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The Effect of Gender and Status Difference on Saturated Fat Content of Entree Items Chosen by Elementary School-Aged Students

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THE EFFECT OF GENDER AND STATUS DIFFERENCE ON SATURATED
FAT CONTENT OF ENTRÉE ITEMS CHOSEN BY ELEMENTARY
SCHOOL-AGED STUDENTS

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
Food Nutrition and Culinary Sciences

by
Annie Anderson
August 2104

Accepted by:
Dr. Vivian Haley-Zitlin, Committee Chair
Dr. Ellen Granberg
Dr. Margaret Condrasky

ABSTRACT

The purpose of this study was to examine participants in a National School Lunch Program (NSLP), and the effect of gender and/or participation in the NSLP on selection of high saturated fat content entrée items by the students. Nutrition information provided to parents often does not include a profile of the fats offered in school lunch items. This was true of this study's schools. However, new NSLP guidelines focus upon saturated and *trans* fat content in school lunches. The total kcal limit is <30% total fat, and saturated fat is $\leq 10\%$ total kcal, along with 0gms/serving *trans* fat. So, there is a need to monitor the fat profile of foods offered to ensure schools meet the new guidelines. As a part of a large plate waste study, all entrée items served in February 2013 in 11 elementary schools were analyzed for SFAs, MUFAs, PUFAs, *trans* fat, and total fat and total kcal using "best fit" selection criteria with Nutritionist Pro™ nutritional analysis software based upon matching of nutrient content (Kcal, CHO, Protein, Total fat, and Sodium) from the school district and recipes of actual entrée items served. In an offer-based school lunch service, three entrée items/day were served with a constant of vegetarian choice (consisting of cheese stick, yogurt, and cracker product) each day. Student numbers were 5,375 total; with a total of 79,359 purchases with a total of 41,738 purchases were made by males and 37,621 by females. Total "paid", "free" and "reduced" meal selections were 24,654; 50,365; and 4,340, respectively. Point of Sale data collected during the same time period coupled with lunch dietary analysis data is

being used to determine the effect of gender and/or participation in the free and reduced school lunch program on the selection of high saturated fat content entrée items by elementary school aged students. Results: There was no significant difference seen with nutrients with the interaction of gender and participation status. There was no significant difference in gender except for males with a significant difference in monounsaturated fat ($p < .0001$). There were significant differences in total calories ($p = 0.0052$), total fat ($p = 0.0011$), saturated fat free ($p = 0.0028$), and polyunsaturated fat ($p = 0.0015$) with paid status. Significant differences in monounsaturated fat ($p = 0.0007$) and *trans* fat ($p = 0.0015$) were seen with free status. Chi-square analysis assessed the association between gender or participation status and entrée selection and detected significant differences with gender, and with status (participation in NSLP). Conclusion: The means for saturated fat for gender and participation status in this study meet the guidelines of ≤ 10 % of total calories from saturated fat from the school lunch entrée. Male students preferred BBQ and Pizza based entrées more than females. Paid status preferred more chicken entrées and pizza entrées. Free status preferred teriyaki beef dippers and hamburger entrées. Further research needs to be performed on entrée selection and consumption to gather more data on the intake of saturated fat for students participating in the free and reduced NSLP and how much saturated fat is being consumed in lunch time meals.

DEDICATION

I dedicate this work to my parents Carl and Maryanne, and my siblings Ashley, John and Emily. Your boundless love and support gave me the encouragement and inspiration to pursue and reach my goals. I am forever grateful to my parents for instilling in me the pursuit of higher learning and for their support as I accomplished my research. To my boyfriend Jamie, I am forever grateful for your endless love, patience, and belief in me. To my friends, many thanks to you all for your reassurance and support.

I am so thankful for everyone who assisted me along the way on this educational pursuit!

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CHAPTER ONE
INTRODUCTION
Background & Overview

The eating habits and dietary patterns of Americans have dramatically changed over the years. It is important to document and monitor these changes that can affect the health status of Americans. The health and nutrition of children is extremely important to continuously monitor because many of our eating habits develop in early childhood and continue into adulthood. If ingrained eating habits are poor, health complications that lead to chronic disease can occur. The prevalence of overweight in children has increased significantly since the 1970's (Academy of Nutrition and Dietetics, 2008). For children the definition of overweight is $\geq 85^{\text{th}}$ percentile weight for age whereas the definition for obesity is $\geq 95^{\text{th}}$ percentile weight for age group (American Heart Association, 2011). The American Heart Association has stated "We are in an epidemic of excess" (American Heart Association, 2011). Large portion sizes, poor eating habits, and inadequate physical activity all contribute to increasing rates of obesity. Conversely, many of children's nutritional needs are not met since the general public is unfamiliar with of daily requirements for food groups and nutrients of this population. Additionally, there is even less knowledge of appropriate portion size for children. (American Heart Association Statistical Sourcebook, 2011). This is why it is important to monitor and evaluate the foods and portion sizes that are presented to children at school so that nutritional needs are met in age-appropriate portion sizes.

The United States Department of Agriculture (USDA) and the *Dietary Guidelines for Americans, 2010* has provided and documented standards for schoolchildren to facilitate healthy food choices and portions. The Dietary Guidelines for Americans, 2010 and Healthy, Hunger-free Kids Act of 2010 have also influenced many of the nutritional changes currently underway in the National School Lunch Program (NSLP). This program has the most impact in setting standards and assessing the nutritional status and health of school aged children (Li J. & Hooker, 2010).

Reforms to the school lunch program standards were mandated in 2012 and are summarized in the Executive Summary from the Federal Register. The changes included a reduction in saturated fat and *trans* fat in school meals served that additionally met the age-appropriate caloric content (Appendix A). Fat guidelines will now require that lunches contain $\leq 10\%$ of total calories from saturated fat and contain no *trans* fat (Appendices A-C). To assure compliance, an assessment of school meals will be completed every 3 years (Federal Register, 2012). If schools are not found to be in compliance with these nutritional requirements, the USDA will take action (Federal Register, 2012). These requirements highlight the importance of evaluation of the different types of fats supplied in school lunches. The purpose of this study is to assess the association between gender and participation status in the NSLP on the selection of high saturated fat entrée items.

LITERATURE REVIEW

The National School Lunch Program

In 1853 the first government program to provide meals to children attending school was developed in response to an initiative to protect the health and wellbeing of children in the US (Gunderson, 1946). Following several school lunch program iterations, the National School Lunch Program (NSLP) in the US was officially established in 1946 with the National School Lunch Act. The purpose of the NSLP was to provide nutritious meals to all students grades K-12th throughout the United States (Truman, 1946) (National School Lunch Program Fact Sheet; 2013). Currently, the National School Lunch Program (NSLP) serves over 100,000 public and private schools (USDA, 2013). About 31 million children nationally participate in the free or reduced reimbursable school lunch program (Bhatia, Jones, & Reicker, 2011) (USDA, 2013).

Participation in the Free or Reimbursed School Lunch Program

Participation in the Free or Reimbursed School Lunch Program requires meeting federal guidelines. Federal guidelines state that all public or private schools may participate in the NSLP (Food Research Action Center, 2013). There are various ways in which students can qualify for free or reduced school meals. Students can qualify through: “categorical eligibility” {e.g. students fall into a category such as the Supplemental Nutritional Assistance Programs (SNAP) or Head Start programs}; “direct certification” (students live in a household that receives food stamps); “community

eligibility” (students live in a community with an increased percentage of low-income students) or “income-based eligibility” (students receive free or reduced lunches based on household income). For “income-based eligibility”, students are eligible for a free meal if the family income falls below the 130th percentile of the poverty line. A student may receive a reduced priced meal if the family income falls between the 130th and 185th percent of poverty (Food and Nutrition Service, 2013). Students who are in families that are above the 185th percentile for income do not qualify for free or reduced meals but can purchase a full priced meal (Food and Nutrition Service, 2013).

The National School Lunch Program and an Emphasis upon Childhood Obesity

The recent Centers for Disease Control and Prevention’s (CDC) Prevalence of Obesity among Adults: United States, 2011-2012 findings demonstrated that more than 78 million US adults and about 12.5 million children and adolescents were obese (CDC, 2012). Although obesity prevalence is significant in both males and females, and all ethnic groups, there is a higher rate of obesity seen in African Americans, Native Americans and Mexican Americans (Cali & Caprio, 2008).

The prevalence of obesity in America has been increasing in all age groups. In the US, in children aged 6-11, the prevalence of obesity has increased during the years 1980 to 2006 from 6.5% to 17.0%, respectively (Li & Hooker, 2010). Similar results in the same age group were found by Govindan, Gurm, Mohan, Kline-Rogers, Corriveau, Goldberg, DuRussel-Weston, Eagle, & Jackson, (2013): They noted an increase in obesity prevalence from 6.5% to 19.6% in the last 30 years (Govindan et al, 2013). A

cross-sectional analysis of data from the National Health and Nutrition Examination Survey (NHANES) also reported that 16.9% of US children and adolescents were obese in 2009-2010 (Ogden, Carroll, Kit, & Flegal, 2012). Interestingly, in the past decade it has also been reported by the CDC that there was a 43% drop in the rate of obesity in children ages 2-5 (CDC, 2014). Other research by Skinner & Skelton, (2014) that analyzed NHANES data from 1999-2012 in children (n= 26,690) ages 2-19 indicated a significant difference in prevalence of obesity. Their research showed that more severe cases of obesity are increasing in individuals ages 2-19; obesity (P=.03) class 2 obesity (P=.04) class 3 obesity (P=.002) (Skinner & Skelton, 2014). Long-term health problems attendant to the obesity epidemic that once were only seen in older adults are now occurring during much earlier stages of life. Approximately 80% of obese children develop into obese adults (Cali & Caprio, 2008). Obesity in childhood which precedes obesity in adulthood often leads to chronic long-term obesity-related health problems such as type 2 diabetes, Metabolic Syndrome, hypertension, and premature atherosclerotic cardiovascular disease (Circulation, 2014). Preventable, lifestyle-related cardiovascular disease (CVD) is the primary cause of death in the United States (CDC, 2013) (Daniels & Greer, 2008). More than 600,000 deaths/year are related to cardiovascular disease (CDC, 2013).

Obesity and Gender

The health-related effects of overweight and obesity as a function of gender has long been of interest. With different age groups being affected by obesity, gender is an

important aspect to focus on regarding obesity rates in children. The CDC has reported that in children ages 2-18, that > 5 million females were obese and 7 million males were obese (CDC; 2012). In an observational study by Govindan et al, (2013) gender differences in obesity and dietary habits were noted in data collected on 1,714 male and female 6th graders. The students were divided into 4 groups based upon gender and obesity status. Students' questionnaires and biochemical data revealed that non-obese students of both genders had much healthier physiological profiles with lower lipid levels and vital sign. It was also demonstrated that males had a higher prevalence of overweight or obese status than females. Thirty-seven percent of all males were overweight or obese and 18.4% of males were obese. The results for females were 31.1% overweight or obese, and 15.8% obese (Govindan et al, 2013). Similar results in the CDC 2011-2012 report stated that in children, 31.8% (95% CI, 29.1% - 34.7% were overweight or obese and 16.9% (95% CI, 14.9%-19.2%) were obese (CDC, 2014) (Ogden et al, 2014). There were no gender differences found related to obesity ($p=0.77$) but age differences were detected ($p < 0.001$, ANOVA).

In Govindan et al (2013), research on obesity, obese males and females both had worse physiologic results (vital signs) and lab values (lipid levels) compared to non-obese students (Govindan et al, 2013). Specifically, in obese males vs. non-obese males, total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides were all worse ($p < .001$). Govindan et al, (2013) found that obese females had higher fasting glucose levels than non-obese females. Govindan et al, (2013) also found that for both males and females, participation in school lunch was a predictor of obesity (OR 1.29, 95% CI 1.01-

1.64; OR 1.27, 95% CI 1.00-1.62, respectively) leading to speculation that participation in school lunch was linked to obesity. However, since this research did not investigate the nutritional content of NSLP lunches, no conclusion can be drawn regarding the relationship of participation and obesity. Govindan et al, (2013) research indicated that this might reflect that students who qualified for participation in NSLP have a lower SES and outside factors such as participation in physical activity may influence obesity prevalence. Interestingly, the consumption of ≥ 2 milk servings/day was a factor that decreased the prevalence of obesity in females (OR 0.81, 95% CI 0.67–0.98). In this study, the proposed effect of milk intake upon obesity in females was related to the substitution of milk for sugary beverages. (Govindan et al, 2013).

Obesity, Race and Ethnicity

Race and ethnicity have also been investigated as non-modifiable risk factors for childhood overweight and obesity. A recent report in *Circulation* (2014) stated that the current percentage of children aged 6-11 years that were overweight and obese in non-Hispanic whites boys and non-Hispanic white girls was 30% and 25%, respectively. The percentage of overweight and obese Non-Hispanic black boys was 41% and that of non-Hispanic black girls was 44%. The percentage of overweight and obese Mexican American boys was 39% and that of Mexican American girls was 40% (Circulation, 2014). Other data on race and obesity from the CDC reported that in 2011-2012 the prevalence of obesity in children was highest in Hispanics (22.4%) and non-Hispanic

blacks (20.2%) compared to non-Hispanic-whites (14.1) (CDC, 2014) (Ogden, Carroll, Kit, & Flegal, 2014). Identification of genetically at risk groups for obesity could lead to earlier interventions that target modifiable risk factors that could be effective in decreasing childhood obesity.

Obesity and Socioeconomic Status (SES)

The effects and complications of obesity can be related to SES which can affect access to healthy foods for both adults and children (Li & Hooker, 2010). Research presented in *Circulation* (2014) stated that among higher unemployment, low-income, low education households that obesity is more common in all age groups (Circulation, 2014). The National School Lunch Program (NSLP) has developed into a venue where nutritional data can be assessed and is becoming a center for intervention (Li & Hooker, 2010). Li & Hooker's, (2010) research results from nutritional and physical activity surveys determined that different aspects of a child's environment and SES may affect the prevalence of childhood obesity. Their research determined that children who qualified for the NSLP/SBP and went to public school had a significantly higher BMI (BMI is about 0.725kg/m² higher) than students going to private schools (P<.001). Also, students who qualified for the NSLP/SBP had a 4.5% higher chance of being overweight than students who do not qualify for the NSLP/SBP (P<.001) (Li & Hooker, 2010). Govindan et al, 2013 indicated that the obesity differences seen in males and females in school aged children, participating in the NSLP, might reflect that students who qualified

for participation in NSLP have a lower SES and outside factors may influence obesity prevalence (Govindan et al, 2013).

Childhood Obesity Statistics in South Carolina

South Carolina statistics on obesity show that 15.2% of 2-5 year olds are overweight (85th to <95th percentile BMI-for-age); and 12.8% of 2-5 year olds were obese (\geq 95th percentile BMI-for-age) (Centers for Disease Control and Prevention South Carolina State Nutrition, Physical Activity, and Obesity Profile, 2012). In SC, > 1 in 4 children, ages 2-5, who are low-income are either overweight or obese (South Carolina Department of Health and Environmental Control, 2011). Specifically, in Anderson County, the obesity rate is 12.9% for low income preschool children (Anderson County profile on Nutrition, Physical Activity, and Obesity Statistics, 2011).

A report by CDC (2012), stated that 15% of adolescents (children < 18 yrs.) were overweight and 16.7% were obese in SC in 2010. This indicates that an opportunity exists for targeting weight gain in children during the years children are in school. Therefore, it is important to assess weight gain during childhood as well as food intake patterns. It is well known that an increase in caloric intake can lead to overweight or obesity. Fat has more kilocalories per gram fat consumed (kcal/gm), and also different types and forms of fat have been shown to be less healthy than other forms. Monitoring the intake of foods (and their nutrients) consumed by children may help determine which modifiable behavioral factors are most important to assess and monitor related to the rates of overweight and obese US children.

Dietary Guidelines for Americans, 2010

The main goal of the *Dietary Guidelines for Americans, 2010* is to “*summarize and synthesize knowledge about individual nutrients and food components into an interrelated set of recommendations for healthy eating that can be used by the public*” (U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2010*). Two main ideas being promoted through the USDA Dietary Guidelines are to 1) “maintain calorie balance over time to achieve and sustain a healthy weight” and to 2) “focus on consuming nutrient-dense foods and beverages” and consuming within a healthy eating pattern (USDA, 2010 p viii-xi).

There are several “Key Recommendations” that the *Dietary Guidelines for Americans, 2010* have set. These recommendations have direct applicability to the school lunch program and are as follows:

Balance calories to manage weight. This concept is meant to focus on prevention of overweight and obese by the use of “improving eating and physical activity” (USDA, 2010). Its main focus is on “calorie regulation” and “physical activity to monitor weight” (USDA, 2010). This is an important concept on which to focus and to implement during childhood to reinforce healthy eating and physical activity patterns to reduce the onset of adulthood-related chronic diseases. This is seen through set calorie ranges for different age groups for lunch meals that the NSLP has recommended (Appendix C).

Foods and food components to reduce. This concept is focusing on reducing intake of different nutrients. For example “reducing sodium intake to ≤ 2300 mg for adults

and 1500mg for those age ≥ 51 or who have chronic diseases” (USDA, 2010). Other recommendations are to “reduce calories to $\leq 10\%$ from saturated fat”, “ ≤ 300 mg /day of dietary cholesterol”, “reduce *trans* fatty acids to minimal amounts by limiting foods that contain them”, and “reduce intake of refined grains, solid fats and added sugars”. The message is also to use “moderation” (USDA, 2010). This approach is also important to reinforce during childhood - to reduce and use moderation when consuming certain foods in order to help reduce adverse health effects associated with obesity-related chronic disease.

Foods and nutrients to increase. This recommendation focuses on eating healthy and balance of nutrients within food groups. The message encourages increasing fruit and vegetable consumption, and eating a “variety of fruits and vegetables particularly dark-green, red and orange vegetables” (USDA, 2010). Other recommendations are to “make half of your grains whole grains”, increase the consumption of milk, cheese and other dairy products that are “fat free or low fat”. Other recommendations are to “substitute solid fats with oils” (USDA, 2010). This idea also is important during childhood to help increase the consumption of foods and nutrients that are vital to growth and maintaining a healthy eating pattern. The Federal Register summaries the USDA and The Healthy Hunger-Free Kids Act (HHFKA) guidelines that include specific requirements on total fat, saturated and *trans* fat for meals offered to children in the NSLP. They also have recommendations on foods such as fruits, vegetables and whole grains to increase.

Building healthy eating patterns. This slogan encourages using moderation and variety to meet nutritional needs over time (USDA, 2010). Again, this concept is

important during childhood to reinforce a balanced consumption of foods and nutrients shown to be critical in the maintenance of a healthy lifestyle which is designed to prevent the onset of chronic diseases in adulthood.

The *Dietary Guidelines for Americans, 2010* is broken up into multiple chapters (six, total). Each chapter targets the recommendations listed above and gives key recommendations with more detailed descriptions of ways to improve health status. As a part of these guidelines, recommendations for appropriate caloric intake with energy expenditure have been set for school-age children (USDA, 2010), (Appendix D and E). The food groups that should be consumed for each age group are based on these different caloric levels (USDA, 2010 p76, 78, 79). The caloric levels are in turn used for developing recommended meal calorie ranges for children in the NSLP.

Understanding the individual components of the *Dietary Guidelines for Americans, 2010* is important because the federally assisted NSLP must meet the *Dietary Guidelines for Americans, 2010* under the current guidelines of operation. The *Dietary Guidelines for Americans, 2010* dietary advice for Americans incorporation into the NSLP provides specific recommendations such as ‘no more than 30% of kcal as fat’. However, the decisions of the types of foods and the methods of preparation and the meal planning systems are made at the local and state school levels. This could allow the inadvertent introduction of additional fats or calories. By assessing the saturated fat content of NSLP foods provided to children it can be determined if these students are meeting the *Dietary Guidelines for Americans, 2010* recommended amounts of saturated fat, for instance.

Energy Yielding Nutrients

The energy yielding nutrients are carbohydrates, proteins and fats, with carbohydrates providing 4 kcal/gm, proteins providing 4 kcal/gm, and fats 9 kcal/gm. As the energy yielding nutrients in foods, the proportions of these macronutrients can greatly influence the caloric content found in a given food. However, for a healthy diet and meal pattern, as well as the growth and development needed in school aged children, adequate consumption of each of these nutrients is vital. Substitution of fat calories with carbohydrate calories can yield a lower calorie food. However, inclusion of dietary fats with health promotion properties, such as monounsaturated fats and polyunsaturated fats, is vital. A more recent focus has been on the replacement of solid fats, such as saturated fats and *trans* fats, with fats that are liquid at room temperature, the monounsaturated and polyunsaturated fats. Monitoring of saturated fats and *trans* fats are a focus of the new school lunch program guidelines. This new focus is extremely important to ensure that schools that participate in the NSLP meet saturated fat guidelines for items served to children and that children are consistently selecting entrée choices within the guidelines for saturated fat.

Nutritional Standards for Children

The NSLP is a federally supported nutritional meal program for children and this program's mission is to "deliver nutritious meals to students throughout the United States" (National School Lunch Program Fact Sheet, 2013). The USDA, Department of Health and Human Services, Institute of Medicine (IOM), Academy of Nutrition and Dietetics and American Heart Association all have had influence on the dietary

recommendations adopted for children. There are recommended macronutrient ranges for carbohydrates, fat and protein for school aged children.

For carbohydrates, the recommended range is 45-65% of total calories (for ages 1-18); whereas, for total fat, it is 25-35% (ages 4-18) of energy, and for protein it is 10-30% (for children ages 4-18) for school aged children (Academy of Nutrition and Dietetics, 2008) (USDA; 2010). Saturated fat should be “< 10% of total calories” for children of all ages (USDA, 2010 p76) (Macronutrient ranges seen in Appendix D). Recommendations for appropriate caloric intake with energy expenditure as well as each of the food groups have also been set for school age children. This information also comes from the *Dietary Guidelines for Americans, 2010*. The food groups that should be consumed for each age group are based on different caloric levels.

An estimated 1400 kcal /day is the recommendation for sedentary males ages 6-8. For females, 1400 kcal /day was estimated for sedentary females age 8-10, and moderately active females age 4-6. The food groups that should be consumed are as follows for a 1400 kcal/ day meal plan: Fruits 1 ½ cup, Vegetables 1½ cup, Grains 5 oz.-eq., Protein foods 4 oz.-eq., Dairy 2 ½ cup, Oils 17g and the maximum Saturated Fats and Added Sugars (SoFAS) limit for calories is 121 (USDA, 2010 p 78-79).

