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First-Year College Seminar as a Tool for Nutrition Education and Food Preparation Skills

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By

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The obesity epidemic is steadily increasing and affecting all age groups. Obesity rates among young adults are scarcely reported but merit special attention as being overweight during young adulthood will likely result in being overweight or obese throughout adulthood. Because college students are still forming lifestyle patterns, the university setting is ideal for intervention and educating young adults on the importance of developing and maintaining healthy behaviors. This study evaluated whether participation in a 16-week first-year college seminar cooking course increased students' self-efficacy in food preparation skills and dietary behaviors. Significant changes in food preparation skills were observed between before and after participation ($p<0.05$) but self-efficacy, overall, did not increase significantly. Institutions of higher education should provide experiential learning opportunities to improve food preparation skills and hence dietary habits of young adults by developing and implementing programs such as first-year seminars focusing on hands-on food preparation basics and techniques.

DEDICATION

I would like to dedicate this research paper to my family and friends who have supported me throughout this academic path; above all to my understanding and patient husband who has stood by me throughout this long process and for his endless support and love. I would also like to dedicate this thesis to my loving mother for encouraging me to pursue a new career in nutrition and for always being so supportive and caring. A special thank you goes to Gisella and Antonio Canestro and to Gion Willi for your invaluable support from across the Ocean.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

It is common knowledge that obesity rates in the United States have dramatically increased for the last three decades. Obesity is defined as a Body Mass Index (BMI) greater or equal to 30 (kg/m2), calculated by weight in kilograms divided by height in meters squared, rounded to one decimal place. Body Mass Index (BMI) is a widely used and recognized method to estimate a person's body weight status as it is a non-invasive and economical tool (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). An individual can be classified as either underweight, normal, overweight, or obese. The term 'normal' is considered a healthy weight status and therefore associated with fewer health problems. Because children and adolescents are still growing, their BMI is plotted on growth charts for sex and age.

The most recent epidemiological report indicates that between the years 2009 and 2010, 35.7% of American adults were considered obese while almost 17% of American children and adolescents were considered obese which represents 78 million U.S. adults and 12.5 million U.S. children and adolescents (Ogden, Carroll, Kit, & Flegal, 2012). The report noted the prevalence of obesity was higher among adolescents than among preschool-aged children and that boys were more likely to be obese than girls.

According to a recent study conducted in 2009-2010, obesity trends are not showing any signs of slowing as data analysis from the 1990 through 2008 Behavioral

Risk Factor Surveillance System (BRFSS) suggests that more than half of the U.S. population will be obese by 2030 (Finkelstein et al., 2012). Furthermore, the study also projects "a 33% increase in the prevalence of obesity and 130% increase in severe obesity prevalence over the next two decades" which would exacerbate the already high medical expenditures associated with obesity. Data from the 2006 Medical Expenditure Panel Surveys (MEPS) indicated that obese individuals had per capita medical spending that was 42% or $1,429 greater than spending for normal-weight people (Finkelstein, Trogdon, Cohen, & Dietz, 2009). The annual medical spending due to obesity could be as high as $147 billion per year.

The latest report on the leading causes of mortality in the United States revealed that five of the top ten reasons of death were nutrition-related. Cardiovascular disease is the leading cause of death followed by cancer, and stroke, diabetes mellitus, and kidney disease in forth, seventh and ninth place, respectively (Heron, 2012). It has been recognized for decades that a balanced diet rich in fruits and vegetables lowers the risk for developing various chronic diseases cited above but only 40% of Americans eat the recommended amounts of fruits and vegetables stated by the US Department of Agriculture (USDA) (Guenther, Dodd, Reedy, & Krebs-Smith, 2006). Moreover, fruit and vegetable consumption can also help improve hypertension and reverse the fast-growing obesity epidemic. In 2006, Dr. Lydia Bazzano compiled evidence to indicate that it was more costly to *not* consume fruits and vegetables. Her analysis of epidemiological, observational and experimental studies indicated that increased vegetable and fruit consumption not only decreased prevalence of obesity and diet-related diseases, but substantially decreased healthcare costs (Bazzano, 2006).

Furthermore, a cross-sectional study confirmed the frequency of consuming restaurant food was positively associated with body fatness regardless of 'education level,' 'smoking status,' 'alcohol consumption,' and 'physical activity' of the participants and that these results bring forth the relation between the rising cost of eating away from home and the prevalence of obesity (McCrory et al., 1999). Supporting this evidence, in a similar study using 2000-2002 Multi-Ethnic Study Atherosclerosis data, participants who never ate fast food were more than twice as likely of having greater nutritional health than those who ate fast food more than once a week. The higher the exposure to fast food, the more likely food will be consumed away from home and the food will be less nutritious. Results of the study showed that diet quality decreases with fast food consumption and neighborhood fast food exposure. The study also emphasizes the importance of interventions that reduce exposure to fast food and/or promote individual behavior change (Moore, Diez Roux, Nettleton, Jacobs, & Franco, 2009).

The transition period between adolescence and adulthood is of particular interest to researchers as between the ages of 18 and 29 the increase of overweight and obesity is the highest among all age groups (Gordon-Larsen, Adair, Nelson, & Popkin, 2004). Body Mass Indices have increased considerably between 1960 and 2002 among male and female adults between the ages of 18-24, from 24.3 to 26.6 and 22.2 to 26.8, respectively (Park, Paul Mulye et al. 2006). The phenomenon of rising obesity trends is not exclusive to the United States. In Australia, scientific researchers assessed weight changes using BMI measurements of a large sample of adolescents aged 14 over a 10 year period and observed a significant shift in weight status of adolescents transitioning into adulthood.

The prevalence of both overweight and obesity status increased significantly between mid-adolescents and adulthood (Patton et al., 2011).

The transition to adulthood has been defined by social scientists as "a distinct phase in the life course" as many young individuals acquire new responsibilities, especially as they enroll in institutions of higher education (Hartmann & Swartz, 2006).

The common goal of first-year seminars is to increase student retention and persistence from the first to second year of college (Goodman & Pascarella, 2006). Between fall 2008 and fall 2011, FNH 1001-Cooking Basics: *Iron Chef Bully* seminar provided the opportunity for Mississippi State University freshmen to enroll in an experiential learning cooking course. The objectives of the first-year seminar were to introduce college students to new foods and flavors and to introduce basic cooking fundamentals and techniques. The objective of the study was to evaluate whether participation in a 16-week first-year college seminar cooking course increased students' self-efficacy in food preparation skills and dietary behaviors.

CHAPTER II

REVIEW OF LITERATURE

The first year of college can be quite challenging for students as they have to learn to live on their own while adapting to a new academic and social environment (Goodman & Pascarella, 2006). At the same time, evidence shows that unhealthy behaviors such as inadequate fruit and vegetable intake occur during the transition from high school to college (Adams & Colner, 2008). Colleges and universities can alleviate transition difficulties by developing programs to assist first-year college students. Because college students are still forming lifestyle patterns, the university setting is ideal for intervention and educating young adults on the importance of developing and maintaining healthy behaviors (Huang et al., 2003; Sira & Pawlak, 2010). Self-efficacy in food preparation skills may be the key to improving healthier nutrition habits and food consumption among young adults. Obesity rates among young adults are of special concern as being overweight as young adults will likely result in being overweight or obese throughout adulthood (Sira & Pawlak, 2010).

Statistics and Obesity Rates

The most recent report on obesity trends in the United States was published in 2012. Data from the National Health and Examination Survey (NHANES) indicated that 35.7% of American adults were considered obese between 2009 and 2010 (Ogden et al.,

2012). Furthermore, the report noted the prevalence of obesity was higher among adolescents than among preschool-aged children and that boys were more likely to be obese than girls. Almost 17% of children and adolescents living in the United States were obese in 2009-2010. Obesity is defined as a Body Mass Index (BMI) greater or equal to 30 (kg/m2), calculated by weight in kilograms divided by height in meters squared, rounded to one decimal place. Because children and adolescents are still developing, their BMI is plotted on growth charts and percentiles are used to compare the relative position of the child's BMI among children of the same sex and age (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010).

The latest published from the National College Health Risk Behavior Survey reported the following statistics: In 1995, 12 million students were enrolled in 3,600 institutions across the United States. Seven million students or 57% were between the ages of 18 and 24 years old (Centers for Disease Control and Prevention, 1997).

According to the U.S. Department of Education, between 2009 and 2010 there were 4,495 degree-granting institutions in the United States of which 1,721 and 2,774 were 2-year colleges and 4-year colleges, respectively (National Center for Education Statistics, 2012).

The National Center for Education Statistics (NCES) projects a 15% increase of total enrollment in all postsecondary degree-granting institutions nationwide from 2010 to 2021, which would amount to approximately 24 million students. The latest published statistics on postsecondary education report that college enrollment has almost doubled between 1996 and 2010 (National Center for Education Statistics, 2013). More recently, the NCES reports that "between 1999 and 2009 college enrollment increased by 38%,

from 14.8 million to 20.4 million" (Snyder, Dillow, & National Center for Education, 2011).

The National College Health Risk Behavior Survey indicates that few college students meet fruit and vegetable intake goals. Only 25% of 18- to 24-year-old students consume 5 or more fruits and vegetables daily and approximately 50% exercised to lose weight or keep from gaining weight (Centers for Disease Control and Prevention, 1997). Additionally, 20.5% of students surveyed were considered as either overweight (BMI greater or equal to 27.8 or higher for men and 27.3 or higher for women), a greater amount, while 41.6% of students, believed themselves to be overweight (Centers for Disease Control and Prevention, 1997). The BMI classification in the survey was based on the 85th percentile value for BMI among persons aged 20-29 years in the Second National Health and Nutrition Examination Survey.

Most recently, a cross-sectional survey conducted by Sira and Pawlack (2010) investigated the obesity rates and eating attitudes among Eastern North Carolina college students and found comparable results to the National College Health Risk Behavior Survey. Twenty-one percent of students surveyed were overweight while 10.8% were obese based on BMI. Likewise, results in a small scale study at Virginia Tech revealed that 68% of their sample of college students were normal weight while 20% were overweight, and 5% obese based on BMI (Poddar et al., 2009). The incidence of obesity in the United States is of interest to many researchers, especially the transition period between adolescence and adulthood when dietary habits are still forming and modifiable. In fact, a group of scientists lead a five-year National Longitudinal Study of Adolescent Health to determine obesity patterns of several different ethnicities among young adults

aged 13 to 26 years of age (Gordon-Larsen et al., 2004). The authors pointed out the difficulties in calculating and comparing body size of adolescents and young adults as the standardized methods for estimating obesity are different for children than for adults. Nonetheless, the conclusion of the study showed that a high number of adolescents were becoming and remaining obese into adulthood and this should be of special concern for public health officials as obesity rates parallel rates of nutrition-related chronic diseases such as hypertension, diabetes, and cardiovascular disease.

Demographics of College Students

The U.S. Department of Education reports first-time fall freshmen enrollment increased by 39% over the last 14 years and is projected to continue to increase another 14% by 2021 nationwide (National Center for Education Statistics, 2012). Females are also expected to remain dominant in total percentage of enrollment (National Center for Education Statistics, 2013).

In 1996, the college student population was compromised of 73% Whites, 10% Blacks, 8.4% Hispanics, 6% Asian/Pacific Islander, and 1% American Indian/ Alaska Native. While the Black and Hispanic student populations has increased steadily over the last decade, the white student body has slightly decreased (National Center for Education Statistics, 2013).

