEAFOOD	
Shrimp, lobster, crabs	Flesh pearly and opaque
Clams, oysters and mussels	Shells open during cooking
Scallops	Milky white, opaque and firm

Partnership for Food Safety Education, 2016
We develop and promote effective education programs to reduce foodborne illness risk for consumers.

FIGHTBAC.ORG
@Fight_BAC

Meal Planning Worksheet –

IOWA STATE UNIVERSITY
Extension and Outreach

5-Day Meal Planning Worksheet

SPEND SMART, EAT SMART.

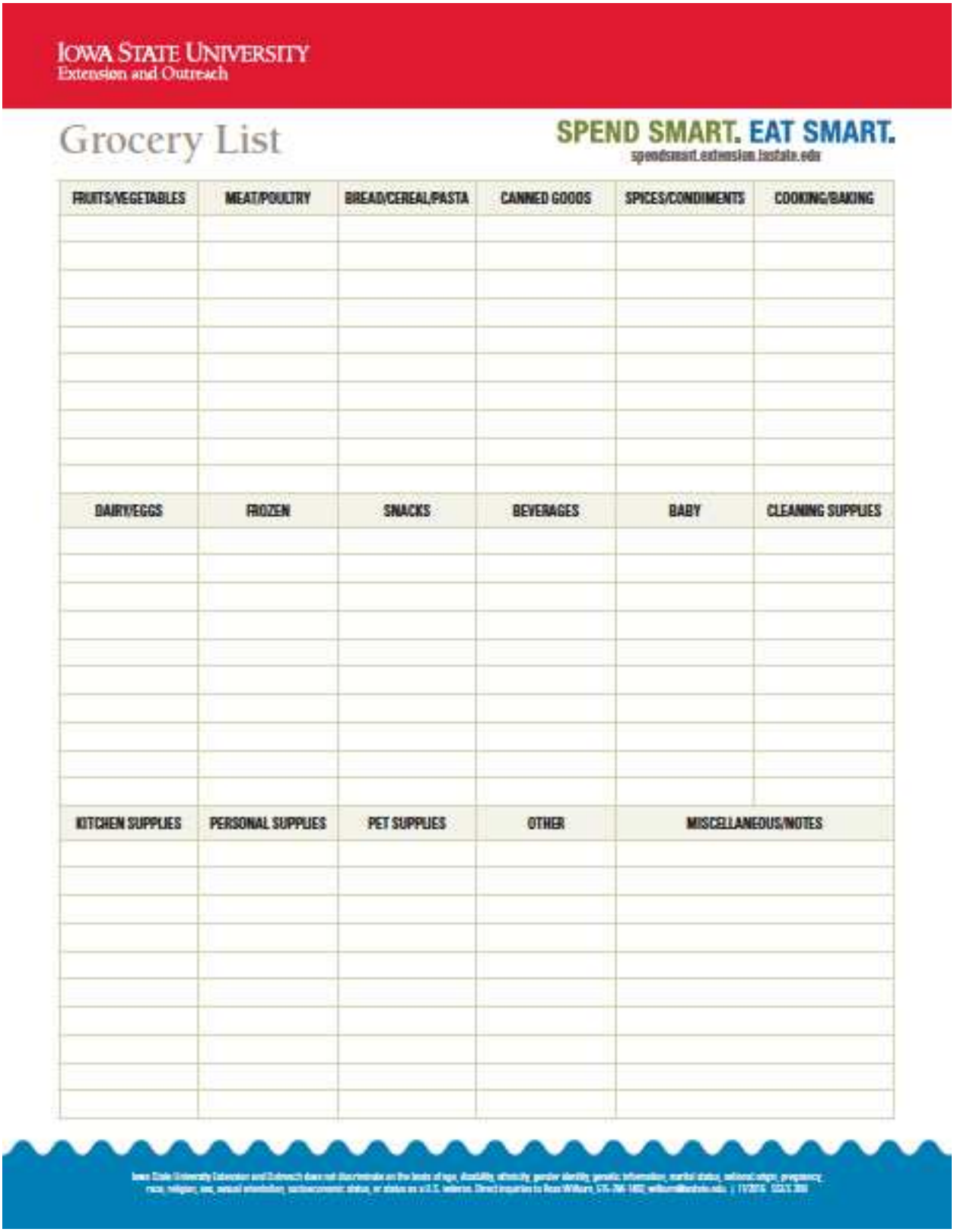
spendsmart.extension.iastate.edu

1. Check refrigerator, freezer, and cupboard for items that need to be used. Fill in menu using these items.
2. Review grocery ads for specials that you can use this week in your menu plan. Add to menu plan and grocery list.

ON HAND

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
BREAKFAST					
SNACK					
LUNCH					
SNACK					
SUPPER					
HOW DID I DO?	☐ Grains ☐ Vegetable ☐ Fruit ☐ Dairy ☐ Protein	☐ Grains ☐ Vegetable ☐ Fruit ☐ Dairy ☐ Protein	☐ Grains ☐ Vegetable ☐ Fruit ☐ Dairy ☐ Protein	☐ Grains ☐ Vegetable ☐ Fruit ☐ Dairy ☐ Protein	☐ Grains ☐ Vegetable ☐ Fruit ☐ Dairy ☐ Protein

Grocery List Making Worksheet –



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Grocery List

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FRUITS/VEGETABLES	MEAT/POULTRY	BREAD/CEREAL/PASTA	CANNED GOODS	SPICES/CONDIMENTS	COOKING/BAKING
DAIRY/EGGS	FROZEN	SNACKS	BEVERAGES	BABY	CLEANING SUPPLIES
KITCHEN SUPPLIES	PERSONAL SUPPLIES	PET SUPPLIES	OTHER	MISCELLANEOUS/NOTES	

Recipes –

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Fresh Tomato Salsa

ISU Culinary Boot Camp

Ingredients:
1 ½ lb. Roma tomatoes, seeded, ¼" dice
¾ c. onion, ¼" dice
3 T. fresh lime juice
2 T. salad oil (such as olive or canola)
2 medium fresh jalapeno peppers, seeded, minced
1 garlic clove, minced
salt and pepper (to taste)

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Bean Salsa

ISU Culinary Boot Camp

Ingredients:	
2 c. black beans, canned, rinsed and drained	
1 c. frozen edamame, thawed	
1 c. frozen whole kernel corn, thawed	½ c. garlic clove, minced
1 c. onion, ¼" dice	½ c. salad oil
½ c. green pepper, ¼" dice	¼ c. fresh lime juice
½ c. red pepper, ¼" dice	salt and pepper (to taste)
1 c. Roma tomatoes, seeded, ¼" dice	
4 medium jalapeno peppers, seeded, minced	

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Roasted Corn Salsa

ISU Culinary Boot Camp

Ingredients:	
2 c. frozen whole kernel corn, thawed	
1 c. Roma tomatoes, seeded, ¼" dice	
1 c. onion, ¼" dice	½ c. salad oil
½ c. green pepper, ¼" dice	¼ c. fresh lime juice
2 T. garlic cloves, minced	salt and pepper (to taste)
2 medium fresh jalapeno peppers, seeded, minced	
½ c. fresh cilantro, chopped	

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Instructions:

Clean, cut, and mix all ingredients in a medium-sized bowl.

Season, cover, and chill.

Serving Size:

2 T.

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IOWA STATE UNIVERSITY

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Clean, cut, and mix all ingredients in a medium-sized bowl.

Season, cover, and chill.

Serving Size:

2 T.

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Fruit Salsa

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Ingredients:

½ lb. fresh cucumber, ¼" dice
½ lb. fresh pineapple, ¼" dice
2 medium fresh jalapeno peppers, seeded, minced
3 T. red onion, ¼" dice
¼ c. fresh cilantro, chopped
2 t. salad oil (such as olive or canola
2 t. fresh lime juice

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Baked Whole Wheat Tortilla Chips

ISU Culinary Boot Camp

Ingredients:

non-stick cooking spray
6 (8- inch) whole wheat tortillas
salt (optional)

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Baked Corn Tortilla Chips

ISU Culinary Boot Camp

Ingredients:

non-stick cooking spray
8 (6-inch) corn tortillas (white or yellow)
salt (optional)

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Instructions:

Clean, cut, and mix all ingredients in a medium-sized bowl.

Season, cover, and chill.

Serving Size:

2 T.

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Instructions:

Pre-heat oven to 400°F.

Lightly grease a baking sheet with cooking spray.

Spray tops of tortillas with cooking spray and lightly salt (optional).

Cut tortillas into 8 wedges using a knife or pizza cutter and place on a baking sheet.

Bake for 8-12 minutes, until crisp and light brown; watch closely so chips don't burn!

Remove from baking sheet and cool on paper towels or a cooling rack.

Serving Size:

6

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Instructions:

Pre-heat oven to 400°F.

Lightly grease a baking sheet with cooking spray.

Spray tops of tortillas with cooking spray and lightly salt (optional).

Cut tortillas into 8 wedges using a knife or pizza cutter and place on a baking sheet.

Bake for 8-12 minutes, until crisp and light brown; watch closely so chips don't burn!

Remove from baking sheet and cool on paper towels or a cooling rack.

Serving Size:

6

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Classic Beef Chili

ISU Culinary Boot Camp

Ingredients:

- ½ lb. lean ground beef
- 1 small onion, chopped
- 1 can (16 oz.) low-sodium kidney beans, light or dark
- 1 can (16 oz.) tomato sauce
- 1-2 T. chili powder

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Easy White Turkey Chili

ISU Culinary Boot Camp

Ingredients:

- 1 T. olive oil
- 1 lb. lean ground or shredded turkey
- 1 large onion, chopped
- 2 cloves garlic, minced
- 5 ½ c. low-sodium chicken broth
- 3 cans (15 oz.) cannellini beans, rinsed and drained
- 2 cans (4 oz.) chopped green chiles
- ½ c. shredded Monterey Jack cheese, for serving
- 1 T. dried oregano
- 1 tsp. ground cumin
- 2 pinches cayenne pepper
- ¼ c. chopped fresh cilantro

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Black Bean & Pork Chili

ISU Culinary Boot Camp

Ingredients:

- nonstick cooking spray
- 1 lb. lean ground pork
- 1 medium red or green bell pepper, chopped
- 1 medium onion, chopped
- 4 cloves garlic, minced
- 2 cans (15 oz.) low-sodium black beans, rinsed and drained
- 1 can (14 ½ oz.) diced tomatoes
- 1 c. water
- 1 ½ tsp. ground cumin
- 2 tsp. dried oregano
- ½ tsp. salt, optional
- 1 tsp. lime juice

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Instructions:

Cook ground beef and onion together in a large saucepan; once cooked, transfer mixture to a colander, set over a glass bowl, and rinse with warm water to remove grease; return mixture to the saucepan.

Add kidney beans, tomato sauce, and chili powder to the large saucepan.

Cook over medium heat until all the ingredients are heated through.

Divide chili among 4 bowls and serve

Serving Size: 4

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Instructions:

Heat olive oil in a large saucepan over medium heat; cook turkey, onion, and garlic in hot oil until the turkey is completely browned, 8-10 minutes.

Add chicken broth, cannellini beans, green chiles, oregano, cumin, and cayenne pepper to the saucepan; bring mixture to a simmer.

Cook over medium heat until all ingredients are heated through, 20-30 minutes.

Divide cilantro among 4 bowls; ladle chili over cilantro and top with ¼ of cheese; serve immediately.

Serving Size: 4

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Instructions:

Coat a heavy, large covered pot with nonstick cooking spray; heat over medium high heat.

Add ground pork, bell pepper, onion, garlic, and cumin; cook and stir until meat is brown and vegetables are tender; drain off fat.

Stir in black beans, undrained tomatoes, water, oregano, and salt into the mixture in the pot; bring to a boil; reduce heat; Simmer, covered 30 minutes; simmer, uncovered an additional 15 minutes more or until chili is desired consistency.

Stir in lime juice; ladle chili into 6 soup bowls and serve with desired toppings.