An estimated 1600 kcal /day is recommended for sedentary males age 9-10, for moderately active males age 6-8, and active males age 4-5. Also, a 1600 kcal/day was estimated for sedentary females age 11-13, for moderately active females age 7-9, and for active females age 5-6. The recommended food groups for 1600 kcal per day are: Fruits 1 ½ cups, Vegetables 2 cups, Grains 5 oz.-eq., Protein foods 5 oz.-eq., Dairy 3 cups, Oils 22

g, maximum SoFAS limit calories 121 (USDA , 2010p 78-79). These requirements are provided in Appendices A, B and C. (Food groups for 1400 kcal/day and 1600kcal/day seen in Appendix E).

Food Nutrient Composition and the National School Lunch Program

Fat Recommendations

National school lunch and breakfast programs may contribute a large portion of a child's nutrition and have a dietary impact on children that participate in school nutrition programs (Crepinsek Gordon, McKinney, Condon, & Wilson, 2009). Therefore, monitoring the dietary fat contained in these lunches is important to the overall health of school lunch participants. Data from the (USDA) indicated that school lunches provide an average of 35% of calories from fat and 12% of calories from saturated fat (Academy of Nutrition and Dietetics, 2008). A 2012 report by the USDA School Nutrition Dietary Assessment Study IV of the 2009-2010 school year stated that 35% of schools were in compliance with $\leq 30\%$ of total calories coming from fat (USDA, 2012). The position of the Academy of Nutrition and Dietetics on Dietary Fat for Adults is that "dietary fat needs to provide 20-25% of energy with more intake of n-3 polyunsaturated fats and less intake from saturated fat (<10% total calories)" (Academy of Nutrition and Dietetics, 2014). A study by Whitaker, Wright, Finch, Deyo, Psaty, (1993), observed elementary school lunch menus for a period of 6 months in a Washington state school district. They determined that "lower fat entrées" were accessible 23% of days. The researchers defined lower fat entrées as meals containing total fat <30 % total calories and saturated fat <10%

total calorie). Their research also showed that when these nutritional recommendations for total fat and saturated fat were met, 37% of students chose the entrée lower in fat when they were offered the choice. Researchers then increased the offerings of “lower fat entrées” and the “percentage of days” with entrées lower in fat served amplified to 71% (Whitaker et al, 1993). Typically most lunch items did not meet the total fat and saturated fat recommendations (Whitaker et al, 1993). School lunch programs typically offer a variety of different entrées per lunch period and these “lower fat entrée” items often compete for selection with “higher fat entrée” items.

Saturated Fat Recommendations

The structure of Saturated fat is linear meaning that all carbons are fully hydrogenated. This structure allows saturated fats to be solid at room temperature. This form of fatty acids can also have negative health effects which can cause increases in LDL cholesterol. Most saturated fats come from animal sources which can include butter, meats, eggs and processed food sources that come from oils (Academy of Nutrition and Dietetics, 2014). In *Circulation* (2014) it was reported that for youth (children and teenagers) the usual intake of saturated fat was about approximately 11% of calories. About 30-40% of children/teenagers diets contain <10% of calories from saturated fat. According to the National Cancer Institute (NCI) and (NHANES), the top five sources of saturated fat in foods consumed by the US population of all ages from 2005-2006 were “Regular Cheese, 8.5%; Pizza, 5.9%; Grain-based desserts, 5.8%; Dairy desserts, 5.6%; and Chicken and Chicken Mixed Dishes, 5.5%” (National Cancer Institute, 2013). Huth

et al, 2013 hypothesized that the chief food items that provided added sugar, calories, and saturated fat also provide a key source of vital nutrients in the diet (Huth, Fulgoni, Keast, Park, & Auestad, 2013). Using observational data from the What We Eat in American (WWEIA), and NHANES, the research focused on eating habits of Americans and food selections and finding the main food items of “added sugars, calories, and saturated fats” consumed by Americans and what other nutrients they provide. They found that in subjects two years or older, the mean saturated fat intake was 27.7g/day, yielding about 11.4% of total calories consumed from saturated fat. From this study they identified the top 10 saturated fat food items as “Cheese (16.5%), Beef (8.5%), Milk (8.3%), Other fats and oils (8.2%), Frankfurters, sausages, luncheon meats (6.9%), Cake, cookies, quick bread, pastries, pie (6.1%), Margarine and butter (5.8%), Milk desserts (5.1%), Poultry (4.2%) and crackers, popcorn, pretzels, chips (4.0%)”. They estimated that, in an American’s diet, these main foods items amount to an intake of 73.6% from saturated fat, 65.1% from monounsaturated fat, and 52.1% from polyunsaturated fat. It was noted that certain foods such as milk provided saturated fat, but also provide valuable nutrients. Milk was responsible for 49% of vitamin D and 11.6% potassium intake. Cheese, milk and beef as a group, provided 42.3% of vitamin B₁₂. Both cheese and milk combined provided 46.3% of calcium (Huth et al, 2013).

A 2012 report by the USDA School Nutrition Dietary Assessment Study IV of the 2009-2010 school year stated that more than half of schools were in compliance with guidelines for $\leq 10\%$ total calories from saturated fat (USDA, 2012). Which if consuming a 2,000 kcal/day diet means that an intake of 22g/day of saturated fat are recommended.

For a 1400kcal/day or 1600kcal/day diet, intake of 15.5g/day and 17.7g/day respectively are recommended. Meal kcal requirements for grades K-5th required to be between 550-650 kcal (Appendices A-C). This would allow a range of 6.1g- 7.2g of saturated fat/meal. In a study by Hanson & Olson (2013) researchers assessed participation in NSLP/SBP and dietary intake data that was recorded from the NHANES from 2003-2008. Researchers used the Healthy Eating Index-2005 (HEI) to assess diet intake quality. The ages of the children were from 6-17 from grades 1-12. Students that participated in the NSLP/SBP were seen to have poorer totals for saturated fat than those that did not participate in NSLP/SBP. Students with a lower SES that participated in NSLP/SBP had a higher HEI than low SES non participants ($p= 0.025$). Overall dietary saturated fat totals were reduced in higher income students that participated in NSLP only ($p=0.049$) and both NSLP/SBP ($p=0.056$). The researchers proposed that bringing a meal from home contained slightly different items which reduced the amount of saturated fat; the opposite was found in lower income students, and this proposed that meals brought from home were similar in saturated fat found in the school meals. Milk and vegetable intake was higher in the NSLP/SBP participants than nonparticipants; however, whole grain intake was lower. This data indicated that participants in the NSLP/SBP provided lower income participants with a greater total diet than nonparticipants (Hanson & Olson, 2013). This was seen with better total intakes for dairy, meat/beans, and grains.

Saturated Fat and Cardiovascular Disease

Consumption of saturated fat has been associated with an increase in risk for heart disease (Siri-Tarino, Sun, Hu, & Krauss, 2010). It is believed to be associated with cardiovascular disease (CVD) due to the effect on “increasing levels of LDL cholesterol”. Most saturated fats are found in “full fat dairy food products” and “red meats”. As stated before, *The Dietary Guidelines for Americans, 2010* recommends saturated fat be “≤10% of calories”. Recommendations made by the *American Heart Association* have been made to reduce saturated fat content to “≤7 % of total calories” for people with diabetes, heart disease and other chronic diseases. (Siri-Tarino et al, 2010). The 2013 guidelines from the American Heart Association state <10% of calories should come from saturated fat which a person on a 2,000 kcal/day diet should consume no more than 16g from saturated fat (American Heart Association, 2013).

New Guidelines for the National School Lunch Program

USDA Federal Register 2012 Executive Summary

The January 2012 Executive Summary from the Federal Register states that there are several reforms to the requirements for school breakfast and school lunch programs to parallel them with what the Dietary Guidelines for Americans recommendations. These new changes are pursued to increase convenience of and increase the offerings of fruits, vegetables, whole grains, and fat-free and low-fat fluid milk. The changes include a decrease in sodium, saturated fat and *trans* fat in meals served for breakfasts and lunch at school. The new rule also incorporates providing meals that meet the needs of children

within their recommended calorie ranges for age and grade level (Federal Register, 2012).

Increasing the accessibility and offerings of foods includes requiring schools to offer fruits and vegetables as two distinct meal constituents, and offer fruit every day at breakfast and lunch meals. Also, vegetables are to be offered every day at lunch including the “sub groups of dark green, orange, legumes and reducing the amount of starchy vegetables during the week” (Federal Register, 2012). Whole grains should be accessible and “at least half of grains are to be whole grain”. A “meat/meat alternative” is to be obtainable every day as well as milk that is “fat-free and low-fat”. In addition, precise calorie ranges for “age groups and grade levels” are to be used (Federal Register, 2012).

The specific nutrient requirements for meals are to be met through changes in sodium and fat recommendations. Sodium levels are to be decreased to “ \leq Tolerable Upper Intake Levels (UL) that are within Dietary Reference Intakes (DRI) level range of 1,900-2,300mg/day”. Fat guidelines are to be met by offering lunches and breakfasts that contain “ \leq 10% of total calories from saturated fat” and preparing meals with “zero *trans* fat” (Federal Register, 2012).

To meet the requirements of offering meals that meet the needs of children within their recommended calorie ranges for age/gender, a “single food-based menu preparation” this means use of a single food item and more specific “age groups” for meal preparation is required (Federal Register, 2012). A nutritional review of school lunches and breakfasts will define a schools compliance with the new dietary

requirements based on review of menu construction. To ensure compliance, an evaluation by the USDA and state agencies of school lunches and breakfasts will be conducted “every 3 years” for meeting the mandates of Healthy Hunger-Free Kids Act (HHFKA) (Federal Register, 2012).

Healthy Hunger-Free Kids Act

The Healthy Hunger-Free Kids Act (HHFKA) that was passed in 2010 aims to advance the value of the National School Lunch Program (NSLP) meals offered to children nationally. Important changes included the amount of food per day and food/week for food groups and the nutrients provided such as kcal, total fat, saturated fat and *trans* fat. The January 2012 Executive Summary from the Federal Register stated several reforms to the requirements for school lunch programs (Federal Register, 2012). Other modifications were seen in decreasing portion sizes, and increasing vegetable and fruit intake. K-5th grade meal calorie maximum amounts were decided at 650 kcal/meal.

New National School Lunch Program Guidelines and Anderson, S.C. School District 5

Anderson School District 5 participates in the NSLP. Approximately 12,500 students from pre-kindergarten to 12th grade are in this school district. There are 5,375 students in grades pre-kindergarten through 5th grade. The guidelines indicate that all students in grades kindergarten to 5th grade schools that participate in the NSLP must offer one option for each of the five meal components each day: 1) meat or meat

alternative, 2) grain or bread, 3) fruit, 4) vegetable, 5) milk. All schools that partake in NSLP produce menus using nutrition guidelines set by the USDA. Anderson 5 has a Director of Food and Nutrition Services that oversees the menu and nutrition guidelines. Schools in South Carolina need to offer at least two different selections for entrées served at school lunch (CDC, 2007). In Anderson District 5 there are 37 total different entrée items served (Peckham, Kropp, Mroz, Haley-Zitlin, Granberg, Hawthorne, 2013). These entrée items are offered in a menu cycle. Each menu cycle is 5 weeks. Information available pertaining to nutritional content of each of the entree items offered includes the total calories (kcal), fat (grams), carbohydrates (grams) sodium (milligrams), and protein (grams). There are many different vendors that supply different food items to Anderson District 5 (Anderson 5 School District, personal communication, 2013). Anderson District 5 has implemented the new USDA guidelines. Menus are available via the internet and also are given to students to take home each month (Anderson 5 School District). Anderson District 5 main website states “Students must take at least 1 fruit or vegetable among the 3 meal constituents”. This means that they must take at least 1 fruit or vegetable serving/day and they may take more if they choose. The serving size will be $\frac{3}{4}$ -1 cup of vegetables and/or $\frac{1}{2}$ -1 cup of fruit/day. There will be a variety of vegetables “dark leafy greens, legumes, and red/orange vegetables” and “variety of fruit offered”. Whole grains will be “served 50% of the time and will increase to all grains being whole grain in the next 2 years”. Information on saturated fat, polyunsaturated fats, monounsaturated fats, or *trans* fats is not provided. As previously mentioned, according to the requirements of the new NSLP guidelines, saturated fat and *trans* fat will be

monitored on a 3-year cycle. The guidelines aim to keep total fat under 30% total calories and saturated fat $\leq 10\%$ of total calories (Appendix B and C) Total calories/lunch meal are to be within 550-650 kcal (Appendix C). Therefore, tracking of these dietary components has reached new importance.

Assessing saturated fat in NSLP is important to guarantee that children meet the recommended guidelines ($\leq 10\%$ of total calories) set by the USDA and the *Dietary Guidelines for Americans, 2010*. The new recommendations need to be monitored more frequently (every 3 years) because many of these changes have been mandated and must meet these new nutritional requirements (Federal Register, 2012).

Effect of Gender, Socioeconomic status and Participation in National School Lunch Program on Diet

The quality of a person's diet is affected by multiple factors ranging from age, gender, education, and socioeconomic status SES. The review by Darmon & Drewnowski, (2008) stated that many studies involving cross sectional surveys show that foods consumed by adults was unequally spread by SES. Whole grains were typically eaten by subjects with a higher SES while refined grains were typically eaten by individuals with a lower SES. Other research reviewed by Darmon & Drewnowski, 2008 which was related to fat and saturated fat consumption shows that higher levels of saturated fats were consumed by lower SES individuals (Groth, Fagt, & Brondsted, 2001). Two other studies reviewed by Darmon & Drewnowski, 2008 showed no significant difference in types of fat consumed (Lindstrom, Hanson, Brunner, 2000)

(Galobardes, Morabia, & Bernstein, 2001). These studies also reported that there were no differences in intake of fat due to SES. Specifically in Lindstrom et al, (2000) prospective cohort study, researchers looked at 11,837 participants in 1992-1994 through the use of a diet history. Researchers found no significant differences in total, saturated, monounsaturated, or polyunsaturated fat for SES gradients for gender ($p < 0.05$).

Galobardes et al, (2001), noted that there were no differences in SES intake of total fat. This research was a “community-based random sample” of males and females, aged 35 to 74. A 24-hour food frequency questionnaire was used to assess intake and gather other data on social, educational and occupation status. Researchers found that SES was independent of the actual amount of food eaten. They reported that “In order to assess diet intake both education and occupation must be examined in order to assess SES and diet intake” (Galobardes et al, 2001). Another study reported that there are SES differences in dietary intake (Groth et al, 2001). Their research indicated the differences were attributable to level of education. Men with a higher education were seen to have healthier eating habits. This study assessed 852 men and 870 women aged 18-80 years. A 7 day dietary intake record was used along with an interview to gather other information on participants’ background (Groth et al, 2001).

Focus on adult and parents’ food choices can also influence children’s food preference at home and thus choices made at school (Scaglioni, Salvioni, & Galimberti, 2008) (Scaglioni, Arrizza, Vecchi, & Tedeschi, 2011). This is why assessing adult food choices is important. Parents can “create an environment” that can cause poor eating habits to develop in early childhood. These may translate to school food lunch choices

that are poor. Adults and parents have a certain amount of control on what their children consume at home, and it is important to instill good eating habits that will be practiced outside of the home environment. Parental influences can help form children's food preferences. If poor eating habits begin in childhood, this can continue into adulthood and create chronic health problems related to lifestyle choices that can lead to adult hood obesity.

Previously mentioned research by Hanson & Olson, (2013) focused on NSLP/SBP participation. Research indicated that there were differences in intake and SES of students who participated in NSLP/SBP. Decreased intakes of saturated fat and sodium were observed in students with a higher SES.

Research by Robinson-O'Brien, Burgess-Champoux, Haines, Hannan, & Neumark-Sztainer, (2010) analyzed fruit and vegetable consumption in school vs. non-school settings in diverse ethnic cultures and low SES students. Their research showed that the meals provided at school aided in the overall daily intake of fruits and vegetables in low SES and diverse ethnic students. They analyzed data from 103 female and male, 4th-6th grade students from four different schools. Results from a one day 24-hour food recalls showed 20% of students ate ≥ 5 fruit/vegetable serving per day (Robinson-O'Brien et al, 2010). Results also indicated that eating at school provided 54% of all students (regardless of high or low fruit/vegetable intake) with half of their recommended daily fruit/vegetable intake (Robinson-O'Brien et al, 2010). Students that had a low overall fruit/vegetable intake ate a higher proportion of their fruits/vegetables at school than students with a high overall fruit/vegetable intake. This is important for children from

low SES that may not have access to fruit and vegetables outside of meals consumed at school. Males were seen to have a poorer fruit/vegetable intake than females. School lunches may be instrumental in the amount of food groups eaten. A survey study by Caine-Bish & Scheule, (2009) of gender differences in food preferences indicated that males had more preference for “ethnic” foods (ex. tacos and fajitas), “fish”, “beef, pork, and barbeque” and “casseroles”; whereas, females had more of a partiality for “starches and sweets”, fruits and vegetables. Differences in food choices were also seen in age level and grade level. Students ages 9-13 had an intake of only 3.7 servings/day of fruits/vegetables. These grade school lunch findings of student preferences may translate into options offered by schools (Caine-Bish & Scheule, 2009).

A recent article by Peckham et al, (2013) cited that the five most purchased entree items in Anderson District 5 from January 7, 2013 to April 30, 2013 were “Vegetarian Tray (12.46% of sales), Chicken sandwich (10.58% of sales), Chicken nuggets (8.99% of sales), cheese pizza (7.35% of sales), and Hamburger (6.57% of sales)”. Based on analyses from their research, an entrée item on average has 340 kcal and 15g fat. No information was available for the saturated, monounsaturated, polyunsaturated, or *trans* fats. Vegetarian Tray is offered every day (as one of three entrées). Peckham et al, (2013) determined that in the sampling period a total of 5,592 students purchased a total of 279,698 school lunches. The distribution of males and females who participated in school lunch, was 48.6% and 51.4% respectively. The NSLP status of females and males were as follows; 48.1% of females and 52.0% of males were free, 50.0% of females and 50.0% of males were reduced, and 49.3% of females and

50.7% of males were paid status. Gender was not statically significant in relation to kcal but suggested that males selected entrée items that were more energy dense than females [-0.17 (0.19)]. There was no difference in free, reduced, or paid status of students in entrée selection without controlling for gender, age, or race. Students that qualified for free lunch selected entrées with lower sodium than students that qualified for reduced or paid lunch. With regard to students that qualified for a free lunch, it was noted that students that were eligible for paid lunches selected entrées that contained more protein and fat and lower carbohydrate content (Peckham et al, 2013).

Gender and Food Preferences

Consumption of fat is an important macronutrient to a person's diet. It can provide more calories than needed if over consumed. Understanding the preference and reasons for selection of high fat foods is important in understanding the diets of individuals (Day, McHale, & Francis, (2012) reviewed a study that looked at dietary fat and preference.

Researchers using the Fat Preference Questionnaire to analyze fat intake preferences by Ledikwe Ello-Martin, Pelkman, Birch, Mannino, & Rolls, 2007. A total of 1,500 questionnaires were dispersed 500 questionnaires were analyzed; 393 of those were female. The average age was $28 \pm (SD = 12.09)$. The questionnaire assessed 19 varieties of foods that have "full fat" and "low fat" foods (Ledikwe et al, 2007). The questionnaire analyzed choice of high fat foods based on preference. It assessed "taste", how often high fat foods were consumed, difference between favored high fat foods and high fat foods

consumed more frequently (Ledikwe et al, 2007). Gender differences were seen with more males choosing high fat foods because of “taste preference” and also consuming high fat foods more frequently.

Cross-sectional survey research by Cooke & Wardle, (2005), focused on age and gender preferences with children food choices and preferences in the UK. This study used questionnaires from a total of 6 schools (3 primary and 3 secondary). A total of 1,291 students; ages ranging was from 4-16 years. The study assessed whether children had tried certain foods and their liking or disliking for these foods. The study controlled for the number of foods tried by children. No significant differences in gender were found. There were significant differences in age by gender interaction in amount of foods disliked. Younger males dislike more foods than females ($F(3, 1167) = 2.66, p < 0.05$). With older children this result was reversed. Males preferred “fatty and sugary foods” ($p < 0.005$), meats ($p < 0.001$) and processed meats ($p < 0.001$), and eggs ($p < 0.05$) more than females. Females preferred fruits ($p < 0.05$) and vegetables ($p < 0.001$) more than males. The top 10 ranking foods in this research were “chocolate, pizza, ice cream, pasta, strawberries, chocolate biscuits, ice lollies, grapes, cakes, and fruit sweets”. The 10 lowest ranking foods were “spinach, leeks, marrow, swede, sprouts, turnips, textured vegetable protein, soya meat, liver-sausage, and liver” (Cooke & Wardle 2005).

Importance of Monitoring School Lunch Food Intake

It is important to monitor the school lunch entrée items offered and the selection of those provided items by children. This likely reflects the taste preferences of the children and is correlated to the amount of food that is being consumed. Foods which are being selected and consumed more often may have a direct effect on a child's growth and development as well as their likelihood of developing overweight and obesity and other food related chronic diseases. Cooke & Wardle, (2005), showed that children's food selection was based on foods they were familiar with and preferred. Assessing children's dietary preference for foods high in saturated fat is important for providing strategies for reducing the onset of CVD and obesity as fat is high in calories/ gram weight. It is important to assess the influence on selection of high saturated fat entrées.

A cross sectional study by Gould, Russell, & Barker, (2006) assessed food selection and menu structure in three secondary schools in England. The food selections of children were analyzed to measure if nutritional standards were being met. Their research looked at male and female students aged 11-12 years. The sample was from a total of 74 students; 24 male and 50 female. Dietary information was collected on the students for 5 days. Students could choose from "individually priced foods" also called the "cafeteria menu" or a "set meal" also called the "fixed price menu". The fixed price meal was a regular "two course meal". The research defines "two course meal" as choice of a main meal or main entrée with the selection of a vegetable, selection of a fruit as a desert choice or a "sugar-based dessert" and a drink. The research indicates that most two out of the three schools analyzed did not meet the recommendations for certain nutrients

at lunch meals. One school met the recommended nutritional criteria for food group requirements. This school was a girl's private school. The other two schools were "state maintained" schools. There were gender differences seen in nutrient intake between students. Males were seen to consume more total fat ($P=0.035$), saturated fat ($P=0.015$) and monounsaturated fat ($P=0.003$). Folate intake was higher in females ($P=0.003$). (Gould et al, 2006). The research also proposed that children from a lower SES selected foods that were less nutritious than students from a higher SES (Gould et al, 2006). This is important because schools need to be in compliance with nutritional guidelines and provide students with healthy choices so that students can make healthy food selections.