According to the American College Health Association during fall semester 2006 in 34 schools across the United States, 66% of students were female and 34% were male among respondents (American College Health Association, 2009). Moreover, freshmen represented a large portion of students as they embodied 31% of the total student population. These numbers have been consistent over the last decade. Out of the 23,863

participants, 76% stated being white, 6% being black, 5% being Hispanic, and finally 10% being Asian. Some students selected more than one race. These results are consistent with numerous studies conducted in the field. In Sira and Pawlack's survey (2010), females represented 79.8% of the 582 students and were between ages 18 and 25. In addition, 69.4% were Caucasian.

Weight Changes during College

The freshman year of college has been associated with the undesirable colloquial term "Freshman 15" which suggests that students gain 15 pounds during the first year in college (Delinsky & Terence, 2008). This is currently an anecdotal fact; however, several studies have tried to determine whether this statement has scientific value. Over 300 undergraduate students at Rutgers University were selected and followed during their freshman year to assess any weight changes (Delinsky & Terence, 2008). Students' BMI were calculated from self-reported data and thus a limitation of the study. Anthropometrics from a subsample of participants were measured to examine the accuracy of the self-reported measurements of students and did not find a significant difference (only 0.5 BMI point discrepancy) between self-reported BMI and actual BMI. Their results indicated that women gained approximately 3 pounds during the freshman year. An observation that fits the same statement from the National College Health Risk Behavior Survey is that 37% of the female students selected in this study described themselves as overweight when in fact only 18% were actually considered overweight or obese.

Racette, Deusinger, Strube, Highstein, and Deusinger (2005) also investigated the "Freshman 15" concept by assessing 764 college students' body weight changes between

their entrance into college to the end of their sophomore year. Eighteen percent of students were overweight which is comparable to the estimates of Delinsky and Terence (2008). The results showed an increase in body weight among 70% of the students and for "those who gained weight, the increase was 4.1 +/- 3.6 kg" which is equivalent to 9 pounds. The weight gain seen in this population was significantly higher than the previous study but still a distant amount from the 15 pounds. The authors did not find a significant increase in height in the participants between the first year and second year. In addition to this, students who self-report may tend to either over or underestimate their body weight, height, and other anthropometric measurements.

Dietary Guidelines

The current national Dietary Guidelines for Americans 2010 provides evidence-based nutrition recommendations for Americans aged 2 years and older on "consuming fewer calories, making informed food choices, and being physically active to attain and maintain a healthy weight, reduce risk of chronic disease, and promote overall health." (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). Calorie needs have been calculated and estimated for various age groups based on gender and physical activity levels to help individuals maintain an adequate calorie balance. Females aged 19-30 years of age should consume an average of 1,800 to 2,000 calories per day while males in the same age category should consume an average of 2,400 to 2,600 calories per day to maintain a sedentary lifestyle. When physical activity increases, the guidelines recommend adding approximately 200 calories to each increment of physical activity. It is important to note that calorie needs should preferably

be based on individual needs as each person's requirements depends on their height, weight, gender, age, and level of physical activity.

Carbohydrate, protein, and fat provide calories in one's diet and are generally referred to as macronutrients. The recommended macronutrient intake for the above age group is as follows: 45-65% of carbohydrate, 10-35% of protein, and 20-35% of fat. The United States Department of Agriculture (USDA) classifies foods into five major food groups including fruits, vegetables, grains, protein foods, and dairy, and recommends daily consumption from each food group to meet nutrient needs.

The current national recommendations support consumption of 2 cups per day of fruit and 2 1/2 cups of vegetables per day for both men and women aged 19 to 30 years old (U.S. Department of Agriculture, 2010). Because the definition of what a serving represents is unclear to many, the USDA developed a tool for Americans to facilitate menu planning: ChooseMyPlate. The objective of ChooseMyPlate is to provide an image of what one's plate should look like on a daily basis to meet the dietary guidelines. Half of the plate should contain fruits and vegetables, and the other half should be divided into two food groups: protein and grains. At least half of grains consumed should be whole grains. Finally, dairy is represented by a glass of either fat-free or low-fat milk (U.S. Department of Agriculture, 2010). The dietary guidelines also strongly emphasize the importance of consuming at least 3 cups per day of dairy products for those aged 19-30 years old since dairy foods provide calcium, vitamin D, and potassium; key nutrients lacking in the American diet (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010).

Gender and Dietary Behaviors

The rapport between food and young adults has been of interest to nutrition professionals for decades. Research has found that young adults perceive the importance of nutrition replaced by the importance of convenience during collegiate years (Betts, Amos, Keim, Peters, & Stewart, 1997). Research shows that eating habits during young adulthood have nutritional consequences later in life. Project EAT I and II (Eating Among Teens) were developed by nutrition experts at the University of Minnesota to examine dietary patterns among young Americans. The researchers observed that young adults consume 0.9 servings of fruit and 1.8 servings of vegetables daily compared to the national recommendations (Larson, Laska et al. 2012). College years are an excellent setting and time period for administrators to develop programs to reduce negative health behaviors such as inadequate fruit and vegetable consumption among college students (Huang et al., 2003). Unhealthy eating habits are of concern as they carry over into adulthood (Morse & Driskell, 2009). Alarmingly little attention has been given to this age group as signs and symptoms of chronic diseases do not usually appear between 18- to 24-year olds (Kreausukon, Gellert, Lippke, & Schwarzer, 2012). Numerous factors that determine American college students' selection of food include "shortage of time, convenience, cost, taste, health, physical and social environment, and weight control" (Davy, Benes, & Driskell, 2006).

These findings on college students are comparable to consumer reports on eating habits of the American population as The International Food Information Council Foundation's 2012 Food & Health Survey indicates "taste" is the most important driver of food consumption followed by "price, healthfulness, convenience, and sustainability"

(International Food Information Council Foundation, 2012). Fruit and vegetable consumption by young American adults can also be affected by price/cost and deter those with low socioeconomic status to purchase fruits and vegetables (Powell, Zhao, & Wang, 2009). Moreover, these factors can be applied universally as Kreausukon et al. (2012) also suggest that Thailand's college students' diets are based on "rituals, convenience," and "social influences." These same factors have been reported in a study focusing on sex differences in fast food consumption of collegiate young adults (Morse & Driskell, 2009).

Additional factors – "lack of cooking skills" and "location" –contribute to the high rates of fast food consumption among college students. Morse and Driskell (2009) report "college students have been reported to eat meals at fast food restaurants 6 to 8 times weekly" and therefore fast food intake encompasses a significant amount of their daily diet. Fast food has been known to contain high amounts of saturated fat and sodium, and generally lacking in fruits and vegetables. Therefore, most of the energy consumed by adolescents is obtained from energy-dense foods eaten away from home. This observation was confirmed in a cross-sectional study using a nationally representative sample of 16,810 individuals from the Nationwide Food Consumption Survey (Nielsen, Siega-Riz, & Popkin, 2002).

The overall dietary trends among adolescents and young adults in the United States shifted over the last two decades. Indeed, most of their energy intake was shifting from meals eaten at home to meals eaten from fast food locations. The results of the study showed foods known to be energy dense that were increasing in popularity among this age group were "salty snacks", "fries", "cheeseburgers", and "Mexican" food. Several longitudinal studies have focused on food consumption patterns including the

Bogalusa Heart Study introduced in 1973 which evaluated food group patterns between childhood and young adulthood using 24-hour dietary recalls (Demory-Luce et al., 2004). The authors established a decrease in mean frequency of food groups such as "fruit/fruit juices," and "dairy" and an increase in "salty snacks" and "sweetened beverages" consumption regardless of gender and ethnicity. Overall, the diet quality of the young respondents had declined over the years.

Another longitudinal study conducted over a 5 year period showed that fast food consumption and breakfast skipping were positively associated with weight gain during the transition from adolescents to young adulthood (Niemeier, Raynor, Lloyd-Richardson, Rogers, & Wing, 2006). Moreover, results indicated a significant increase in fast food consumption in the large sample. The authors point out that this transition also parallels adolescents' increased "independence [and] responsibility for food attainment and preparation." Students in Betts et al. (1997) study exhibited strong opinions on the importance of healthful foods but their purchasing and preparation skills were barriers to engaging in these activities. According to a study (Larson, Perry, Story, & Neumark-Sztainer, 2006), the majority of young adults surveyed ages 18 to 23 years, were not involved in food preparation or food purchasing related behaviors during the past week surveyed. Interestingly, students' living situation (campus housing) and race (African American) were correlated with infrequent food preparation. Thirty-six percent of students claimed "lack of time" was a barrier to preparing a meal which confirms the findings of the previously mentioned studies.

The recommended daily intakes of 5 servings of fruits and vegetables set by the Dietary Guidelines for Americans (2010) were met when students reported high food

preparation. Consequently, those who prepare food at home are less likely to consume fast food; therefore, college courses and/or programs should emphasize basic cooking fundamentals and techniques to allow students to gain the confidence and skills to prepare food.

Studies show gender differences in relation to eating habits of college students. Male students employ less-healthful eating habits such as consuming more fast food therefore higher fat content foods than their female counterparts (Li et al., 2012). College women and men also differ in the amount of attention they dedicate to nutrition and dieting (Davy et al., 2006). Furthermore, young adult males are less likely to respond to interventions addressing these issues than females because a greater proportion of men are in precontemplation mode versus action mode (Horacek et al., 2002). Researchers also support these observations as self-efficacy to eat vegetables was not as a strong predictor of vegetable intake as it was for young women in a previous study (Chung & Hoerr, 2005).

Self-Efficacy

Self-efficacy was a term coined by Bandura as a key concept in Social Cognitive Theory which suggests that individuals learn through observation and modeling from others (Bandura, 1986). Self-efficacy is influenced by one's environment and behavior and can determine the initiation of a health behavior change and how much effort will be put into changing the behavior (Luszczynska, Gutiérez-Doña, & Schwarzer, 2005). Bandura (1986) proposes that one will perform a specific task in a particular situation if one believes they can accomplish that specific task and therefore avoid tasks that are perceived too difficult to overcome due to limited capabilities. It is important to note that

self-efficacy does not denote a personality trait; in fact, it varies from person to person and from task to task.

Researchers in New Zealand (Mainvil, Lawson, Horwath, McKenzie, & Reeder, 2009) successfully developed and validated Self-Efficacy scales to measure self-efficacy in eating fruits and eating vegetables separately among adults aged 25 to 60 years old. They concluded that self-efficacy to eat fruits was positively associated with fruit intake and likewise self-efficacy to eat vegetable was positively associated with vegetable intake. Moreover, female subjects had higher self-efficacy in eating fruit and higher fruit intake than male participants. Finally, self-efficacy to eat vegetables was significantly correlated with vegetable intake.

The fruit and vegetable self-efficacy scale was originally developed by Domel et al. in 1996 among fourth and fifth grade children. Domel et al. (1996) findings suggest that overall fruit and vegetable consumption by elementary children is mostly influenced by their preferences and not as much by their fruit and vegetable self-efficacy. The study also reported self-efficacy varied according to children's mood. Exposure to fruit and vegetables as well as availability of the latter, are the main determinants of fruit and vegetable consumption.

A randomized controlled trial was conducted in Thailand which focused on two interventions to improve fruit and vegetable consumption among undergraduate university students. The first being a social-cognitive intervention –self-efficacy and planning– and the second intervention was a knowledge-based health education session, also referred to as the control group (Kreausukon et al., 2012). The authors point out that in order to change dietary behaviors one must be motivated before one can actually

change. Self-efficacy seems to be a major player in facilitating health behavior change and because college years are an important time for lifestyle changes, this is an ideal time to provide nutrition education. The results of the study did favor the psychological nutrition intervention as the participants consumed significantly more fruit and vegetables than the control group.