Serving Size: 6

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Edamame Chili

ISU Culinary Boot Camp

Ingredients:

- 1 T. olive oil
- 2 medium yellow onions, chopped
- 6 cloves garlic, minced
- 1 can (14 ½ oz.) diced tomatoes
- 1 T. dried oregano
- 1 T. cumin
- 1 T. chili powder
- 2 c. prepared, shelled edamame
- ½ c. water

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Instructions:

1. Heat oil in a heavy, large covered pot over medium high heat.
2. Add onions and garlic and sauté until translucent, about 5 minutes.
3. Stir in the can of tomatoes and sauté 3-4 more minutes.
4. Add the oregano, cumin, and chili powder; sauté another 2 minutes.
5. Stir in the edamame and water and bring entire mixture to a boil.
6. Reduce heat to low and let simmer 30-45 minutes.
7. Divide chili among 4 bowls and serve immediately.

Serving Size: 4

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Build Your Own Egg Omelet

ISU Culinary Boot Camp

Ingredients:

non-stick cooking spray

2 eggs, beaten

2-4 T. total of one or more of the following – shredded cheese, chopped bell peppers, sliced mushrooms, chopped onion, spinach, diced tomato, salsa

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Grilled Cheeses

ISU Culinary Boot Camp

Ingredients:

8 slices cinnamon raisin or whole wheat bread

2 T. butter or soft margarine spread

4 slices American cheese or mozzarella cheese

2 small apples or pears, thinly sliced or 1 zucchini and 1 red bell pepper or tomato, thinly sliced

ground cinnamon or fresh basil, optional

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Skillet Lasagna

ISU Culinary Boot Camp

Ingredients:

½ lb. zucchini

½ onion, chopped (about ½ c.)

3 c. spaghetti or pasta sauce

2 garlic cloves, minced or ¼ tsp. garlic powder

1 c. water

1 bag (8 oz.) egg noodles

1 package (10 oz.) frozen chopped spinach, thawed

1 package mushrooms, optional

1 container (12 oz.) cottage cheese

½ c. mozzarella cheese, shredded

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Instructions:

Heat a small frying pan over medium high heat; spray with non-stick cooking spray and pour in beaten eggs.

Lift edges of eggs with a spatula; tip frying pan to let uncooked egg flow underneath cooked egg.

Add 3-4 T. filling when eggs are almost done.

Fold omelet over to form a half moon shape when eggs are firm.

Slide onto a plate and serve hot.

Serving Size: 1

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Instructions:

Spread one side of each bread slice lightly with butter or margarine.

Place 4 slices of bread on a griddle or skillet (butter or margarine side down); top each with 1 slice of cheese.

Arrange fruit slices or vegetable slices over the cheese; top with the other 4 slices of bread (butter or margarine side up).

Place griddle or skillet over medium high heat; cook 2-3 minutes; turn and cook 2-3 minutes more or until bread is golden and cheese is melted.

Serving Size: 4

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Instructions:

Cook zucchini and onion in a large skillet or electric fry pan; stir to prevent sticking; cook until zucchini and onion are browned, about 5 minutes.

Add spaghetti/pasta sauce, garlic, and water; bring ingredients in the skillet/fry pan to a boil.

Add uncooked egg noodles; stir and cover with lid; turn down the heat and cook 5 minutes.

Add thawed spinach to the skillet; add mushrooms if you like; cover and simmer 5 minutes.

Spoon cottage cheese over the top; sprinkle with mozzarella cheese; put the lid on and let it heat another 5-10 minutes until heated through and noodles are tender; do not stir the dish!

Serving Size: 8

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Scrambled Egg Muffins

ISU Culinary Boot Camp

Ingredients:

2 c. vegetables (broccoli, peppers, mushrooms, onion), washed and diced
6 eggs
¼ tsp. salt
¼ tsp. ground black pepper
¼ tsp. garlic powder
¼ c. low-fat cheddar cheese, shredded
non-stick cooking spray

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Instructions:

Pre-heat oven to 350◦F.
Spray a muffin tin with non-stick cooking spray.
Add chopped vegetables to the muffin tin.
Beat eggs in a bowl. Stir in salt, black pepper, and garlic powder.
Pour eggs into the muffin tin and bake 20-25 minutes.
Remove the tin from the oven during the last 5 minutes of baking. Sprinkle the cheese on top of the muffins and return the tin to the oven.
Bake until the temperature reaches 160◦F or a knife inserted near the center comes out clean.
Serving Size: 6

Nutrition Facts

Calories 110

APPENDIX M. GROCERY ORDERS

SESSION 1 –
Mindful Eating Exercise
- 50 clementines

Salsas
KITCHEN 1 – fresh tomato and roasted corn salsas (**per kitchen**)
- 2 c. frozen whole kernel corn, thawed
- 4-6 Roma tomatoes
- 1 white onion
- ½ green pepper
- 4 jalapeno peppers
- 4 garlic cloves
- 1 c. fresh cilantro
- 2 limes
- ½ c. + 2T. salad oil
- salt and pepper, to taste

Tortilla Chips
- non-stick cooking spray
- 6 whole wheat or corn tortillas

KITCHEN 2 – bean and fruit salsas (**per kitchen**)
- 1 can black beans
- 1 c. frozen shelled edamame, thawed
- 1 c. frozen whole kernel corn, thawed
- 3 Roma tomatoes
- 4 jalapeno peppers
- ½ green pepper
- ½ red pepper
- 4 garlic cloves
- ¼ c. fresh cilantro
- 1 lime
- ½ lb. fresh cucumber (1 small cucumber)
- ½ lb. fresh pineapple (½ small pineapple)
- ½ red onion
- ½ c. + 2 tsp. salad oil
- salt and pepper, to taste

Tortilla Chips
- non-stick cooking spray
- 6 whole wheat or corn tortillas

DEMONSTRATIONS
Classic Hummus
- 2 garlic cloves
- ½ c. dried garbanzo beans/chickpeas*

- ¾ tsp. salt
- ¼ c. tahini (sesame paste)
- 3 T. lemon juice
- 2-4 T. liquid from garbanzo beans/chickpeas
- 4 dashes hot sauce
- various fresh vegetables, for dipping → carrots, peppers, broccoli, cauliflower, grape tomatoes

Silken Tofu Dip

- 1 package (10 oz.) silken tofu, drained
- 2 tsp. grated lemon zest
- 1 lemon, juiced
- 4 garlic cloves, chopped
- 1 c. water
- 2 tsp. Worcestershire sauce
- 3 T. grated parmesan cheese
- salt and pepper, to taste
- various fresh vegetables, for dipping → carrots, peppers, broccoli, cauliflower, grape tomatoes

ADDITIONAL ITEMS

- paper plates
- paper bowls
- plastic cups
- plastic utensils
- plastic tupperware
  - to-go boxes
  - leftovers
- napkins

SESSION 2 –
STUDENTS –

Build Your Own Omelets (**per kitchen**)

- 8 eggs **DONATED**
- 1 c. shredded cheese
- various vegetables → bell peppers, mushrooms, onion, spinach, tomato, salsa
- non-stick cooking spray

Sweet and Savory Grilled Cheeses (**per kitchen**)

- 4 slices cinnamon raisin bread
- 4 slices whole wheat bread
- 2 T. butter or soft margarine spread
- 4 slices cheese → American **or** mozzarella
- 2 small apples or pears **or** 1 small zucchini and 1 red bell pepper or tomato

EMPLOYEES –

Scrambled Egg Muffins (**per kitchen**)

- 2 c. chopped vegetables (broccoli, peppers, mushrooms, onion)
  - onion → 3 lb. bag
  - mushrooms → 6 packages
  - green pepper → 4 each
  - red pepper → 4 each
  - broccoli → 4 heads
- 6 eggs **DONATED**
- ¼ tsp. salt
- ¼ tsp. black pepper
- ¼ tsp. garlic powder
- ½ c. shredded cheddar cheese
- non-stick cooking spray

Skillet Lasagna (**per 2 kitchens**)

- 1 medium zucchini
- ½ onion
- 3 c. (24 oz) pasta spaghetti or pasta sauce
- 2 cloves garlic
- 1 c. water
- 8 oz egg noodles
- 1 package (10 oz) frozen chopped spinach, thawed
- 1 package mushrooms, fresh or canned (optional)
- 1 container (12 oz) low fat cottage cheese
- ½ c. shredded mozzarella cheese

ADDITIONAL ITEMS

- paper plates
- paper bowls
- plastic cups
- plastic utensils
- plastic containers/bags
  - to-go boxes
  - leftovers
- napkins

SESSION 3 –

Chili

KITCHEN 1 – classic beef chili and white turkey chili (**per kitchen**)

- 1 T. olive oil
- ½ lb. ground beef **DONATED**
- 1 lb. ground turkey
- 2 medium onions
- 2 cloves garlic

- 5 ¼ c. low-sodium chicken broth
- 1 can (16 oz.) kidney beans
- 1 can (16 oz.) tomato sauce
- 3 cans (15 oz.) cannellini beans (white kidney) beans
- 2 cans (4 oz.) chopped green chiles
- 1-2 T. chili powder
- 1 T. dried oregano
- 1 tsp. ground cumin
- 2 pinches cayenne pepper
- salt
- ¼ c. chopped fresh cilantro

KITCHEN 2 – pork & black bean chili and edamame chili (**per kitchen**)

- nonstick cooking spray
- 1 T. olive oil
- 1 lb ground pork
- 2 c. edamame, prepared and shelled
- 1 medium red or green bell pepper
- 1 medium white onion
- 2 medium yellow onions
- 10 cloves garlic
- 2 cans (15 oz.) low-sodium black beans
- 2 cans (14 ½ oz.) can diced tomatoes
- 1 ½ T. ground cumin
- 1 T. + 2 tsp. dried oregano
- 1 T. chili powder
- 1 tsp. lime juice
- salt
- water

ADDITIONAL ITEMS

- toppings
  - cheese or sour cream
  - spinach
  - oyster crackers
- paper plates
- paper bowls
- plastic cups
- plastic utensils
- plastic tupperware
  - to-go boxes
  - leftovers
- napkins

APPENDIX N. KITCHEN SUPPLIES

SESSION 1 –

- Recipe Cards **(every other kitchen)**
  - Kitchen 1
    - Fresh Tomato Salsa
    - Roasted Corn Salsa
    - Baked Tortilla Chips
  - Kitchen 2
    - Bean Salsa
    - Fruit Salsa
    - Baked Tortilla Chips
- Recipe Supplies **(per kitchen)**
  - 2 chef knives
  - 2 paring knives
  - 2 pairs of disposable gloves
  - measuring cups (1/4, 1/2, 3/4, 1 c.)
  - measuring spoons (tsp. and T.)
  - strainer
  - can opener
  - salt and pepper shakers
  - 3 mixing bowls
  - 2 serving spoons
  - 1 oven
  - 2 hot pads
  - nonstick cooking spray
  - pizza cutter
  - baking sheet
  - cooling rack
  - dish soap
  - 2 dish clothes
  - 2 drying towels
  - dish rack

SESSION 2 –

- Recipe Cards
  - **Students**
    - Build Your Own Egg Omelet
    - Grilled Cheeses
  - **Employees**
    - Scrambled Egg Muffins
    - Skillet Lasagna
- Recipe Supplies
  - **Students**

- cooking utensils **(per kitchen)**
  - 2 small mixing bowls
  - 2 whisks
  - 2 chef knives
  - 2 small cutting boards
  - 2 small fry pans
  - 4 spatulas
  - 2 medium fry pans
  - 2 butter knives
  - 2 paring knives
  - 2 medium cutting boards
  - apple corer
  - measuring cups (1/4, 1/2, 3/4, 1 c.)
  - measuring spoons (tsp. and T.)
  - dish soap
  - 2 dish clothes
  - 2 drying towels
  - dish rack