A study by Bartholomew & Jowers (2006) discussed the effect of changing the offerings of high fat verses low fat meals to control entrée selection of students. There were two phases to this study. The first phase evaluated the influence of increasing lower fat entrée offerings and children's entrée choices. In order to do this, fat content of all entrée items was determined and lower fat items were offered more frequently. It was hypothesized that when the ratio of lower to moderate fat choices was increased in the intervention schools, that student's choices of lower and moderate fat entrées would increase. The hypothesis was not reinforced at a level of statistical significance. However, while the results were not statistically significant ($p=0.07$), they were suggestive that there were differences between the control and intervention schools for lower fat entrée item choices. There was no significant difference seen in students' choices of moderate fat entrée items with the intervention school ($p>0.10$). There was also no significant difference seen in students choices of high fat entrée items ($p=0.10$).

In the second phase of the study, the offerings of higher fat entrée items was decreased, while the offerings of low to moderate fat entrée items were preserved. The hypothesis was that controlling or reducing the number of high fat entrée items that students had provided to them would result in an increase in choices of low and moderate fat entrée items. The hypothesis was reinforced and there was a significant difference between intervention and control schools for choosing entrees that were lower in fat ($p < 0.01$). There was also a significant difference in moderate fat entrée choices ($p < 0.01$) and high fat entrée choices ($p < 0.01$). The research indicated that by reducing the availability high fat entrées that this can affect the selection of low fat entrees by students (Bartholomew & Jowers, 2006).

It is the responsibility of schools to ensure that the new dietary recommendations provided by the USDA are being implemented properly in the NSLP participating school lunchrooms and that students' nutritional needs are being met. However, schools have the ability to meet these nutritional needs by providing a variety of menus with entrées which may have varied fat profiles (e.g. high or low in saturated fat). By determining the amount of saturated fat in different entrée items offered to children it can be then determined if factors such as gender or participation in the free or reduced school lunch program are an influence in making high or low saturated fat food choices. Assessing how often certain entrée items are offered and which items are picked more frequently can also provide insight into how much saturated fat students are consuming and how often. Examination of the profile of students choosing selected entrée items which are

higher or lower in saturated fats may provide insights into potential modification of favorite menu items to be healthier food choices.

Aims & Objectives

Aim: Determine the effect of gender or participation in the free and reduced school lunch program on the selection of high saturated fat content entrée items by elementary school aged students.

Hypotheses:

- 1) Males who participate in the free or reduced school lunch program will select higher saturated fat entrée items.
- 2) Males will select higher saturated fat entrée items.
- 3) Students that are free or reduced participation status in the national school lunch program will select higher saturated fat items.

Research Questions:

1. What is the fat profile of entrée items offered for school lunches in Anderson District 5?
2. Is there a gender difference in saturated fat content entrée items selected by students in Anderson District 5 school district?

3. Does participation in the free and reduced school lunch program have an effect on selection of entrée items high in saturated fat chosen by students in Anderson District 5 school district?

Objectives:

1. Compare the total fat profile (saturated, polyunsaturated, monounsaturated and *trans* fat) of entrées items served in Anderson District 5 school district.
 - a. Match caloric and macronutrient profile of food items from Anderson District 5 nutrition data sheets with Nutritionist Pro software to gather saturated, monounsaturated, polyunsaturated and *trans* fat profiles of each entrée item.
 - b. Conduct a systematic analysis of the entrée items offered to determine the ‘best fit’ total fat profile (saturated, monounsaturated, polyunsaturated and *trans* fat) and caloric content of the entrée items
 - c. Rank entrée items based on fat profile from highest to lowest
2. Merge point of sale data sheet with nutritional information from Anderson 5 and Nutritionist Pro to assess gender and participation status differences on entrée selection
 - a. Assess the association of gender on high versus low saturated fat entrée items selected by Anderson District 5 students.

- b. Assess the association of participation in the free and reduced school lunch program on high versus low saturated fat entrée items selected by Anderson District 5 students
- c. Assess the interaction between gender and participation in the free and reduced school lunch program on high versus low saturated fat entrée items selected.

Outcomes:

The relationship of selection of high saturated fat entrée items with gender.

The relationship of selection of high saturated fat entrée items with participation in the free and reduced school lunch program.

Development of a profile of students more likely to choose higher saturated fat school lunch entrées as a function of gender and participation in the free and reduced school lunch program.

CHAPTER TWO

MATERIALS AND METHODS

Analysis of Anderson District 5 School District Point of Sale Data and Entrée Nutrition Information

Background Research Information

This research is a secondary analysis of Point of Sale (POS) and entrée nutrition information data from Anderson 5 School District (A5SD) located in Anderson, SC in combination with a primary data set of derived A5SD nutritional information from Nutritionist Pro™ Diet Analysis and other sources. The time period during which the menu items were analyzed was the month of February, 2013. We obtained the nutritional information on all entrée items offered in February 2013, and were provided the point of sale (POS) data from A5SD. The information was from 11 elementary schools, and included kindergarten through fifth grade students' data. The sample size was 5,375 students.

The data analyzed from the elementary students from A5SD was from the lunch entrées. No breakfast items were included in this study. There are 3 different entrée choices offered each lunch period which are designated as; Lunch meal choice 1 elementary, Lunch meal choice 2 elementary, Lunch meal vegetarian elementary. The vegetarian choice is offered every day while the other 2 entrées vary. The data analyzed for this study was from a total of 18 school days from February 2013. Entrees analyzed

were from the A5SD menu which has basic nutritional information offered online to the public. The point of sale (POS) data analyzed was from all February 2013 purchases.

Data Sets

Point of Sale Data

The Point of Sale (POS) data was provided by A5SD as part of a larger Clemson University program project. It contained the students' pin numbers, grade level, race, gender, school name, NSLP status (free, reduced, paid), school name, date, meal purchased (breakfast and/or lunch), and buyer information for food items utilized in this study. From the POS datasheet all entrée choices (Lunch meal choice 1 elementary, Lunch meal choice 2 elementary, Lunch meal vegetarian elementary) for February 2013 were used. This document was used in combination with an excel sheet created for this study (Anderson 5 School District Nutrition Information Data) containing entrée items, nutrition information on entrée items, the dates entrées were offered, and the frequency of the entrée offered.

Participants/Subjects

Subjects were primary school aged students in grades Kindergarten through fifth grades (K-5) who attended school in the Anderson 5 School District during February 2013. Students were actively enrolled in one or more of the eleven schools within this district during the time period of this study. The cross-sectional data collected from subjects was derived from the school provided Point of Sale (POS) data. The POS data

provided the participants unique identifier number (student pin number; the subjects' data was all de-identified, this was done using pin numbers.) which is linked to student grade level, race, gender, and participation in the NSLP as a free, reduced, or paid meal participant. Ultimately, this pin number can be linked to the school attended and the meal purchased (date, meal chosen, etc.), as well. The study protocol was approved by the CU Institutional Review Board and all ethics requirements were met.

Anderson 5 School District Menu and Nutrition Information Data

The A5SD posts their monthly menus online at the address: <http://www.anderson5.net/cms/lib02/SC01001931/Centricity/Domain/1706/April.pdf>. As stated above, general information on the nutritional value of the entrées served is offered online to the public. The nutrition information available includes kcal (total calories), total fat, carbohydrate, protein, and sodium. For the purposes of this study, all entrées from the A5SD February, 2013 menu were used. The entrée items' nutrition information is located on the A5SD website, <http://www.anderson5.net/Page/19006>. The kcal and macronutrient values of the school district's entrée items were collected and used to compare to food items in the Nutritionist Pro™ program (described below). In the event multiple similar entrée items were listed in the school data base, for an example if there were 4-5 different types of entrées or different brands for a particular entrée that were similar e.g. chicken nuggets, chicken patty, popcorn chicken, or hamburger patty; then a

median value of the nutrients was used for the kcal, total fat, protein, carbohydrate, and sodium for searching purposes within Nutritionist Pro™ diet analysis program.

Research Compliance Statement

All research was done in the accordance of the guidelines of the Institutional Review Board (IRB).

Determination of Nutritional Content of Entrée Items

Nutrient Analysis using Nutritionist Pro™ by Axxya Systems Version 5.4 (2014) Diet Analysis Software Stafford, TX

The Nutritionist Pro™ Diet Analysis Software program is a broad food base of different foods and can also be used to analyze diets, menus, recipes, and various food items. This wide-ranging database contains > 51,000 foods and ingredients, 500 brand name items, and > 700 manufactures. The diet analysis component can assess various types of dietary recalls with precise nutrient requirements. Recipes and menus can also be analyzed to compare against nutritional needs. The Nutritionist Pro™ Diet Analysis Software program was used to determine the complete fat profile which included the saturated, polyunsaturated, monounsaturated and *trans* fat content of entrée items matched to the 1) kcal, 2) total fat, 3) carbohydrate, 4) protein and 5) sodium nutrient values found in the Anderson District 5 nutritional sheet.

Entrée Item Searches in Nutritionist Pro™

Using A5SD recipes and an entrée nutrition sheet (provided online from the A5SD website) all entrée items from February 2013 menu were evaluated. Briefly, the school district's entrée items' kcal and total fat values (along with other macronutrient information provided) were used to compare to food items in the Nutritionist Pro™ program to search for a “best fit” entrée item for the saturated (SFA), monounsaturated (MUFA), polyunsaturated (PUFA) and *trans* fat of all of the A5SD entrées offered in February. Single entrées entries from the A5SD nutritional sheet were used but in the event of multiple single entrée entries, a median value previously determined for the Clemson University (CU) program project was utilized for consistency of all related research projects. When searching for food items in Nutritionist Pro™, all entrée items were searched within +/- 10% from the entrée kcal and total fat values. If no value was available using these criteria, items were searched using product or manufacture codes via the internet to obtain the nutritional values. The detailed steps taken to search for the food items in Nutritionist Pro™ are located in Appendix F.

Other Steps and Methods for searching for Entrée Items

Some entrée items were searched on the internet using the vender information from A5SD or using internet venders that had similar nutritional content to the entrée items from Anderson 5. This information was used when items searched on Nutritionist

Pro™ did not match the nutritional content on entrée items from A5SD. The only items that had to be searched this way were Teriyaki Beef Dippers and Rich's rolls.

Development of the Primary Data Set for this Project

Merging of Primary and POS Secondary Data

The primary data sheet created from the Nutritionist Pro™ nutrient information was put into a separate excel sheet and used for analysis. This data represented only the total kcal and total fat from the A5SD nutrition data sheet, along with the saturated, monounsaturated, polyunsaturated and *trans* fat gathered from Nutritionist Pro™ or from other venter information. These numbers containing the complete fat profile of the entrée plus its nutrient analysis were merged with the POS (February, 2013) information creating the master spreadsheet (Anderson 5 School District Nutrition Information Data) used for statistical analysis. The POS data sheet which included the total number of pins was used the POS data itself included a total of ~ 80,000 observations, and included 75 observations (out of ~80,000), that made 2 entrée purchases in one day (38 of the 75 picked the same entrée twice) and also included 40 observations (40 /80,000) with a participation status change during the February sampling period). The students represented by the 75 observations (2 entrée choices) and the 40 observations (participation status change) were not omitted from the dataset as the percentage error was < 1%.

Statistical Analysis

Variables:

The dependent variables were: total calories, total fat, saturated fat, monounsaturated fat, polyunsaturated fat, and *trans* fat. The independent variables were gender and status (participation in the NSLP program).

Data Analysis:

Gender comparisons were conducted with two-sample t-tests and participation comparisons were made with a one-way analysis of variance (ANOVA). Fisher's LSD was used for follow-up analyses when the overall test in the one-way ANOVA was significant. A significance level of 0.05 was used for all tests of significance.

The results are the product of Fit Model in JMP Pro 10 which was used to test the means and standard error of the means (SEM) for gender, NSLP participation status, and the interaction of gender and participation status with kcal, total fat, saturated fat, monounsaturated fat, polyunsaturated fat, and *trans* fat are summarized in the following Tables 9 and 10 on page 69.

Testing for the interaction of gender and participation status with all nutrients was conducted using a two-way analysis of variance (ANOVA). For the analysis of the interaction of gender and participation status with all nutrients, the equation below was used:

$$Y = \text{Gender} + \text{Status} + \text{Gender} \times \text{Status} + E$$

For the analysis of gender with all nutrients the equation below was used:

$$Y = \text{Gender} + E$$

For the analysis of participation status with all nutrients the equation below was used:

$$Y = \text{Status} + E$$

To investigate the association between gender or participation and entrée selection, a Chi-square test of independence was conducted. This test assessed the predicted verses the actual results by days as a function of gender and participation status. A significance level of 0.05 was used for all tests of significance.

Using the Fit Y by X Model in JMP Pro 10, Chi squares analysis was used to detect the frequency of observed entrée selection compared to the expected value entrée selection based upon gender or participation in the NSLP. Significance level of 0.05 was used. Individual entrée selections instead of mean entrées by group or participation were used for testing of significance.

The equation used for chi squares was:

$$x^2 = \sum (\text{observed-expected})^2 / \text{expected.}$$

Layout of Chi Square test

	Dependent variables	Dependent variables	Total
Independent variable Group 1	X_1	$n_1 - X_1$	n_1
Independent variable Group 2	X_2	$n_2 - X_2$	n_2
Combined	$X_1 + X_2$	$N - (X_1 + X_2)$	$N = n_1 + n_2$

JMP Pro 10 Statistical Discovery™ from SAS Clemson University, Clemson, SC

JMP Pro 10 statistical software was used for data analysis. It was chosen for its versatility. All previously described statistics used JMP for analysis. The relationships between gender, NSLP participation status, and gender and participation status interaction and entrée nutrient profile were analyzed using a “best fit model”.

Defining Chi Square terms:

Pearson’s test was used to assess significant differences in the “goodness of fit” or likelihood of a difference detected between the participants in the NSLP and gender.

The % row makes up the numbers in each cell that totals to 100% across rows. From the chi square tables the % row was used to graph results.

CHAPTER THREE

RESULTS

The data analyzed for this study consisted of a total of 18 days in the month of February, 2013 (all days school was in session and meals were served). Three entrée items are offered each day, one is a vegetarian option that is offered every day. Analysis from the month of February yielded 18 days sampled with a total number of student participants of 5,375.

Demographic Information and NSLP Participation

The demographic information for our population is shown in Table 1, page 45. The majority of the participants were male, with a total number of male participants of 2,766 (51.46%), and total female participants 2,609 (48.54%). Most students were classified as “free” status students (no cost for school lunch), n=3,123; with “reduced” status students n=283, and “paid” status students n=1,969 completing the NSLP participant profile (Table 1, page 45). The students purchased a total of 79,359 entrées in February. Of these, a total of 41,738 (52.59%) purchases were made by males and a total of 37,621 (47.41%) purchases by females. The total participation status “paid”, “free” and “reduced” meal purchases made were 24,654; 50,365; and 4,340, respectively. The percentage of “free”, “reduced” and “paid” status purchases were 63.46%, 5.47%, and 31.07%, respectively. The number of purchases of males and females that were “paid”, “reduced”, and “free” status were as follows; for males 13,194; 2,263; 26,281 and for

females 11,460; 2,077; 24,084, respectively. The percentage of males and females that were “paid”, “reduced”, and “free” status were as follows for males 31.61%; 5.42%; and 62.96% and for females 30.46%; 5.52%; and; 64.01%, respectively. Most of the students who participated in the NSLP were white or non-Hispanic white (2858) and. black or non-Hispanic black (1839).The totals for all races are listed in Table 2, page 46.

There were 11 schools that participated in the sample. Table 3, page 46, below lists the total number of students from each school.

Table 1. Demographics and Participation in the National School Lunch Program
Information of K-5th Grade Study Participants

	Male	Female	Total
No.	2766	2609	5375
%	51.46%	48.54%	
<i>Participation Status</i>			
Free	1627	1496	3123
Paid	997	972	1969
Reduced	142	141	283
<i>Race</i>			
Asian	38	41	79
Black	953	886	1839
Hispanic	169	152	321
Indian	1	1	2
Mixed	157	116	273
Pacific Islander	0	3	3
White	1448	1410	2858

Table 2. Race and Participation Status Breakdown

Race	Status			Total
	Free	Paid	Reduced	
Asian	42	31	6	79
Black	1513	236	90	1839
Hispanic	272	36	13	321
Indian	1	1	0	2
Mixed	187	62	24	273
Pacific Islander	2	1	0	3
White	1106	1602	150	2858
				5375

Table 3. Student Total Enrollment in the Eleven Anderson School District 5 Elementary

Study Schools

School	Total
Calhoun ES	573
Centerville ES	603
Concord ES	605
Homeland ES	361
McLees ES	588
Midway ES	686
Nevitt ES	458
North Point ES	295
STEM ES	459
Varennes ES	321
Whitehall ES	426
Total	5375

*ES = Elementary School

Frequency of Entrée Purchases

A total of 26 entrée items were offered in the 18 days in February surveyed for this study. A detailed description of the entrée items (Appendix G), along with their acronyms is provided. The frequency that a particular entrée was purchased was assessed by gender as well as by participation in the NSLP with the results shown in Table 4, page 50-54, as “Percentage of Each Daily Entrée Selected by Gender and by Participants in the National School Lunch Program” table. This allowed intra-entrée evaluation (of each daily entrée selected) by male vs female students as well as NSLP participants. The highest percentage purchase made by males (59.95%) during the study period was on February 11, 2013 when BBQ on WG Bun was offered. The highest percentage of purchases made by females (57.79%) was on February 22, 2013 with the Stuffed Baked Potato w/ Ham and Cheese & crackers. The highest percentage of purchases made by the paid status (39.31%) was on February 22, 2013 with the Vegetarian Tray. The highest percentage of purchases made by reduced (7.04%) status was on February 13, 2013 when Turkey and Gravy over brown rice was offered. The highest percentage of purchases made by free (72.86%) status was on February 26, 2013 when a Manager’s Choice was offered. Manager’s Choice is offered once a month. The entrée item is chosen by the school cafeteria managers of each school in the district. The second most popular item selected by free status (69.02%) was Teriyaki Beef Dippers over brown rice on February 7, 2013.

Differences in entrée selection habits as a function of NSLP participation and gender based upon preference for a particular entrée (intra-entrée preference) served

(Table 4 pages 50-54) can be compared to the preference for a particular entrée on a specified day (inter-entrée preference) and is noted in Tables 4, 5, pages 50-60. Table 6, pages 61-64, shows the saturated fat content of popular entrée item by gender and participation status while controlling for the number of days each entrée item was offered and taking into account the average purchasing percentage. The Vegetarian Tray is offered every day and can be wrongly interpreted to be more frequently selected by students. Table 6, pages 61-64, corrects for this by providing an average purchasing percentage for each of the days each entrée item was offered during the 18 days. The table shows the grams of saturated fat per item, number of days offered, and popularity by total population, gender and participation status. This data (Tables 4-6) may be used to determine most to least preferred entrée items (inter and intra-entrée analysis) with corrections for redundancy in entrée offerings, and thus could be used to assist in future meal planning activities – hopefully, assisting with decreasing daily plate waste. Another important aspect of these tables is insight into the saturated fat content of the entrée items provided for selection and the entrée items that are most frequently chosen by students as a function of gender or NSLP status. The vegetarian entrée item was selected most frequently on days when turkey based entrée items were served (turkey pot pie, deli sliced turkey, and turkey and gravy over brown rice).

Tables 7 page 65, and 8 page 66, show Frequency of Total Entrées Purchased by Free, Reduced or Paid Status by Day and Frequency of Total Entrées Purchased by Gender by Day, respectively. Details of the entrée items that contributed to these tables are in Table 5, pages 54-60. The results in tables 4, 5, 6, 7 and 8 all show the entrée

selection choices made by gender and participation status. The popular choices by gender and by participation status vary by saturated fat content.

The five entrées highest to lowest in saturated fat are 1) Macaroni & Cheese Bake w/WG Roll 10.9g, 2) Rib B Que on WG bun 9.457g, 3) Mexican Beef Soft Tacos w/Trimblings 9.082g, 4) Pizzatas 9.014g, 5) Cheese Pizza on WG Crust 7.731g. Of these, males significantly preferred BBQ (60% male, 40% female preference) and Cheese Pizza (55% male vs 45% female) of these five selections. The remaining preferences for males and females, interestingly, was 52% male and 48% females.