According to AbuSabha and Achterberg (1997) self-efficacy has been "repeatedly a good predictor of health behavior, sometimes explaining more than 50% of variability." As the authors state:

> *"Applied to nutrition, self-efficacy may predict which dietary behaviors people feel capable of changing, how much effort they will expend while trying to adopt the new behavior, and how long they will persist in the face of obstacles."*
>
> (AbuSabha & Achterberg, 1997) p1130

In a more recent study, self-efficacy of vegetable preparation was measured at the beginning-of-semester and at the end-of-semester at Utah State University (Brown, Wengreen, Vitale, & Anderson, 2011). Students enrolled in an undergraduate nutrition course participated in an online food demonstration followed by a vegetable in-class tasting experience featuring four different vegetables throughout a semester. The culinary demonstration and tasting of the target vegetables increased self-efficacy of vegetable preparation from the beginning to the end of the semester. The results of the study were promising as self-efficacy was positively associated with vegetable intake.

Asparagus, one of the target vegetables that was not popular among the freshmen collegiate students at the start of the semester, witnessed an increase in consumption. This study shows that self-efficacy and taste exposure can be a good predictor of fruit and

vegetable intake. Domel et al. (1996) also reported exposure to vegetables as a predictor of fruit and vegetable consumption but in the case of young adults, self-efficacy may not be affected by mood as it is with children. Cooking is a normal activity during adulthood.

According to a study, self-efficacy, one of the main mediators of behavior change stemming from the Social Cognitive Theory, was the most significant determinant of healthy nutrition behavior compared to 'social support,' 'self-regulation,' and 'expected outcomes' (Anderson, Winett, & Wojcik, 2007). Self-efficacy in regulating food intake and purchases was nonetheless influenced by gender, race, socio-economic status, self-regulation and outcome expectations. Participants had higher confidence in their ability to make healthier food choices such as opt for foods lower in fat content, higher fiber and fruit and vegetable intake. This study also indicated that family support was also an indicator for eating healthier foods and may enhance nutrition self-efficacy. In other words, nutrition interventions that encompass strengthening family support and building self-efficacy are powerful tools in changing nutrition behaviors.

Family Meal Patterns

Historically, the family meal in the United States was considered an important and vital daily custom with established rules and behaviors originating in the nineteenth-century from Western European and American Victorian middle-class citizens. As Simone Cinotto posits:

> *"A proper family meal is one consumed in the home by family members. It is expected to be a daily routine...[and] ...is homemade; unlike snacks or fast food, food is transformed in the domestic kitchen through a cultural operation*

(cooking), which requires time and effort…[] it is eaten at a regular time, according to an accepted set of rules and behaviors [].” (Cinotto, 2006) p18

Starting in the 1960s and ongoing today, family meal patterns experienced a shift as women were entering the workforce and divorce rates were increasing forming single-parent households across the United States. As a consequence, convenience foods and meals-eaten away from home were emerging to respond to the lack of time and effort to prepare meals. This phenomenon caused a disruption in family mealtime patterns. The reason why stable family meal patterns or “eating around the table” are important is that they are associated with overall better diet quality among adolescents (Burgess-Champoux, Larson, Neumark-Sztainer, Hannan, & Story, 2009; Cinotto, 2006).

A longitudinal study showed that regular family meals defined as 5 or more meals eaten together by all or most family members during middle school was associated with better quality diets and would continue into high school 5 years later (Burgess-Champoux et al., 2009). Despite the positive association between family meal patterns and diet quality, the results of the study exposed a dramatic decline from 60% to 30% in regular family meals from early adolescence to middle adolescence between 1998 and 2004. However, a smaller-scale pool of participants (n=277) in a previous study conducted in the United States showed 30% of the participants reported “they were too busy to eat together as a family most nights” and that more than half reported sitting down together for dinner 4 or more times a week (Boutelle, Birnbaum, Lytle, Murray, & Story, 2003). Another important outcome of the Burgess-Champoux study that is consistent with national findings is that overall dietary intake of the subjects did not meet the 2005 Dietary Guidelines for Americans. The research indicates that promoting frequent family

meals and food preparation skills can improve overall diet. Parenting style (ie, authoritative, authoritarian, permissive, and neglectful), and its association with frequency of family meals was also analyzed in Project EAT (Berge, Wall, Neumark-Sztainer, Larson, & Story, 2010). The findings confirmed the postulations that parenting styles have an effect on the regularity of family meals but only between opposite sex child/parent dyads.

Actually, the authoritative maternal and paternal parenting styles had the most effect on occurrence of family meals as it brought structure, expectations, and "warmth" to the home environment promoting planned family meals. Moreover, one must take into account a common trend practiced in the American culture which is television watching during mealtimes. Boutelle et al. (2003) also support the finding that frequency of family meals is positively associated with healthier dietary habits but to be aware that television viewing during mealtimes was associated with lower fruit and vegetable consumption and higher fat consumption. Furthermore, about 40% of families surveyed reported "having the television on at least 4 times per week during dinner," indicating family meals may be shared together but in a setting that stimulates negative eating health behavior.

Conversely, over 90% of adults surveyed considered dinnertime a pleasant experience for the family, a time to "connect" and "talk"(Boutelle et al., 2003). Most recently, in a meta-analysis comprised of a large sample of children and adolescents, results showed that the frequency of shared meals was significantly related to healthier lifestyle patterns in children and adolescents. Those sharing a family meal 3 or more

times per week increased their probabilities of being of normal weight range and having less disordered eating patterns (Hammons & Fiese, 2011).

The above mentioned studies concern dietary habits of adolescents and how family meal patterns affect these. Little research has been conducted on young adults and how their meal structures are associated with dietary quality. This was the goal of Larson et al. (2009) to investigate the attitudes and behaviors related to meal patterns of young adults averaging the age of 20 years old. The findings of the study suggest that social eating was significantly associated with greater intake of fruit and vegetables including dark-green and orange vegetables. Contrastingly, "eating on the run" was positively associated with higher intakes of unhealthful foods and beverages such as soft drinks and fast food. A large portion of young adults participating in the study claimed enjoying eating with others and that it was important to eat regular meals and to have "social eating experiences" and most agreed to eating dinner with other people "usually." Yet, over half of females and half of males "somewhat or strongly agreed" they ate on the run and these foods included convenient foods. The authors therefore recommend providing young adults with ways to prepare simple meals to meet the demands of time constraints (Larson, Nelson, Neumark-Sztainer, Story, & Hannan, 2009).

Food Preparation and Cooking Skills

The principal investigator of the previous study examined food preparation behaviors and cooking skills of young adults (Larson et al., 2006). The data for this study were also drawn from the Project EAT (Eating Among Teens) but only 18 to 23 year olds were included in the analysis. Overall the majority of the young adults did not perform food preparation and purchasing behaviors which comprised of five different

categories/questions (1) “bought fresh vegetables” (2) “wrote a grocery list” (3) “prepared a green salad” (4) prepared a dinner with chicken, fish or vegetables,” and (5) “prepared an entire dinner for two or more people.” Their dietary intake notably total fat, saturated fat, calcium, fruit, vegetables (green and yellow) and grains were assessed, and perceived skills and resources in food preparation and purchasing were measured. Most of the young adults considered their skills and resources for food preparation to be satisfactory but several important barriers were noted.

Obstacles to food preparation included “not having enough time” and “limited cooking skills.” Those who scored high in food preparation behaviors consumed five servings of fruits and vegetables daily and tended to meet the Healthy People 2010 dietary objectives more easily. Adequacy of resources and skills were inversely correlated with socio-economic status and race, low or low-middle and African American or Hispanic, respectively (Larson et al., 2006). Females emerged from this study as being more involved in cooking and purchasing. Additionally, female students in a similar study also had higher mean overall food preparation knowledge compared to their male counterparts (Byrd-Bredbenner, 2001). The findings of Larson et al. (2006) revealed that university courses focusing on teaching skills to prepare easy and economical meals can have a positive dietary impact on young adults who struggle with time constraints and cost to preparing meals.

According to Byrd-Bredbenner’s 2004 study on college students cooking abilities and attitudes, undergraduate students’ overall food preparation knowledge was relatively low but surprisingly, most of them overestimated their knowledge level. The researcher explains the discrepancy could pose challenges to nutrition professionals as young adults

who believe they are knowledgeable in cooking preparation would not seek to improve their skills, as they already perceive themselves to be "well informed." Those who rated themselves average or poorly are more inclined to learn how to expand their competences in the kitchen. Only 15% of students surveyed could accurately assess their food preparation knowledge showing the incongruity between self-ratings and actuality.

In an unpublished research paper, female college students' food preparation skills were analyzed (Soliah, Walter, & Antosh, 2006). According to the study, the frequency of eating away from home was inversely correlated with cooking ability. The two most significant barriers to food preparation were lack of cooking skills, already mentioned in subsequent research and 'no interest in learning,' a novel finding. Interestingly, dishes requiring low food preparation abilities were prepared more frequently than those requiring more culinary skills. However, when students were proficient in cooking a specific food, they were no barriers to performing these activities.

Cooking Classes in a University Setting

The Oklahoma Cooperative Extension Service (Brown & Hermann, 2005) evaluated the development of a new program using cooking classes to improve fruit and vegetable intake and food security among both youth and adults. The program covered eight cooking classes in two months and raised interest and participation by allowing tasting of the food prepared. The number of fruit and vegetable servings consumed per day increased from pre- to posteducation for both groups. The average number of fruit servings per day increased from 1.1 to 2.3 and 1.5 to 2.1 for youth and adults, respectively. Similarly, the average number of vegetable servings increased significantly in the two target groups.

The second objective of the program was met as improvements in safe food handling were also observed among youth and adults. Perhaps the most important change of behavior detected was that the majority of youth and almost half of adults reported eating a new fruit or vegetable and preparing them in a new way indicating that exposure to a variety of new foods improves the quality of the overall diet. Therefore, programs that allow hands-on cooking experiences and tasting increases fruit and vegetable intake and safe-handling practices.

A study conducted in Colorado investigated the effectiveness of a hands-on cooking class in a college setting in contrast to a cooking demonstration only (Levy & Auld, 2004). The researchers assessed the differences in students' knowledge, attitudes, and behaviors towards cooking pre and post intervention and demonstration. The majority of students stated "they knew how to cook and how to grocery shop." Both groups witnessed a positive shift in confidence using various cooking techniques while the hands-on cooking class had a more significant change. Brown et al. (2011) also found that between the beginning and the end of the semester a positive shift in self-efficacy to prepare vegetables in college students attending a nutrition course.

Incorporating cooking classes in a college setting demands greater financial resources, planning and space and is not always feasible for an introductory nutrition course. To overcome this barrier, two instructors at Brigham Young University incorporated a "cook-an-entrée" assignment into a basic nutrition class (Brown & Richards, 2010). Students were required to prepare an entrée with at least three ingredients: "a protein, a starch, and a fruit or non-starchy vegetable" and have it evaluated for nutrient content and tasted by another classmate for full credits. Overall,

almost all of the students recognized the ease and simplicity of preparing a healthful meal and intended to prepare the entrée again.

More recently, the use of television has been used as an education tool to disseminate nutrition and cooking information to college students. Clifford, Anderson, Auld, and Champ (2009) developed a series of *Good Grubbin'* 15-minute cooking shows based on the Social Cognitive Theory targeting collegiates living off campus in a western university. Information was gathered previously to assess the needs and challenges of students with meal planning and cooking while the main objective of the study was to increase fruit and vegetable intake. A Registered Dietitian was assigned to perform the cooking shows and select a guest student to assist with the demonstration and share their nutritional struggles demonstrating self-efficacy. Viewers were given the opportunity to learn about preparing, shopping, and planning balanced meals while the guest students experienced hands-on learning.