- **Employees**
  - cooking utensils **(per kitchen)**
    - measuring cups (1/4, 1/2, 3/4, 1 c.)
    - measuring spoons (tsp. and T.)
    - 2 chef knives
    - 2 cutting boards
    - 2 skillets
    - 2 spatulas
    - 1 colander
    - 1 large spoon
    - 1 oven
    - 2 hot pads
    - 1 muffin tin
    - 1 medium mixing bowl
    - 1 whisk
    - 1 bread & butter knife or fork
    - dish soap
    - 2 dish clothes
    - 2 drying towels
    - dish rack

SESSION 3 –

- Recipe Cards **(every other kitchen)**
  - Kitchen 1
    - Classic Beef Chili

        - Easy White Turkey Chili
    - Kitchen 2
        - Black Bean & Pork Chili
        - Edamame Chili
- Recipe Supplies **(every other kitchen)**
    - Kitchen 1 – classic beef, easy white turkey
        - cooking utensils
            - 2 knives
            - 2 cutting boards
            - 2 crockpots or 2 large saucepans
            - spatula
            - 2 colanders
            - can opener
            - measuring cups (1/4, ½, ¾, 1 c.)
            - measuring spoons (tsp. and T.)
            - dish soap
            - 2 dish clothes
            - 2 drying towels
            - dish rack
    - Kitchen 2 – black bean & pork, edamame
        - cooking utensils
            - 2 knives
            - 2 cutting boards
            - 2 crockpots or 2 large saucepans
            - spatula
            - can opener
            - measuring cups (1/4, ½, ¾, 1 c.)
            - measuring spoons (tsp. and T.)
            - dish soap
            - 2 dish clothes
            - 2 drying towels
            - dish rack

APPENDIX 0. VOLUNTEER TRAINING

Thank you for volunteering your time and energy towards Culinary Boot Camp. I am excited to be working with everyone this evening! Before we begin tonight, there are some information and instructions I would like to share with you:

- Set-up – Please refer to the Kitchen Supplies Handout and recipe cards for Lesson when setting up kitchen units; this is where all required kitchen equipment as well as food or ingredients for the evening are listed.
- Professionalism –
  - wear a chef coat, hair restraint, and closed toe shoes in the kitchens
  - treat participants with respect
  - remember you are the expert… be confident in your capabilities!
  - PLEASE DO NOT EAT IN THE KITCHEN
- Kitchen Roles and Responsibilities –
  - get any kitchen supplies/ingredients that may be missing in your assigned kitchen
  - keep your group on track in the kitchen
  - engage with participants
  - guide recipe preparation
    - allow participants to practice culinary skills and help when necessary
    - demonstrate culinary skills but do not prepare recipes for participants
  - answer participant questions
    - if at all possible
    - if the question is out of your scope of practice, please ask one of the supervisors in the kitchens (chef, instructors, or myself).
  - HAVE FUN!
- Clean-up – Please wash and return all kitchen equipment back to its designated place (cupboards, drawers, cabinets, store room) and gather all leftover ingredients to be stored for later use (we will collect all leftovers at the front of each room). When we are finished cleaning up kitchen units, you will be able to sit down and eat any leftover food from the evening.

Thank you again for your help this evening. I sincerely appreciate all of you volunteering for Culinary Boot Camp!

APPENDIX P. CHEF TRAINING

SESSION 1 –

Please discuss the topics below during your demonstration at Culinary Boot Camp.

- Preparing Fresh Produce
  - first wash your hands
    - soap and warm water
  - always clean produce before preparing
    - fruit/vegetable brush
    - rinse with cool running water
  - frozen produce
    - ready-to-eat
  - canned produce
    - rinse to remove excess sugar/sodium
  - dried produce
    - ready-to-eat
  - always clean cooking surfaces and utensils after every single use
- Discuss Knives
  - parts –
    - cutting edge – bottom edge of the blade, can be flat and tapered, or serrated
    - point – very end of the blade, used to pierce foods, make incisions, and cut small items
    - tip – first few inches of the blade, used to cut small or delicate items
    - spine – top of the blade, grip with thumb and forefinger
    - bolster – where the blade meets the handle, thick strip of steel, protects hand if the knife slips
    - heel – last few inches of the blade, used to cut through large, tough or hard foods
    - rivets – hold handle to the tang, need to be tight to prevent injury, snags on clothing, and growth of microorganisms
    - handle – many types of materials, important that it is comfortable in your hand
    - butt – end of the handle
    - tang – metal that continues from the blade through the handle, some knives only have a partial tang, provides weight on the back half of the knife for stability and durability
  - kinds of knives
    - chef's knife
      - ❖ purposes – everyday preparation, very versatile
      - ❖ what we will use as our primary cooking utensil this evening
    - others
      - ❖ utility – everyday preparation, very versatile
      - ❖ paring – cutting small fruits and vegetables with ease
      - ❖ boning – breaking down poultry or butterflying meats

- ❖ bread – slicing meats, poultry, seafood, warm breads, and cakes
- ❖ butcher – segmenting and trimming large cuts of poultry or meat
- ❖ carving – slicing meat and poultry as well as large fruits and vegetables
- ❖ cheese – slicing hard cheese and spreading soft cheese
- ❖ meat cleaver – cutting and separating meat/poultry from bones
- ❖ santoku – similar to the chef's knife but with a drop point for added precision
- ❖ steak/table – cut any food at the table (steak, salad, bread, etc.)
- ❖ vegetable cleaver – slicing, chopping, and dicing fruits/vegetables

- knife SAFETY
  - S – Securely hold your knife. Grip the top of the blade firmly between your thumb and forefinger. Cut things on a flat surface like a cutting board. Do not cut things while you hold them in your hand.
  - A – Anchor all cutting boards to ensure they don't slip. If your cutting board easily slides on the counter, put a damp cloth underneath it, this will help it grip.
  - F – Fingertips should be curled back. Hold foods with fingertips tucked under away from the knife.
  - E – Eyes on the knife! When using a knife, try to avoid distractions and keep your eyes on what you're doing. It is also a good idea to keep knives where they are clearly visible, for example, do not put a knife in a sink full of dirty dishes where someone may not know it is there.
  - T – Take your time. Don't rush with a knife.
  - Y – Yield to falling knives. If a knife slips out of your hand or falls from the counter, let it drop. Do not attempt to catch it. This is why it is a good idea to wear closed toe shoes in the kitchen.
- proper technique and handling
  - description –
    - ❖ pinch blade with thumb and first finger
    - ❖ wrap other three fingers around the handle close to the blade
    - ❖ keep the fingers on your guide hand curled under
    - ❖ if you can hear the knife you're doing it wrong!
  - demonstration –
    - ❖ onion – in half, cut tip off, cut towards root but not through, then parallel to root
    - ❖ pepper – demo cutting circle from top and then cutting off bottom and opening up
    - ❖ tomato – cut in half and cut off stem and use same technique as onion
    - ❖ cilantro – demo mincing, removing stems
- different cutting terms
  - chop – cut into small pieces
  - cut – make smaller in size, separate into segments
  - dice – cut into small square-shaped pieces, uniform in size (about ¼ inch)
  - mince – cut or chop into extremely small pieces

You will also be walking around throughout the cooking experience to assist students or employees with preparation of the featured food dishes.

- fresh tomato salsa
- bean salsa
- roasted corn salsa
- fruit salsa
- baked tortilla chips

Thank You!

SESSION 2 –

Please discuss the topics below during your demonstration at Culinary Boot Camp.

- students and employees
  - egg safety and sanitation
    - common source of salmonella
      - ❖ bacteria commonly found in food products prepared improperly
      - ❖ causes severe foodborne illness
    - preparing
      - ❖ wash with hot soapy water both before and after handling raw eggs
        - hands, utensils, equipment, and work surfaces
      - ❖ cook eggs completely until yolk and white are firm
        - scrambled – eggs should not be runny
      - ❖ all dishes that contain egg should be cooked to 160°F
        - use a thermometer to determine doneness
      - ❖ purchase pasteurized egg products when a recipe requires raw or undercooked eggs
    - serving
      - ❖ serve eggs and dishes containing egg immediately after cooking
      - ❖ keep hot egg dishes hot and cold egg dishes cold
        - serve smaller portions hot eggs and reheat as necessary
        - keep cold eggs refrigerated until it is time to serve
        - egg dishes should not sit out for more than 2 hours at most
- students
  - preparing a perfect omelet
    - beat eggs together in a bowl prior to pouring into skillet or fry pan
    - heat the skillet or fry pan before adding eggs
    - spray skillet or fry pan with non-stick cooking spray to prevent sticking
    - pour beaten eggs into heated skillet or fry pan and allow to cook without stirring for 1-2 minutes
    - lift edges of eggs with a spatula and let uncooked egg flow underneath cooked egg
    - add filling when eggs are almost cooked
    - fold omelet over when eggs are firm and slide onto a plate to serve

- employees
  - pasta basics
    - many shapes and sizes
      - holes or ridges – chunky sauces
      - thin and delicate – light sauces
      - thick and durable – heavy sauces
    - shape and size determines cooking time
      - al dente – "tender but firm"
      - larger and denser pasta – longer cooking time
      - follow the recipe or box to prepare pasta the right way
    - cooking time makes pasta bigger and heavier
      - bigger – 2-3 times the original size
      - heavier – double or triple original weight
      - follow the recipe to prepare the right amount of pasta and minimize food waste
    - general rule for boiling pasta
      - 1 lb. pasta = 1 gallon water + 1 tsp. salt + 1 tsp. oil
- students and employees – measurement skills
  - sautéing and frying basics
    - sauté – cook in a small amount of oil or water and stir continuously
      - typically less fat and medium cooking temperatures
    - pan-fry – cook in a small amount of oil or water without stirring
      - typically more fat and low cooking temperatures
    - cooking method that brings out the flavor in many foods
    - tips and techniques
      - chop ingredients evenly into bite-size pieces
        - faster cooking
        - easier consumption
      - do not crowd the chopped ingredients in the skillet
        - food will steam instead of brown
        - cook in batches if necessary
      - select an appropriate size skillet
        - too big – fat or oil will burn
        - too small – food will steam instead of brown
      - add the fat or oil and heat the skillet before adding food
        - slow and steady heat
        - fat or oil should sizzle but not smoke or burn
      - add foods that take the most time to cook to the skillet first
      - test doneness
        - most fruits and vegetables will take 5-7 minutes (al dente)
        - check meat and poultry temperature with a thermometer to determine cook time
      - do not press down on the food
        - will brown with appropriate amount of fat and heat
        - will lose a lot of moisture

- conversions
  - 1 gallon = 4 qt. = 16 c.
  - 1 qt. = 4 c.
  - 1 c. = 16 T.
  - 1T. = 3 tsp.
- accuracy
  - always use the measuring utensil closest to the amount required in a recipe
    - ❖ example 1: ¾ c. = ½ c. + ¼ c.
      - NOT ¼ c. + ¼ c. + ¼ c.
    - ❖ example 2: 4 tsp. = 1 T. + 1 tsp.
      - NOT 1 tsp. + 1 tsp. + 1 tsp. + 1 tsp.
  - important in the kitchen to make the most accurate and delicious dishes
- portions
  - remember everything in moderation

You will also be walking around throughout the cooking experience to assist students or employees with preparation of the featured food dishes.

- students
  - build your own egg omelets
  - grilled cheeses
- employees
  - scrambled egg muffins
  - skillet lasagna

Thank You!

SESSION 3 –

Please discuss the topics below during your demonstration at Culinary Boot Camp.