Table 4. Percentage of Each Daily Entrée Selected by Gender and by Participants in the National School Lunch Program

Date	Entree	Total	Male No. %	Female No. %	Paid No. %	Reduced No. %	Free No. %
1- Feb	Vegetarian Tray	318	177 (55.66%)	141 (44.34%)	98 (30.82%)	16 (5.03%)	204 (64.15%)
1- Feb	Stuffed Baked Potato w/Ham and Cheese & Crackers	1275	599 (46.98%)	676 (53.02%)	397 (31.14%)	62 (4.86%)	816 (64.00%)
1- Feb	Cheese Pizza on WG Crust	2806	1519 (54.13%)	1287 (45.87%)	944 (33.64%)	162 (5.77%)	1700 (60.58%)
4- Feb	Deli Sliced Turkey on WG Bun	628	342 (54.46%)	286 (45.54%)	158 (25.16%)	37 (5.89%)	433 (68.95%)
4- Feb	Chicken Sandwich on WG Bun	3135	1639 (52.28%)	1496 (47.72%)	955 (30.46%)	175 (5.58%)	2005 (63.96%)
4- Feb	Vegetarian Tray	623	316 (50.72%)	307 (49.28%)	195 (31.30%)	31 (4.98%)	397 (63.72%)
5- Feb	Manager's Choice	936	526 (56.20%)	410 (43.80%)	248 (26.50%)	65 (6.94%)	623 (66.56%)
5- Feb	Stuffed Crust Dippers w/Marinara Sauce	2785	1470 (52.78%)	1315 (47.22%)	855 (30.70%)	147 (5.28%)	1783 (64.02%)
5- Feb	Vegetarian Tray	589	293 (49.75%)	296 (50.25%)	209 (35.48%)	26 (4.41%)	354 (60.10%)
7- Feb	Teriyaki dippers over brown rice	1107	609 (55.01%)	498 (44.99%)	280 (35.29%)	63 (5.69%)	764 (69.02%)
7- Feb	Mexican Beef Soft Tacos w/Trimmings	2238	1164 (52.01%)	1074 (47.99%)	690 (30.83%)	121 (5.41%)	1427 (63.76%)

7-Feb	Vegetarian Tray	1044	523 (50.10%)	521 (49.90%)	347 (33.24%)	52 (4.98%)	645 (61.78%)
8-Feb	Cheese Pizza on WG Crust	1850	1019 (55.08%)	831 (44.92%)	586 (31.68%)	101 (5.46%)	1163 (62.86%)
8-Feb	Nachos w/Chili and Cheese	2443	1238 (50.68%)	1205 (49.32%)	780 (31.93%)	130 (5.32%)	1533 (62.75%)
8-Feb	Vegetarian Tray	261	116 (44.44%)	145 (55.56%)	94 (36.02%)	16 (6.13%)	151 (57.85%)
11-Feb	BBQ on WG Bun	871	522 (59.93%)	349 (40.07%)	219 (25.14%)	59 (6.77%)	593 (68.08%)
11-Feb	Vegetarian Tray	384	196 (51.04%)	188 (48.96%)	120 (31.25%)	13 (3.39%)	251 (65.36%)
11-Feb	Chicken Nuggets w/Dipping Sauce & WG Roll	3182	1615 (50.75%)	1567 (49.25%)	1058 (33.25%)	166 (5.22%)	1958 (61.53%)
12-Feb	Turkey pot pie with WG Roll	459	242 (52.72%)	217 (47.28%)	128 (27.89%)	19 (4.14%)	312 (67.97%)
12-Feb	Vegetarian Tray	639	323 (50.55%)	316 (49.45%)	184 (28.79%)	31 (4.85%)	424 (66.35%)
12-Feb	Chicken Sandwich on WG Bun	3283	1753 (53.40%)	1530 (46.60%)	1015 (30.92%)	187 (5.70%)	2081 (63.39%)
13-Feb	Hamburger on WG Bun	2775	1558 (56.14%)	1217 (43.86%)	742 (26.74%)	154 (5.55%)	1879 (67.71%)
13-Feb	Vegetarian Tray	880	451 (51.25%)	429 (48.75%)	294 (33.41%)	43 (4.89%)	543 (61.70%)
13-Feb	Turkey & gravy over brown rice	554	246 (44.40%)	308 (55.60%)	178 (32.13%)	39 (7.04%)	337 (60.83%)
14-Feb	Grilled Cheese	1575	807 (51.24%)	768 (48.76%)	439 (27.87%)	93 (5.90%)	1043 (66.22%)

14-Feb	Vegetarian Tray	309	157 (50.81%)	152 (49.19%)	106 (34.30%)	15 (4.85%)	188 (60.84%)
14-Feb	Popcorn Chicken w/Dipping sauce & WG Roll	2756	1434 (52.03%)	1322 (47.97%)	970 (35.20%)	152 (5.52%)	1634 (59.29%)
18-Feb	Hot dog w/chili	1451	799 (55.07%)	652 (44.93%)	428 (29.50%)	88 (6.06%)	935 (64.44%)
18-Feb	Vegetarian Tray	406	205 (50.49%)	201 (49.51%)	131 (32.27%)	20 (4.93%)	255 (62.81%)
18-Feb	Pizzatas	2452	1273 (51.92%)	1179 (48.08%)	829 (33.81%)	138 (5.63%)	1485 (60.56%)
19-Feb	Rib B Que on WG bun	1035	617 (59.61%)	418 (40.39%)	274 (26.47%)	61 (5.89%)	700 (67.63%)
19-Feb	Vegetarian Tray	875	443 (50.63%)	432 (49.37%)	259 (29.60%)	47 (5.37%)	569 (65.03%)
19-Feb	Grilled Cheese w/Chicken Noodle Soup	2304	1160 (50.35%)	1144 (49.65%)	708 (30.73%)	119 (5.16%)	1477 (64.11%)
20-Feb	Vegetarian Tray	331	168 (50.76%)	163 (49.24%)	100 (30.21%)	11 (3.32%)	220 (66.47%)
20-Feb	Popcorn Chicken w/Dipping Sauce	2162	1126 (52.08%)	1036 (47.92%)	599 (27.71%)	134 (6.20%)	1429 (66.10%)
20-Feb	Scrambled Eggs, Grits, Sausage Patty	2047	1091 (53.30%)	956 (46.70%)	766 (37.42%)	107 (5.23%)	1174 (57.35%)
21-Feb	Macaroni & Cheese Bake w/WG Roll	508	264 (51.97%)	244 (48.03%)	147 (28.94%)	32 (6.30%)	329 (64.76%)
21-Feb	Vegetarian Tray	612	317 (51.80%)	295 (48.20%)	185 (30.23%)	35 (5.72%)	392 (64.05%)

21-Feb	Stuffed Crust Dippers w/Marinara Sauce	3346	1768 (52.84%)	1578 (47.16%)	1073 (32.07%)	178 (5.32%)	2095 (62.61%)
22-Feb	Cheese Pizza on WG Crust	2997	1672 (55.79%)	1325 (44.21%)	919 (30.66%)	168 (5.61%)	1910 (63.73%)
22-Feb	Stuffed Baked Potato w/Ham and Cheese & Crackers	912	385 (42.21%)	527 (57.79%)	298 (32.68%)	57 (6.25%)	557 (61.07%)
22-Feb	Vegetarian Tray	524	271 (51.72%)	253 (48.28%)	206 (39.31%)	22 (4.20%)	296 (56.49%)
25-Feb	Vegetarian Tray	630	317 (50.32%)	313 (49.68%)	180 (28.57%)	34 (5.40%)	416 (66.03%)
25-Feb	Chicken Sandwich on WG Bun	3472	1862 (53.63%)	1610 (46.37%)	1051 (30.27%)	193 (5.56%)	2228 (64.17%)
25-Feb	Deli Sliced Turkey on WG Bun	268	131 (48.88%)	137 (51.12%)	84 (31.34%)	13 (4.85%)	171 (63.81%)
26-Feb	Manager's Choice	829	443 (53.44%)	386 (46.56%)	183 (22.07%)	42 (5.07%)	604 (72.86%)
26-Feb	Vegetarian Tray	469	229 (48.83%)	240 (51.17%)	128 (27.29%)	25 (5.33%)	316 (67.38%)
26-Feb	Stuffed Crust Dippers w/Marinara Sauce	3111	1648 (52.97%)	1463 (47.03%)	1055 (33.91%)	170 (5.46%)	1886 (60.62%)
27-Feb	Chicken Nuggets w/Dipping Sauce	3264	1722 (52.76%)	1542 (47.24%)	1009 (30.91%)	176 (5.39%)	2079 (63.69%)
27-Feb	Italian spaghetti	1024	539 (52.64%)	485 (47.36%)	339 (33.11%)	54 (5.27%)	631 (61.62%)
27-Feb	Vegetarian Tray	293	154 (52.56%)	139 (47.44%)	99 (33.79%)	16 (5.46%)	178 (60.75%)
28-Feb	Mexican Beef Soft Tacos w/Trimmings	2472	1288 (52.10%)	1184 (47.90%)	708 (28.64%)	121 (4.89%)	1643 (66.46%)

28-Feb	Teriyaki dippers over brown rice	953	508 (53.31%)	445 (46.69%)	273 (28.65%)	58 (6.09%)	622 (65.27%)
28-Feb	Vegetarian Tray	907	484 (53.36%)	423 (46.64%)	334 (36.82%)	46 (5.07%)	527 (58.10%)

Table 5. Popularity of Entrée Items Served Daily Based Upon Gender and NSLP Participants' Selections

Date	Entrée	Total No. (%)	Male No. (%)	Female No. (%)	Paid No. (%)	Reduced No. (%)	Free No. (%)
1-Feb	Vegetarian Tray	318 (7.22%)	177 (7.71%)	141 (6.70%)	98 (6.81%)	16 (6.66%)	204 (7.50%)
1-Feb	Stuffed Baked Potato w/Ham and Cheese & Crackers	1275 (28.98%)	599 (26.10%)	676 (32.12%)	397 (27.58%)	62 (25.83%)	816 (30.00%)
1-Feb	Cheese Pizza on WG Crust	2806 (63.78%)	1519 (66.18%)	1287 (61.16%)	944 (65.60%)	162 (67.50%)	1700 (62.50%)
1-Feb Total		4399	2295 (52.17%)	2104 (47.82%)	1439 (32.71%)	240 (5.45%)	2720 (61.83%)
4-Feb	Deli Sliced Turkey on WG Bun	628 (14.31%)	342 (14.88%)	286 (13.69%)	158 (12.07%)	37 (15.22%)	433 (15.27%)
4-Feb	Chicken Sandwich on WG Bun	3135 (71.47%)	1639 (71.35%)	1496 (71.61%)	955 (73.01%)	175 (72.01%)	2005 (70.72%)

4-Feb	Vegetarian Tray	623 (14.40%)	316 (13.75%)	307 (14.69%)	195 (14.90%)	31 (12.75%)	397 (14.00%)
4-Feb Total		4386	2297 (52.37%)	2089 (47.62%)	1308 (29.82%)	243 (5.54%)	2835 (64.63%)
5-Feb	Manager's Choice	936 (21.71%)	526 (22.97%)	410 (20.28%)	248 (18.90%)	65 (27.31%)	623 (22.57%)
5-Feb	Stuffed Crust Dippers w/Marinara Sauce	2785 (64.61%)	1470 (64.22%)	1315 (65.06%)	855 (65.16%)	147 (61.76%)	1783 (64.60%)
5-Feb	Vegetarian Tray	589 (13.66%)	293 (12.80%)	296 (14.64%)	209 (15.92%)	26 (10.92%)	354 (12.82%)
5-Feb Total		4310	2289 (53.10%)	2021 (46.07%)	1312 (30.44%)	238 (5.52%)	2760 (64.03%)
7-Feb	Teriyaki dippers over brown rice	1107 (25.22%)	609 (26.52%)	498 (23.79%)	280 (21.26%)	63 (26.69%)	764 (26.93%)
7-Feb	Mexican Beef Soft Tacos w/Trimmings	2238 (50.99%)	1164 (50.69%)	1074 (51.31%)	690 (52.39%)	121 (51.27%)	1427 (50.31%)
7-Feb	Vegetarian Tray	1044 (23.78%)	523 (22.77%)	521 (24.89%)	347 (26.34%)	52 (22.03%)	645 (22.74%)
7-Feb Total		4389	2296 (52.31%)	2093 (47.68%)	1317 (30.00%)	236 (5.27%)	2836 (64.61%)
8-Feb	Cheese Pizza on WG Crust	1850 (40.62%)	1019 (42.94%)	831 (38.10%)	586 (40.13%)	101(40.89%)	1163 (40.85%)
8-Feb	Nachos w/Chili and Cheese	2443 (53.64%)	1238 (52.17%)	1205 (55.24%)	780 (53.42%)	130 (52.63%)	1533 (53.84%)
8-Feb	Vegetarian Tray	261 (5.73%)	116 (4.88%)	145 (6.64%)	94 (6.43%)	16 (6.47%)	151 (5.30%)
8-Feb Total		4554	2373 (52.20%)	2181 (47.89%)	1460 (32.05%)	247 (5.42%)	2847 (62.51%)
11-Feb	BBQ on WG Bun	871 (19.63%)	522 (22.37%)	349 (16.58%)	219 (15.67%)	59 (24.78%)	593 (21.16%)

11-Feb	Vegetarian Tray	384 (8.65%)	196 (8.40%)	188 (8.93%)	120 (8.58%)	13 (5.46%)	251 (8.95%)
11-Feb	Chicken Nuggets w/Dipping Sauce & WG Roll	3182 (71.71%)	1615 (69.22%)	1567 (74.47%)	1058 (75.73%)	166 (69.74%)	1958 (69.87%)
11-Feb Total		4437	2333 (52.58%)	2104 (47.41%)	1397 (31.48%)	238 (5.36%)	2802 (63.15%)
12-Feb	Turkey pot pie with WG Roll	459 (10.47%)	242 (10.44%)	217 (10.51%)	128 (9.64%)	19 (8.01%)	312 (11.07%)
12-Feb	Vegetarian Tray	639 (14.58%)	323 (13.93%)	316 (15.31%)	184 (13.86%)	31 (13.08%)	424 (15.05%)
12-Feb	Chicken Sandwich on WG Bun	3283 (74.93%)	1753 (75.62%)	1530 (74.16%)	1015 (76.48%)	187 (78.90%)	2081 (73.87%)
12-Feb Total		4381	2318 (52.91%)	2063 (47.08%)	1327 (30.28%)	237 (5.40%)	2817 (64.30%)
13-Feb	Hamburger on WG Bun	2775 (65.93%)	1558 (69.09%)	1217 (62.28%)	742 (61.12%)	154 (65.25%)	1879 (68.10%)
13-Feb	Vegetarian Tray	880 (20.90%)	451 (20.00%)	429 (21.95%)	294 (24.21%)	43 (18.22%)	543 (19.68%)
13-Feb	Turkey & gravy over brown rice	554 (13.16%)	246 (10.90%)	308 (15.76%)	178 (14.66%)	39 (16.52%)	337 (12.21%)
13-Feb Total		4209	2255 (53.57%)	1954 (46.42%)	1214 (28.84%)	236 (5.60%)	2759 (65.55%)
14-Feb	Grilled Cheese	1575 (33.94%)	807 (33.65%)	768 (34.25%)	439 (28.97%)	93 (35.76%)	1043 (36.40%)
14-Feb	Vegetarian Tray	309 (6.65%)	157 (6.54%)	152 (6.77%)	106 (6.99%)	15 (5.76%)	188 (6.56%)

14-Feb	Popcorn Chicken w/Dipping sauce & WG Roll	2756 (59.39%)	1434 (59.79%)	1322 (58.96%)	970 (64.02%)	152 (58.46%)	1634 (57.03%)
14-Feb Total		4640	2398 (51.68%)	2242 (48.31%)	1515 (32.65%)	260 (5.60%)	2865 (61.74%)
18-Feb	Hot dog w/chili	1451 (33.67%)	799 (35.09%)	652 (32.08%)	428 (30.83%)	88 (35.77%)	935 (34.95%)
18-Feb	Vegetarian Tray	406 (9.42%)	205 (9.00%)	201 (9.89%)	131 (9.43%)	20 (8.13%)	255 (9.53%)
18-Feb	Pizzatas	2452 (56.90%)	1273 (55.90%)	1179 (58.02%)	829 (59.72%)	138 (56.09%)	1485 (55.51%)
18-Feb Total		4309	2277 (52.84%)	2032 (47.15%)	1388 (32.21%)	246 (5.70%)	2675 (62.07%)
19-Feb	Rib B Que on WG bun	1035 (24.56%)	617 (27.79%)	418 (20.96%)	274 (22.07%)	61 (26.87%)	700 (25.49%)
19-Feb	Vegetarian Tray	875 (20.76%)	443 (19.95%)	432 (21.66%)	259 (20.87%)	47 (20.70%)	569 (20.72%)
19-Feb	Grilled Cheese w/Chicken Noodle Soup	2304 (54.67%)	1160 (52.25%)	1144 (57.37%)	708 (57.05%)	119 (52.42%)	1477 (53.78%)
19-Feb Total		4214	2220 (52.68%)	1994 (47.31%)	1241 (29.44%)	227 (5.38%)	2746 (65.16%)
20-Feb	Vegetarian Tray	331 (7.29%)	168 (7.04%)	163 (7.56%)	100 (6.82%)	11 (4.36%)	220 (7.79%)
20-Feb	Popcorn Chicken w/Dipping Sauce	2162 (47.62%)	1126 (47.21%)	1036 (48.07%)	599 (40.88%)	134 (53.17%)	1429 (50.61%)

20-Feb	Scrambled Eggs, Grits, Sausage Patty	2047 (45.08%)	1091 (45.74%)	956 (44.36%)	766 (52.28%)	107 (42.46%)	1174 (41.58%)
20-Feb Total		4540	2385 (52.53%)	2155 (47.46%)	1465 (32.26%)	252 (5.55%)	2823 (62.18%)
21-Feb	Macaroni & Cheese Bake w/WG Roll	508 (11.37%)	264 (11.23%)	244 (11.52%)	147 (10.46%)	32 (13.06%)	329 (11.68%)
21-Feb	Vegetarian Tray	612 (13.70%)	317 (13.49%)	295 (13.93%)	185 (13.16%)	35 (14.28%)	392 (13.92%)
21-Feb	Stuffed Crust Dippers w/Marinara Sauce	3346 (74.92%)	1768 (75.26%)	1578 (74.53%)	1073 (76.37%)	178 (72.65%)	2095 (74.39%)
21-Feb Total		4466	2349 (52.59%)	2117 (47.40%)	1405 (31.45%)	245 (5.48%)	2816 (63.05%)
22-Feb	Cheese Pizza on WG Crust	2997 (67.60%)	1672 (71.82%)	1325 (62.94%)	919 (64.58%)	168 (68.01%)	1910 (69.12%)
22-Feb	Stuffed Baked Potato w/Ham and Cheese & Crackers	912 (20.57%)	385 (16.53%)	527 (25.03%)	298 (20.94%)	57 (23.07%)	557 (20.15%)
22-Feb	Vegetarian Tray	524 (11.82%)	271 (11.64%)	253 (12.01%)	206 (14.47%)	22 (8.90%)	296 (10.71%)
22-Feb Total		4433	2328 (52.51%)	2105 (47.48%)	1423 (32.10%)	247 (5.57%)	2763 (62.32%)
25-Feb	Vegetarian Tray	630 (14.41%)	317 (13.72%)	313 (15.19%)	180 (13.68%)	34 (14.16%)	416 (14.77%)
25-Feb	Chicken Sandwich on WG Bun	3472 (79.45%)	1862 (80.60%)	1610 (78.15%)	1051 (79.92%)	193 (80.41%)	2228 (79.14%)

25-Feb	Deli Sliced Turkey on WG Bun	268 (6.13%)	131 (5.67%)	137 (6.65%)	84 (6.38%)	13 (5.41%)	171 (6.07%)
25-Feb Total		4370	2310 (52.86%)	2060 (47.13%)	1315 (30.09%)	240 (5.49%)	2815 (64.41%)
26-Feb	Manager's Choice	829 (18.80%)	443 (19.09%)	386 (18.47%)	183 (13.39%)	42 (17.72%)	604 (21.52%)
26-Feb	Vegetarian Tray	469 (10.63%)	229 (9.87%)	240 (11.48%)	128 (9.37%)	25 (10.54%)	316 (11.26%)
26-Feb	Stuffed Crust Dippers w/Marinara Sauce	3111 (70.56%)	1648 (71.03%)	1463 (70.03%)	1055 (77.23%)	170 (71.72%)	1886 (67.21%)
26-Feb Total		4409	2320 (52.61%)	2089 (47.38%)	1366 (30.98%)	237 (5.37%)	2806 (63.64%)
27-Feb	Chicken Nuggets w/Dipping Sauce	3264 (71.25%)	1722 (71.30%)	1542 (71.19%)	1009 (69.73%)	176 (71.54%)	2079 (71.98%)
27-Feb	Italian spaghetti	1024 (22.35%)	539 (22.31%)	485 (22.39%)	339 (23.42%)	54 (21.95%)	631 (21.84%)
27-Feb	Vegetarian Tray	293 (6.39%)	154 (6.37%)	139 (6.41%)	99 (6.84%)	16 (6.50%)	178 (6.16%)
27-Feb Total		4581	2415 (52.71%)	2166 (47.28%)	1447 (31.58%)	246 (5.37%)	2888 (63.04%)
28-Feb	Mexican Beef Soft Tacos w/Trimmings	2472 (57.06%)	1288 (56.49%)	1184 (57.69%)	708 (53.84%)	121 (53.77%)	1643 (58.84%)
28-Feb	Teriyaki dippers over brown rice	953 (21.99%)	508 (22.28%)	445 (21.68%)	273 (20.76%)	58 (25.77%)	622 (22.27%)
28-Feb	Vegetarian Tray	907 (20.93%)	484 (21.22%)	423 (20.61%)	334 (25.39%)	46 (20.44%)	527 (18.87%)

28- Feb Total		4332	2280 (52.63%)	2052 (47.36%)	1315 (30.35%)	225 (5.19%)	2792 (64.45%)
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Table 6. Saturated Fat Content of Entrée Items by Gender and Participation Status Based Upon an Entrée's Popularity and Corrected for Number of Days Offered

Entrée	Sat Fat (gms)	Number Times on Menu	Mean % Pop	% Male	% Female	% Paid	% Free	% Reduced	Total Count
Chicken Sandwich on WG Bun	3	3	75.28%	53%	47%	31%	64%	6%	9890
Chicken Nuggets w/Dipping Sauce & WG Roll	4	1	71.71%	51%	49%	33%	62%	5%	3182
Chicken Nuggets w/Dipping Sauce	4	1	71.25%	53%	47%	31%	64%	5%	3264
Stuffed Crust Dippers w/Marinara Sauce	7.663	3	70.03%	53%	47%	32%	62%	5%	9242
Hamburger on WG Bun	3.491	1	65.93%	56%	44%	27%	68%	6%	2775
Popcorn Chicken w/Dipping sauce & WG Roll	3.62	1	59.39%	52%	48%	35%	59%	6%	2756

Cheese Pizza on WG Crust	7.731	3	57.33%	55%	45%	32%	62%	6%	7653
Pizzatas	9.014	1	56.90%	52%	48%	34%	61%	6%	2452
Grilled Cheese w/Chicken Noodle Soup	6.36	1	54.67%	50%	50%	31%	64%	5%	2304
Mexican Beef Soft Tacos w/Trimmings	9.082	2	54.03%	52%	48%	30%	65%	5%	4710
Nachos w/Chili and Cheese	6.36	1	53.64%	51%	49%	32%	63%	5%	2443
Popcorn Chicken w/Dipping Sauce	3.62	1	47.62%	52%	48%	28%	66%	6%	2162
Scrambled Eggs, Grits, Sausage Patt	7.687	1	45.08%	53%	47%	37%	57%	5%	2047
Grilled Cheese	5.543	1	33.94%	51%	49%	28%	66%	6%	1575
Hot dog w/chili	7.291	1	33.67%	55%	45%	29%	64%	6%	1451

Stuffed Baked Potato w/Ham and Cheese & Crackers	6.717	2	24.78%	45%	55%	32%	63%	5%	2187
Rib B Que on WG bun	9.457	1	24.56%	60%	40%	26%	68%	6%	1035
Teriyaki dippers over brown rice	3.876	2	23.61%	54%	46%	27%	67%	6%	2060
Italian spaghetti	0.123	1	22.35%	53%	47%	33%	62%	5%	1024
Manager's Choice	N/A	2	20.25%	55%	45%	24%	70%	6%	1765
BBQ on WG Bun	3.222	1	19.63%	60%	40%	25%	68%	7%	871
Turkey & gravy over brown rice	2.704	1	13.16%	44%	56%	32%	61%	7%	554
Vegetarian Tray	6.039	18	12.83%	51%	49%	32%	63%	5%	10094
Macaroni & Cheese Bake w/WG Roll	10.9	1	11.37%	52%	48%	29%	65%	6%	508
Turkey pot pie with WG Roll	5.164	1	10.47%	53%	47%	28%	68%	4%	459

Deli Sliced Turkey on WG Bun	0.189	2	10.22%	53%	47%	27%	67%	6%	896
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Table 7. Frequency of Total Entrées Purchased by Free, Reduced or Paid Status by Day