The outcomes of the study were generally positive as improvements in knowledge and self-efficacy were noted in the intervention group when compared to the control group. Nevertheless, improvements in cooking motivators, barriers, and self-efficacy did not carry on at follow-up and fruit and vegetable intake did not increase considerably. An encouraging report indicated more than half of participants reported changing their eating habits after viewing the episodes and would continue to watch *Good Grubbin'* if offered. The use of technology for providing nutrition education may be cost-effective (Clifford, Anderson, Auld, & Champ, 2009).

First-Year Experience

First-Year Seminars, also known as First-Year Experience classes are courses offered to newly admitted students to enhance their 'academic and social integration' into higher education institutions (University of South Carolina, 2013b). First-Year seminars have been an integral part of American academia since the late 1880s. However, a small Kentucky college offered the first "for-credit" seminar in 1911. First-Year seminars did not increase in popularity until the 1970s. The University of South Carolina introduced the first modern "first-year" seminar in 1972 and remains the leader in college first-year seminar research and development. New student seminars give freshmen the opportunity to interact with senior students and build rapports with faculty and staff members therefore creating a supportive environment during college.

The latest data from the 2009 National Survey on First-Year Seminars show that approximately 87% of responding colleges and universities from across the United States offer some type of first-year seminar (University of South Carolina, 2013a). Seminars across the United States differ in their content and method of delivery but overall have an essential common goal to increase student retention and subsequent academic performance (Goodman & Pascarella, 2006). Retention rates are important to higher institutions as they are indicative of academic quality (Porter & Swing, 2006). Among the 10 recommendations in the report from the National Resource Center for The Freshman Year Experience, seminars must be small classes, credit-earning and full-semester long courses involving faculty and upperclassmen in order to be successful (Cuseo, 1991).

According to Joseph Cuseo, first-year seminars are an important component of University and college curricula to reduce first-year college attrition (Cuseo, 1991).

Retention rate is defined as the percentage of students enrolled in a defined year who return the following year to continue their studies. Currently, the retention rate for 4-year institutions is approximately 79% and 45% of first-time, full-time and part-time students, respectively. Retention rates are lower for 2-year institutions and vary according to locations and type of institutions from 60 to 80% (public versus private). Back in 1986, about 40 of every 100 college newly admitted student dropped out of college and never received a college degree (Cuseo, 1991). Clearly, the first year of college, regardless of type of institution, is a critical period to intervene to prevent permanent withdrawal from higher education and subsequently prevent raised costs of higher education.

Researchers in Maine assessed the effect of a first-year seminar on student academic success defined as a higher mean GPA and retention and concluded that overall retention was not higher for students taking a first-year seminar versus a first-year transition course. However, students reported having a better experience and being more involved with campus activities when taking a first-year seminar (Barton & Donahue, 2009). Previous studies investigated specific areas of first-year seminars to determine what affects intentions to persist among college students (Porter & Swing, 2006). A striking finding of Porter and Swing's study highlights only two of the five measures which were directly related to 'intention to persist' and included study skills and health education. First-year seminars covering health topics are positively received by students. The authors speculate that students may be more interested in 'self-maintenance' since they are living away from home for the first time and are not perceived as "cognitive beings."

Research suggests that eating habits and weight gain during college years may contribute to obesity rates in adulthood. Students may not gain 15 pounds the first year of college but studies positively show that a significant number of students gain weight (between 3 to 9 pounds) during the first two years of college. Studies also show substantial gaps between recommended fruit and vegetable intake and actual fruit and vegetable consumption and the high costs associated with not consuming fruits and vegetables. Factors mentioned repeatedly in the literature influencing adults' dietary choices are time constraints, cost/convenience, and taste. Lack of cooking skills has also been reported as a major barrier to food preparation and should thus be an educational target of colleges and universities across the United States. The following study evaluates the effectiveness of a 16-week long first-year college seminar cooking course on student's self-efficacy in food preparation skills and dietary behaviors.

CHAPTER III

METHODS

The Center for Teaching and Learning at Mississippi State University has offered First-Year Seminars as part of the First-Year Experience since 2008 and has been successful as students and faculty members continue to embrace the program. In fall 2012, over 20 different departments across campus offered seminars enrolling over 600 students from various majors. Freshmen were given the opportunity to select a First-Year Seminar related to their major, or on a diverse topic unrelated to their major to enhance overall learning experience and join the 'academic culture' at Mississippi State University. First-Year Seminars at the University are expected to integrate discussions and/or events related to Maroon Edition, a book-reading program requiring all newly admitted students to read a common book selected by the University.

The FNH 1001-Cooking Basics: *Iron Chef Bully* seminar provided the opportunity for Mississippi State University (MSU) freshmen to enroll in an experiential learning cooking class offered by the Department of Food Science, Nutrition, and Health Promotion and funded by the Center for Teaching and Learning through the Office of the Provost and Executive Vice President. Five hundred dollars were provided each semester for kitchen supplies and food purchasing. Every semester, beginning fall 2008, a maximum of 32 students enrolled in the first-year seminar due to limited kitchen laboratory space and to meet the university's first-year seminar policy of minimum of 20

students per course. The 50-minute class met on campus once a week over a 16-week long semester and students earned one course credit hour. Students from a variety of majors were enrolled in this course since the beginning of the program. Students were required to be classified as a freshman in order to participate. The course was taught by a Registered Dietitian with the assistance of graduate and undergraduate students majoring in Nutrition. The principal investigator assisted and was a co-teacher in fall 2010 and 2011, and spring 2011. Staff members and other faculty in Food Science, Nutrition, and Health Promotion were occasionally invited as guest speakers. The main objectives of the course were stated in the syllabus as follows:

At the conclusion of the course students will have an opportunity to:

1. Identify basic equipment used in food preparation.
2. Demonstrate basic cooking fundamentals and techniques.
3. Experience new foods and flavors.
4. Utilize time management skills in food preparation.
5. Understand the importance of food safety and sanitation.

The first three weekly activities met the first, second and fifth objectives as students were introduced to cooking terms, kitchen equipment, proper measuring techniques, knife skills, and cutting techniques. A stir-fry food demonstration introduced students to new foods and flavors and demonstrated the cutting and sautéing of various vegetables.

Furthermore, “mise en place” was demonstrated to show students how to manage time in the kitchen effectively and efficiently by having “everything in its place” before cooking as the French term implies. The importance of food safety and sanitation was

strongly emphasized during the introductory lecture such as proper hand-washing techniques, dishwashing, proper knife-handling, avoiding cross-contamination, and the importance of safe food handling and the food temperature danger zone.

Iron Chef Bully students were also introduced at the beginning of the semester to the term 'locavore' which emphasizes the consumption of locally grown fruits and vegetables in season and subsequently minimizing one's carbon footprint and supporting local communities and farmers. The following week focused on identifying different herbs and spices and what the difference between the two entails. Students also became acquainted with sensory evaluation techniques by learning to correctly evaluate the appearance, consistency, flavor, aroma, and composition of various food products by human senses. They learned to use descriptive terms used in sensory evaluation of foods to describe the various herbs and spices presented to them. This activity was conducted by a food scientist from the Department of Food Science, Nutrition, and Health Promotion.

The food scientist also demonstrated in a separate class session dedicated to "Milk and Cheese," on how to compare appearance, consistency, flavor, aroma, and composition of various commercial milk products and textures of various cheeses that are available on the market. Students were able to become familiar and taste-test different varieties of cheeses and milk products and how to evaluate them correctly. The importance of dairy consumption was highlighted through the demonstration of calcium jars to educate students on the association of calcium and osteoporosis.

Each weekly assignment consisted of a culinary demonstration concentrating on a food group followed by students dividing into groups of 2, 3 or 4 in eight individual

laboratory kitchens to practice techniques they had just observed. Herbs and Spices, Flavors, Starch and Cereals, Milk and Cheese, Fruits, Eggs, Salads and Salad Dressings, Vegetables, Yeast Breads, Quick Breads; Meat/Poultry/Fish and Meat Alternates are topics that were covered during the course of the semester. Each student was required to journal about weekly activity related to one of the topics.

Each group or kitchen was either assigned the same recipe or a different/modified version of the original one. For example, for egg cookery, each lab was responsible for making a quiche and four different types of quiche were selected: Quiche Lorraine also known as Ham and Swiss Cheese Quiche, Sausage Quiche, Four-Cheese Quiche and Spinach Quiche.

Before the end of class, each group presented their dish by placing it on a table in front of the classroom to provide an opportunity for every student to taste the food prepared by each group. Each student was encouraged to taste every dish presented unless not permitted for religious or medical reasons.

Since the launch of FNH 1001-Cooking Basics: *Iron Chef Bully* seminar, 240 students have successfully completed the course. A copy of the course syllabus can be found in Appendix A. On the first day of classes, each student voluntarily completed a self-efficacy pretest adapted from a validated questionnaire (Domel et al., 1996) and used previously in a similar study conducted on children evaluating their knowledge in regards to food consumption and preparation, and physical activity (Hill, 2009). The pretest can be found in Appendix B. In spring 2012, a follow-up electronic survey consisting of 46 items was designed using Survey Monkey to evaluate whether participation in a 16-week first-year college seminar cooking course increased students' self-efficacy in food

preparation skills and dietary behaviors utilizing the same questions as the pretest to compare pretest and follow-up survey.

Questions 13-28, and 33 from the pretest were repeated in the follow-up survey and a copy of the follow-up survey can be found in Appendix C. Questions related to demographics were added to the follow-up survey including age, race, gender, and student classification. A final optional question of the follow-up survey allowed students to share any additional thoughts about the course and have been included in Appendix D. As an incentive, students who completed the electronic follow-up survey received a $10 gift-card. The completion of the electronic survey indicated the student's consent to use data from the pretests and the follow-up survey.

A convenience sample of 28 students who were enrolled in FNH 1001-Cooking Basics: *Iron Chef Bully* seminar during fall semester 2008 and who did not participate in the pretest were invited via email invitation by Survey Monkey to complete a pilot survey to test the validity of the follow-up survey. The latter students received a $10 gift-card as well upon completion of the pilot survey. In addition, the follow-up survey was reviewed by numerous experts in the field and the results and comments of the pilot survey were used to refine the final follow-up survey.

Students (n=212) were initially contacted by email via Survey Monkey (Appendix E) to participate in the research study and those who did not complete the survey were cordially reminded by email no more than 3 times to complete the follow-up survey if they had missed the opportunity the first time.

The study was approved by the institution's Institutional Review Board for the Protection of Human Subjects (IRB) in 2012 (Appendix F). Descriptive statistics were

analyzed using the Statistical Package for the Social Sciences, version 20.0 (SPSS Inc, Chicago, Ill) and statistical analyses were conducted using SAS software (SAS 9.2). Statistical significance was set at $p<0.05$. McNemar's test for correlated proportions was used for self-efficacy questions 29 to 45 in the follow-up survey, the same questions used in the pretest relating to self-efficacy of fruit, vegetable, dairy, and whole grains consumption. For questions, 11 through 16 related to students' experience with the course with "yes" and "no" as the possible answer were computed to observed proportions and confidence intervals. The test determined the likelihood of choosing same responses before and after *Iron Chef Bully*.

A sign test was used to analyze questions 20 and 22 through 28 to determine whether the null hypothesis could be rejected. The null hypothesis in this case is that there is no significant change between abilities before and after class participation related to time management skills, cooking techniques, knife skills, food and sanitation skills, selecting fresh and ripe fruits and vegetables, following a recipe, and using kitchen equipment.

CHAPTER IV

RESULTS AND DISCUSSION

The instrument was administered online through Survey Monkey during spring 2012. Two hundred and twelve students completed the pretest and were selected to receive a follow-up survey. Thirty-four students' net IDs were invalid resulting in a sample size of 178 students who received an online invitation to participate in the study. Participants were invited to sign on to the website at their convenience and 82 students (46%) completed the survey in a single session.