- preparing protein
  - meat, poultry, seafood
    - choose lean cuts – marinate and season for flavor
    - select seafood 2x per week – coat with whole wheat crackers or oatmeal and bake in the oven to add a little crunch
  - beans & legumes
    - make dips – hummus example
    - mix into soups, stews, and casseroles
  - nuts & seeds
    - make sauces – pesto example
    - sprinkle atop different dishes
      - ❖ steamed vegetables with slivered almonds
      - ❖ ice cream with peanuts or pistachios
      - ❖ salad with walnuts or pecans

- soy and other vegetarian options
  - create delicious veggie burgers – mix together soybeans, vegetables, and spices
  - incorporate tofu into stir-frys
- 1A. how to sear cuts and brown ground products
  - start with a heavy skillet, a little oil, and high heat
  - pat dry meat or poultry and season accordingly
    - ❖ skip step if protein is marinated
  - preheat skillet
    - ❖ medium heat
    - ❖ prevent sticking
  - add oil to skillet
    - ❖ canola or corn works well
  - drop in meat or poultry and turn up temperature to high heat
    - ❖ use a tongs
    - ❖ do not overcrowd skillet → cook protein in batches
  - allow to cook on one side until meat or poultry does not stick to the skillet
    - ❖ indicates searing or browning is complete
  - turn meat or poultry over to the other side to cook through
    - ❖ check with a thermometer to ensure doneness

AND

- how to drain and rinse ground products
  - when ground meat or poultry is cooked through, pick up skillet and bring to a colander set on top of a glass bowl
  - scrape ground product into colander with a spatula
  - pour hot water over meat or poultry
  - chill glass bowl with fat and water mixture in the refrigerator; let sit for a few hours
  - once chilled, skim the surface of the glass bowl with a large spoon to remove fat
  - throw chilled fat drippings into the garbage.

You will also be walking around throughout the cooking experience to assist students or employees with preparation of the featured food dishes.

- classic beef chili
- easy white turkey chili
- black bean & pork chili
- edamame chili

Thank You!

OR

Please discuss the topics below during your demonstration at Culinary Boot Camp.

- preparing protein

- meat, poultry, seafood
  - choose lean cuts – marinate and season for flavor
  - select seafood 2x per week – coat with whole wheat crackers or oatmeal and bake in the oven to add a little crunch
- beans & legumes
  - make dips – hummus example
  - mix into soups, stews, and casseroles
- nuts & seeds
  - make sauces – pesto example
  - sprinkle atop different dishes
    - ❖ steamed vegetables with slivered almonds
    - ❖ ice cream with peanuts or pistachios
    - ❖ salad with walnuts or pecans
- soy and other vegetarian options
  - create delicious veggie burgers – mix together soybeans, vegetables, and spices
  - incorporate tofu into stir-frys
- 2A. how to prepare a whole chicken or turkey
  - different purchasing options
    - ❖ dark or white meat → when to select each type
    - ❖ boneless and/or skinless → ready to prepare, best cooking methods (pan fry, grill, bake, slow cooker, etc.)
  - whole chicken – more economical/cost effective
  - step-by-step cutting process
    - ❖ With chicken breast side up, pull each leg away from body, then slice through skin between breast and drumstick.
    - ❖ Turn chicken on its side. Bend each leg back until thighbone pops out of its socket. Cut through joint and skin to detach leg completely.
    - ❖ With chicken on its side, pull each wing away from body. Cut through joint and remove wing.
    - ❖ Lift up chicken and cut downward through rib cage and then shoulder joints to separate breast from back (save back for stock).
    - ❖ Place breast skin side down. Split center bone using a chopping motion, then slice through meat and skin to separate into 2 pieces.
    - ❖ To cut breast halves into quarters, turn each skin side up and cut in half diagonally through bone.
    - ❖ To divide the legs, turn each skin side down and cut through joints (along white fat line) to separate thigh from drumstick.
    - ❖ You should end up with 6 to 10 parts, depending on whether you divided the breast halves and legs.
  - de-boning techniques (if time allows)
  - meal ideas
    - ❖ casseroles
    - ❖ soups or stews
    - ❖ chicken salad

- purchase in bulk and store excess to save money

AND

- 2B. how to prepare a flank steak
  - lean cuts of meat typically end in –loin or –round
  - marinate and season for flavor
  - flank steak – more economical/cost-effective
  - best cooking methods to maintain or add flavor
    - ❖ tenderization techniques
    - ❖ other cooking methods beyond grilling
    - ❖ slow cooker
  - meal ideas
    - ❖ stir fry
    - ❖ fajitas
    - ❖ shredded BBQ sandwiches

You will also be walking around throughout the cooking experience to assist students or employees with preparation of the featured food dishes.

- classic beef chili
- easy white turkey chili
- black bean & pork chili
- edamame chili

Thank You!

APPENDIX Q. CART SUPPLIES

- Navigating the Nutrition Facts Label
  - Comparisons
    - Barilla whole-grain elbows, Barilla elbows, HyVee Vegetable Elbows
    - Golden Home 100% whole-grain ultra-thin crust, Golden Home original ultra-thin crust
    - HyVee traditional spaghetti sauce, HyVee classic alfredo
    - HyVee instant brown rice, HyVee instant white rice
- Fresh Produce
  - Seasonality
    - apples, carrots, squash, potatoes
  - Ripeness
    - avocadoes (3 distinct degrees of ripeness)
- Organic vs. Conventional – what's the difference?
  - Comparison
    - Annie's organic classic mac and cheese, Horizon organic mac elbows and mild cheddar cheese, Annie's classic mac and cheese
- Meat, Poultry, Seafood
  - N/A
    - point out food products in aisles
- Breads and Grains
  - Comparison
    - Sara Lee soft and smooth whole grain white bread, Sara Lee classic honey wheat bread, Sara Lee classic 100% whole wheat bread
  - Superstars
    - instant brown rice, corn tortillas, Quaker barley, Bob's Red Mill millet and spelt and kamut and quinoa
- Cereals
  - Comparisons
    - Fat – granola, shredded wheat
    - Sugar – Froot Loops, Cheerios, HyVee quick oats, HyVee maple brown sugar instant oats
    - Dietary Fiber – Rice Krispies, All Bran
- Canned Goods
  - Comparisons
    - Fat/Sodium – Green Giant cream style sweet corn, Green Giant whole kernel sweet corn, Green Giant whole kernel sweet corn 50% less sodium
    - Sugar – Mott's applesauce, Mott's natural applesauce
- Snack Foods
  - Comparisons
    - Fat – original Nilla wafers, low-fat Nilla wafers, regular microwave popcorn, air-popped popcorn
    - Sodium/Sugar – Planter's dry roasted peanuts, Planter's honey roasted peanuts, Planter's unsalted dry roasted peanuts

    - Superstars
        - air-popped popcorn, unsalted nuts and seeds, graham crackers, rice cakes, baked potato chips, tortilla chips
- Drinks
    - Comparison
        - Sugar – Welch's 100% grape juice, Welch's grape juice from concentrate
    - Superstars
        - water, sparkling water, diet soda, Gatorade G2, Powerade 0, green and herbal and black teas, plain cofffee
- Dairy Products
    - N/A
        - point out food products in aisles
- Frozen Section
    - N/A
        - point out food products in aisles

APPENDIX R. RDN TRAINING (GROCERY STORE TOUR NOTE CARDS)

Navigating the Nutrition Facts Label

- **AISLE ACTIVITY** – ask all participants to select a food item from the shelf and follow along during the discussion
- **Serving Size** – all information listed on the label is for one serving, important to note when looking at nutrition facts
- **Calories** – number of calories listed is for one serving, 3 servings = calories x 3
- **Select Food Items Low in ...** saturated fat, sodium, and added sugars* (low is ≤ 5% DV)
- **Select Food Items High in...** unsaturated fat, dietary fiber, potassium*, calcium, and vitamin D* (high is ≥ 20% DV)

  *items to appear on the new Nutrition Facts Label
- **New Nutrition Facts Label** – bigger and bolder serving size/calories, no calories from fat, include added sugars/potassium/vitamin D, no vitamins A or C, improved definition of %DV

Fresh Produce

- **Seasonality** – select in-season options for optimal savings and flavor
- **Variety** – choose fruits and vegetables of all shapes, colors, and sizes
- **Ripeness** – depends on when produce will be consumed
  - right away → extra ripe and ready-to-eat
  - next day or two → somewhat ripe but not too soft
  - end of the week → firm and/or green
- **Nutrition Information** – not listed on all produce, typically maximal vitamins and minerals with minimal calories, ask a RDN or find another reliable source (government websites, etc.)
- **Highlight Items** – in-season produce, organic vs. conventional fruit or vegetable

Organic vs. Conventional – what's the difference?

- **Organic** – restricts use of pesticides and fertilizers (certified products), less yields, ecological, increased cost
- **Conventional** – use of pesticides and fertilizers, larger yields, economical, decreased cost
- **Safety**– the same with thorough washing of all produce items
- **Nutrition** – identical in nutrient composition
- **Looking at Labels** –
  - 100% Organic → all content is certified organic,
  - Organic → at least 95% of product is organic,
  - Made with Organic Ingredients → 70% or more of total content is organic
- **Why Switch?** – reduce exposure to pesticide and fertilizer residues, protect the environment

Meat, Poultry, and Seafood

- **Select Lean Options** –
  - Meat → cuts that end in –loin or –round
  - Poultry → boneless and skinless
  - Seafood → naturally lower in fat, fatty items higher in omega-3s
  - Ground Products → 93% lean or greater, can rinse and drain too
- **Purchase Appropriate Serving Size** – 4 to 5 oz. raw meat or poultry, 4 oz. raw or 1 fillet fish, 7 medium pieces or 2 oz. cooked shellfish
- **Highlight Items** – sirloin, bottom round roast, tenderloin, chops, Canadian bacon, boneless and skinless breasts/tenders/thighs, salmon, mackerel, tuna, mahi mahi, shrimp, crab (sustainably sourced)

Breads and Grains

- **Serving Size** – 1 or 2 slices?
- **Low in Sodium** – 140mg or less
- **Moderate-High in Dietary Fiber** – 2.5g to 5g or more
- **Look at the Ingredients List** – 100% whole grains, first ingredient whole wheat/brown rice/quinoa/whole oats/corn/buckwheat
- **Spot the Whole Grains Stamp** –
  - good source → 8g or more per serving
  - excellent source → 16g or more per serving
- **Highlight Items** – Sara Lee soft and smooth whole grain white bread vs. Sara Lee classic honey wheat bread vs. Sara Lee classic 100% whole wheat bread
- **Superstars** – brown rice, quinoa, corn tortillas, barley

Cereals

- **Low in Fat** – 3g or less; highlight items KIND granola vs. Shredded Wheat
- **Low in Sugar** – 10g or less; highlight items Froot Loops vs. Cheerios
- **Moderate-High in Dietary Fiber** – 2.5g to 5g or more; highlight items Rice Krispies vs. All Bran
- **Look at the Ingredients List** –
  - first is whole grain → whole wheat, brown rice, quinoa, whole oat, corn, buckwheat
  - last is added sugar → sucrose, honey, corn syrup, fructose, molasses, malt syrup (should not see sugar terms listed as one of the first 3 ingredients)
- **AISLE ACTIVITY** – ask all participants to select their favorite cereal from the shelf and determine if it meets identified criteria; ask participants to find an alternative cereal that may be similar but achieves set standards
- **Superstars** – Shredded Wheat, Cheerios, All Bran, Grape Nuts, Wheaties, Kashi cereals, Original oatmeal

Canned Goods

- **Low in Sodium** – 140mg or less; highlight items HyVee black beans vs. HyVee no salt added black beans (can rinse most regular canned products to remove some sodium)
  - no salt added → terms include "sodium" and "salt"
  - reduced sodium → at least 25% less sodium than the regular product
  - lightly salted → at least 50% less salt than the regular product
- **Low in Sugar** – 10g or less; highlight items Mott's applesauce vs. Mott's natural applesauce (can rinse most other regular canned products to remove some added sugars)
  - no sugar added → terms include sucrose, honey, corn syrup, fructose, molasses, malt syrup
- **No Sauce/Syrup Added** – increase sodium, fat, and sugar content; highlight items Green Giant cream style sweet corn vs. Green Giant whole kernel sweet corn vs. Green Giant whole kernel sweet corn 50% less sodium