Date	Paid, n=1969 N. %	Reduced, n=283 N. %	Free, n=3123 N. %	Total, N=5375
1-Feb	1439 (32.71%)	240 (5.46%)	2720 (61.83%)	4399
4-Feb	1308 (29.82%)	243 (5.54%)	2835 (64.64%)	4386
5-Feb	1312 (30.44%)	238 (5.52%)	2760 (64.04%)	4310
7-Feb	1317 (30.01%)	236 (5.38%)	2836 (64.62%)	4389
8-Feb	1460 (32.06%)	247 (5.42%)	2847 (62.52%)	4554
11-Feb	1397 (31.49%)	238 (5.36%)	2802 (63.15%)	4437
12-Feb	1327 (30.29%)	237 (5.41%)	2817 (64.30%)	4381
13-Feb	1214 (28.84%)	236 (5.61%)	2759 (65.55%)	4209
14-Feb	1515 (32.65%)	260 (5.60%)	2865 (61.75%)	4640
18-Feb	1388 (32.21%)	246 (5.71%)	2675 (62.08%)	4309
19-Feb	1241 (29.45%)	227 (5.39%)	2746 (65.16%)	4214
20-Feb	1465 (32.27%)	252 (5.55%)	2823 (62.18%)	4540
21-Feb	1405 (31.46%)	245 (5.49%)	2816 (63.05%)	4466
22-Feb	1423 (32.10%)	247 (5.57%)	2763 (62.33%)	4433
25-Feb	1315 (30.09%)	240 (5.49%)	2815 (64.42%)	4370
26-Feb	1366 (30.98%)	237 (5.38%)	2806 (63.64%)	4409
27-Feb	1447 (31.59%)	246 (5.37%)	2888 (63.04%)	4581
28-Feb	1315 (30.36%)	225 (5.19%)	2792 (64.45%)	4332
Overall	24654 (31.07%)	4340(5.47%)	50365(63.46%)	79359

Table 8. Frequency of Total Entrées Purchased by Gender by Day

Date	Male, n = 2766 N. %	Female, n = 2609 N. %	Total N = 5375
1-Feb	2295 (52.17%)	2104 (47.83%)	4399
4-Feb	2297 (52.37%)	2089 (47.63%)	4386
5-Feb	2289 (53.11%)	2021 (46.89%)	4310
7-Feb	2296 (52.31%)	2093 (47.69%)	4389
8-Feb	2373 (52.11%)	2181 (47.89%)	4554
11-Feb	2333 (52.58%)	2104 (47.42%)	4437
12-Feb	2318 (52.91%)	2063 (47.09%)	4381
13-Feb	2255 (53.58%)	1954 (46.42%)	4209
14-Feb	2398 (51.68%)	2242 (48.32%)	4640
18-Feb	2277 (52.84%)	2032 (47.16%)	4309
19-Feb	2220 (52.68%)	1994 (47.32%)	4214
20-Feb	2385 (52.53%)	2155 (47.47%)	4540
21-Feb	2349 (52.60%)	2117 (47.40%)	4466
22-Feb	2328 (52.52%)	2105 (47.48%)	4433
25-Feb	2310 (52.86%)	2060 (47.14%)	4370
26-Feb	2320 (52.62%)	2089 (47.38%)	4409
27-Feb	2415 (52.72%)	2166 (47.28%)	4581
28-Feb	2280 (52.63%)	2052 (47.37%)	4332
Overall	41738(52.59%)	37621 (47.41%)	79359

Entrée Nutrient Analysis:

All of the 26 entrée items offered in the month of February are listed in table 11-16 pages 81-86, with the ranking of high to low nutrient content of the kcal and fat profiles. The A5SD menus for the month of February may be found in Appendix H. For the purposes of this study, it is noteworthy that the vegetarian option that is provided daily and consists of a cheese stick, yogurt cup and crackers.

Nutrient Analysis

Calories (Kcal), total fat (gms), saturated fat (gms), monounsaturated fat (gms), polyunsaturated fat (gms), and *trans* fat (gms), of the entrée items selected are summarized in Tables 9 and 10 listed on page 69. Findings are listed below and are as follows:

Testing for the interaction between gender and participation status was performed. There was no significant difference seen with nutrients with the interaction of gender and participation status.

There was no significant difference seen in nutrients with gender except for males with a significant difference in monounsaturated fat ($p < .0001$). Females selected entrée items with lower monounsaturated fat profiles 3.50 ± 0.01 gms. than males, 3.57 ± 0.01 gms (Table 10, p 69).

There were significant differences seen with Calories and fat profiles of the entrée items with participation status (Table 9, p 69). For calories, there were significant differences between students of paid status with students who were either free or reduced status. Students with free status selected entrée items with 337.36 ± 0.23 kcal (mean, SEM), reduced entrée items had an average of 336.77 ± 0.77 kcal, and paid had an average of 338.55 ± 0.32 kcal, ($p=0.0052$). There were also significant differences in total fat of entrée items selected with free status, 14.94 ± 0.02 gms, reduced 14.99 ± 0.07 gms and paid 15.07 ± 0.03 gms, ($p=0.0011$). There was no statistical significance between free and reduced status students and there was no difference between reduced and paid status for total fat for entrée items. Saturated fat content of entrée items also yielded significant differences between status groups: free, 5.77 ± 0.01 gms; reduced, 5.75 ± 0.03 gms and paid, 5.83 ± 0.01 gms ($p=0.0028$), with no difference in free and reduced status students. Of note, the paid status students selected entrée items that were higher in saturated fat than the free or reduced status groups – this was statistically difference. The students in the paid status group also selected entrée items higher in polyunsaturated fat. The values were; free 1.49 ± 0.01 gms, reduced 1.53 ± 0.02 gms and paid 1.53 ± 0.01 gms, ($p=0.0015$). There were no statistical differences between paid and reduced groups or between reduced and free groups.

Significant differences in selection of entrée monounsaturated fat content and *trans* fat content were also seen with free status selecting entrées highest in MUFA and *trans* fats. However there was no statistical difference between free and reduced status choices. Also, there was no statistical difference between paid and reduced status

participants for entrée choices for monounsaturated or *trans* fats. Values are:

monounsaturated fats in entrée items; free 3.56 ±0.01gms, paid 3.49± 0.01gms, reduced 3.55 ± 0.03gms (p=0.0007), and *trans* fat in entrée items - fat free 0.31±0.00gms, paid 0.29±0.00gms, reduced 0.31±0.00gms (p=0.0015).

Table 9. Entrée Item Average Nutrient Profile as a Function of Participation Status

Participation Status	Free	Reduced	Paid	p-value
Variable				
Kcal	337.36±0.23 ^b	336.77±0.77 ^b	338.55±0.32 ^a	0.0052*
Total Fat	14.94±0.02 ^b	14.99±0.07 ^{ab}	15.07±0.03 ^a	0.0011*
SFA	5.77±0.01 ^b	5.75±0.03 ^b	5.83±0.01 ^a	0.0028*
PUFA	1.49±0.01 ^b	1.53±0.02 ^{ab}	1.53±0.01 ^a	0.0015*
MUFA	3.56±0.01 ^a	3.55±0.03 ^{ab}	3.49±0.01 ^b	0.0007*
<i>Trans</i> fat	0.31±0 ^a	0.31±0.01 ^{ab}	0.29±0 ^b	0.0015*

SFA = saturated fat, PUFA = polyunsaturated fat, MUFA = monounsaturated fat, *indicates significant. Levels not connected by same letter are significantly different. P<0.05 significantly different

Table 10. Entrée Item Average Nutrient Profile as a Function of Gender

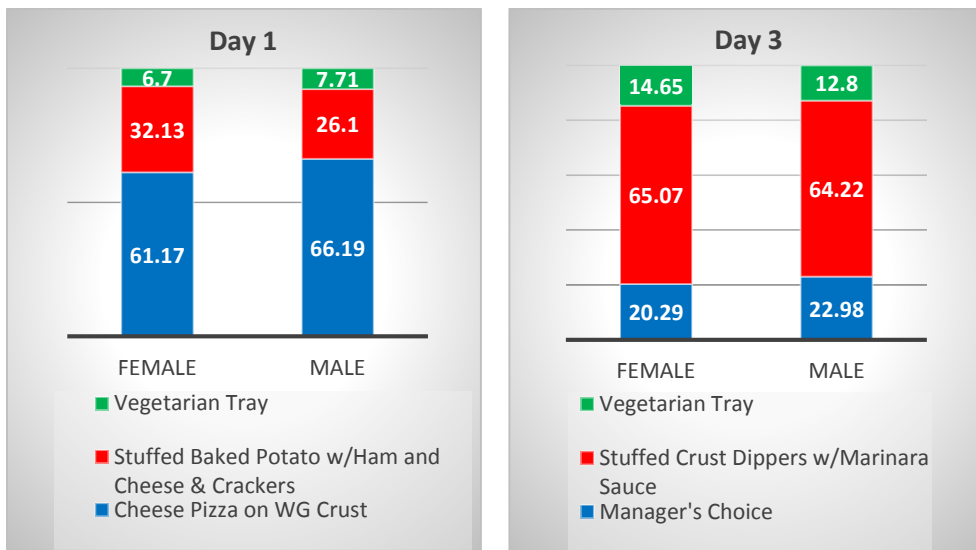
Gender	Male	Female	p-value
Variable			
Kcal	337.59±0.25	337.81±0.26	0.5462
Total Fat	14.98±0.02	14.98±0.02	0.9161
SFA	5.79±0.01	5.79±0.01	0.9161
PUFA	1.51±0.01	.51±0.01	0.9981
MUFA	3.57±0.01 ^a	3.5±0.01 ^b	<.0001*
<i>Trans</i> fat	0.31±0	0.3±0	0.2162

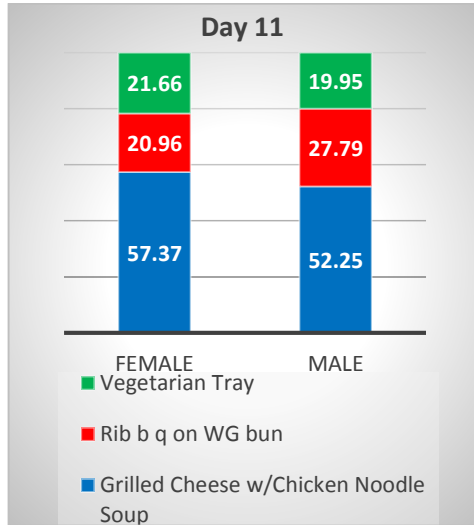
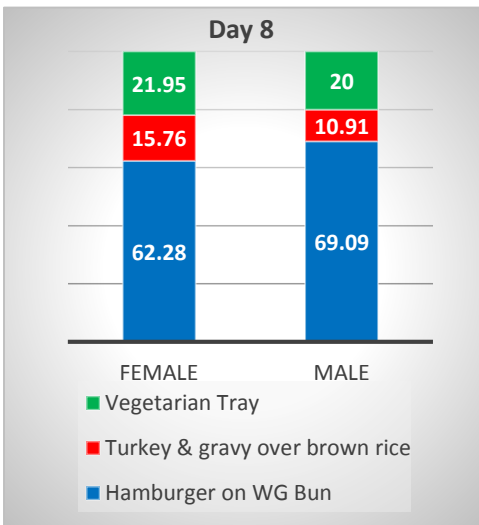
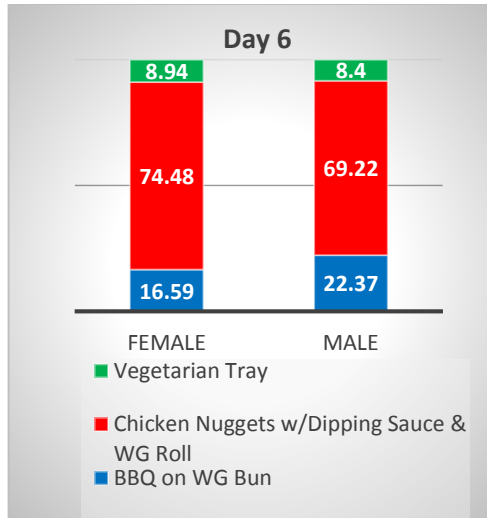
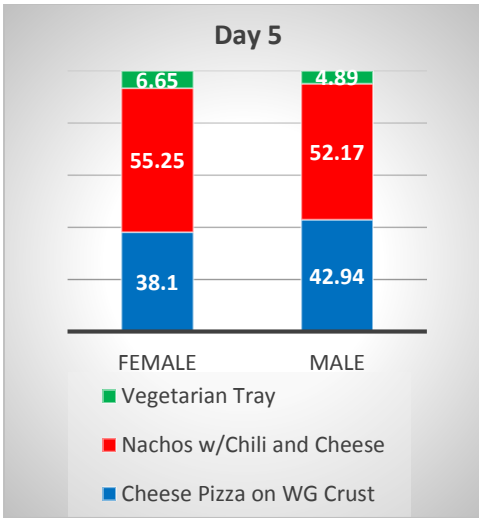
SFA= saturated fat, PUFA= polyunsaturated fat, MUFA = monounsaturated fat, *indicates significant. Levels not connected by same letter are significantly different. P<0.05 significantly different

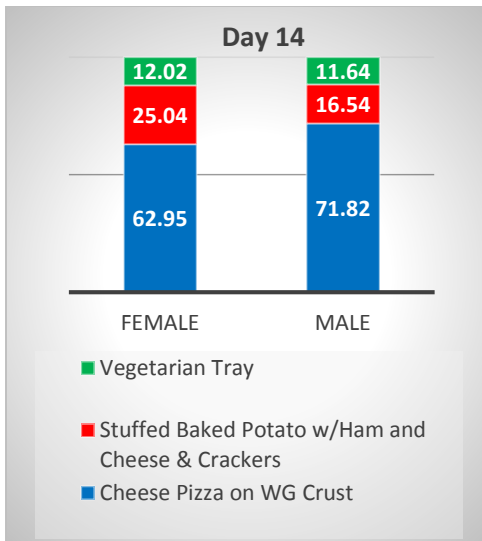
Chi Square Analysis of Daily Entrée Selection as a Function of Gender and Participation Status

Individual days and entrees were also assessed and significant differences were seen with gender (Figures A) and with participation status (Figures B) with entrée selection. Figure A. depicts the Chi-square analyses for days yielding statistically significant results for entrée selection by gender. Figures B. depicts the Chi-square analyses for days yielding statistically significant results for entrée selection by NSLP status.

Figure A. Chi-Squares Analysis of Entrée Selection by Gender







*All Graphs Significance used $P < 0.05$

Figure A. Chi-Square Gender Graph Descriptions

Day 1: Female $n=2104$, Male $n=2295$

66.19% ($n=1519$) of males and 61.17% ($n=1287$) of females chose the Cheese Pizza on WG Crust. 26.10% ($n=599$) of males and 32.13% ($n=676$) of females chose the Stuffed Baked Potato w/ Ham and Cheese & Crackers. 7.71% ($n=177$) of males and 6.70% ($n=141$) of females chose the Vegetarian Tray. The association between gender and entrée choice is significant ($X^2=19.651$, $p < .0001$).

Day 3: Female $n=2021$, Male $n=2289$

22.98% ($n=526$) of males and 20.29% ($n=410$) of females chose the Manger's Choice. 64.22% ($n=1470$) of males and 65.07% ($n=1315$) of females chose the Stuffed Crust Dippers w/ Marinara Sauce. 12.80% ($n=293$) of males and 14.65% ($n=296$) of females chose the Vegetarian Tray. The association between gender and entrée choice is significant ($X^2= 6.378$, $p=0.0412$).

Day 5: Female n=2181, Male n=2373

42.94% (n=1019) of males and 38.10% (n=831) of females chose the Cheese Pizza on WG Crust. 52.17% (n=1238) of males and 55.25 % (n=1205) of females chose the Nachos w/ Chili and Cheese. 4.89% (n=116) of males and 6.65% (n=145) of females chose the Vegetarian Tray. The association between gender and entrée choice is significant ($X^2= 14.704$, $p =0.0006$).

Day 6: Female n=2104, Male n=2333

22.37% (n=522) of males and 16.59% (n=349) of females chose the BBQ on WG Bun. 69.22% (n=1615) of males and 74.48% (n=1567) of females chose the Chicken Nuggets w/ Dipping Sauce & WG roll. 8.40% (n=196) of males and 8.94% (n=188) of females chose the Vegetarian Tray. The association between gender and entrée choice is significant ($X^2= 23.496$, $p<.0001$).

Day 8: Female n=1954, Male n=2255

69.09% (n=1558) of males and 62.28% (n=1217) of females chose the Hamburger on WG Bun. 10.91% (n=246) of males and 15.76% (n=308) of females chose the Turkey & Gray over brown Rice. 20.00% (n=451) of males and 21.95% (n=429) of females chose the Vegetarian Tray. The association between gender and entrée choice is significant ($X^2= 28.009$, $p <.0001$).

Day 11: Female n=1994, Male n=2220

52.25% (n=1160) of males and 57.37% (n=1144) of females chose the Grilled Cheese w/ Chicken Noodle Soup. 27.79% (n=617) of males and 20.96% (n=418) of females chose the Rib B Que on WG Bun. 19.95% (n=443) of males and 21.66% (n=432) of females chose the Vegetarian Tray. The association between gender and entrée choice is significant ($X^2= 26.467$, $p <.0001$).

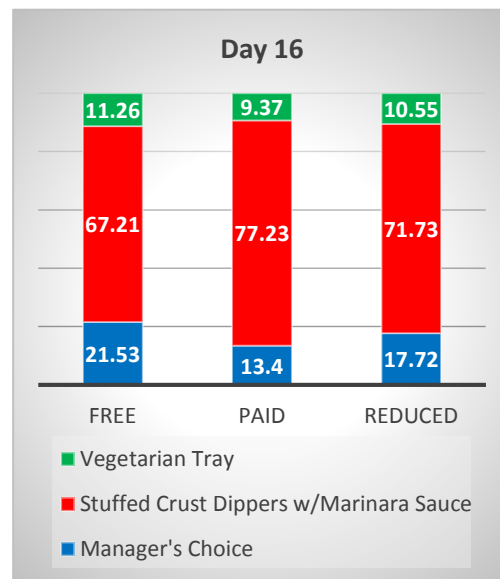
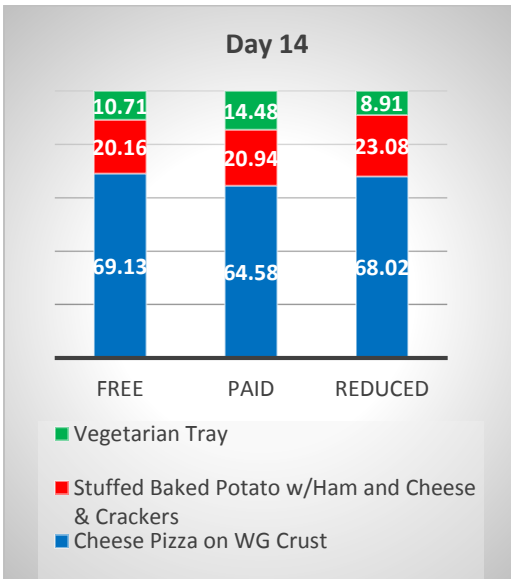
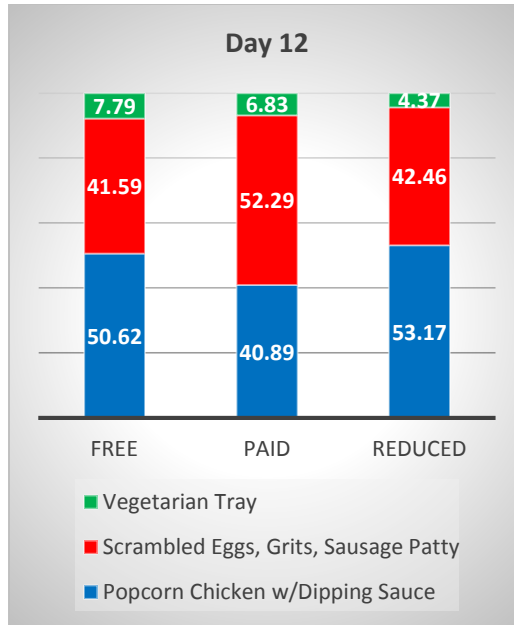
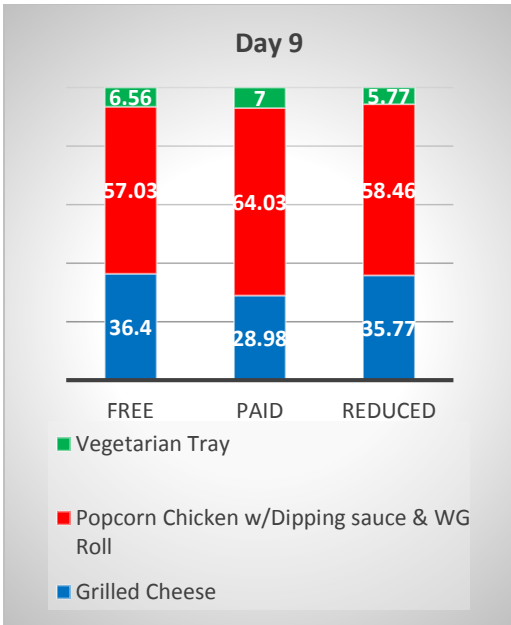
Day 14: Female n= 2105, Male n= 2328

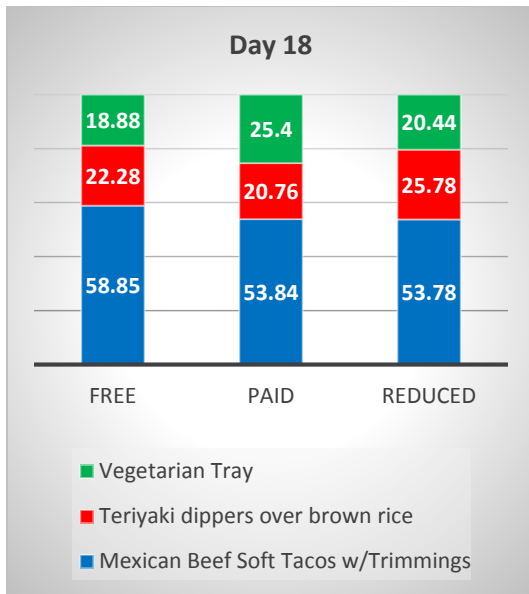
71.82% (n=1672) of males and 62.95% (n=1325) of females chose the Cheese Pizza on WG Crust. 16.54% (n=385) of males and 25.04% (n=527) of females chose the Stuffed Baked Potato w/ Ham and Cheese & Crackers. 11.64% (n=271) of males and 12.02%

(n=253) of females chose the Vegetarian Tray. The association between gender and entrée choice is significant ($X^2= 51.818, p <.0001$).