In total, 78 students completed all 46 questions of the online follow-up survey in spring 2012. Four respondents were excluded due to incomplete surveys. Approximately 85.9% of respondents were female (n=67) and 14.1% were male (n=11) (Table 1). In this sample, white female students were predominant in numbers; however, these results were expected since the majority of participants of *Iron Chef Bully* were female. The results on gender were also very comparable to recent large-scale studies on college students' health in the United States.

Eighty-four percent of respondents were white, while 11.5% were African American, and almost 3% of respondents selected from multiple races of which 1% were Hispanic (Table 1), which is comparable to enrollment data at Mississippi State University and national data (Mississippi State University, 2010). The mean age of respondents was 21.05 years old, ranging from 19 to 25 years of age at the time of the

survey, which is consistent with similar studies (Brown et al., 2011; Levy & Auld, 2004). Only one individual was 25 years of age and considered the oldest respondent. All subjects with the exception of one were still enrolled at Mississippi State University during spring 2012 and were enrolled in a variety of majors from various departments (data not shown here). As can be seen in Table 1, the current academic classification of respondents was relatively evenly distributed between freshman, sophomore, junior, and senior, with 15.4%, 26.9%, 26.9%, and 30.8% represented, respectively.

Table 1 Demographics of *Iron Chef Bully* Seminar

Age (follow-up)	**Frequency (n)**	**Percent (%)**
19	7	9%
20	20	25.6%
21	22	28.2%
22	22	28.2%
23	6	7.7%
24	0	0%
25	1	1.3%
Gender		
Male	11	14.1%
Female	67	85.9%
Race		
White	66	84.6%
Black or African American	9	11.5%
From Multiple Races	2	2.6%
Hispanic	1	1.3%
Academic Classification (follow-up)		
Freshman	12	15.4%
Sophomore	21	26.9%
Junior	21	26.9%
Senior	24	30.8%

This study and those conducted previously on first-year seminars clearly show how participation in a first-year experience class can positively impact students' academic careers (Goodman & Pascarella, 2006; Porter & Swing, 2006). The vast

majority of respondents (93.6%) reported that this class did help them transition from high school to college while only 5.1% stated otherwise (Table 2). Factors influencing students integration in the university environment/culture included 'learning the importance of a healthy diet,' 'working in a small group,' 'making new friends,' 'interact with professors,' 'learning how to cook by myself,' 'easy/fun class,' and finally 'hands-on class.' Students' comments further strengthened this finding with statements such as "*It was a fun class to ease me into college freshman year*" and as another student shared "*I really enjoyed this class. I got to meet people and really enjoyed the hands-on experience. It was so much fun and easy*" (see Appendix D). Porter and Swing speculated that first-year seminars focusing on health education among other topics tend to positively influence students persistence into second year of college.

Of those who responded to the survey, a respectable number (67.9%) declared that this has been their only nutrition course while 32% (n=25) stated that they have taken an additional course or more related to nutrition in college (see Table 2). In a similar study conducted at Colorado State University involving sophomore students, 67.7% of subjects had taken a nutrition class while only 32.3% had taken a cooking class previously (Levy & Auld, 2004). In a typical week, 46.2% (n=36) of respondents reported not watching any cooking shows while the remaining respondents agreed to watching from 1 to 5 or more hours (Table 2).

When asked to identify where they learned to cook the majority of respondents identified a relative followed by First-Year Experience: *Iron Chef Bully*, and lastly a friend (data not shown here). Numerous studies on food habits of college students have identified family members as being the primary source for recipe sources or the first

places young adults learned to cook (Byrd-Bredbenner, 2001; Davy et al., 2006; Hertzler & Bruce, 2002; Levy & Auld, 2004). In Hertzler and Bruce's study, a fourth of the participants named a cooking class at school and cookbooks as a primary source for learning how to cook. Furthermore, a promising finding noted in Davy's et al. study (2006) is that almost half of students surveyed (n=286) "reported receiving most of their nutrition knowledge from classes."

Table 2 General Questions related to Nutrition Practices

How many nutrition courses have you taken in college (First-Year Seminar, Cooking Basics: Iron Chef Bully)?	**n**	**(%)**
This has been my only Nutrition course	53	67.9
One additional course	14	17.9
Two additional courses	9	11.5
Three or more additional courses	2	2.6
Do you feel that Iron Chef Bully helped you transition from high school to college? If so, what factors contributed to your transition?	**n**	**(%)**
This class did *NOT* help me transition from high school to college	4	5.1
This class did help me transition from high school to college*	73	93.6
In a typical week, how many hours of cooking shows do you watch?	**n**	**(%)**
0 hours	36	46.2
1-2 hours	29	37.2
3-4 hours	6	7.7
5+ hours	7	9

Note: Percents may vary due to response frequencies
*Factors not listed here

Self-efficacy questions developed in the pretest were used again in the follow-up survey have been included in Table 3, had the optional responses of either "not sure" assigned a value of (1) or "sure" assigned a value of (2) and were analyzed using McNemar's test. A shift from "not sure" response to "sure" shows a positive change in

dietary behaviors between before class and after class participation. Table 3 lists the total percentage of responses for each question.

Table 3 McNemar's Analysis for Pretest and Follow-up Responses

Question	Pretest (%)		Follow-up (%)	
How sure are you that you can…	**Not Sure**	**Sure**	**Not Sure**	**Sure**
Fruit				
eat 1/2 cup of fruit at home once a week?*	2.6	97.4	14.1	85.9
eat 1/2 cup of fruit at home most days?*	16.7	83.3	42.3	57.7
eat 1 1/2 cups of fruit at home once a week?*	10.3	89.7	21.8	78.2
eat 1 1/2 cups of fruit at home most days?*	33.8	66.2	58.4	41.6
Vegetable				
eat 1/2 cup of vegetables at home once a week?*	19.5	80.5	6.5	93.5
eat 1/2 cup of vegetables at home most days?	39.0	61.0	35.0	64.9
eat 1 1/2 cups of vegetables at home once a week?	36.4	63.6	37.7	62.3
eat 1 1/2 cups of vegetables at home most days?	70.1	29.9	70.1	29.9
Whole grains				
eat 1 serving of whole grains at home once a week?	1.3	98.7	6.5	93.5
eat 1 serving of whole grains at home most days?	20.8	79.2	31.2	68.8
eat 6 servings of whole grains at home once a week?	33.8	66.2	42.9	57.1
eat 6 servings of whole grains at home most days?	72.7	27.3	72.7	27.3
Milk				
drink 1 cup of milk at home once a week?*	11.7	88.3	27.3	72.7
drink 1 cup of milk at home most days?	37.7	62.3	45.4	55.6
drink 2 cups of low-fat milk at home once a week?	27.3	72.7	40.3	59.7
drink 2 cups of low-fat milk at home most days?	53.3	46.7	58.4	41.6

Note: * Significant level at $p<0.05$
Not Sure=1 and Sure=2
Percents may not equal to 100 due to rounding

A review of Table 3 indicates a significant difference was observed for all questions related to self-efficacy in fruit intake from pretest to follow-up ($p<0.05$). However, despite a large number of respondents expressing confidence in fruit intake, 14.1% vs 2.6% of respondents felt less confident at follow-up survey than they did at pretest. The same declines in self-efficacy are detected for all the following categories of fruit intake questions. *Iron Chef Bully* participants were exposed to a wider variety of

vegetables than fruits. Previous research has shown that fruit intake is more prevalent than vegetable intake (Chung & Hoerr, 2005) and that food preparation involvement among young women was directly associated with fruit intake but does decline as adolescents enter adulthood (Larson et al., 2008). Participants of the seminar were only involved in one activity related to fruit preparation and this may explain the lower confidence in fruit intake before and after the seminar. Respondents may have also realized over the course of the semester that they may not have been eating the recommended amount of daily fruit intake and thus were more inclined to respond "not sure." However, when students were questioned if the class had directly an effect on their fruit and vegetable consumption since taking the class, 66.7% responded positively (see Table 5).

A positive and significant finding that can be noted is that confidence in eating half a cup of vegetables at home once a week increased from 80.5% to 93.5% from pretest to follow-up. Nonetheless, only 29.9% of respondents were 'sure' that they could eat one and half cups of vegetables at home most days. Recent research has shown that an effective way to promote vegetable intake is to increase vegetable variety (Meengs, Roe, & Rolls, 2012) and allow taste testing during preparation (Brown et al., 2011; Meengs et al., 2012). In Brown's et al. (2011) study, the exposure to a new vegetable such as asparagus proved to be very effective at shifting self-efficacy into a positive dietary behavior change such as increased vegetable intake. In the current study, as noted in Table 4, the vast majority of respondents (83.3%) reported using a recipe from *Iron Chef Bully* and 22 students (data not shown here) selected roasted asparagus as one of the recipes used after participation in the seminar.

Table 4 Questions with Significant Effects related to *Iron Chef Bully* Seminar

Have you prepared (a) recipe(s) from Iron Chef Bully Seminar since taking the class?	**n (%)**
I have *NOT* prepared any recipe(s) from Iron Chef Bully	12 (15.4%)
I have prepared a recipe(s) from Iron Chef Bully	65 (83.3%)
Are there food(s) that you disliked before Iron Chef Bully but now purchase/prepare/cook and eat because of the class?	**n (%)**
None	29 (37.2%)
Yes*	48 (61.5%)

Note:*all foods selected were grouped into the 'Yes' category

Four questions were related to whole grain consumption and no statistically significant changes between pretest and follow-up were found. The majority of students reported being confident in eating one serving of whole grains at home once a week before taking the class and after participating in the class (98.7% vs 93.5%, respectively). For most days, 46 students reported confidently eating one serving of whole grains at pretest and follow-up. Further examination of table 4 indicated that when the amount of servings increased in the questionnaire, fewer students reported eating six servings of whole grains once a week or most days before and after the class (40.2% vs 55.8%, respectively). Conversely, a question on the follow-up survey, available in Table 5, asked the question about whole grain consumption in regards to whether the class had a direct effect on eating more whole grains and 55.1% of the respondents (n=43) felt that their consumption had increased since taking the class.

Participants were exposed to a variety of whole grain products during the semester such as whole-wheat pizza, quinoa, cream of wheat, oatmeal, brown rice, buckwheat, and cracked wheat and several students selected these options when asked "are there food(s) that you disliked before *Iron Chef Bully* but now

purchase/prepare/cook and eat because of the class? If so, please select those foods from the list below" (see Table 5).

A study on whole grain consumption among collegiate subjects was conducted in 2011 using a comparable sample size to the current research (n=80). The results showed an increase in whole grain consumption by 38% from the beginning to the end of the semester after an interactive introductory nutrition course demonstrated the importance of whole grains intake and its relation to disease prevention (Ha & Caine-Bish, 2011). When students are exposed to new foods, given hands-on experience, and are informed on the health benefits of consuming whole grains, research shows a positive shift in dietary behavior.

Four questions associated with dairy consumption were addressed in the pretest and follow-up survey. Only one significant change was observed with dairy consumption where the majority of students (88.3% [pretest] versus 72.7% [follow-up]) responded "sure" to drinking one cup of milk at home once a week at pretest and follow-up. No substantial differences were observed for the remaining questions associated with dairy consumption. In addition, when students were asked if *Iron Chef Bully* class had influenced their total dairy intake, more than half (57.5%) of respondents indicated "no" (Table 5). Overall, students in this study did not meet the national recommendations of minimum of three servings a day of low-fat or fat-free milk a day for young adults which is consistent with other published studies on dairy consumption among college students (Poddar, Hosig, Anderson, Nickols-Richardson, & Duncan, 2010). Only 34 participants reported drinking 1 cup of milk at home most days while only 23 participants stated drinking 2 cups of low-fat milk at home most days.