Snack Foods

- **Serving Size** – important to identify prior to consumption, portion control
- **Low in Fat** – 3g or less; highlight items original Nilla wafers vs. low-fat Nilla wafers, regular microwave popcorn vs. air-popped popcorn
  - low-fat or fat-free snack foods may increase sodium or sugar to maintain flavor
- **Low in Sodium** – 140mg or less; highlight items Planter's dry roasted peanuts vs. Planter's honey roasted peanuts vs. Planter's unsalted dry roasted peanuts
- **Low in Sugar** – 10g or less; highlight items Planter's peanuts (see above)
- **AISLE ACTIVITY** – ask all participants to select their favorite snack from the shelf and determine if it meets identified criteria; ask participants to find an alternative snack that may be similar but achieves set standards
- **Superstars** – air-popped popcorn, unsalted nuts and seeds, graham crackers, rice cakes, baked potato chips, tortilla chips

Drinks

- **Check Sugar Content** – typically all added sugars (exception is 100% fruit or vegetable juice), empty calories (no nutritional value)
  - added sugar → sucrose, honey, corn syrup, fructose, molasses, malt syrup
  - limit sugar sweetened beverages → soda, lemonade, sports drinks*, sweet teas, etc. *can provide energy and electrolytes to enhance sports performance (moderate-high intensity, ≥ 60 minutes)
- **Check Caffeine Content** – excess can become addicting (everything in moderation)
  - additional stimulatory ingredients (when combined) → taurine, ginseng, gingko, and guarana
  - limit caffeinated beverages → coffee with sugar and creamer, cappuccinos*, frappuccinos*, chai tea, energy drinks*, etc. *also contains various types of added sugar
- **Superstars** – WATER, diet soda, sparkling water, Gatorade G2, Powerade 0, green/herbal/black teas, plain coffee, lattes

Dairy Products

- **Low-Fat or Fat-Free options**– unless using full-fat dairy as daily fat allowance
  - low-fat or fat-free options may increase sodium or sugar to maintain flavor
- **Low in Sodium** – 140mg or less; highlight items cheese
  - added salt → "sodium" and "salt"
  - **AISLE ACTIVITY** – ask all participants to select a full-fat cheese and low-fat or fat-free cheese from the shelf and compare fat and sodium content, as fat decreases sodium increases and vice versa
- **Low in Sugar** – 10g or less; highlight items flavored milk or yogurt
  - added sugar → sucrose, honey, corn syrup, fructose, molasses, malt syrup
  - **AISLE ACTIVITY** – ask all participants to select a flavored yogurt and a plain yogurt from the shelf to compare sugar content; need to subtract natural sugar in plain yogurt from total sugar in flavored yogurt to determine added sugar

Dairy Products (cont.)

- **Non-Dairy Alternatives** – less protein and more fat compared to milk, also contain added sugar
  - fat-free milk → 8g protein, 0g fat, no added sugars (all natural)
  - original soymilk → 6g protein, 1.5g fat, minimal added cane sugar (best alternative)
  - original almond milk → 1g protein, 2.5g fat, added cane sugar
  - original coconut milk → 0g protein, 5g fat, added cane sugar
- **Superstars** – 1% or fat-free milk, plain yogurt, Greek yogurt (½ sodium, low lactose), hard cheese (low-fat or low-sodium or both, low lactose), Fairlife products (lactose-free)

Frozen Section

- **Low in Fat** – less than 30% total Calories
  - low-fat or fat-free frozen items may increase sodium or sugar to maintain flavor
- **Low in Sodium** – less than 600mg per serving
  - added salt → "sodium" and "salt"
- **Low in Sugar** – watch added sugar content
  - added sugar → sucrose, honey, corn syrup, fructose, molasses, malt syrup
- **Everything in Moderation** – save frozen foods for extremely busy days, add other items to frozen meals and snacks to make them more nutritious
- **AISLE ACTIVITY** – ask all participants to select their favorite frozen food and determine if it meets identified criteria; ask participants what they could add to the various frozen meals and snacks to make it more nutritious
  - ideas → steamed vegetables mixed in with a frozen entrée, green garden salad served with pizza, baby carrots and hummus served with chicken nuggets, frozen berries mixed in with ice cream

Frozen Section (cont.)

- **Highlight Items–**
  - Produce → as nutritious as fresh fruits and vegetables; select options without added sauces or syrups to minimize fat, sodium, and sugar content
  - Entrees and Pizzas → watch fat and sodium content; spot the whole grains stamp; superstar entrees – Kashi, evol, Amy's*, Healthy Choice Café Steamers, Lean Cuisine*; superstar pizzas – Kashi, Amy's, DiGiorno thin crust*, frozen crusts *some products may contain excess fat/sodium
  - Meat, Poultry, and Seafood → minimize breaded and fried products; try some meat alternatives (Morningstar products, Boca burgers, etc.); superstars – Tyson grilled and ready chicken breast strips, Tyson naturals grilled chicken nuggets, turkey burgers, tilapia/salmon/cod fillets, cooked shrimp
  - Desserts → watch fat and sugar content; superstars – Nestle Outshine fruit and veggie bars, Dole dippers, frozen yogurt, Enlightened ice cream bars, Breyer's snack size ice cream cups, Edy's slow churned ice cream

APPENDIX S. PRE-, POST-, AND FOLLOW-UP SURVEYS: STUDENT CULINARY BOOT CAMP (AND COMPARISON GROUP)

Pre-Survey –

Consent
The Culinary Boot Camp you are attending is designed to enhance your culinary education and skills set. We are conducting research to determine whether or not the boot camp is effective. If you agree to participate in this study, you are asked to respond to questions using this online survey system. First, you will be asked to share some basic information (age, gender, ethnicity, college status) as well as your ISU student ID number to track your answers. The rest of the survey includes questions about your eating habits as well as confidence with cooking and grocery shopping. Names will not be collected with the survey responses. Only group-level study results will be reported to prevent identification from published results. This is optional. The survey will take about 5 minutes to complete. You have the right to refuse to participate, skip any question, or leave the study at any time without penalty. If you choose to participate in both pre- and post- surveys, you will receive a $15 HyVee gift card as a reimbursement. If you choose to participate in the follow-up survey, you will be entered to win a cookbook from our commodity group sponsors. There are no identified risks. Whether or not you take part in this study does not impact your ability to participate in Culinary Boot Camp. For further information about the study, please contact Dr. Ruth Litchfield, litch@iastate.edu 515-294-9484, 220 MacKay Hall, 2302 Osborn Drive, Ames, IA. If you have any questions about the rights of research subjects, please contact the IRB Administrator, 515-294-4566, IRB@iastate.edu or Director, 515-294-3115, Office for Responsible Research, Iowa State University, Ames, IA 50011.Do agree to participate in this study?

- ❍ Yes
- ❍ No

What are the last four digits of your ISU ID?

What is your age?

What is your gender?

- ❍ male
- ❍ female
- ❍ prefer not to specify

What is your ethnicity?

What is your current classification?

- ❍ freshman
- ❍ sophomore
- ❍ junior
- ❍ senior
- ❍ graduate student

What is your home college/school?

- ❍ Agriculture and Life Sciences
- ❍ Business
- ❍ Design
- ❍ Education
- ❍ Engineering
- ❍ Human Sciences
- ❍ Journalism and Communication
- ❍ Liberal Arts and Sciences
- ❍ Veterinary Medicine

Below are statements about your eating. Think about each one, then choose the best response for you.

	Always	Often	Sometimes	Rarely	Never
I am relaxed about eating.	❍	❍	❍	❍	❍
I am comfortable about eating enough.	❍	❍	❍	❍	❍
I have regular meals.	❍	❍	❍	❍	❍
I feel it is okay to eat food that I like.	❍	❍	❍	❍	❍
I experiment with new food and learn to like it.	❍	❍	❍	❍	❍
If the situation demands, I can "make do" by eating food I don't much care for.	❍	❍	❍	❍	❍
I eat a wide variety of foods.	❍	❍	❍	❍	❍
I am comfortable with my enjoyment of food and eating.	❍	❍	❍	❍	❍
I trust myself to eat enough for me.	❍	❍	❍	❍	❍

I eat as much as I am hungry for.	❍	❍	❍	❍	❍
I tune in to food and pay attention to eating.	❍	❍	❍	❍	❍
I make time to eat.	❍	❍	❍	❍	❍
I eat until I feel satisfied.	❍	❍	❍	❍	❍
I enjoy food and eating.	❍	❍	❍	❍	❍
I consider what is good for me when I eat.	❍	❍	❍	❍	❍
I plan for feeding myself.	❍	❍	❍	❍	❍

Indicate the extent to which you feel confident about performing each of the following...

	not at all confident	not confident	neutral	confident	very confident
using knife skills in the kitchen.	❍	❍	❍	❍	❍
using basic cooking techniques.	❍	❍	❍	❍	❍
steaming.	❍	❍	❍	❍	❍
sautéing.	❍	❍	❍	❍	❍
stir-frying.	❍	❍	❍	❍	❍
grilling.	❍	❍	❍	❍	❍
baking.	❍	❍	❍	❍	❍
roasting.	❍	❍	❍	❍	❍
slow cooking.	❍	❍	❍	❍	❍
preparing fresh or frozen vegetables (eg corn, tomatoes, onions, peppers, zucchini, mushrooms, spinach).	❍	❍	❍	❍	❍
preparing fresh or frozen fruit (eg mangoes, pineapple, apples). (11)	❍	❍	❍	❍	❍
using herbs and spices (eg, basil, oregano, chili powder, cayenne	❍	❍	❍	❍	❍

pepper). (12)					

Indicate the degree to which you agree or disagree with each statement...

	strongly disagree	disagree	neutral	agree	strongly agree
I do not like to cook because it takes too much time.	❍	❍	❍	❍	❍
Cooking is frustrating.	❍	❍	❍	❍	❍
It is too much work to cook.	❍	❍	❍	❍	❍
I find cooking tiring.	❍	❍	❍	❍	❍

Think about each of the statements below and select the response that best represents your level of confidence. I can stick to healthful foods and cooking...

	not at all confident	not confident	confident	very confident
...even if I need a long time to develop the necessary routines.	❍	❍	❍	❍
...even if I have to try several times for it to work.	❍	❍	❍	❍
...even if I have to rethink my food choices and cooking practices.	❍	❍	❍	❍
...even if I do not receive a great deal of support from others when making my first attempts.	❍	❍	❍	❍
...even if I have to make a detailed plan.	❍	❍	❍	❍

If you wanted to, how confident are you that you could eat healthy foods when you are...

	not at all confident					very confident
at the mall.	❍	❍	❍	❍	❍	❍
hungry after school or work.	❍	❍	❍	❍	❍	❍
with your friends.	❍	❍	❍	❍	❍	❍
stressed out.	❍	❍	❍	❍	❍	❍
feeling down.	❍	❍	❍	❍	❍	❍
bored.	❍	❍	❍	❍	❍	❍
at a fast food restaurant.	❍	❍	❍	❍	❍	❍
alone.	❍	❍	❍	❍	❍	❍
eating dinner with your family.	❍	❍	❍	❍	❍	❍

When you are grocery shopping, how confident are you in your ability to...

	not at all confident	not confident	neither	confident	very confident
select whole grain bread or cereal products.	❍	❍	❍	❍	❍
select low-fat dairy products.	❍	❍	❍	❍	❍
select foods that are low in sodium.	❍	❍	❍	❍	❍
select foods that are low in saturated fat.	❍	❍	❍	❍	❍
select foods that are low in cholesterol.	❍	❍	❍	❍	❍
select foods that are low in or free of trans fat.	❍	❍	❍	❍	❍
select foods that are high in dietary fiber.	❍	❍	❍	❍	❍
select foods that are low in added sugar.	❍	❍	❍	❍	❍

Think about your eating habits over the last year or so. About how often do you eat each of the following foods? Be sure to include breakfast, lunch, dinner, snacks, and eating out.