Figure B. Chi-Squares Analysis of Entrée Selection by Participation Status







*All graph significance used $P < 0.05$

Figure B. Chi-Square Participation Status Graph Descriptions

Day 3 Free n=2760, Paid n=1312, Reduced n=238

22.57% (n=623) of free and 18.90% (n=248) of paid, and 27.31% (n=65) of reduced chose the Manager’s Choice. 64.60% (n=1783) of free and 65.17% (n=855) of paid, and 61.76% (n=147) chose the Stuffed Crust Dippers w/ Marinara Sauce. 12.83% (n=354) of free and 15.93% (n=209) of paid, and 10.92% (n=26) of reduced chose the Vegetarian Tray. The association between participation status and entrée choice is significant ($X^2 = 17.161, p = 0.0018$).

Day 4: Free n=2836, Free n=1317, Reduced n=236

50.32% (n=1427) of free and 52.39% (n=690) of paid, and 51.27% (n=121) of reduced chose the Mexican Beef Soft Tacos w/ Trimmings. 26.94% (n=764) of free and 21.26% (n=280) of paid, and 26.69% (n=63) of reduced chose the Teriyaki Dippers over Brown Rice. 22.74% (n=645) of free and 26.35% (n=347) of paid, and 22.03% (n=52) of reduced chose the Vegetarian Tray. The association between participation status and entrée choice is significant ($X^2 = 17.711, p = 0.0014$).

Day 6 Free n=2802, Paid n=1397, Reduced n=238

21.16% (n=593) of free and 15.68% (n=219) of paid, and 24.79% (n=59) of reduced chose the BBQ on WG Bun. 69.88% (n=1958) of free and 75.73% (n=1058) of paid, and 69.75% (n=166) reduced chose the Chicken Nuggets w/ Dipping Sauce & WG Roll. 8.96% (n=251) of free and 8.59% (n=120) of paid, and 5.46% (n=13) of reduced chose the Vegetarian Tray. The association between participation status and entrée choice is significant ($X^2= 25.407$, $p <.0001$).

Day 8: Free n=2759, Paid n=1214 Reduced n=236

68.10% (n=1879) of free and 61.12% (n=742) of paid, and 65.25% (n=154) of reduced chose the Hamburger on WG Bun. 12.21% (n=337) of free and 14.66% (n=178) of paid, and 16.53% (n=39) of reduced chose the Turkey & Gravy over Brown Rice. 19.68% (n=543) of free and 24.22% (n=294) of paid, and 18.22% (n=43) of reduced chose the Vegetarian Tray. The association between participation status and entrée choice is significant ($X^2= 21.402$, $p =0.0003$).

Day 9: Free n=2865, Paid n=1515 Reduced n=260

36.40% (n=1043) of free and 28.98% (n=439) of paid, and 35.77% (n=93) of reduced chose the Grilled Cheese. 57.03% (n=1634) of free and 64.03% (n=970) of paid, and 58.46% (n=152) of reduced chose the Popcorn Chicken w/ Dipping Sauce & WG Roll. 6.56% (n=188) of free and 7.00% (n=106) of paid, and 5.77% (n=15) of reduced chose the Vegetarian Tray. The association between participation status and entrée choice is significant ($X^2=25.187$, $p <.0001$).

Day 12: Free n=2823, Paid n=1465 Reduced n=252

50.62% (n=1429) of free and 40.89% (n=599) of paid, and 53.17% (n=134) of reduced chose the Popcorn Chicken w/ Dipping Sauce. 41.59 % (n=1174) of free and 52.29% (n=766) of paid, and 42.46% (n=107) of reduced chose the Scrambled Eggs, Grits, Sausage Patty. 7.79% (n=220) of free and 6.83% (n=100) of paid, and 4.37% (n=11) of reduced chose the Vegetarian Tray. The association between participation status and entrée choice is significant ($X^2= 50.18$, $p <.0001$).

Day 14: Free n=2763, Paid n=1423, Reduced n=247

69.13% (n=1910) of free and 64.58% (n=919) of paid, and 68.02% (n=168) of reduced chose the Cheese Pizza on WG Crust. 20.16% (n=557) of free and 20.94% (n=298) of paid, and 23.08% (n=57) of reduced chose the Stuffed Baked potato w/ Ham and Cheese & Crackers. 10.71% (n=296) of free and 14.48% (n=206) of paid, and 8.91% (n=22) of reduced chose the Vegetarian Tray. The association between participation status and entrée choice is significant ($X^2=17.087$, $p=0.0019$).

Day 16: Free n=2806, Paid n=1366, Reduced n=237

21.53% (n=604) of free and 13.40% (n=183) of paid, and 17.72% (n=42) of reduced chose the Manager's Choice. 67.21% (n=1886) of free and 77.23% (n=1055) of paid, and 71.73% (n=170) of reduced chose the Stuffed Crust Dippers w/ Marinara Sauce. 11.26% (n=316) of free and 9.37% (n=128) of paid, and 10.55% (n=25) of reduced chose the Vegetarian Tray. The association between participation status and entrée choice is significant ($X^2=48.652$, $p<.0001$).

Day 18: Free n= 2792, Paid n= 1315, Reduced n= 225

58.85% (n=1643) of free and 53.84% (n=708) of paid, and 53.78% (n=121) of reduced chose the Mexican Beef Soft Tacos w/ Trimmings. 22.28% (n=622) of free and 20.76% (n=273) of paid, and 25.78% (n=58) of reduced chose the Teriyaki Dippers over Brown Rice. 18.88% (n=527) of free and 25.40% (n=334) of paid, and 20.44% (n=46) of reduced chose the Vegetarian Tray. The association between participation status and entrée choice is significant ($X^2=25.052$, $p<.0001$).

Ranking of Entrées Based Upon High to Low Nutrient Levels

The ranking of all entrées served during the month of February for each of the nutrients (kcal, Total fat, Saturated fat, Monounsaturated fat, Polyunsaturated fat, and *Trans* fat) is seen in Tables 11-16 pages, 78-83, listed below. The entrées are ranked

highest to lowest in kcal, total fat, saturated, monounsaturated, polyunsaturated and *trans* fat for the all entrées.

The average of nutrient values in an entrée was 335.88 kcal, 15.37g total fat, 5.47g saturated fat, 4.05g monounsaturated fat, 1.59g polyunsaturated fat and 0.18g *trans* fat. Appendix G includes more specific details on certain entrée items offered during February 2013.

Kcal:

The ranking of the five entrées highest in kcal that are ranked the highest to lowest in kcal are: 1) Macaroni and Cheese Bake w/ WG roll 463 kcal, 2) Mexican Beef Soft Tacos w/ Trimmings 453 kcal, 3) Rib B Que on WG Bun 420 kcal, 4) Chicken Nuggets w/ Dipping sauce and a WG roll 416 kcal, and 5) Popcorn Chicken w/ Dipping sauce and a WG roll 413 kcal. The five lowest kcal entrées from lowest to highest were 1) Deli Sliced Turkey on WG Bun, 146.5 kcal, 2) Turkey and gravy over brown rice, 220 kcal, 3) Grilled Cheese, 250 kcal, 4) Teriyaki Dippers over brown rice, 286.5 kcal and 5) Hamburger on WG Bun, 291.5 kcal.

Total fat:

Total fat is the sum of all saturated and unsaturated fats. The ranking of the five entrées highest to lowest in Total fat are 1) Rib B Que on WG bun 25.5g, 2) Chicken

Nuggets w/Dipping Sauce & WG Roll 23.25g, 3) Popcorn Chicken w/Dipping sauce & WG Roll 23.25g, 4) Chicken Nuggets w/Dipping Sauce 22g, and 5) Popcorn Chicken w/Dipping Sauce 22g. The five entrées lowest to highest in total fat are 1) Deli Sliced Turkey on WG Bun 2.245g, 2) Italian spaghetti 6.25g, 3) Turkey & gravy over brown rice 10g, 4) Teriyaki dippers over brown rice 10g, and 5) Grilled Cheese 11g. Of note, only one of the entrée items highest in kcal is in the top 5 highest saturated fat ranking - Rib B Que on WG bun. With a total fat value of 25.5 g, 230 of the 420 kcal of this entrée are provided by fat (54.6%).

Saturated fat:

The ranking of the five entrées highest to lowest in saturated fat are 1) Macaroni & Cheese Bake w/WG Roll 10.9g, 2) Rib B Que on WG bun 9.457g, 3) Mexican Beef Soft Tacos w/Trimblings 9.082g, 4) Pizzatas 9.014g, 5) Cheese Pizza on WG Crust 7.731g. The five entrées with the lowest to highest amount of saturated fat are 1) Italian spaghetti 0.123g, 2) Deli Sliced Turkey on WG Bun 0.189g, 3) Turkey & gravy over brown rice 2.704g, 4) Chicken Sandwich on WG Bun 3g, and 5) BBQ on WG Bun 3.222g.

Table 11. Ranking of Entrees from High to Low kcal Content

Entree	Calories (kcal)	Total Fat (gms)	Sat Fat (gms)	Mono Fat (gms)	Poly Fat (gms)	Trans Fat (gms)
Macaroni & Cheese Bake w/WG Roll	463	19.25	10.9	6.646	1.403	0
Mexican Beef Soft Tacos w/Trimmings	453	17.33	9.082	7.736	0.599	1.031
Rib B Que on WG bun	420	25.5	9.457	11.465	2.322	0
Chicken Nuggets w/Dipping Sauce & WG Roll	416	23.25	4	5.206	3.59	0
Popcorn Chicken w/Dipping sauce & WG Roll	413	23.25	3.62	3.24	4.86	0
Turkey pot pie with WG Roll	380	12.25	5.164	9.037	1.291	0
Grilled Cheese w/Chicken Noodle Soup	360	14	6.36	4.336	1.382	0.331
Pizzatas	360	21	9.014	2.098	2.199	0.014
BBQ on WG Bun	357	14.5	3.222	4.162	1.134	0
Scrambled Eggs, Grits, Sausage Patty	351	20.15	7.687	3.469	1.386	0
Hot dog w/chili	344	18.99	7.291	9.03	2.222	0.852
Stuffed Crust Dippers w/Marinara Sauce	340	14.25	7.663	0.634	1.472	0.014
Stuffed Baked Potato w/Ham and Cheese & Crackers	335	12	6.717	0.609	0.943	0.01
Chicken Nuggets w/Dipping Sauce	326	22	4	5.206	3.59	0
Vegetarian Tray	325	12.5	6.039	2.3	0.562	0
Popcorn Chicken w/Dipping Sauce	323	22	3.62	3.24	4.86	0
Chicken Sandwich on WG Bun	316.5	11.5	3	4	1	1.5
Cheese Pizza on WG Crust	310	12	7.731	4.203	1.414	0.004
Italian spaghetti	306	6.25	0.123	0.092	0.223	0
Nachos w/Chili and Cheese	304	17	6.36	4.227	0.855	0.163
Hamburger on WG Bun	291.5	12	3.491	3.68	0.302	0.285
Teriyaki Dippers over brown rice	286.5	10	3.876	0.319	0.315	0
Grilled Cheese	250	11	5.543	3.24	0.705	0.324
Turkey & gravy over brown rice	220	10	2.704	2.741	0.899	0
Deli Sliced Turkey on WG Bun	146.5	2.245	0.189	0.28	0.177	0

Table 12. Ranking of Entrees from High to Low Total Fat Content

Entree	Calories (kcal)	Total Fat (gms)	Sat Fat (gms)	Mono Fat (gms)	Poly Fat (gms)	Trans Fat (gms)
Rib B Que on WG bun	420	25.5	9.457	11.465	2.322	0
Chicken Nuggets w/Dipping Sauce & WG Roll	416	23.25	4	5.206	3.59	0
Popcorn Chicken w/Dipping sauce & WG Roll	413	23.25	3.62	3.24	4.86	0
Chicken Nuggets w/Dipping Sauce	326	22	4	5.206	3.59	0
Popcorn Chicken w/Dipping Sauce	323	22	3.62	3.24	4.86	0
Pizzatas	360	21	9.014	2.098	2.199	0.014
Scrambled Eggs, Grits, Sausage Patty	351	20.15	7.687	3.469	1.386	0
Macaroni & Cheese Bake w/WG Roll	463	19.25	10.9	6.646	1.403	0
Hot dog w/chili	344	18.99	7.291	9.03	2.222	0.852
Mexican Beef Soft Tacos w/Trimmings	453	17.33	9.082	7.736	0.599	1.031
Nachos w/Chili and Cheese	304	17	6.36	4.227	0.855	0.163
BBQ on WG Bun	357	14.5	3.222	4.162	1.134	0
Stuffed Crust Dippers w/Marinara Sauce	340	14.25	7.663	0.634	1.472	0.014
Grilled Cheese w/Chicken Noodle Soup	360	14	6.36	4.336	1.382	0.331
Vegetarian Tray	325	12.5	6.039	2.3	0.562	0
Turkey pot pie with WG Roll	380	12.25	5.164	9.037	1.291	0
Stuffed Baked Potato w/Ham and Cheese & Crackers	335	12	6.717	0.609	0.943	0.01
Cheese Pizza on WG Crust	310	12	7.731	4.203	1.414	0.004
Hamburger on WG Bun	291.5	12	3.491	3.68	0.302	0.285
Chicken Sandwich on WG Bun	316.5	11.5	3	4	1	1.5
Grilled Cheese	250	11	5.543	3.24	0.705	0.324
Teriyaki dippers over brown rice	286.5	10	3.876	0.319	0.315	0
Turkey & gravy over brown rice	220	10	2.704	2.741	0.899	0
Italian spaghetti	306	6.25	0.123	0.092	0.223	0
Deli Sliced Turkey on WG Bun	146.5	2.245	0.189	0.28	0.177	0

Table 13. Ranking of Entrees from High to Low Saturated Fat Content

Entree	Calories (kcal)	Total Fat (gms)	Sat Fat (gms)	Mono Fat (gms)	Poly Fat (gms)	Trans Fat (gms)
Macaroni & Cheese Bake w/WG Roll	463	19.25	10.9	6.646	1.403	0
Rib B Que on WG bun	420	25.5	9.457	11.465	2.322	0
Mexican Beef Soft Tacos w/Trimmings	453	17.33	9.082	7.736	0.599	1.031
Pizzatas	360	21	9.014	2.098	2.199	0.014
Cheese Pizza on WG Crust	310	12	7.731	4.203	1.414	0.004
Scrambled Eggs, Grits, Sausage Patty	351	20.15	7.687	3.469	1.386	0
Stuffed Crust Dippers w/Marinara Sauce	340	14.25	7.663	0.634	1.472	0.014
Hot dog w/chili	344	18.99	7.291	9.03	2.222	0.852
Stuffed Baked Potato w/Ham and Cheese & Crackers	335	12	6.717	0.609	0.943	0.01
Grilled Cheese w/Chicken Noodle Soup	360	14	6.36	4.336	1.382	0.331
Nachos w/Chili and Cheese	304	17	6.36	4.227	0.855	0.163
Vegetarian Tray	325	12.5	6.039	2.3	0.562	0
Grilled Cheese	250	11	5.543	3.24	0.705	0.324
Turkey pot pie with WG Roll	380	12.25	5.164	9.037	1.291	0
Chicken Nuggets w/Dipping Sauce & WG Roll	416	23.25	4	5.206	3.59	0
Chicken Nuggets w/Dipping Sauce	326	22	4	5.206	3.59	0
Teriyaki dippers over brown rice	286.5	10	3.876	0.319	0.315	0
Popcorn Chicken w/Dipping sauce & WG Roll	413	23.25	3.62	3.24	4.86	0
Popcorn Chicken w/Dipping Sauce	323	22	3.62	3.24	4.86	0
Hamburger on WG Bun	291.5	12	3.491	3.68	0.302	0.285
BBQ on WG Bun	357	14.5	3.222	4.162	1.134	0
Chicken Sandwich on WG Bun	316.5	11.5	3	4	1	1.5
Turkey & gravy over brown rice	220	10	2.704	2.741	0.899	0
Deli Sliced Turkey on WG Bun	146.5	2.245	0.189	0.28	0.177	0
Italian spaghetti	306	6.25	0.123	0.092	0.223	0

Table 14. Ranking of Entrees from High to Low Monounsaturated Fat Content

Entree	Calories (kcal)	Total Fat (gms)	Sat Fat (gms)	Mono Fat (gms)	Poly Fat (gms)	Trans Fat (gms)
Rib B Que on WG bun	420	25.5	9.457	11.465	2.322	0
Turkey pot pie with WG Roll	380	12.25	5.164	9.037	1.291	0
Hot dog w/chili	344	18.99	7.291	9.03	2.222	0.852
Mexican Beef Soft Tacos w/Trimmings	453	17.33	9.082	7.736	0.599	1.031
Macaroni & Cheese Bake w/WG Roll	463	19.25	10.9	6.646	1.403	0
Chicken Nuggets w/Dipping Sauce & WG Roll	416	23.25	4	5.206	3.59	0
Chicken Nuggets w/Dipping Sauce	326	22	4	5.206	3.59	0
Grilled Cheese w/Chicken Noodle Soup	360	14	6.36	4.336	1.382	0.331
Nachos w/Chili and Cheese	304	17	6.36	4.227	0.855	0.163
Cheese Pizza on WG Crust	310	12	7.731	4.203	1.414	0.004
BBQ on WG Bun	357	14.5	3.222	4.162	1.134	0
Chicken Sandwich on WG Bun	316.5	11.5	3	4	1	1.5
Hamburger on WG Bun	291.5	12	3.491	3.68	0.302	0.285
Scrambled Eggs, Grits, Sausage Patty	351	20.15	7.687	3.469	1.386	0
Grilled Cheese	250	11	5.543	3.24	0.705	0.324
Popcorn Chicken w/Dipping sauce & WG Roll	413	23.25	3.62	3.24	4.86	0
Popcorn Chicken w/Dipping Sauce	323	22	3.62	3.24	4.86	0
Turkey & gravy over brown rice	220	10	2.704	2.741	0.899	0
Vegetarian Tray	325	12.5	6.039	2.3	0.562	0
Pizzatas	360	21	9.014	2.098	2.199	0.014
Stuffed Crust Dippers w/Marinara Sauce	340	14.25	7.663	0.634	1.472	0.014
Stuffed Baked Potato w/Ham and Cheese & Crackers	335	12	6.717	0.609	0.943	0.01
Teriyaki dippers over brown rice	286.5	10	3.876	0.319	0.315	0
Deli Sliced Turkey on WG Bun	146.5	2.245	0.189	0.28	0.177	0
Italian spaghetti	306	6.25	0.123	0.092	0.223	0

Table 15. Ranking of entrees from High to Low Polyunsaturated Fat Content

Entree	Calories (kcal)	Total Fat (gms)	Sat Fat (gms)	Mono Fat (gms)	Poly Fat (gms)	Trans Fat (gms)
Popcorn Chicken w/Dipping sauce & WG Roll	413	23.25	3.62	3.24	4.86	0
Popcorn Chicken w/Dipping Sauce	323	22	3.62	3.24	4.86	0
Chicken Nuggets w/Dipping Sauce & WG Roll	416	23.25	4	5.206	3.59	0
Chicken Nuggets w/Dipping Sauce	326	22	4	5.206	3.59	0
Rib B Que on WG bun	420	25.5	9.457	11.465	2.322	0
Hot dog w/chili	344	18.99	7.291	9.03	2.222	0.852
Pizzatas	360	21	9.014	2.098	2.199	0.014
Stuffed Crust Dippers w/Marinara Sauce	340	14.25	7.663	0.634	1.472	0.014
Cheese Pizza on WG Crust	310	12	7.731	4.203	1.414	0.004
Macaroni & Cheese Bake w/WG Roll	463	19.25	10.9	6.646	1.403	0
Scrambled Eggs, Grits, Sausage Patty	351	20.15	7.687	3.469	1.386	0
Grilled Cheese w/Chicken Noodle Soup	360	14	6.36	4.336	1.382	0.331
Turkey pot pie with WG Roll	380	12.25	5.164	9.037	1.291	0
BBQ on WG Bun	357	14.5	3.222	4.162	1.134	0
Chicken Sandwich on WG Bun	316.5	11.5	3	4	1	1.5
Stuffed Baked Potato w/Ham and Cheese & Crackers	335	12	6.717	0.609	0.943	0.01
Turkey & gravy over brown rice	220	10	2.704	2.741	0.899	0
Nachos w/Chili and Cheese	304	17	6.36	4.227	0.855	0.163
Grilled Cheese	250	11	5.543	3.24	0.705	0.324
Mexican Beef Soft Tacos w/Trimmings	453	17.33	9.082	7.736	0.599	1.031
Vegetarian Tray	325	12.5	6.039	2.3	0.562	0
Teriyaki dippers over brown rice	286.5	10	3.876	0.319	0.315	0
Hamburger on WG Bun	291.5	12	3.491	3.68	0.302	0.285
Italian spaghetti	306	6.25	0.123	0.092	0.223	0
Deli Sliced Turkey on WG Bun	146.5	2.245	0.189	0.28	0.177	0

Table 16. Ranking of Entrees from High to Low *Trans* Fat Content

Entree	Calories (kcal)	Total Fat (gms)	Sat Fat (gms)	Mono Fat (gms)	Poly Fat (gms)	<i>Trans</i> Fat (gms)
Chicken Sandwich on WG Bun	316.5	11.5	3	4	1	1.5
Mexican Beef Soft Tacos w/Trimmings	453	17.33	9.082	7.736	0.599	1.031
Hot dog w/chili	344	18.99	7.291	9.03	2.222	0.852
Grilled Cheese w/Chicken Noodle Soup	360	14	6.36	4.336	1.382	0.331
Grilled Cheese	250	11	5.543	3.24	0.705	0.324
Hamburger on WG Bun	291.5	12	3.491	3.68	0.302	0.285
Nachos w/Chili and Cheese	304	17	6.36	4.227	0.855	0.163
Pizzatas	360	21	9.014	2.098	2.199	0.014
Stuffed Crust Dippers w/Marinara Sauce	340	14.25	7.663	0.634	1.472	0.014
Stuffed Baked Potato w/Ham and Cheese & Crackers	335	12	6.717	0.609	0.943	0.01
Cheese Pizza on WG Crust	310	12	7.731	4.203	1.414	0.004
Macaroni & Cheese Bake w/WG Roll	463	19.25	10.9	6.646	1.403	0
Rib B Que on WG bun	420	25.5	9.457	11.465	2.322	0
Scrambled Eggs, Grits, Sausage Patty	351	20.15	7.687	3.469	1.386	0
Vegetarian Tray	325	12.5	6.039	2.3	0.562	0
Turkey pot pie with WG Roll	380	12.25	5.164	9.037	1.291	0
Chicken Nuggets w/Dipping Sauce & WG Roll	416	23.25	4	5.206	3.59	0
Chicken Nuggets w/Dipping Sauce	326	22	4	5.206	3.59	0
Teriyaki dippers over brown rice	286.5	10	3.876	0.319	0.315	0
Popcorn Chicken w/Dipping sauce & WG Roll	413	23.25	3.62	3.24	4.86	0
Popcorn Chicken w/Dipping Sauce	323	22	3.62	3.24	4.86	0
BBQ on WG Bun	357	14.5	3.222	4.162	1.134	0
Turkey & gravy over brown rice	220	10	2.704	2.741	0.899	0
Deli Sliced Turkey on WG Bun	146.5	2.245	0.189	0.28	0.177	0
Italian spaghetti	306	6.25	0.123	0.092	0.223	0

CHAPTER 4

DISCUSSION & CONCLUSIONS

The total number of male participants in this study was 2,766 (51.46%), and the total number of female participants were 2,609 (48.54%) (Table 1, page 45): therefore, this population readily lent itself to analysis of gender differences. The total number of students eligible for a free status meal was 3,123 (58.10%), while eligibility for a reduced meal was 283 (5.26 %), and eligibility for a paid meal was 1,969 (36.63%) (Table 1, page 45). So, the majority of students in A5SD that participated in the NSLP were free status. This compares favorably with the ratios of approximately 50% of school lunches being provided under a ‘free’ status and 10% provided at ‘reduced’ cost nationally (Ralston K, Newman C, citation 2 under Hanson 2013).