Findings from the current study are similar with previous studies targeting young adults in consuming more dairy as calcium deposition is still occurring in this population group while dairy intake is declining as this group ages (Poddar et al., 2010; Poddar et al., 2009). In Poddar's earlier study (2009), only 4% of students consumed the recommended amount of total dairy per day. Alarmingly, young adults are known for unhealthy dietary behaviors such as low dairy intake. Poddar et al. (2010) claim that low-fat dairy consumption can contribute to weight maintenance and should be included in health interventions in university settings. *Iron Chef Bully* seminar addressed the benefits of consuming calcium rich foods but only during one class period and was undoubtedly not sufficient to change dietary intake of collegiate adults.

Table 5 Dietary Behavior Changes associated with *Iron Chef Bully* Seminar

Question	**Number of Yes Responses**	**Number of No Responses**
Are you eating more whole grains because of *Iron Chef Bully* Seminar?	43 (55.1%)	35 (44.9%)
Are you eating more fruits and vegetables because of *Iron Chef Bully* Seminar?	52 (66.7%)	26 (33.3%)
Are you eating/drinking more dairy products because of *Iron Chef Bully* Seminar?	33 (42.3%)	45 (57.7%)
Have you purchased new kitchen equipment/utensils because of *Iron Chef Bully* Seminar?	32 (41%)	46 (59%)
Have your knife skills improved because of *Iron Chef Bully* Seminar?	64 (82.1%)	14 (17.9%)
Have you become more adventurous in trying new foods because of *Iron Chef Bully* Seminar?	66 (84.6%)	12 (15.4%)

Note: Total (n=78)

Table 6 reports the statistical findings of questions in the follow-up survey assessing students' confidence in food preparation skills 'before' *Iron Chef Bully* and 'now' and were analyzed using a sign test. Possible answers were on a 3- point scale from "not at all confident' (0), "a little confident" (2), to "very confident" (3). Data were overwhelmingly positive. It is interesting to note that all questions related to food preparation skills witnessed a highly significant statistical change in confidence between before class and after ($p<0.001$).

Table 6 Students' Self-Reported Confidence in Food Preparation Skills

Question	**Not at all confident**		**A little confident**		**Very confident**	
How would you rate your…	**Before (%)**	**Now (%)**	**Before (%)**	**Now (%)**	**Before (%)**	**Now (%)**
cooking skills*	30.0	0	51.3	48.7	18.7	51.3
time management skills in the kitchen*	37.5	2.5	46.3	56.3	16.3	41.3
cooking techniques*	38.8	0	48.8	45.0	12.5	55.0
knife skills*	50.0	2.5	43.8	52.5	6.2	45.0
food safety and sanitation skills*	17.5	0	52.5	16.3	30.0	83.8
ability in selecting fresh, ripe, "in season" fruits or vegetables at the grocery store*	29.5	5.1	55.1	48.7	15.4	46.2
ability to follow a recipe*	5.1	0	48.1	12.7	46.8	87.3
ability to use food preparation equipment*	16.9	1.3	54.6	32.5	28.6	66.2

Note: Scale of 0 to 2 with 0=Not at all confident, 1=A little confident, and 2=Very confident
*Significant level at $p<0.05$
Percents may not equal to 100 due to rounding

A significant number of students showed a positive shift in confidence of cooking skills after taking *Iron Chef Bully* Seminar. Indeed, 48 students (60%) reported either being "not at all confident" to a "little confident" or "a little confident" to "very confident" before and after. Not a single participant stated they were "not at all confident" in cooking at the time of the follow-up survey. Similarly, 68.8% of

respondents (n=55) and 53.2% (n=41) felt their confidence increased in cooking techniques and in using food preparation equipment before and after the class, respectively.

Students were instructed on how to use time management skills in the kitchen by implementing the mise en place technique common in the culinary world and differences between before and after class were statistically significant as well ($p<0.001$). While 37 students stated being "very confident" at following a recipe before Iron Chef Bully, many (n=30) shifted from being "a little confident" to "very confident" with following a recipe after exposure to the class. *Iron Chef Bully* seems to have strengthened students' ability in following food preparation instructions. Moreover, the seminar introduced the meaning of including a locavore concept into one's daily diet and how to select fresh, ripe, "in season" fruits and vegetables and 36 students (46.1%) reported they were very confident in performing these tasks after class.

As can be seen in Table 6, one question addressed safe food handling and was highly significant ($p<0.001$) using a sign test. Thirty-four students shifted from being "a little confident" before class to being "very confident" after class in their food safety and sanitation skills. Limited research about college students' food safety knowledge and attitude is available. Only a few recent studies on this topic have focused on the outcomes of interventions on college students' food safety knowledge and overall, have been successful at influencing behavior change and beliefs of young adults, which are consistent with the current study (Yarrow, Remig, & Higgins, 2009). Conversely, other studies have showed that undergraduate students report high levels of confidence in their ability to handle food safely but in reality lack the knowledge to perform these tasks

reiterating the need for more food safety interventions targeting young adults as they will become future caregivers (Abbot, Byrd-Bredbenner, Schaffner, Bruhn, & Blalock, 2009; Stein, Dirks, & Quinlan, 2010).

One question at follow-up survey addressed confidence in knife skills before and after the class and results show a highly significant change before and after ($p<0.001$). Twenty-six students reported being "not at all confident' before *Iron Chef Bully* to "a little confident" after the class while 19 students reported being "a little confident" before to being "very confident" after. Furthermore, Table 5 shows that when students were asked if their knife skills had improved because of *Iron Chef Bully*, a significant amount of participants responded "yes" (82.1%). To further strength this finding, a few students commented openly at the end of the questionnaire and stated "*I loved the Cooking Basics class. It taught me things about cooking that I still remember today like the ways to properly cut different things,*" and others even declared "*This class was most helpful in knife skills. I learned how to chop garlic and herbs.*"

The vast majority of students (84.6%) also agreed that they have become more adventurous in trying new foods because of Iron Chef Bully and is reinforced with statements such as "*This was an amazing course that fueled my desire to want to cook more often and try new foods.*" Additionally, as another student points out "*It really did help me branch out in my variety of foods I eat*" (see Appendix D).

A major strength of the study was its uniqueness as no research to date has been published on a college first-year cooking course seminar addressing food preparation skills of young adults. Additionally, the response rate was respectable in part due to a

monetary incentive. Qualitative data collected in the survey strengthened the study as it showed direct positive outcomes/comments from students.

The study has however several limitations. First, the sample was a convenient sample and comprised of mostly female freshmen and therefore not representative of the general student population, however the sample represented adequately the participants of *Iron Chef Bully*. Nevertheless, the results are similar to large-scale health studies conducted on college students across the United States. Second, a control group was not selected which would have identified the normal variations of food preparation skills and eating habits of students throughout their college years. In addition to this, students who enrolled in the cooking seminar class may already have been interested in learning about healthy eating and were already health-conscious and self-motivated explaining their enrollment in the class. Furthermore, changes in self-efficacy in cooking skills and knowledge were self-reported and perceived and thus may have been exposed to potential error or bias toward socially desirable outcomes. Another limitation of the instrument may have been that it was not sensitive enough to detect differences between before and after participation in the course.

To infer health nutrition behavior changes based solely upon participation in a first-year college seminar would not be reasonable as other factors may come into play. Students may be exposed to new foods and flavors through family, friends, and/or other social settings, and maturity may also have increased between freshman year and senior year. Finally, another limitation and strength of the study were that the sample was affected by time as the sample represents different students' attitudes at different times. Also, the time elapsed between pre and follow-up survey were different among

subsamples; students who took the class four years ago may not remember recipes than those who took it last semester.

In spite of these limitations, we can conclude First-Year Seminar- Cooking Basics: *Iron Chef Bully* as an effective nutrition education tool at improving food preparation skills among college students. The strongest effects were observed in specific areas such as trying new foods and flavors and knife skills and as one student boasts: "*This was an amazing course that fueled my desire to want to cook more often and try new foods.*"

CHAPTER V

CONCLUSION

This research has demonstrated that a hands-on or experiential learning food preparation course targeting freshmen from various backgrounds in a higher education institution resulted in changes in food preparation skills that may have influenced positive health outcomes. Providing an environment during collegiate years that fosters healthy eating habits and basic food preparation skills may be warranted and has not been studied sufficiently in the literature.

Students in this study felt that a first-year seminar *Iron Chef Bully* enabled them to explore new foods and flavors and gave them the confidence and skills to engage in cooking activities. Additionally, several goals set by university administrators for implementing first-year seminars were met in this study since many students agreed that *Iron Chef Bully* helped them transition from high school to college. Students felt they could build relationships with their peers and seniors, and establish rapports with faculty.

No previous study to date has examined the effectiveness of a first-year college seminar in changing food preparation skills and dietary behaviors of young adults. The results are promising for nutrition professionals as a growing number of young adults are not meeting the daily dietary recommendations for fruits and vegetables, dairy, and whole grain consumption. It is an accepted fact that a healthy diet will reduce risks for chronic diseases and will prevent obesity complications.

It would be beneficial to observe current dietary behaviors and food preparation skills of students from freshman year to senior year to fully understand how students' eating habits develop throughout their college years. College courses that provide experiential learning and tasting prove to be beneficial in changing food habits and could be replicated in different settings including schools, wellness and religious centers. When constrained by space and costs, food demonstrations may be reasonable.

Future research should consider the potential for additional variables such as social and environmental factors influencing self-efficacy in fruit, vegetable, dairy, and whole grain consumption. Additional topics including menu planning, grocery shopping tips, and quick breakfast ideas could be beneficial to young adults entering college.

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APPENDIX A

FNH 1001 FIRST YEAR SEMINAR - COOKING BASICS: *IRON CHEF BULLY*

COURSE SYLLABUS

Mississippi State University
College of Agriculture and Life Sciences
Department of Food Science, Nutrition, and Health Promotion
FNH 1001 First Year Seminar – Cooking Basics: Iron Chef Bully - Section 02
Spring 2011
Course Syllabus

FNH 1001-02 First Year Seminar - Cooking Basics: Iron Chef Bully

Time of Class: M 12:00 – 12:50 am
Classroom: Moore 104
Credit: 1 hour
Instructors: Sylvia H. Byrd, PhD, RD, LD
Office Room Number: 251 Herzer
Office Phone: 662-325-0919
E-Mail: shb5@msstate.edu
Office Hours: T, TH 10:00-11:00 am and by appointment

Graduate Teaching Assistants (TA): Ingrid Kobler
Student Assistant: Jane Anderson
Kelsey Shanklin

Course Description: Healthy eating doesn't have to be difficult or cost a fortune. Students will have fun learning through lecture, demonstration and hands-on practice, basic cooking fundamentals and techniques. These skills will help students be more versatile, creative, and experienced with food as well as developing skills that can be used everyday.

Text: None

Instructional Objectives:

To provide a variety of learning experiences and teaching strategies that:

1. Encourage students to take responsibility for their own learning by identifying their personal learning objectives.
2. Promote participation by all students.
3. Take into account individual learning needs.
4. Provide basic food and nutrition content appropriate to individuals represented in the class.
5. Respect and support the individuals represented in the class in their personal study of foods and nutrition.
6. Promote a climate conducive to learning and one, which encourages students to question and expand learning beyond the classroom environment.
7. Foster a spirit of cooperation, collaboration, and a life-long love of learning.

Course Objectives:

At the conclusion of the course students will have an opportunity to:

1. Identify basic equipment used in food preparation.
2. Demonstrate basic cooking fundamentals and techniques.
3. Experience new foods and flavors.
4. Utilize time management skills in food preparation.
5. Understand the importance of food safety and sanitation.