	<1x per week	1x per week	2-3x per week	4-6x per week	1x per day	2 or >2x per day
fruit juice (fresh, frozen, or canned. orange, apple, grape, etc)	❍	❍	❍	❍	❍	❍
any fruit (fresh, frozen, or canned. not including fruit juice)	❍	❍	❍	❍	❍	❍
vegetable juice (tomato, V8, carrot, etc)	❍	❍	❍	❍	❍	❍
salad greens (lettuce, kale, spinach, collards, etc)	❍	❍	❍	❍	❍	❍
potatoes (any kind. baked, mashed, french fried, etc)	❍	❍	❍	❍	❍	❍
vegetable soup or stew (with vegetables)	❍	❍	❍	❍	❍	❍
any other vegetables	❍	❍	❍	❍	❍	❍

(any kind. green beans, peas, corn, broccoli, etc)						
fiber cereals (Raisin Bran, Shredded Wheat, Fruit-n-Fiber, etc)	❍	❍	❍	❍	❍	❍
beans (baked, pinto, black, kidney, etc. not including green beans) or lentils	❍	❍	❍	❍	❍	❍
dark bread (whole wheat, rye, etc)	❍	❍	❍	❍	❍	❍

Please indicate the frequency in which you consume these convenience food items.

	daily	5-6x per week	2-4x per week	1x per week	1-3x per month	5-11x per year	rarely or never
ready-to-eat meal in a can (spaghetti-Os, ravioli, etc)	❍	❍	❍	❍	❍	❍	❍
ready-to-eat meal chilled or frozen (lean cuisine, etc)	❍	❍	❍	❍	❍	❍	❍
instant noodles, soup, or pasta (ramen, etc)	❍	❍	❍	❍	❍	❍	❍
instant pasta with sauce (dried, add water, cook. pasta sides, macaroni and cheese, etc)	❍	❍	❍	❍	❍	❍	❍
ready-to-eat soup in a can, box container, or bag	❍	❍	❍	❍	❍	❍	❍
ready-to-eat sandwiches	❍	❍	❍	❍	❍	❍	❍
chilled fresh	❍	❍	❍	❍	❍	❍	❍

tortellini, pasta, gnocchi, etc							
warmed pizza bought or delivered	❍	❍	❍	❍	❍	❍	❍
ready-to-eat pizza chilled or frozen	❍	❍	❍	❍	❍	❍	❍
frozen French fries, tater tots, etc	❍	❍	❍	❍	❍	❍	❍
vegetables, frozen or canned	❍	❍	❍	❍	❍	❍	❍
fish already crumbled or seasoned (fish sticks, etc)	❍	❍	❍	❍	❍	❍	❍
meat already crumbled or marinated (chicken nuggets, bbq, etc)	❍	❍	❍	❍	❍	❍	❍
salad cut and/or washed in a bag	❍	❍	❍	❍	❍	❍	❍
ready-to-eat green salad (with sauce, croutons, cheese, etc)	❍	❍	❍	❍	❍	❍	❍

ready-to-eat salads (potatoes, beans, pasta, etc)	❍	❍	❍	❍	❍	❍	❍
fresh fruit salads	❍	❍	❍	❍	❍	❍	❍

In the past month, how often did you eat something from the following types of restaurants (including take-out and delivery)?

	daily	5-6x per week	3-4x per week	1-2x per week	1-3x per month	never
traditional burger and fries fast food restaurant (eg McDonald's, Wendy's, Culver's)	❍	❍	❍	❍	❍	❍
Mexican fast food restaurant (eg Taco Bell, Chipotle)	❍	❍	❍	❍	❍	❍
fried chicken fast food restaurant (eg KFC, Chick Fil-A)	❍	❍	❍	❍	❍	❍
sandwich or sub shop (eg Subway, Panera)	❍	❍	❍	❍	❍	❍
pizza place (eg Papa John's, Papa Murphy's)	❍	❍	❍	❍	❍	❍

Post- and Follow-up Surveys –

Consent
The Culinary Boot Camp you are attending is designed to enhance your culinary education and skills set. We are conducting research to determine whether or not the boot camp is effective. If you agree to participate in this study, you are asked to respond to questions using this online survey system. First, you will be asked to share some basic information (age, gender, ethnicity, college status) as well as your ISU student ID number to track your answers. The rest of the survey includes questions about your eating habits as well as confidence with cooking and grocery shopping. Names will not be collected with the survey responses. Only group-level study results will be reported to prevent identification from published results. This is optional. The survey will take about 5 minutes to complete. You have the right to refuse to participate, skip any question, or leave the study at any time without penalty. If you choose to participate in both pre- and post- surveys, you will receive a $15 HyVee gift card as a reimbursement. If you choose to participate in the follow-up survey, you will be entered to win a cookbook from our commodity group sponsors. There are no identified risks. Whether or not you take part in this study does not impact your ability to participate in Culinary Boot Camp. For further information about the study, please contact Dr. Ruth Litchfield, litch@iastate.edu 515-294-9484, 220 MacKay Hall, 2302 Osborn Drive, Ames, IA. If you have any questions about the rights of research subjects, please contact the IRB Administrator, 515-294-4566, IRB@iastate.edu or Director, 515-294-3115, Office for Responsible Research, Iowa State University, Ames, IA 50011.Do agree to participate in this study?

- ❍ Yes
- ❍ No

What are the last four digits of your ISU ID?

Below are statements about your eating. Think about each one, then choose the best response for you.

	Always	Often	Sometimes	Rarely	Never
I am relaxed about eating.	❍	❍	❍	❍	❍
I am comfortable about eating enough.	❍	❍	❍	❍	❍
I have regular meals.	❍	❍	❍	❍	❍
I feel it is okay to eat food that I like.	❍	❍	❍	❍	❍
I experiment with new food and learn to like it.	❍	❍	❍	❍	❍
If the situation demands, I can "make do" by eating food I don't much care for.	❍	❍	❍	❍	❍
I eat a wide variety of foods.	❍	❍	❍	❍	❍
I am comfortable with my enjoyment of food and eating.	❍	❍	❍	❍	❍
I trust myself to eat enough for me.	❍	❍	❍	❍	❍

I eat as much as I am hungry for.	❍	❍	❍	❍	❍
I tune in to food and pay attention to eating.	❍	❍	❍	❍	❍
I make time to eat.	❍	❍	❍	❍	❍
I eat until I feel satisfied.	❍	❍	❍	❍	❍
I enjoy food and eating.	❍	❍	❍	❍	❍
I consider what is good for me when I eat.	❍	❍	❍	❍	❍
I plan for feeding myself.	❍	❍	❍	❍	❍

Indicate the extent to which you feel confident about performing each of the following...

	not at all confident	not confident	neutral	confident	very confident
using knife skills in the kitchen.	❍	❍	❍	❍	❍
using basic cooking techniques.	❍	❍	❍	❍	❍
steaming.	❍	❍	❍	❍	❍
sautéing.	❍	❍	❍	❍	❍
stir-frying.	❍	❍	❍	❍	❍
grilling.	❍	❍	❍	❍	❍
baking.	❍	❍	❍	❍	❍
roasting.	❍	❍	❍	❍	❍
slow cooking.	❍	❍	❍	❍	❍
preparing fresh or frozen vegetables (eg corn, tomatoes, onions, peppers, zucchini, mushrooms, spinach).	❍	❍	❍	❍	❍
preparing fresh or frozen fruit (eg mangoes, pineapple, apples). (11)	❍	❍	❍	❍	❍
using herbs and spices (eg, basil, oregano, chili powder, cayenne	❍	❍	❍	❍	❍

pepper). (12)					

Indicate the degree to which you agree or disagree with each statement...

	strongly disagree	disagree	neutral	agree	strongly agree
I do not like to cook because it takes too much time.	❍	❍	❍	❍	❍
Cooking is frustrating.	❍	❍	❍	❍	❍
It is too much work to cook.	❍	❍	❍	❍	❍
I find cooking tiring.	❍	❍	❍	❍	❍

Think about each of the statements below and select the response that best represents your level of confidence. I can stick to healthful foods and cooking...

	not at all confident	not confident	confident	very confident
...even if I need a long time to develop the necessary routines.	❍	❍	❍	❍
...even if I have to try several times for it to work.	❍	❍	❍	❍
...even if I have to rethink my food choices and cooking practices.	❍	❍	❍	❍
...even if I do not receive a great deal of support from others when making my first attempts.	❍	❍	❍	❍
...even if I have to make a detailed plan.	❍	❍	❍	❍

If you wanted to, how confident are you that you could eat healthy foods when you are...

	not at all confident					very confident
at the mall.	❍	❍	❍	❍	❍	❍
hungry after school or work.	❍	❍	❍	❍	❍	❍
with your friends.	❍	❍	❍	❍	❍	❍
stressed out.	❍	❍	❍	❍	❍	❍
feeling down.	❍	❍	❍	❍	❍	❍
bored.	❍	❍	❍	❍	❍	❍
at a fast food restaurant.	❍	❍	❍	❍	❍	❍
alone.	❍	❍	❍	❍	❍	❍
eating dinner with your family.	❍	❍	❍	❍	❍	❍

When you are grocery shopping, how confident are you in your ability to...

	not at all confident	not confident	neither	confident	very confident
select whole grain bread or cereal products.	❍	❍	❍	❍	❍
select low-fat dairy products.	❍	❍	❍	❍	❍
select foods that are low in sodium.	❍	❍	❍	❍	❍
select foods that are low in saturated fat.	❍	❍	❍	❍	❍
select foods that are low in cholesterol.	❍	❍	❍	❍	❍
select foods that are low in or free of trans fat.	❍	❍	❍	❍	❍
select foods that are high in dietary fiber.	❍	❍	❍	❍	❍
select foods that are low in added sugar.	❍	❍	❍	❍	❍

Think about your eating habits over the last year or so. About how often do you eat each of the following foods? Be sure to include breakfast, lunch, dinner, snacks, and eating out.

	<1x per week	1x per week	2-3x per week	4-6x per week	1x per day	2 or >2x per day
fruit juice (fresh, frozen, or canned. orange, apple, grape, etc)	❍	❍	❍	❍	❍	❍
any fruit (fresh, frozen, or canned. not including fruit juice)	❍	❍	❍	❍	❍	❍
vegetable juice (tomato, V8, carrot, etc)	❍	❍	❍	❍	❍	❍
salad greens (lettuce, kale, spinach, collards, etc)	❍	❍	❍	❍	❍	❍
potatoes (any kind. baked, mashed, french fried, etc)	❍	❍	❍	❍	❍	❍
vegetable soup or stew (with vegetables)	❍	❍	❍	❍	❍	❍
any other vegetables	❍	❍	❍	❍	❍	❍

(any kind. green beans, peas, corn, broccoli, etc)						
fiber cereals (Raisin Bran, Shredded Wheat, Fruit-n-Fiber, etc)	❍	❍	❍	❍	❍	❍
beans (baked, pinto, black, kidney, etc. not including green beans) or lentils	❍	❍	❍	❍	❍	❍
dark bread (whole wheat, rye, etc)	❍	❍	❍	❍	❍	❍

Please indicate the frequency in which you consume these convenience food items.

	daily	5-6x per week	2-4x per week	1x per week	1-3x per month	5-11x per year	rarely or never
ready-to-eat meal in a can (spaghetti-Os, ravioli, etc)	❍	❍	❍	❍	❍	❍	❍
ready-to-eat meal chilled or frozen (lean cuisine, etc)	❍	❍	❍	❍	❍	❍	❍
instant noodles, soup, or pasta (ramen, etc)	❍	❍	❍	❍	❍	❍	❍
instant pasta with sauce (dried, add water, cook. pasta sides, macaroni and cheese, etc)	❍	❍	❍	❍	❍	❍	❍
ready-to-eat soup in a can, box container, or bag	❍	❍	❍	❍	❍	❍	❍
ready-to-eat sandwiches	❍	❍	❍	❍	❍	❍	❍
chilled fresh	❍	❍	❍	❍	❍	❍	❍

tortellini, pasta, gnocchi, etc							
warmed pizza bought or delivered	❍	❍	❍	❍	❍	❍	❍
ready-to-eat pizza chilled or frozen	❍	❍	❍	❍	❍	❍	❍
frozen French fries, tater tots, etc	❍	❍	❍	❍	❍	❍	❍
vegetables, frozen or canned	❍	❍	❍	❍	❍	❍	❍
fish already crumbled or seasoned (fish sticks, etc)	❍	❍	❍	❍	❍	❍	❍
meat already crumbled or marinated (chicken nuggets, bbq, etc)	❍	❍	❍	❍	❍	❍	❍
salad cut and/or washed in a bag	❍	❍	❍	❍	❍	❍	❍
ready-to-eat green salad (with sauce, croutons, cheese, etc)	❍	❍	❍	❍	❍	❍	❍

ready-to-eat salads (potatoes, beans, pasta, etc)	❍	❍	❍	❍	❍	❍	❍
fresh fruit salads	❍	❍	❍	❍	❍	❍	❍