The position of the Academy of Nutrition and Dietetics on dietary fat intake for adults is that “dietary fat needs to provide 20-25% of energy with more intake of n-3 polyunsaturated fats and less intake from saturated fat (<10% total calories).” (Academy of Nutrition and Dietetics, 2014). Parents’ dietary patterns of intake including macronutrient consumption of fats, has been shown to be directly influential upon the choices made by their children (Scaglioni, 2011). The dietary fat intake recommendations for children are total fat <30% total calories and saturated fat <10% total calories (USDA, 2012). A key component of the consumption of fat by children is the intake during the school day. While schools may provide both breakfast and lunch, the focus of this research was lunch entrée selections only. Typically food items selected and eaten for lunch and dinner have greater overlap than those chosen for breakfast. Therefore,

inferences of foods likely to be selected and consumed preferentially by gender or SES (and resulting free, reduced, or paid NSLP status) will likely be stronger for this data set.

Saturated fat content of entrée items was a primary focus of this project. Based upon previous research it was hypothesized that males would preferentially choose food items higher in saturated fat as would individuals who received free or reduced priced lunches (Gould et al, 2006) (Hanson & Olson, 2013). In this study, the mean and standard error of the mean (SEM) of saturated fat in entrées selected by males and females was 5.79 ± 0.01 gms and 5.79 ± 0.01 gms, respectively. So, there was no significant difference in choice of entrée items as a function of gender. The large sample size lend credibility to this finding as do the means \pm SEM that with rounding are identical. The mean and SEM of saturated fat in entrées selected by paid, free, and reduced participation status was 5.83 ± 0.01 gms, 5.77 ± 0.01 gms, and 5.75 ± 0.03 gms, respectively. The means for saturated fat for gender and participation status meet the guidelines of ≤ 10 % of total calories from saturated fat from the school lunch entrée. For the previously discussed recommendations for an elementary school aged child, a 1400 kcal/day or 1600 kcal/day diet, (which by convention would include 3 meals), would allow a saturated fat intake of 15.5g/day and 17.7g/day, respectively. Meal kcal requirements for grades K-5th are required to be between 550-650 kcal (Appendices A-C). This would allow a range of 6.1g-7.2g of saturated fat/meal. Using this range, students in this study, on average, selected entrée items less than the recommended amount of saturated fat allowed per meal: however it is important to recall that only the fat contributed by the entrée was

assessed in this study. Additional sources of saturated fat could come from milk and milk-based products as well as recipe additions of ‘added fats’.

Some entrée items offered in A5SD were over the recommended amount for saturated fat of <10% from total kcal/meal (range of 6.1g-7.2g). These items include Macaroni & Cheese Bake (10.9g), Rib B Que on WG Bun (9.457g), Mexican Beef Soft Tacos w/ Trimmings (9.082g), Pizzas (9.014g), Cheese Pizza on WG Crust (7.731g), Scrambled Eggs, Grits, Sausage Patty (7.687g), Stuffed Crust Dippers w/ Marinara Sauce (7.663g), and Hot dog w/ chili (7.291g). However, these same items are also within the <10% total saturated fat per/day of 15.5-17.7g/day (based off of a 1400-1600 kcal/day diet). One consuming these lunch entrée items should be careful to select lower saturated fat items for the other day’s meals and snacks. Knowledge of items high in fat and saturated fat in food items in a school aged population is important. The consumption of high saturated fat items at lunch could easily put a child at risk of over consumption of daily saturated fat based upon current guidelines. As the intent of the *Dietary Guidelines for Americans*, 2010 and the NSLP is to decrease saturated fat intake and some of the items listed above are also in the preferred entrée items by students (examples: Rib B Que on WG Bun and Cheese Pizza on WG Crust) changes in the preparation methods or ingredients might be used as methods to allow students to consume their favorite foods yet make them a healthier option. This is particularly noteworthy for males who chose these items preferentially over females as the onset of obesity related diseases such as CVD is sooner during the lifespan for males.

Research by Gould et al, (2006), assessed whether secondary schools in England met nutritional standards for children aged 11-12, and reported that two out of the three schools did not meet the nutritional standards. These schools encompassed different SES. It appears from the entrées served that the 5,375 students in A5SD are likely within the recommended guidelines of $\leq 10\%$ total calories from saturated fat, if one attributes 1/3 of kcal to the school lunch. Gender differences were detected in Gould et al, (2006) research with more males consuming total, saturated, and monounsaturated fat. This study's research did not assess age differences.

The results of this study did not detect gender differences with kcal, total, saturated, polyunsaturated and *trans* fat, however there was a significant difference seen in gender in monounsaturated fat with males ($p < .0001$) with males consuming more monounsaturated fat. In Gould et al, (2006), research, their hypothesis was that participation status affected intake with lower SES consuming foods that were less healthy than higher SES (Gould et al, 2006). As previously stated, In Gould et al, (2006), research there were gender differences seen in nutrient intake between students. Males were seen to consume more total fat ($P=0.035$), saturated fat ($P=0.015$) and monounsaturated fat ($P=0.003$) than females (Gould et al, 2006).

The review article by Skinner and Skelton show that obesity rates in children have a positive linear trend and is significant in all ages while also showing a stabilization of obesity prevalence in recent years. Class 2 and class 3 obesity have significantly increased in females in all ages over the analyzed time period of 1999-2012. For males there is also a positive liner trend that is significant for overweight or obesity was also

shown (Skinner & Skelton, 2014). This positive linear trend in overweight and obesity makes it extremely important to monitor food intake in children. This research did not find a significant difference with the interaction of gender and participation status; however a significant difference in nutrients was detected with participation status alone. The results show that paid status consumed more saturated fat than did free or reduced NSLP status participants.

There were significant differences seen in participation status with kcal and fat profile nutrients. With kcal ($p=0.0052$), total fat ($p=0.0011$), saturated fat ($p=0.0028$), and polyunsaturated fat ($p=0.0015$) there was a significant difference in paid status when compared to free status. There was overlap in paid and reduced status for total fat, polyunsaturated fat, monounsaturated fat and *trans* fat. For monounsaturated fat ($p=0.007$), and *trans* fat ($p=0.0015$) in the entrées served there was a significant difference seen in free status when compared to paid status. However, there was overlap in the free and reduced as well as the paid and reduced status for significance. The menu for A5SD is available online and lists the entrée items that students may purchase ahead of time. Students are not required to take the entrée item for which they have pre-paid allowing them choice at the school lunch service station where they pick up available lunch items. Paid status students may have opted to bring their meals on days when they (or their parents) decided ahead of time that they did not want to purchase the lunch items listed in the A5SD provided menus. However, even if a student had decided that they did not want to purchase an entrée item from the school lunch this did not preclude them from purchasing the lunch item should it appeal to them in the moment. Having money

on account with the individual school system for lunch or other food item purchases allows students added flexibility to opt-in or opt-out of purchases for school lunches.

In Caine-Bish & Scheule, (2009) gender differences were examined as a factor in food selections, including entrée type foods. Males selected more “ethnic foods” (tacos, fajitas), “beef”, “pork” and “barbeque”, and “casseroles”. Females selected more “starches”, “sweets”, fruits/vegetables.

In our research the Chi-square analysis of saturated fat of entrée selection as a function of gender were similar in that males preferred the BBQ entrées (Rib B Que 9.457g saturated fat (SF)) and BBQ sandwich (3.222g SF). Males also preferred the Hamburger on WG Bun (3.491g SF) and Pizza entrées (Cheese pizza 7.731g SF, Pizzatas 9.014g SF, SCD 7.663g SF). Females were seen to prefer the “Starch based entrée” Stuffed Baked Potatoes w/ Ham and Cheese & Crackers (6.717g SF) and grilled cheese w chicken noodle soup entrée (6.36g SF). The BBQ based dishes (Rib B Que specifically) and Pizza dishes were items that contained more saturated fat.

The Chi-square analysis of entrée items selection as a function of participation status show that paid status tends to prefer more entrée selections such as Chicken Nuggets or popcorn chicken entrées and pizza entrées (cheese pizza (7.731g SF) and Pizzatas (9.014g SF), stuffed crust dippers (7.663g SF). The chicken based entrees which include Chicken Nuggets with and without a WG Roll contain (4g SF) and Popcorn Chicken with and without a WG Roll contain (3.62g SF) per entrée. The free status group

preferred entrée items such as Teriyaki beef dippers (3.876g SF) and hamburger on WG Bun (3.491g SF). The Pizza based entrées are higher in saturated fat content.

The results for ranking of entrée items were similar to other studies. Items such as beef products, cheese dishes, and pizza dishes high in saturated fat found in our study are consistent with some of the National Cancer Institute (NCI) and NHANES report of the top five sources of saturated fat that are commonly consumed by the US population which stated that these items “Regular Cheese, Pizza, Grain-based desserts, Dairy desserts, and Chicken and Chicken Mixed Dishes, (National Cancer Institute, 2013). The five top sources of saturated fat found in this study’s research were also similar to many of the food items found in Huth et al, (2013) study of saturated fat foods commonly consumed by the US population “Cheese, Beef, Milk, Other fats and oils, Frankfurters /sausages/luncheon meats, Cake/cookies/quick bread/pastries/pie, Margarine and butter, Milk desserts, Poultry and crackers/popcorn/pretzels/chips (Huth et al, 2013).

The results of our research shows that the top 5 entrées from high to low in sat fat were: 1) Macaroni & Cheese Bake w/WG Roll 10.9g, 2) Rib B Que on WG bun 9.457g, 3) Mexican Beef Soft Tacos w/Trimmings 9.082g, 4) Pizzatas 9.014g, 5) Cheese Pizza on WG Crust 7.731g. The BBQ based entrées and cheese pizza entrées were selected more by males.

Cross-sectional survey research by Cooke & Wardle (2005), focused on age and gender influences in children 14-16 years of age on food choices and preferences. The study assessed whether children had tried certain foods and their liking or disliking for foods. The study controlled for the number of foods tried by children. The findings

showed no significant differences in preferences as a function of gender (Cooke & Wardle, 2005). The results in our study showed no significant differences in fat selection or kcal content with gender. Cooke & Wardle also showed significant differences based upon age by gender interaction in amount of foods disliked. Younger males disliked more foods than females ($F(3, 1167) = 2.66, p < 0.05$). In older children the results were opposite. Males preferred “fatty and sugary foods” ($p < 0.005$), meats ($p < 0.001$) and processed meats ($p < 0.001$), and eggs ($p < 0.05$) more than females. Females preferred fruits ($p < 0.05$) and vegetables ($p < 0.001$) more than males (Cooke & Wardle, 2005). This is similar to results found in our study. It was found that males preferred more entrées with BBQ or Rib B Que, and females preferred the Stuff Baked Potato. In Cooke & Wardle (2005), research pizza was a top ranking food. Pizza based entrées were more popular in this study’s population.

Bartholomew & Jowers (2006), researched the effect of increasing the frequency of offering low or moderate fat entrées over high fat entrées in two schools in Texas. In our research the entrée items were ranked highest to lowest in saturated fat content, and the frequency of purchasing of entrée items was also assessed. This provided information on the purchasing patterns when higher and lower fat (all types) or caloric entrée items were offered for selection by elementary school aged children. This can give school lunch programs more information about the kcal and fat content of entrée items and their selection frequency which can influence the menu planning for the future. This research indicated that on days where turkey based entrée items were served, the vegetation tray entrée was more popular (February 4, 12, 13 and 25th) (Table 5 page 54). Conversely,

when chicken entrées were offered they were the most popular. These data may be used to determine most to least preferred entrée items and thus assist in future meal planning activities – hopefully, assisting with decreasing daily plate waste.

The top five entrées highest in saturated fat were 1) Macaroni & Cheese Bake w/WG Roll 10.9g, 2) Rib B Que on WG bun 9.457g, 3) Mexican Beef Soft Tacos w/Trimmings 9.082g, 4) Pizzatas 9.014g, 5) Cheese Pizza on WG Crust 7.731g. As expected, many of these entrée items were popular choices based upon gender and participation status. The BBQ entrée was most popular with males and is one of the top five lowest in saturated fat content. Cheese pizza was also a popular entrée with males which is in the top five highest in saturated fat. Paid status also preferred chicken nuggets and pizza based entrées more - both of which are in the top five highest in saturated fat content.

In conclusion the Guidelines state that saturated fat intake needs to be within $\leq 10\%$ of total calories. If consuming a 2,000kcal/day diet this correlates to an intake of 22g of saturated fat that is recommended to meet the current guidelines for average daily consumption. The needs of children may require different kcal ranges, a 1400 kcal/day or 1600 kcal/day correlates to a 15.5g/day or 17.7g/day of saturated fat recommended. All of the entrée items offered in the month of February meet the guidelines of $\leq 10\%$ of total calories coming from saturated fat, however this is only representative of their lunch time entrée selection and not consumption of the entrée item.

Compared to Hanson & Olson, (2013) results of participation in NSLP/SBP NSLP/SBP gathered from NHANES dietary recall data from 2003-2008, that found students that participated in the NSLP/SBP had poorer totals for saturated fat than those that did not participate. That is, based only on the entrée selection, all of the participants in our study, regardless of participation status, were shown to have selected entrées with totals for saturated fat $\leq 10\%$ of total calories.

The fat profile of entrée items offered for school lunches in A5SD was able to be determined by searching and locating all of the fat profiles for all entrée items offered in February 2013. The hypothesis for this research was that male students participating in the free and reduced NSLP would select entrée items higher in saturated fat. This hypotheses was not reinforced. The second hypothesis males will select higher saturated fat entrée items. This hypothesis was not reinforced. The third hypothesis students that are free or reduced participation status in the national school lunch program will select higher saturated fat items. This hypothesis was not reinforced.

There was a significant difference in participation status, with paid selecting more saturated fat. There were also significant difference seen in participation status with kcal and fat profile nutrients. The menu for A5SD is available online and lists the entrée items that students may purchase ahead of time. This may have affected paid status selection on entrée items. Paid status students may have opted to bring their meals on days where they did not want to purchase entrée items from the school lunch.

The primary focus of this research was only on the selection of entrée items and not the actual consumption of these entrée items. Also important to note that only entrée

items were assessed and not all lunch items offered, selected or consumed at lunch. It is possible that some non-entrée items could contribute to saturated fat such as milk or milk-based products. Further research needs to be performed on entrée selection and consumption to gather more data on the intake of saturated fat for students participating in the free and reduced NSLP and how much saturated fat is being consumed in lunch time meals.

Potential limitations of this study include the use of entrée items which were matched using a “best fit criteria” and may not be a 100% match to actual items served in A5SD. Efforts to overcome this potential limitation included using the Nutritionist Pro™ which is a reliable diet analysis software system that matched foods within a $\pm 10\%$ from actual values used in A5SD

Preferences can also be used in particular school settings, such as an all boys’ or all girls’ school or in school settings with large differences in number of students participating the federally assisted NSLP.

APPENDICES

Appendix A

January 2012 Final Rule Nutrition Standards

Final Rule Nutrition Standards in the National School Lunch and School Breakfast Programs – Jan. 2012

	Breakfast Meal Pattern			Lunch Meal Pattern		
	Grades K-5 ^a	Grades 6-8 ^a	Grades 9-12 ^a	Grades K-5	Grades 6-8	Grades 9-12
Meal Pattern	Amount of Food^b Per Week (Minimum Per Day)					
Fruits (cups) ^{c,d}	5 (1) ^e	5 (1) ^e	5 (1) ^e	2½ (½)	2½ (½)	5 (1)
Vegetables (cups) ^{c,d}	0	0	0	3¼ (¾)	3¼ (¾)	5 (1)
Dark green ^f	0	0	0	½	½	½
Red/Orange ^f	0	0	0	¾	¾	1¼
Beans/Peas (Legumes) ^f	0	0	0	½	½	½
Starchy ^f	0	0	0	½	½	½
Other ^{f,g}	0	0	0	½	½	¾
Additional Veg to Reach Total ^h	0	0	0	1	1	1½
Grains (oz eq) ⁱ	7-10 (1) ^j	8-10 (1) ^j	9-10 (1) ^j	8-9 (1)	8-10 (1)	10-12 (2)
Meats/Meat Alternates (oz eq)	0 ^k	0 ^k	0 ^k	8-10 (1)	9-10 (1)	10-12 (2)
Fluid milk (cups) ^l	5 (1)	5 (1)	5 (1)	5 (1)	5 (1)	5 (1)
Other Specifications: Daily Amount Based on the Average for a 5-Day Week						
Min-max calories (kcal) ^{m,n,o}	350-500	400-550	450-600	550-650	600-700	750-850
Saturated fat (% of total calories) ^{n,o}	< 10	< 10	< 10	< 10	< 10	< 10
Sodium (mg) ^{n,p}	≤ 430	≤ 470	≤ 500	≤ 640	≤ 710	≤ 740
Trans fat ^{n,o}	Nutrition label or manufacturer specifications must indicate zero grams of trans fat per serving.					

^aIn the SBP, the above age-grade groups are required beginning July 1, 2013 (SY 2013-14). In SY 2012-2013 only, schools may continue to use the meal pattern for grades K-12 (see § 220.23).

^bFood items included in each food group and subgroup and amount equivalents. Minimum creditable serving is ½ cup.

^cOne quarter-cup of dried fruit counts as ½ cup of fruit; 1 cup of leafy greens counts as ½ cup of vegetables. No more than half of the fruit or vegetable offerings may be in the form of juice. All juice must be 100% full-strength.

^dFor breakfast, vegetables may be substituted for fruits, but the first two cups per week of any such substitution must be from the dark green, red/orange, beans and peas (legumes) or "Other vegetables" subgroups as defined in §210.10(c)(2)(iii).

^eThe fruit quantity requirement for the SBP (5 cups/week and a minimum of 1 cup/day) is effective July 1, 2014 (SY 2014-2015).

^fLarger amounts of these vegetables may be served.

^gThis category consists of "Other vegetables" as defined in §210.10(c)(2)(iii)(E). For the purposes of the NSLP, "Other vegetables" requirement may be met with any additional amounts from the dark green, red/orange, and beans/peas (legumes) vegetable subgroups as defined in §210.10(c)(2)(iii).

^hAny vegetable subgroup may be offered to meet the total weekly vegetable requirement.

ⁱAt least half of the grains offered must be whole grain-rich in the NSLP beginning July 1, 2012 (SY 2012-2013), and in the SBP beginning July 1, 2013 (SY 2013-2014). All grains must be whole grain-rich in both the NSLP and the SBP beginning July 1, 2014 (SY 2014-15).

^jIn the SBP, the grain ranges must be offered beginning July 1, 2013 (SY 2013-2014).

^kThere is no separate meat/meat alternate component in the SBP. Beginning July 1, 2013 (SY 2013-2014), schools may substitute 1 oz. eq. of meat/meat alternate for 1 oz. eq. of grains after the minimum daily grains requirement is met.

^lFluid milk must be low-fat (1 percent milk fat or less, unflavored) or fat-free (unflavored or flavored).

^mThe average daily amount of calories for a 5-day school week must be within the range (at least the minimum and no more than the maximum values).

ⁿDiscretionary sources of calories (solid fats and added sugars) may be added to the meal pattern if within the specifications for calories, saturated fat, trans fat, and sodium. Foods of minimal nutritional value and fluid milk with fat content greater than 1 percent milk fat are not allowed.

^oIn the SBP, calories and trans fat specifications take effect beginning July 1, 2013 (SY 2013-2014).

^pFinal sodium specifications are to be reached by SY 2022-2023 or July 1, 2022. Intermediate sodium specifications are established for SY 2014-2015 and 2017-2018. See required intermediate specifications in § 210.10(f)(3) for lunches and § 220.8(f)(3) for breakfast

Appendix B

January 26, 2012 Comparison of Current and Previous Requirements

Comparison of Previous and Current Regulatory Requirements under Final Rule "Nutrition Standards in the National School Lunch and School Breakfast Programs" (published January 26, 2012)

National School Lunch Program Meal Pattern		
Food Group	Previous Requirements K-12	Current Requirements K-12 (as of 7/1/12)
Fruit and Vegetables	½ - ¾ cup of fruit and vegetables combined per day	¾ - 1 cup of vegetables <u>plus</u> ½ -1 cup of fruit per day <small>Note: Students are allowed to select ¼ cup fruit or vegetable under OVS.</small>
Vegetables	No specifications as to type of vegetable subgroup	Weekly requirement for: <ul style="list-style-type: none"> • dark green • red/orange • beans/peas (legumes) • starchy • other (as defined in 2010 Dietary Guidelines)
Meat/Meat Alternate (M/MA)	1.5 – 2 oz eq. (daily minimum)	Daily minimum and weekly ranges: Grades K-5: 1 oz eq. min. daily (8-10 oz weekly) Grades 6-8 : 1 oz eq. min. daily (9-10 oz weekly) Grades 9-12 : 2 oz eq. min. daily (10-12 oz weekly)
Grains	8 servings per week (minimum of 1 serving per day)	Daily minimum and weekly ranges: Grades K-5: 1 oz eq. min. daily (8-9 oz weekly) Grades 6-8 : 1 oz eq. min. daily (8-10 oz weekly) Grades 9-12 : 2 oz eq. min. daily (10-12 oz weekly)
Whole Grains	Encouraged	At least half of the grains must be whole grain-rich beginning July 1, 2012. Beginning July 1, 2014, all grains must be whole grain rich.
Milk	1 cup Variety of fat contents allowed; flavor not restricted	1 cup Must be fat-free(unflavored/flavored) or 1% low fat (unflavored)

Appendix C

March 2012 Updated Comparison of Current and New Requirements of Nutrition Standards

Comparison of Current and New Regulatory Requirements under Final Rule “Nutrition Standards in the National School Lunch and School Breakfast Programs”

Revised March 2012

National School Lunch Program Meal Pattern			
Food Group	Current Requirements K-12	New Requirements	How USDA Foods supports new requirements
Fruits and Vegetables	½ - ¾ cup of fruit and vegetables combined per day	¾ - 1 cup of vegetable <u>plus</u> ½ -1 cup of fruit per day Note: 1. Students are allowed to select ½ cup fruit or vegetable under OVS 2. Fruits (and vegetables) that are prepared without added solid fats, sugars, refined starches, and sodium are nutrient rich foods.	USDA offers a wide variety of canned, frozen, fresh and dried fruits, which are low in sugar or have no added sugars. <ul style="list-style-type: none"> • Canned fruits in extra light syrup. Applesauce is unsweetened. • Frozen fruits - unsweetened blueberries, whole strawberries, and apple slices without added sugar. • In SY 13-14, all frozen fruits will be offered with no added sugar. • Fresh sliced apples, whole apples for direct delivery or processing, fresh pears, fresh oranges • Dried fruits include raisins, cherries, (dried plums apricots, and fig pieces in fruit-nut mix)
Vegetables	No specifications as to type of vegetable subgroup	Weekly requirement for: <ul style="list-style-type: none"> • dark green • red/orange • beans/peas (legumes) • starchy • other (as defined in 2010 Dietary Guidelines) 	<ul style="list-style-type: none"> • USDA offers a wide variety of low sodium canned, frozen and fresh vegetables and tomato products. • Red/ Orange-Fresh Baby carrots, frozen carrots, sweet potatoes (canned, fresh, frozen, bulk) • Dark green - Exploring frozen broccoli, and blends with broccoli/carrots/cauliflower. • Beans- canned and dry, including garbanzos; bulk pinto beans for processing • Starchy vegetables- No salt added canned and frozen corn, fat free potato wedges, low sodium canned and no salt added frozen peas.