TOPICS TO BE COVERED:

I. Introduction
   A. Kitchen Equipment/Utensils
   B. Cooking Terms
   C. Knife Skills
   D. Herbs and Spices
   F. Measuring

II. Foods
   A. Fruits
   B. Vegetables
   C. Milk and Cheese
   D. Meat, Poultry, and Fish
   E. Eggs
   F. Salads and Salad Dressings
   G. Starch and Cereals
   H. Yeast Breads
   I. Quick Breads
   J. Cakes and Cookies

III. Application of Cooking
   A. Meal Planning
   B. Grocery Store Shopping
   C. On a Budget
   D. In the Dormitory
   E. Food Safety and Sanitation
   D. Diet and health

Student Activities:

- Assignments

Course Policies:

Attendance:
Students are expected to attend all scheduled classes. Class attendance will be taken each class period. **Students who arrive late or leave early will be considered absent for that day.** Regardless of the cause of the absence, the student is responsible for materials and notes covered or assigned during the absence. Students who miss class will be counseled on the benefits of attending class.

Communication with Instructor:
Students are encouraged to communicate with the instructor when there are questions concerning any aspect of the course. It is the responsibility of the student to call back if the instructor is unavailable. All discussions concerning grades and progress in the course will be conducted in the instructor's office by appointment **NOT** in the classroom, over the phone, or via e-mail.

A free social networking and microblogging service that enables users to send and read messages known as *tweets*. Tweets are text-based posts of up to 140 characters displayed on the author's profile page and delivered to the author's subscribers who are known as *followers*. Senders can restrict delivery to those in their circle of friends or, by default, allow open access. Users can send and receive tweets via the Twitter website, Short Message Service (SMS) or external applications. While the service itself costs nothing to use, accessing it through SMS may incur phone service provider fees. You can follow me FOODTEACH.

Cell Phones and Other Electronic Devices:
It is against University policy to use cell phones, beepers, etc. in class. Students may inform family and friends that University Police Department will relay emergency situations to students. Electronic devices must be set to quite mode and stored during class.

University Policies:
Academic Operating Policy and Procedures (AOP) located at the following URL
http://www.msstate.edu/dept/audit/mainindex.html will be followed in this course.

Academic Add/Drop Policy 12.01:
Academic Misconduct 12.07:
Academic Accommodations for Students with Disabilities 12.35:

MSU Honor Code:

Mississippi State University has an approved Honor Code that applies to all students. The code is as follows:

"As a Mississippi State University student I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do."

Upon accepting admission to Mississippi State University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor Code. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the MSU community from the requirements or the processes of the Honor Code.

For additional information please visit: http://www.msstate.edu/dept/audit/1207A.html

Methods of Instruction:

A variety of teaching strategies are planned to enhance student learning and to create interest and greater participation by all students. Self-directed study will be encouraged and students are free to contribute to the discussions and to tailor special assignments to meet their personal learning objectives. Lecture, discussion, in-class group activities, and additional outside reading as needed to tailor the class to needs and interest of the students will be applied in this course. *No study sheets or summaries will be provided in preparation of tests, exam, or assignments.*

Assessment of Concepts and Skills/Student Progress
Basic knowledge will be assessed by performance of students on quizzes and a final exam. Applied knowledge will be assessed by performance of students on daily assignments.

Unannounced Quizzes: The instructor reserves the right to give short unannounced quizzes on material covered in the class or on material assigned for the date on which the quiz is given. Unannounced quizzes will be given only if the need arises to stimulate greater interest in class preparation and/or to encourage class attendance. Quizzes will not exceed 10 points.

Evaluation of Student Progress:

Evaluation of Student Progress:

Final Exam	15 %
Lab Journal	25%
Class Participation and Attendance	60 %

Grading Scale:

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = 59 or below

TENTATIVE SCHEDULE

DATE	TOPIC
January 10	Introduction: Basics: Cooking Terms and Knife Skills
January 24	Kitchen Equipment, Measuring, Recipes
January 31	Herbs and Spices, Flavors – Sensory Analysis
February 7	Fruits
February 14	Vegetables
February 21	Milk and Cheese
February 28	Eggs
March 7	Starch and Cereal
March 21	Meat, Poultry, and Fish
March 28	Salads and Salad Dressings
April 4	Yeast Breads
April 11	Quick Breads
April 18	Final Exam

APPENDIX B

IRON CHEF BULLY PRETEST

"How sure " Questions* **Name_____**

FYE Spring 2011 **MSU ID_____**

Please read each statement and circle the response that best describes how sure you are that you can do it. There are no wrong answers. (CIRCLE ONLY ONE RESPONSE FOR EACH QUESTION.)

How sure are you that you can…

1. make a vegetable salad with help?	not sure	sure
2. make a vegetable salad by yourself?	not sure	sure
3. make a fruit salad with help?	not sure	sure
4. make a fruit salad by yourself?	not sure	sure
5. select fresh, ripe, "in season" fruits or vegetables at the grocery store?	not sure	sure
6. follow a recipe with help?	not sure	sure
7. follow a recipe by yourself?	not sure	sure
8. use food preparation equipment required to prepare a recipe?	not sure	sure
9. apply cooking techniques, such as braise, in food preparation?	not sure	sure
10. try new foods and flavors?	not sure	sure
11. cut up vegetables and eat them with a dip for a snack at least once a week?	not sure	sure
12. cut up vegetables and eat them with a dip for a snack most days?	not sure	sure
13. eat a half cup of fruit at home once a week?	not sure	sure
14. eat a half cup of fruit at home most days?	not sure	sure
15. eat one and a half cups of fruit at home once a week?	not sure	sure

OVER

16. eat one and a half cups of fruit at home most days?	not sure	sure
17. eat a half cup of vegetables at home once a week?	not sure	sure
18. eat a half cup of vegetables at home most days?	not sure	sure
19. eat two and a half cups of vegetables at home once a week?	not sure	sure
20. eat two and a half cups of vegetables at home most days?	not sure	sure
21. eat one serving of whole grains at home once a week?	not sure	sure
22. eat one serving of whole grains at home most days?	not sure	sure
23. eat six servings of whole grains at home once a week?	not sure	sure
24. eat six servings of whole grains at home most days?	not sure	sure
25. drink one cup of milk at home once a week?	not sure	sure
26. drink one cup of milk at home most days?	not sure	sure
27. drink two cups of low fat milk at home once a week?	not sure	sure
28. drink two cups of low fat milk at home most days?	not sure	sure
29. walk, bike or be very physically active for 30 minutes once a week?	not sure	sure
30. walk, bike or be very physically active for 30 minutes most days?	not sure	sure
31. walk, bike or be very physically active for 60 minutes once a week?	not sure	sure
32. walk, bike or be very physically active for 60 minutes most days?	not sure	sure
33. safely handle and prepare foods?	not sure	sure
34. select a healthy choice when eating away from home?	not sure	sure

*Adapted from Domel, Thompson, Davis, T. Baranowski, Leonard, J. Baranowski, Health Education Research, 1996: 11: 299-308

APPENDIX C

IRON CHEF BULLY FOLLOW-UP SURVEY

FNH 1001 Cooking Basics: Iron Chef Bully

***1. What is your NetID?**

***2. Are you male or female?**

- Male
- Female

***3. In what year were you born?**

***4. What is your race?**

Some other race (please specify)

***5. Are you enrolled at Mississippi State University?**

- Yes
- No

***6. What is your current classification?**

Other (please specify)

***7. What is your major?**

Other (please specify)

***8. How many nutrition courses have you taken in college (First-Year Seminar, Cooking Basics: Iron Chef Bully)?**

FNH 1001 Cooking Basics: Iron Chef Bully

***9. Do you feel that Iron Chef Bully helped you transition from high school to college? If so, what factors contributed to your transition?**

- ☐ This class did not help me transition from high school to college
- ☐ Making new friends
- ☐ Interact with professors
- ☐ Choosing a major
- ☐ Attending cultural events promoted by this class
- ☐ Learning the importance of a healthy diet
- ☐ Learning how to cook by myself
- ☐ Easy/Fun class
- ☐ Hands-on class
- ☐ Working in a small group
- ☐ Other

Other (please specify)

***10. Have you prepared (a) recipe(s) from Iron Chef Bully Seminar since taking the class? (Choose all that apply)**

- ☐ I have not prepared any recipe(s) from Iron Chef Bully
- ☐ Individual Apple Tart
- ☐ Fruit Smoothie
- ☐ Quiche Lorraine
- ☐ 4-Cheese Quiche
- ☐ Spinach Quiche
- ☐ Sausage Quiche
- ☐ Southern Biscuits (from scratch)
- ☐ Pizza Dough (from scratch)
- ☐ Aunt Alison's Salad
- ☐ Pasta Salad
- ☐ Broccoli Salad
- ☐ Classic Tuna Salad
- ☐ Creamy Coleslaw (from scratch)
- ☐ Shredded Carrot Salad with Raisins
- ☐ Marinated Vegetable Salad
- ☐ Potato Salad
- ☐ Congealed Salad
- ☐ Spaghetti Squash with Tomato Sauce
- ☐ Herbed Carrots
- ☐ Roasted Beets
- ☐ Roasted Butternut Squash
- ☐ Roasted Butternut Squash Seeds
- ☐ Roasted Asparagus
- ☐ Roasted Sweet Potatoes
- ☐ Vegetable Stir-Fry
- ☐ Bok Choy Stir-Fry with Onions
- ☐ Green Bean Casserole
- ☐ Hawaiian Chicken Salad
- ☐ Mixed Green Salad with Gorgonzola cheese
- ☐ Granola
- ☐ Tabouleh
- ☐ Buckwheat Pancakes
- ☐ Beef Stew
- ☐ Other

Other (please specify)

FNH 1001 Cooking Basics: Iron Chef Bully

***11. Are you eating more whole grains because of Iron Chef Bully Seminar?**

- Yes
- No

***12. Are you eating more fruits and vegetables because of Iron Chef Bully Seminar?**

- Yes
- No

***13. Are you eating/drinking more dairy products because of Iron Chef Bully Seminar?**

- Yes
- No

***14. Have you purchased new kitchen equipment/utensils because of Iron Chef Bully Seminar?**

- Yes
- No

***15. Have your knife skills improved because of Iron Chef Bully Seminar?**

- Yes
- No

***16. Have you become more adventurous in trying new foods because of Iron Chef Bully Seminar?**

- Yes
- No

FNH 1001 Cooking Basics: Iron Chef Bully

***17. Are there food(s) that you disliked before Iron Chef Bully but now purchase/prepare/cook and eat because of the class? If so please select those foods from the list below**

- ☐ None
- ☐ Biscuits
- ☐ Whole-wheat pizza dough
- ☐ Spaghetti Squash
- ☐ Quinoa
- ☐ Cream of Wheat
- ☐ Oatmeal
- ☐ Oats, steel cut
- ☐ Green Beans
- ☐ Carrots
- ☐ Cracked Wheat
- ☐ Brown Rice
- ☐ Buckwheat
- ☐ Beets
- ☐ Butternut Squash
- ☐ Sweet Potatoes
- ☐ Asparagus
- ☐ Bok Choy
- ☐ Whole Milk
- ☐ 2% Milk
- ☐ 1% Milk
- ☐ Brie
- ☐ Seasoned/Fresh Mozzarella
- ☐ Sharp Cheddar
- ☐ Mild Cheddar
- ☐ Gruyère
- ☐ Monchego
- ☐ Parmigiano Reggiano
- ☐ Pecorino Romano
- ☐ Blue Cheese
- ☐ Edam
- ☐ Gouda
- ☐ Herbs and Spices
- ☐ Other

Other (please list all)