In the past month, how often did you eat something from the following types of restaurants (including take-out and delivery)?

	daily	5-6x per week	3-4x per week	1-2x per week	1-3x per month	never
traditional burger and fries fast food restaurant (eg McDonald's, Wendy's, Culver's)	❍	❍	❍	❍	❍	❍
Mexican fast food restaurant (eg Taco Bell, Chipotle)	❍	❍	❍	❍	❍	❍
fried chicken fast food restaurant (eg KFC, Chick Fil-A)	❍	❍	❍	❍	❍	❍
sandwich or sub shop (eg Subway, Panera)	❍	❍	❍	❍	❍	❍
pizza place (eg Papa John's, Papa Murphy's)	❍	❍	❍	❍	❍	❍

APPENDIX T. PRE-, POST-, AND FOLLOW-UP SURVEYS: EMPLOYEE CULINARY BOOT CAMP (AND COMPARISON GROUP)

Pre-Survey –

Consent
The Culinary Boot Camp you are attending is designed to enhance your culinary education and skills set. We are conducting research to determine whether or not the boot camp is effective. If you agree to participate in this study, you are asked to respond to questions using this online survey system. First, you will be asked to share some basic information (age, gender, ethnicity, college status) as well as your ISU student ID number to track your answers. The rest of the survey includes questions about your eating habits as well as confidence with cooking and grocery shopping. Names will not be collected with the survey responses. Only group-level study results will be reported to prevent identification from published results. This is optional. The survey will take about 5 minutes to complete. You have the right to refuse to participate, skip any question, or leave the study at any time without penalty. If you choose to participate in both pre- and post- surveys, you will receive a $15 HyVee gift card as a reimbursement. If you choose to participate in the follow-up survey, you will be entered to win a cookbook from our commodity group sponsors. There are no identified risks. Whether or not you take part in this study does not impact your ability to participate in Culinary Boot Camp. For further information about the study, please contact Dr. Ruth Litchfield, litch@iastate.edu 515-294-9484, 220 MacKay Hall, 2302 Osborn Drive, Ames, IA. If you have any questions about the rights of research subjects, please contact the IRB Administrator, 515-294-4566, IRB@iastate.edu or Director, 515-294-3115, Office for Responsible Research, Iowa State University, Ames, IA 50011.Do agree to participate in this study?

- ❍ Yes
- ❍ No

What are the last four digits of your ISU ID?

What is your age?

What is your gender?

- ❍ male
- ❍ female
- ❍ prefer not to specify

What is your ethnicity?

What is your employment status?

- ❍ Faculty
- ❍ Staff
- ❍ Graduate Assistant
- ❍ Post-doctoral Fellow
- ❍ Researcher

How many years have you been working for ISU?

- ❍ 0-5 years
- ❍ 6-10 years
- ❍ 11-15 years
- ❍ 16-20 years
- ❍ 20+ years

Below are statements about your eating. Think about each one, then choose the best response for you.

	Always	Often	Sometimes	Rarely	Never
I am relaxed about eating.	❍	❍	❍	❍	❍
I am comfortable about eating enough.	❍	❍	❍	❍	❍
I have regular meals.	❍	❍	❍	❍	❍
I feel it is okay to eat food that I like.	❍	❍	❍	❍	❍
I experiment with new food and learn to like it.	❍	❍	❍	❍	❍
If the situation demands, I can "make do" by eating food I don't much care for.	❍	❍	❍	❍	❍
I eat a wide variety of foods.	❍	❍	❍	❍	❍
I am comfortable with my enjoyment of food and eating.	❍	❍	❍	❍	❍
I trust myself to eat enough for me.	❍	❍	❍	❍	❍

I eat as much as I am hungry for.	❍	❍	❍	❍	❍
I tune in to food and pay attention to eating.	❍	❍	❍	❍	❍
I make time to eat.	❍	❍	❍	❍	❍
I eat until I feel satisfied.	❍	❍	❍	❍	❍
I enjoy food and eating.	❍	❍	❍	❍	❍
I consider what is good for me when I eat.	❍	❍	❍	❍	❍
I plan for feeding myself.	❍	❍	❍	❍	❍

Indicate the extent to which you feel confident about performing each of the following...

	not at all confident	not confident	neutral	confident	very confident
using knife skills in the kitchen.	❍	❍	❍	❍	❍
using basic cooking techniques.	❍	❍	❍	❍	❍
steaming.	❍	❍	❍	❍	❍
sautéing.	❍	❍	❍	❍	❍
stir-frying.	❍	❍	❍	❍	❍
grilling.	❍	❍	❍	❍	❍
baking.	❍	❍	❍	❍	❍
roasting.	❍	❍	❍	❍	❍
slow cooking.	❍	❍	❍	❍	❍
preparing fresh or frozen vegetables (eg corn, tomatoes, onions, peppers, zucchini, mushrooms, spinach).	❍	❍	❍	❍	❍
preparing fresh or frozen fruit (eg mangoes, pineapple, apples). (11)	❍	❍	❍	❍	❍
using herbs and spices (eg, basil, oregano, chili powder, cayenne	❍	❍	❍	❍	❍

pepper). (12)					

Indicate the degree to which you agree or disagree with each statement...

	strongly disagree	disagree	neutral	agree	strongly agree
I do not like to cook because it takes too much time.	❍	❍	❍	❍	❍
Cooking is frustrating.	❍	❍	❍	❍	❍
It is too much work to cook.	❍	❍	❍	❍	❍
I find cooking tiring.	❍	❍	❍	❍	❍

Think about each of the statements below and select the response that best represents your level of confidence. I can stick to healthful foods and cooking...

	not at all confident	not confident	confident	very confident
...even if I need a long time to develop the necessary routines.	❍	❍	❍	❍
...even if I have to try several times for it to work.	❍	❍	❍	❍
...even if I have to rethink my food choices and cooking practices.	❍	❍	❍	❍
...even if I do not receive a great deal of support from others when making my first attempts.	❍	❍	❍	❍
...even if I have to make a detailed plan.	❍	❍	❍	❍

If you wanted to, how confident are you that you could eat healthy foods when you are...

	not at all confident					very confident
at the mall.	❍	❍	❍	❍	❍	❍
hungry after school or work.	❍	❍	❍	❍	❍	❍
with your friends.	❍	❍	❍	❍	❍	❍
stressed out.	❍	❍	❍	❍	❍	❍
feeling down.	❍	❍	❍	❍	❍	❍
bored.	❍	❍	❍	❍	❍	❍
at a fast food restaurant.	❍	❍	❍	❍	❍	❍
alone.	❍	❍	❍	❍	❍	❍
eating dinner with your family.	❍	❍	❍	❍	❍	❍

When you are grocery shopping, how confident are you in your ability to...

	not at all confident	not confident	neither	confident	very confident
select whole grain bread or cereal products.	❍	❍	❍	❍	❍
select low-fat dairy products.	❍	❍	❍	❍	❍
select foods that are low in sodium.	❍	❍	❍	❍	❍
select foods that are low in saturated fat.	❍	❍	❍	❍	❍
select foods that are low in cholesterol.	❍	❍	❍	❍	❍
select foods that are low in or free of trans fat.	❍	❍	❍	❍	❍
select foods that are high in dietary fiber.	❍	❍	❍	❍	❍
select foods that are low in added sugar.	❍	❍	❍	❍	❍

Think about your eating habits over the last year or so. About how often do you eat each of the following foods? Be sure to include breakfast, lunch, dinner, snacks, and eating out.

	<1x per week	1x per week	2-3x per week	4-6x per week	1x per day	2 or >2x per day
fruit juice (fresh, frozen, or canned. orange, apple, grape, etc)	❍	❍	❍	❍	❍	❍
any fruit (fresh, frozen, or canned. not including fruit juice)	❍	❍	❍	❍	❍	❍
vegetable juice (tomato, V8, carrot, etc)	❍	❍	❍	❍	❍	❍
salad greens (lettuce, kale, spinach, collards, etc)	❍	❍	❍	❍	❍	❍
potatoes (any kind. baked, mashed, french fried, etc)	❍	❍	❍	❍	❍	❍
vegetable soup or stew (with vegetables)	❍	❍	❍	❍	❍	❍
any other vegetables	❍	❍	❍	❍	❍	❍

(any kind. green beans, peas, corn, broccoli, etc)						
fiber cereals (Raisin Bran, Shredded Wheat, Fruit-n-Fiber, etc)	❍	❍	❍	❍	❍	❍
beans (baked, pinto, black, kidney, etc. not including green beans) or lentils	❍	❍	❍	❍	❍	❍
dark bread (whole wheat, rye, etc)	❍	❍	❍	❍	❍	❍

Please indicate the frequency in which you consume these convenience food items.

	daily	5-6x per week	2-4x per week	1x per week	1-3x per month	5-11x per year	rarely or never
ready-to-eat meal in a can (spaghetti-Os, ravioli, etc)	❍	❍	❍	❍	❍	❍	❍
ready-to-eat meal chilled or frozen (lean cuisine, etc)	❍	❍	❍	❍	❍	❍	❍
instant noodles, soup, or pasta (ramen, etc)	❍	❍	❍	❍	❍	❍	❍
instant pasta with sauce (dried, add water, cook. pasta sides, macaroni and cheese, etc)	❍	❍	❍	❍	❍	❍	❍
ready-to-eat soup in a can, box container, or bag	❍	❍	❍	❍	❍	❍	❍
ready-to-eat sandwiches	❍	❍	❍	❍	❍	❍	❍
chilled fresh	❍	❍	❍	❍	❍	❍	❍

tortellini, pasta, gnocchi, etc							
warmed pizza bought or delivered	❍	❍	❍	❍	❍	❍	❍
ready-to-eat pizza chilled or frozen	❍	❍	❍	❍	❍	❍	❍
frozen French fries, tater tots, etc	❍	❍	❍	❍	❍	❍	❍
vegetables, frozen or canned	❍	❍	❍	❍	❍	❍	❍
fish already crumbled or seasoned (fish sticks, etc)	❍	❍	❍	❍	❍	❍	❍
meat already crumbled or marinated (chicken nuggets, bbq, etc)	❍	❍	❍	❍	❍	❍	❍
salad cut and/or washed in a bag	❍	❍	❍	❍	❍	❍	❍
ready-to-eat green salad (with sauce, croutons, cheese, etc)	❍	❍	❍	❍	❍	❍	❍

ready-to-eat salads (potatoes, beans, pasta, etc)	❍	❍	❍	❍	❍	❍	❍
fresh fruit salads	❍	❍	❍	❍	❍	❍	❍

In the past month, how often did you eat something from the following types of restaurants (including take-out and delivery)?

	daily	5-6x per week	3-4x per week	1-2x per week	1-3x per month	never
traditional burger and fries fast food restaurant (eg McDonald's, Wendy's, Culver's)	❍	❍	❍	❍	❍	❍
Mexican fast food restaurant (eg Taco Bell, Chipotle)	❍	❍	❍	❍	❍	❍
fried chicken fast food restaurant (eg KFC, Chick Fil-A)	❍	❍	❍	❍	❍	❍
sandwich or sub shop (eg Subway, Panera)	❍	❍	❍	❍	❍	❍
pizza place (eg Papa John's, Papa Murphy's)	❍	❍	❍	❍	❍	❍

Post- and Follow-up Surveys –

Consent
The Culinary Boot Camp you are attending is designed to enhance your culinary education and skills set. We are conducting research to determine whether or not the boot camp is effective. If you agree to participate in this study, you are asked to respond to questions using this online survey system. First, you will be asked to share some basic information (age, gender, ethnicity, college status) as well as your ISU student ID number to track your answers. The rest of the survey includes questions about your eating habits as well as confidence with cooking and grocery shopping. Names will not be collected with the survey responses. Only group-level study results will be reported to prevent identification from published results. This is optional. The survey will take about 5 minutes to complete. You have the right to refuse to participate, skip any question, or leave the study at any time without penalty. If you choose to participate in both pre- and post- surveys, you will receive a $15 HyVee gift card as a reimbursement. If you choose to participate in the follow-up survey, you will be entered to win a cookbook from our commodity group sponsors. There are no identified risks. Whether or not you take part in this study does not impact your ability to participate in Culinary Boot Camp. For further information about the study, please contact Dr. Ruth Litchfield, litch@iastate.edu 515-294-9484, 220 MacKay Hall, 2302 Osborn Drive, Ames, IA. If you have any questions about the rights of research subjects, please contact the IRB Administrator, 515-294-4566, IRB@iastate.edu or Director, 515-294-3115, Office for Responsible Research, Iowa State University, Ames, IA 50011.Do agree to participate in this study?