***18. How many cookbooks do you own?**

○ None ○ Only 1 ○ 2 or more ○ Too many to count

***19. In a typical week, how many hours of cooking shows do you watch?**

- ○ 0 hours
- ○ 1 - 2 hours
- ○ 3 - 4 hours
- ○ 5+ hours

***20. How would you rate your cooking skills BEFORE Iron Chef Bully and NOW?**

	Not at all confident	A little confident	Very confident
BEFORE	○	○	○
NOW	○	○	○

FNH 1001 Cooking Basics: Iron Chef Bully

***21. Who taught you how to cook? (select more than 1 if applicable)**

- ☐ Relative
- ☐ Friend
- ☐ Teacher
- ☐ Coworker
- ☐ First-Year Seminar: Iron Chef Bully
- ☐ Other
- ☐ Not applicable

Other (please specify)

22. How would you rate your time management skills in the kitchen BEFORE Iron Chef Bully and NOW?

	Not at all confident	A little condident	Very confident
BEFORE	○	○	○
NOW	○	○	○

23. How would rate your cooking techniques BEFORE Iron Chef Bully and NOW?

	Not at all confident	A little condident	Very confident
BEFORE Iron Chef Bully	○	○	○
NOW	○	○	○

24. How would you rate your knife skills BEFORE Iron Chef Bully and NOW?

	Not at all confident	A little condident	Very confident
BEFORE	○	○	○
NOW	○	○	○

25. How would you rate your food safety and sanitation skills BEFORE Iron Chef Bully and NOW?

	Not at all confident	A little condident	Very confident
BEFORE	○	○	○
NOW	○	○	○

***26. How would you rate your ability in selecting fresh, ripe, "in season" fruits or vegetables at the grocery store BEFORE Iron Chef Bully and NOW?**

	Not at all condident	A little confident	Very confident
BEFORE	○	○	○
NOW	○	○	○

FNH 1001 Cooking Basics: Iron Chef Bully

***27. How would you rate your ability to follow a recipe BEFORE Iron Chef Bully and NOW?**

	Not at all confident	A little confident	Very confident
BEFORE	○	○	○
NOW	○	○	○

***28. How would you rate your ability to use food preparation equipment BEFORE Iron Chef Bully and NOW?**

	Not at all confident	A little confident	Very confident
BEFORE	○	○	○
NOW	○	○	○

***29. How sure are you that you can try new foods and flavors?**

- ○ Not sure
- ○ Sure

***30. How sure are you that you eat ½ cup of fruit at home once a week?**

- ○ Not sure
- ○ Sure

***31. How sure are you that you eat ½ cup of fruit at home most days?**

- ○ Not sure
- ○ Sure

***32. How sure are you that you eat 1½ cups of fruit at home once a week?**

- ○ Not sure
- ○ Sure

***33. How sure are you that you eat 1½ cups of fruit at home most days?**

- ○ Not sure
- ○ Sure

***34. How sure are you that you eat ½ cup of vegetables at home once a week?**

- ○ Not sure
- ○ Sure

FNH 1001 Cooking Basics: Iron Chef Bully

***35. How sure are you that you eat ½ cup of vegetables at home most days?**

- Not sure
- Sure

***36. How sure are you that you eat 2½ cups of vegetables at home once a week?**

- Not sure
- Sure

***37. How sure are you that you eat 2½ cups of vegetables at home most days?**

- Not sure
- Sure

***38. How sure are you that you eat 1 serving of whole grains at home once a week?**

- Not sure
- Sure

***39. How sure are you that you eat 1 serving of whole grains at home most days?**

- Not sure
- Sure

***40. How sure are you that you 6 servings of whole grains at home once a week?**

- Not sure
- Sure

***41. How sure are you that you eat 6 servings of whole grains at home most days?**

- Not sure
- Sure

***42. How sure are you that you drink 1 cup of milk at home once a week?**

- Not sure
- Sure

***43. How sure are you that you drink 1 cup of milk at home most days?**

- Not sure
- Sure

FNH 1001 Cooking Basics: Iron Chef Bully

***44. How sure are you that you drink 2 cups of low-fat milk at home once a week?**

- Not sure
- Sure

***45. How sure are you that you drink 2 cups of low-fat milk at home most days?**

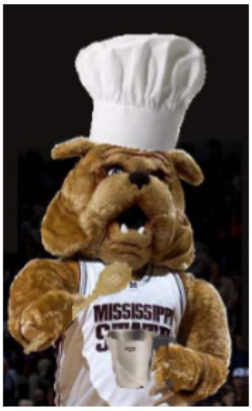
- Not sure
- Sure

46. Do you have any other comments you woud like to share?

Thank you for completing the survey!

To obtain your gift card: please submit an email to Ingrid Kobler with the subject line FNH 1001 to ivk2@msstate.edu stating you have completed the survey and submit an address where to mail the gift card.

Keep Cooking Bulldogs!



APPENDIX D

ADDITIONAL COMMENTS FROM STUDENTS

1. I loved this class. It really did help me branch out in my variety of foods I eat. When I came home from school that summer my parents were complaining because I would make them buy all the ingredients to cook for them. They blamed in all on Iron Chef Bully. But they sure did love the food!
2. I enjoyed Iron Chef Bully. It was a great class. I think that if the class were over an hour would be more beneficial.
3. Very much enjoyed the class.. hope it is offered for many years to come!
4. This was one of my favorite classes I took at MSU!
5. Loved the teacher and the class!
6. This was an excellent and helpful experience!!!
7. The class was wonderful, and I really enjoyed how the assistants also interacted with us (students)!
8. I really enjoyed the cooking basics course when I did take it.
9. This was my favorite class from my freshman year; I met a lot of people and peers that I would not have met otherwise. And, the skills and information have made me very confident in the kitchen. My friends always ask me to select the meal and cook because they know it will be "healthy and awesome!" Loved this course!
10. It was a great class. I wish I could take another one just like it.
11. A very fun class that helps you either learn to cook or fine-tune your current cooking skills.
12. thoroughly enjoyed the class. it was a great addition to my freshman year first semester
13. I loved the Cooking Basics class. It taught me things about cooking that I still remember today like the ways to properly cut different things to how to choose the appropriate milk (the ones that are away from the light in the grocery) It has also make me aware of how much food I tend to throw away!
14. This was an amazing course that fueled my desire to want to cook more often and try new foods.
15. It was a fun class to ease me into college freshman year.
16. I really enjoyed this class. I got to meet people and really enjoyed the hands-on experience. It was so much fun and easy.

17. I do wish we could have cooked more, the first three weeks we cooked during class but then the rest of class we watched the teacher cook. And I would have liked more hands on experience.
18. This class was most helpful in knife skills. I learned how to chop garlic and herbs.
19. Thanks to cooking with you guys before class each day, I feel that I am a much better chef than I was before (and I'm addicted to Brie cheese)! Thank you! Name removed.
20. Iron Chef Bully was the best class I could have taken my freshman year and the skills I learned in the class will stay with me for life.
21. I wish there were more advanced classes like this for upperclassmen. I would like to learn more about cooking.
22. Dr. Byrd was definitely my favorite professor while I was a student at State. She made this class extremely fun and interesting! I loved it!
23. I enjoyed the class and have learned to sauté onions and bell peppers and enjoy them with more things from this class.
24. The class opened my eyes to many new recipes and how easy it is to complete recipes I thought previously were complicated.
25. I had TONS of fun with Iron Chef Bully and it was a great class to take for my first semester of college. Prof. Byrd was super sweet and all the TAs were fun and helpful. I'd definitely encourage others to take FNH 1001. Thank you, Ingrid!

APPENDIX E

EMAIL CONSENT

Dear former *Iron Chef Bully* student~~s~~,

Do you remember how to make Southern Biscuits or Apple Tarts? Do you practice mise en place? We hope *FNH 1001 Cooking Basics: Iron Chef Bully* was a memorable experience and that you have had the opportunity to use the skills you learned in class.

My name is Ingrid Kobler and I am currently a graduate student in the Food Science, Nutrition, and Health Promotion Department. As part of the Master of Science Program, I am required to complete a research project. I was a teaching assistant in First-Year Seminar of fall semester 2010, 2011 and spring semester 2011. As part of the first day of First-Year Seminar class, you completed a pretest for non-research purposes to provide information on your eating habits, cooking skills, and nutrition knowledge.

For my research project, I would like to ask your permission to use that information and ask for your participation in a follow-up survey. If you are willing to participate, please complete the survey found at https://www.surveymonkey.com/s/IRON-CHEF-BULLY. The information you provide will help us determine how participation in a *FNH 1001-Cooking Basics: Iron Chef Bully* can impact eating habits and food preparation skills of college students.

The survey is completely voluntary and you may discontinue your participation at any time. It will take you approximately **five to ten minutes** to answer the survey. **A $10 Wal-Mart gift card will be provided as an incentive to all who complete the survey.** Upon completion of the survey you will be requested to send an email stating you have completed the survey and to submit an address where to mail the gift card. Your information will be confidential and will be kept in a locked drawer in an office on the MSU campus.

If you have any questions about this research, please contact me by email ivk2@msstate.edu or Sylvia Byrd at (662) 325-0919 or by email shb5@msstate.edu. You may also contact the Institutional Review Board about your rights as a participant at (662) 325-3994. We appreciate you taking time to complete the survey.

Completion of the survey indicates your permission to participate in the study.

Sincerely,

Ingrid Kobler, Graduate Assistant

To view the survey, please click the following link: https://www.surveymonkey.com/s/IRON-CHEF-BULLY

APPENDIX F

IRB APPROVAL PAGE

Project Title: First Year Experience

PRINCIPAL INVESTIGATOR'S ASSURANCE

As Primary Investigator, I have ultimate responsibility for the performance of this study, the protection of the rights and welfare of the human subjects, and strict adherence by all co-investigators and research personnel to all Institutional Review Board (IRB) requirements, federal regulations, and state statutes for human subjects research. I hereby assure the following:

The information provided in this application is accurate to the best of my knowledge.

All named individuals on this project have been given a copy of the protocol and have acknowledged an understanding of the procedures outlined in the application.

All experiments and procedures involving human subjects will be performed under my supervision or that of another qualified professional listed on this protocol.

I understand that, should I use the project described in this application as a basis for a proposal for funding (either intramural or extramural), it is my responsibility to ensure that the description of human subjects use in the funding proposal(s) is identical in principle to that contained in this application. I will submit modifications and/or changes to the IRB as necessary to ensure concordance.

I and all the co-investigators and research personnel in this study agree to comply with all applicable requirements for the protection of human subjects in research including, but not limited to, the following:

- Obtaining the legally effective informed consent of all human subjects or their legally authorized representatives, and using only the currently approved, consent form with the IRB approval stamp (if applicable); and
- Obtaining written notification of approval from the IRB before implementation of any changes to the project (except when necessary to eliminate apparent immediate hazards to the subject); and
- Reporting via the Problem Report any unanticipated problem; and
- Promptly providing the IRB with any information requested relative to the project; and
- Promptly and completely complying with an IRB decision to suspend or withdraw its approval for the project; and
- Obtaining continuing review prior to the date approval for this study expires; and
- Granting access to any project-associated records to the IRB to ensure compliance with the approved protocol.

Name of Principal Investigator / Researcher: Ingrid Kobler

Signature: Kobler

ADVISOR'S ASSURANCE (if applicable)

As Advisor, I assume responsibility for ensuring the competence, integrity and ethical conduct of the investigator(s) for this research project. The investigator(s) is/are fully competent to accomplish the goals and techniques stated in the attached proposal. Further, I certify that I have thoroughly reviewed this application for readability and accuracy and the study is clearly described herein.

Name of Advisor: Sylvia H. Byrd

Signature: Sylvia H Byrd