- ❍ Yes
- ❍ No

What are the last four digits of your ISU ID?

Below are statements about your eating. Think about each one, then choose the best response for you.

	Always	Often	Sometimes	Rarely	Never
I am relaxed about eating.	❍	❍	❍	❍	❍
I am comfortable about eating enough.	❍	❍	❍	❍	❍
I have regular meals.	❍	❍	❍	❍	❍
I feel it is okay to eat food that I like.	❍	❍	❍	❍	❍
I experiment with new food and learn to like it.	❍	❍	❍	❍	❍
If the situation demands, I can "make do" by eating food I don't much care for.	❍	❍	❍	❍	❍
I eat a wide variety of foods.	❍	❍	❍	❍	❍
I am comfortable with my enjoyment of food and eating.	❍	❍	❍	❍	❍
I trust myself to eat enough for me.	❍	❍	❍	❍	❍

I eat as much as I am hungry for.	❍	❍	❍	❍	❍
I tune in to food and pay attention to eating.	❍	❍	❍	❍	❍
I make time to eat.	❍	❍	❍	❍	❍
I eat until I feel satisfied.	❍	❍	❍	❍	❍
I enjoy food and eating.	❍	❍	❍	❍	❍
I consider what is good for me when I eat.	❍	❍	❍	❍	❍
I plan for feeding myself.	❍	❍	❍	❍	❍

Indicate the extent to which you feel confident about performing each of the following...

	not at all confident	not confident	neutral	confident	very confident
using knife skills in the kitchen.	❍	❍	❍	❍	❍
using basic cooking techniques.	❍	❍	❍	❍	❍
steaming.	❍	❍	❍	❍	❍
sautéing.	❍	❍	❍	❍	❍
stir-frying.	❍	❍	❍	❍	❍
grilling.	❍	❍	❍	❍	❍
baking.	❍	❍	❍	❍	❍
roasting.	❍	❍	❍	❍	❍
slow cooking.	❍	❍	❍	❍	❍
preparing fresh or frozen vegetables (eg corn, tomatoes, onions, peppers, zucchini, mushrooms, spinach).	❍	❍	❍	❍	❍
preparing fresh or frozen fruit (eg mangoes, pineapple, apples). (11)	❍	❍	❍	❍	❍
using herbs and spices (eg, basil, oregano, chili powder, cayenne	❍	❍	❍	❍	❍

pepper). (12)					

Indicate the degree to which you agree or disagree with each statement...

	strongly disagree	disagree	neutral	agree	strongly agree
I do not like to cook because it takes too much time.	❍	❍	❍	❍	❍
Cooking is frustrating.	❍	❍	❍	❍	❍
It is too much work to cook.	❍	❍	❍	❍	❍
I find cooking tiring.	❍	❍	❍	❍	❍

Think about each of the statements below and select the response that best represents your level of confidence. I can stick to healthful foods and cooking...

	not at all confident	not confident	confident	very confident
...even if I need a long time to develop the necessary routines.	❍	❍	❍	❍
...even if I have to try several times for it to work.	❍	❍	❍	❍
...even if I have to rethink my food choices and cooking practices.	❍	❍	❍	❍
...even if I do not receive a great deal of support from others when making my first attempts.	❍	❍	❍	❍
...even if I have to make a detailed plan.	❍	❍	❍	❍

If you wanted to, how confident are you that you could eat healthy foods when you are...

	not at all confident					very confident
at the mall.	❍	❍	❍	❍	❍	❍
hungry after school or work.	❍	❍	❍	❍	❍	❍
with your friends.	❍	❍	❍	❍	❍	❍
stressed out.	❍	❍	❍	❍	❍	❍
feeling down.	❍	❍	❍	❍	❍	❍
bored.	❍	❍	❍	❍	❍	❍
at a fast food restaurant.	❍	❍	❍	❍	❍	❍
alone.	❍	❍	❍	❍	❍	❍
eating dinner with your family.	❍	❍	❍	❍	❍	❍

When you are grocery shopping, how confident are you in your ability to...

	not at all confident	not confident	neither	confident	very confident
select whole grain bread or cereal products.	❍	❍	❍	❍	❍
select low-fat dairy products.	❍	❍	❍	❍	❍
select foods that are low in sodium.	❍	❍	❍	❍	❍
select foods that are low in saturated fat.	❍	❍	❍	❍	❍
select foods that are low in cholesterol.	❍	❍	❍	❍	❍
select foods that are low in or free of trans fat.	❍	❍	❍	❍	❍
select foods that are high in dietary fiber.	❍	❍	❍	❍	❍
select foods that are low in added sugar.	❍	❍	❍	❍	❍

Think about your eating habits over the last year or so. About how often do you eat each of the following foods? Be sure to include breakfast, lunch, dinner, snacks, and eating out.

	<1x per week	1x per week	2-3x per week	4-6x per week	1x per day	2 or >2x per day
fruit juice (fresh, frozen, or canned. orange, apple, grape, etc)	❍	❍	❍	❍	❍	❍
any fruit (fresh, frozen, or canned. not including fruit juice)	❍	❍	❍	❍	❍	❍
vegetable juice (tomato, V8, carrot, etc)	❍	❍	❍	❍	❍	❍
salad greens (lettuce, kale, spinach, collards, etc)	❍	❍	❍	❍	❍	❍
potatoes (any kind. baked, mashed, french fried, etc)	❍	❍	❍	❍	❍	❍
vegetable soup or stew (with vegetables)	❍	❍	❍	❍	❍	❍
any other vegetables	❍	❍	❍	❍	❍	❍

(any kind. green beans, peas, corn, broccoli, etc)						
fiber cereals (Raisin Bran, Shredded Wheat, Fruit-n-Fiber, etc)	❍	❍	❍	❍	❍	❍
beans (baked, pinto, black, kidney, etc. not including green beans) or lentils	❍	❍	❍	❍	❍	❍
dark bread (whole wheat, rye, etc)	❍	❍	❍	❍	❍	❍

Please indicate the frequency in which you consume these convenience food items.

	daily	5-6x per week	2-4x per week	1x per week	1-3x per month	5-11x per year	rarely or never
ready-to-eat meal in a can (spaghetti-Os, ravioli, etc)	❍	❍	❍	❍	❍	❍	❍
ready-to-eat meal chilled or frozen (lean cuisine, etc)	❍	❍	❍	❍	❍	❍	❍
instant noodles, soup, or pasta (ramen, etc)	❍	❍	❍	❍	❍	❍	❍
instant pasta with sauce (dried, add water, cook. pasta sides, macaroni and cheese, etc)	❍	❍	❍	❍	❍	❍	❍
ready-to-eat soup in a can, box container, or bag	❍	❍	❍	❍	❍	❍	❍
ready-to-eat sandwiches	❍	❍	❍	❍	❍	❍	❍
chilled fresh	❍	❍	❍	❍	❍	❍	❍

tortellini, pasta, gnocchi, etc							
warmed pizza bought or delivered	❍	❍	❍	❍	❍	❍	❍
ready-to-eat pizza chilled or frozen	❍	❍	❍	❍	❍	❍	❍
frozen French fries, tater tots, etc	❍	❍	❍	❍	❍	❍	❍
vegetables, frozen or canned	❍	❍	❍	❍	❍	❍	❍
fish already crumbled or seasoned (fish sticks, etc)	❍	❍	❍	❍	❍	❍	❍
meat already crumbled or marinated (chicken nuggets, bbq, etc)	❍	❍	❍	❍	❍	❍	❍
salad cut and/or washed in a bag	❍	❍	❍	❍	❍	❍	❍
ready-to-eat green salad (with sauce, croutons, cheese, etc)	❍	❍	❍	❍	❍	❍	❍

ready-to-eat salads (potatoes, beans, pasta, etc)	❍	❍	❍	❍	❍	❍	❍
fresh fruit salads	❍	❍	❍	❍	❍	❍	❍

In the past month, how often did you eat something from the following types of restaurants (including take-out and delivery)?

	daily	5-6x per week	3-4x per week	1-2x per week	1-3x per month	never
traditional burger and fries fast food restaurant (eg McDonald's, Wendy's, Culver's)	❍	❍	❍	❍	❍	❍
Mexican fast food restaurant (eg Taco Bell, Chipotle)	❍	❍	❍	❍	❍	❍
fried chicken fast food restaurant (eg KFC, Chick Fil-A)	❍	❍	❍	❍	❍	❍
sandwich or sub shop (eg Subway, Panera)	❍	❍	❍	❍	❍	❍
pizza place (eg Papa John's, Papa Murphy's)	❍	❍	❍	❍	❍	❍

APPENDIX U. FOCUS GROUP DISCUSSION QUESTIONS: STUDENT AND EMPLOYEE CULINARY BOOT CAMPS

1. To start the night, please share your name and the most delicious dish you made at Culinary Boot Camp.

2. Please describe your experience at Culinary Boot Camp.
    - Which night did you enjoy most? Why?
    - Which night did you enjoy least? Why?
    - What was the most helpful skill or piece of information you learned?
    - What was the least helpful skill or piece of information you learned?

3. Please discuss your experience in the kitchens.
    - Lesson 1 – Versatile Fruits & Vegetables, various types of salsa
        - Which topic taught at this session interested you most?
        - Which topic taught at this session interested you least?
        - How has this session influenced your cooking skills?
    - Lesson 2 – Great Grains & Delightful Dairy, build your own omelets and grilled cheeses OR scrambled egg muffins and skillet lasagna
        - Which topic taught at this session interested you most?
        - Which topic taught at this session interested you least?
        - How has this session influenced your cooking skills?

- Lesson 3 – Protein Power, various types of chili
  - Which topic taught at this session interested you most?
  - Which topic taught at this session interested you least?
  - How has this session influenced your cooking skills?

4. Please discuss your experience at the grocery store.
   - Which topic taught at this session interested you most?
   - Which topic taught at this session interested you least?
   - How has the session influenced your grocery shopping skills?

5. How have you incorporated the skills and pieces of information obtained at Culinary Boot Camp into your everyday lives?
   - How have your cooking habits changed, if at all?
   - How have your grocery shopping habits changed, if at all?
   - How have you practiced competent eating in the past two weeks, if at all?

6. After completing Culinary Boot Camp, how have you been able to overcome any barriers or obstacles that were holding you back from forming a happy and healthy relationship with food and nutrition?
   - What skills have helped you reach this success?
   - What are some barriers or obstacles that still need to be overcome?

7. On a scale of 1-10, 1 being terrible and 10 being excellent, how would you rate your overall experience at Culinary Boot Camp? Please explain your rating.

8. If you could change one aspect about Culinary Boot Camp, what would it be and why?

9. Of all the topics discussed at Culinary Boot Camp, which one do you think is the most important? least important?

10. "Is this an adequate summary?" or "Have we missed anything?" *asked after moderator provides a summary and states the overview of study's purpose one more time!