Appendix C Continued

March 2012 Updated Comparison of Current and New Requirements of Nutrition Standards

Comparison of Current and New Regulatory Requirements under Final Rule “Nutrition Standards in the National School Lunch and School Breakfast Programs”

Revised March 2012

National School Lunch Program Meal Pattern			
Food Group	Current Requirements K-12	New Requirements	How USDA Foods supports new requirements
Meat/Meat Alternate (M/MA)	1.5 – 2 oz eq. (daily minimum)	Daily minimum and weekly ranges: Grades K-5: 1 oz eq. min. daily (8-10 oz weekly) Grades 6-8 : 1 oz eq. min. daily (9-10 oz weekly) Grades 9-12 : 2 oz eq. min. daily (10-12 oz weekly)	USDA offers a wide variety of nutrient dense meat/meat alternate products which are reduced or low sodium and lower fat. <ul style="list-style-type: none"> • Egg products- 5 lb or 30 lb cartons of liquid eggs, bulk eggs; • Reduced Fat Shredded Cheddar, reduced sodium/reduced fat American Cheese • Shredded Mozzarella; light or part skim • Lean meat, pork, poultry and fish products • Piloting lower sodium Pork Ham • Turkey Ham, lower sodium; deli breast • Chicken Fajita –lower sodium • Turkey taco filling – lower sodium
Grains	8 servings per week (minimum of 1 serving per day)	Daily minimum and weekly ranges: Grades K-5: 1 oz eq. min. daily (8-9 oz weekly) Grades 6-8 : 1 oz eq. min. daily (8-10 oz weekly) Grades 9-12 : 2 oz eq. min. daily (10-12 oz weekly)	<ul style="list-style-type: none"> • Whole grain pastas (spaghetti, rotini, macaroni) • Whole grain tortillas • Whole grain pancakes • Whole wheat flour • Rolled oats • Regular and quick cooking brown rice • Whole Kernel corn for further processing • Exploring whole white wheat specification
Whole Grains	Encouraged	At least half of the grains must be whole grain-rich beginning July 1, 2012. Beginning July 1, 2014, all grains must be whole grain rich.	USDA Foods offers whole-grain products which meet the whole grain rich requirement of >51%.
Milk	1 cup Variety of fat contents allowed; flavor not restricted	1 cup Must be fat-free(unflavored/flavored) or 1% low fat (unflavored)	

Appendix C Continued

March 2012 Updated Comparison of Current and New Requirements of Nutrition Standards

Comparison of Current and New Regulatory Requirements under Final Rule “Nutrition Standards in the National School Lunch and School Breakfast Programs”

Revised March 2012

School Breakfast Program Meal Pattern			
Food Group	Current Requirements K-12	New Requirements	How USDA Foods supports new requirements
Fruit	½ cup per day (vegetable substitution allowed)	1 cup per day (vegetable substitution allowed) <small>Note: Quantity required SY 2014-15. Students are allowed to select ½ cup of fruit under OVS.</small>	<p>USDA offers a wide variety of canned, frozen, fresh and dried fruits, which are low in sugar or have no sugar added.</p> <ul style="list-style-type: none"> • Canned fruits in extra light syrup. Applesauce is unsweetened. • Frozen fruits - unsweetened blueberries, whole strawberries, and apple slices without added sugar. • In SY 13-14, all frozen fruits will be offered with no added sugar. • Fresh sliced apples, whole apples for direct delivery or processing, fresh pears, fresh oranges • Dried fruits include raisins, cherries
Grains and Meat/Meat Alternate (M/MA)	2 grains, or 2 meat/meat alternates, or 1 of each per day	<p>Daily min. and weekly ranges for grains:</p> <p>Grades K-5: 1 oz eq. min. daily (7-10 oz weekly)</p> <p>Grades 6-8 : 1 oz eq. min. daily (8-10 oz weekly)</p> <p>Grades 9-12 : 1 oz eq. min. daily (9-10 oz weekly)</p> <p><small>Note: Quantity required SY 2013-14. Schools may substitute M/MA for grains after the minimum daily grains requirement is met.</small></p>	<p>USDA offers many whole grain products to help school meet the new requirements while meeting new nutrient targets:</p> <ul style="list-style-type: none"> • Whole grain tortillas • Whole grain pancakes • Whole wheat flour • Rolled oats • Regular and quick cooking brown rice • Whole Kernel corn for further processing

Appendix C Continued

March 2012 Updated Comparison of Current and New Requirements of Nutrition Standards

**Comparison of Current and New Regulatory Requirements under Final Rule
“Nutrition Standards in the National School Lunch and School Breakfast Programs”**

Revised March 2012

School Breakfast Program Meal Pattern			
Food Group	Current Requirements K-12	New Requirements	How USDA Foods supports new requirements (continued)
Grains and Meat/Meat Alternate (M/MA) (continued)	2 grains, or 2 meat/meat alternates, or 1 of each per day	Daily min. and weekly ranges for grains: Grades K-5: 1 oz eq. min. daily (7-10 oz weekly) Grades 6-8 : 1 oz eq. min. daily (8-10 oz weekly) Grades 9-12 : 1 oz eq. min. daily (9-10 oz weekly) <small>Note: Quantity required SY 2013-14. Schools may substitute M/MA for grains after the minimum daily grains requirement is met.</small>	Meat/Meat Alternate USDA Foods: USDA offers a wide variety of nutrient dense meat/meat alternate products which are reduced or low sodium and fat. <ul style="list-style-type: none"> • Egg products; 5 lb or 30 lb cartons of liquid eggs, • Reduced Fat Shredded Cheddar; White or Yellow • Reduced Sodium and reduced fat American Cheese • Shredded Mozzarella; light or part skim • Meat, pork, poultry and fish products • Turkey Ham, deli roll • Chicken Fajita lower sodium • Turkey taco filling – lower sodium
Whole Grains	Encouraged	At least half of the grains must be whole grain-rich beginning July 1, 2013. Beginning July 1, 2014, all grains must be whole grain rich.	USDA whole-grain products are whole grain rich and contain at least 51%.
Milk	1 cup Variety of fat contents allowed; flavor not restricted	1 cup Must be fat-free (unflavored/flavored) or 1% low fat (unflavored)	

Appendix C Continued

March 2012 Updated Comparison of Current and New Requirements of Nutrition Standards

Comparison of Current and New Regulatory Requirements under Final Rule “Nutrition Standards in the National School Lunch and School Breakfast Programs”

Revised March 2012

Nutrient Standards	New Standards under Final Rule	
Nutrient	Targets	How USDA Foods supports new targets
Sodium Reduce, no set targets	Target 1: SY 2014-15 Lunch ≤1230mg (K-5); ≤1360mg (6-8); ≤1420mg (9-12) Breakfast ≤540mg (K-5); ≤600mg (6-8); ≤640mg (9-12)	<ul style="list-style-type: none"> • USDA canned vegetables, meat, poultry, pork, and cheeses all have reduced or low sodium levels to help school meet or exceed the SY 14-15 target. • USDA continues to dialog with industry to modify specifications. (10-15% reduction from current levels.)
	Target 2: SY 2017-18 Lunch ≤935mg (K-5); ≤1035mg (6-8); ≤1080mg (9-12) Breakfast ≤485mg (K-5); ≤535mg (6-8); ≤570mg (9-12)	
	Final target: 2022-23 Lunch ≤640mg (K-5); ≤710mg (6-8); ≤740mg (9-12) Breakfast ≤430mg (K-5); ≤470mg (6-8); ≤500mg (9-12)	
Saturated Fat <10% of total calories	Saturated Fat <10% of total calories	USDA offers lean meats, poultry, fish, and reduced fat cheeses
Trans Fat: no limit	New specification: zero grams per serving (nutrition label) Note: FDA allows products with less than .5 gm per serving to count as zero.	USDA Foods do not contain added trans fats. Each specification will be modified to require zero trans fats: <ul style="list-style-type: none"> • Peanut & Sunflower butters • Vegetable oils • Potato products • Catfish strips. • Very little naturally occurring trans fats in beef and cheese

Appendix C Continued

March 2012 Updated Comparison of Current and New Requirements of Nutrition Standards

**Comparison of Current and New Regulatory Requirements under Final Rule
“Nutrition Standards in the National School Lunch and School Breakfast Programs”**

Revised March 2012

Nutrient Standards	New Standards under Final Rule	
Nutrient	Targets	How USDA Foods supports new targets
<p>Calories (min. only) <i>Traditional Menu Planning</i> Lunch: 633 (grades K-3) 785 (grades 4-12) 825 (optional grades 7-12) Breakfast: 554 (grades K-12)</p> <p><i>Enhanced Menu Planning</i> Lunch: 664 (grades K-6) 825 (grades 7-12) 633 (optional grades K-3) Breakfast: 554 (grades K-12) 774 (optional grades 7-12)</p> <p><i>Nutrient Based Menu Planning</i> Lunch: 664 (grades K-6) 825 (grades 7-12) 633 (optional grades K-3) Breakfast: 554 (grades K-12) 618 (optional grades 7-12)</p>	<p>Calorie Ranges (min. & max.) <i>Only food-based menu planning allowed</i> Lunch: 550-650 (grades K-5) 600-700 (grades 6-8) 750-850 (grades 9-12) Breakfast: 350-500 (grades K-5) 400-550 (grades 6-8) 450-600 (grades 9-12)</p>	<p>USDA offers a wide variety of nutrient dense foods which are reduced or low in fat and added sugar, and thus provide fewer discretionary calories.</p>

Appendix D

Macronutrients Ranges for US Children Ages 1-18

Ages	CHO	Protein	Fat	Sat Fat
1-3	45-65%	5-20%	30-40%	< 10% of total calories
4-18	45-65%	10-30%	25-35%	< 10% of total calories

Appendices D from:

* U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans; 2010

* Academy of Nutrition and Dietetics; 2008

*IOM Dietary Reference Intakes

Appendix E

Food Groups for US Children Ages 1-18: Based on Calorie Ranges

	Males and Females	Males and Females
Calorie level	1400 kcal	1600 kcal
Fruits	1 ½ c.	1 ½ c.
Vegetables	1 ½ c.	2 c.
Grains	5 oz.-eq.	5 oz.-eq.
Proteins	4 oz.-eq.	5 oz.-eq.
Diary	2 ½ c.	3 c.
Oils	17gms	22gms
Max SoFAS limit of calories	121	121

Appendices E adapted from:

* U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans; 2010

* Academy of Nutrition and Dietetics; 2008

*IOM Dietary Reference Intakes

Appendix F

Steps and Methods on how to search food entrée items in Nutritionist Pro™

1. Click on Nutritionist Pro™ program
2. Click on File.
3. Click new, click food, click recipe.
4. In recipe tab: Click on ingredients, click on “Add”.
5. Add food item. For an example: if selecting peanut butter. Click on appropriate food item needed, for an example select peanut butter brand or manufacture you want. If you want to use foods from USDA standard reference database.
6. Next input correct amount (example select 1 or 2 tablespoons).
7. Select number of servings on recipe tab.
8. Select General tab and select classification box click on “...” select appropriate food item. Example for peanut butter select the combination foods.
9. In the serving amount box select the serving size, for example 1 item was selected for peanut butter. Under notes box can include note, for example 1 item is equal to 1 or 2 tablespoons of peanut butter.
10. Select Nutrient tab, this contains all nutrients for the item then click on Adult bullet.

11. Select exchanges tab, click default, and make sure appropriate items selected.
Click calculate.
12. Select FGP categories tab, click default, and make sure appropriate items selected.
Click calculate.
13. Select MyPyramid tab click default, and make sure appropriate items selected.
Click calculate.
14. Select MyPlate tab click default, and make sure appropriate items selected. Click
calculate.
15. Save food item, for example saved as peanut butter.
16. Next click on file, print, extract file, file will be extracted into excel and saved to
computer or thumb drive.

Appendix G

Description of Entrée Items

Entrée	Serving Size
BBQ Sandwich on WG Bun	1 sandwich (4 oz. BBQ pork, 1 bun)
Cheese Pizza WG crust	5 oz. or 1 piece
Chicken Nuggets w dipping sauce**	3-3.28oz. (5 pieces), 1-1.5 oz. sauce
Chicken Nuggets w dipping sauce** & WG Roll	3-3.28oz. (5 pieces), 1-1.5 oz. sauce, 1 roll
Chicken Sandwich on WG Bun	1 sandwich (3-4oz. chicken patty, 1 bun)
Deli Sliced Turkey on WG Bun	1 sandwich (2 oz. deli turkey, 1 bun)
Grilled Cheese	1 sandwich (1oz./2 slices cheese, 2 slices bread)
Grilled Cheese w Chicken Noodle Soup	1 sandwich (1oz./2 slices cheese, 2 slices bread), 1 cup soup
Hamburger on WG Bun	1 sandwich (1 beef patty 2.25-3oz.)
Hot Dog w Chili	1 sandwich (2 oz. hot dog and 1 bun, chili is made with ground beef)
Italian Spaghetti	1 c. (Spaghetti noodles with meatballs in marinara sauce)
Macaroni & Cheese Bake w/ WG Roll	6 oz. and 1 roll (Macaroni noodles with cheese and ham baked)
Managers Choice	Changes with each Manager's Choice
Mexican Beef Soft Taco	1 taco each and trimmings

Nachos w Chili & Cheese	1 serving (28 gms chips, 1oz. chili (made with ground beef) 3oz. cheese)
Pizzatas pepperoni	2 sticks, 2 oz. or 2 tbsp. sauce (Pepperonis, cheese, marinara sauce inside bread stick)
Popcorn Chicken w dipping sauce**	3.08-3.2 oz. chicken, 1-1.5 oz. sauce
Popcorn Chicken w dipping sauce** & WG Roll	3.08-3.2 oz. chicken, 1-1.5 oz. sauce, 1 roll
Rib BQue on WG Bun	1 sandwich (1 boneless pork rib patty, 1 bun)
Scrambled Eggs, Sausage Patty & Grits	3 oz. eggs, /1.25 oz. pork patty, 1/4 cup grits
Stuffed Baked Potato w/Ham & cheese & crackers	1 potato, 2 oz. ham, 2-3 oz. cheese, 1 pack of crackers (2 crackers)
Stuffed Crust Dippers w Marinara sauce	4 sticks, 2 oz. or 2 tbsp. sauce (mozzarella cheese inside bread stick)
Teriyaki Dippers over Brown Rice	2.8-4.2 oz. (4-6 pieces of beef nuggets in a teriyaki sauce) and 1/2 c. brown rice
Turkey & Gravy Brown Rice	1 c.
Turkey Pot Pie w/ WG Roll	1 c. & 1 Roll
Vegetarian Tray	1 plate (1 cheese stick, 1 yogurt, 1 packet of crackers)
Key:	
* WG= Whole Grain	

** Dipping sauce for chicken nuggets or popcorn chicken is always honey mustard	
***WG roll is a whole grain yeast roll	

Appendix H

Calendar of February 2013 Menu

Menus for February 2013

ANDERSON DISTRICT FIVE

In accordance with Federal Law and U. S. Department of Agriculture policy, this institution is participating in this program on the basis of race, color, national origin, sex, age or disability. For the information of consumers, USDA, Choice of Food Alternatives, 1425 Independence Avenue, S.W., Washington, D.C. 20250-3410 is called to file (800) 852-5922 (Voice), (800) 852-5922 (TDD), individuals who are hearing impaired call (800) 852-5922 through the relay service. TDD: (800) 852-5922, or (202) 344-3113 (TDD). USDA is an equal opportunity provider and employer.



Available Daily
Breakfast
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

Lunch
 Vegetarian Tray
 Choice of Milk

Friday, February 1

BREAKFAST
 Scrambled Eggs, Grits w/ Biscuit OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 Cheese Pizza on WG Crust OR
 Ham & Cheese Stuffed Baked
 Potato & Crackers
 Spinach Salad w/ Dressing
 Kidney Beans
 Seasoned Steamed Cabbage
 Banana
 Roly Applesauce

Monday, February 4

BREAKFAST
 Sausage Pancake Roll Up w/ Syrup OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 Chicken Sandwich on WG Bun OR
 Baked Sliced Turkey on WG Bun
 Baked French Fries
 Baby Carrots w/ Dip
 Pickle Beans
 Fresh Apple
 Mandarin Oranges

Tuesday, February 5

BREAKFAST
 Chicken Biscuit OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 Stuffed Crust Dippers w/ Marinara
 Sauce OR
 Managers Choice
 Seasoned Green Beans
 Glazed Carrots
 Fresh Fruit
 Applesauce

Wednesday, February 6

BREAKFAST
 Breakfast Pizza OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 Early Release Day
 No Lunch Served

Thursday, February 7

BREAKFAST
 Sausage Biscuit OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 Mexican Beef Soft Taco w/
 Trimmings OR
 Teriyaki Dippers over Brown Rice
 Black Beans
 Veggie Cup w/ Dip
 Fruit Cocktail
 Diced Peas

Friday, February 8

BREAKFAST
 Scrambled Eggs, Grits w/ Cheese
 Toast OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 Cheese Pizza on WG Crust OR
 Nachos w/ Chili & Cheese
 Seasoned Steamed Broccoli
 Kidney Beans
 Banana
 Roly Applesauce
 Brownie

ADJUSTMENTS.

Healthy eating is all about making adjustments. And our new menu guidelines are no exception. We now have the flexibility to offer a little more grains and proteins, while staying within the same calorie maximums. And don't worry, the new higher amounts of fruits and veggies are still in place, too.

EAT BETTER. PLAY HARDER. LIVE HEALTHIER. LEARN EASIER.

WELLNESS IS A WAY OF LIFE!

Another name for the groundhog is the "whistle pig." Wonder where they came up with that name?!

Groundhog Day is February 2. We're pretty sure he'll see his shadow!

Monday, February 11

BREAKFAST
 Brown Sugar Oatmeal Bowl w/
 Raisins OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 BBQ Sandwich OR
 Chicken Nuggets w/ Dipping Sauce
 & WG Roll
 Baked Tater Tots
 Seasoned Green Beans
 Baby Carrots w/ Dip
 Fresh Apple
 Mandarin Oranges

Tuesday, February 12

BREAKFAST
 Sausage Pancake Roll Up w/ Syrup OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 Chicken Sandwich on WG Bun OR
 Turkey Pot Pie w/ WG Roll
 Pickle & Cucumber Chips w/ Dip
 Mixed Vegetables
 Fresh Fruit
 Applesauce

Wednesday, February 13

BREAKFAST
 Chicken Biscuit & String Cheese OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 Hamburger on WG Bun OR
 Turkey & Gamy over Brown Rice
 Broccoli Salad
 Sweet Potato Wedges
 Fresh Fruit
 Pineapple Tidbits
 Dirt for Dessert

Thursday, February 14

BREAKFAST
 Breakfast Pizza OR
 WG Cereal w/ Toast & Jelly
 Choice of Juice and Milk

LUNCH
 Grilled Cheese OR
 Popcorn Chicken w/ Dipping Sauce
 & WG Roll
 Vegetable Soup
 Pinto Beans
 Garden Salad w/ Dressing
 Fruit Cocktail
 Diced Peas
 Valentine Cake

Friday, February 15

No School Today

Appendix H

Calendar of February 2013 Menu continued



President's Day
February 18th

Monday, February 18

BREAKFAST
Sausage Biscuit OR
WG Cereal w/ Toast & Jelly
Choice of Juice and Milk

LUNCH
Peanuts OR
Hot Dog w/ Chili
Gole Slaw
Baked Beans
Sweet Potato Wedges
Fresh Apple
Mandarin Oranges

Tuesday, February 19

BREAKFAST
Sausage Panini Roll Up w/ Syrup OR
WG Cereal w/ Toast & Jelly
Choice of Juice and Milk

LUNCH
Grilled Cheese w/ Chicken
Honey Le Soup OR
Rib B on WG Bun
Seasoned Green Beans
Steamed Mixed Vegetables
Fresh Fruit
Applesauce
Cookie

Wed., February 20

BREAKFAST
Chicken Biscuit OR
WG Cereal w/ Toast & Jelly
Choice of Juice and Milk

LUNCH
Scrambled Eggs, Sausage Patty & Grits OR
Popcorn Chicken w/ Dipping Sauce
Baked Tater Tots
Baby Carrots w/ Dip
Biscuit
Fresh Fruit
Pineapple Tidbits

Thursday, February 21

BREAKFAST
Brown Sugar Oatmeal Bowl w/ Raisins OR
WG Cereal w/ Toast & Jelly
Choice of Juice and Milk

LUNCH
Stuffed Crust Dippers w/ Marinara Sauce OR
Macaroni Cheese Bake w/ WG Roll
Herbed Broccoli & Cauliflower
Roasted Potatoes
Fruit Cocktail
Diced Peas

Friday, February 22

BREAKFAST
Scrambled Eggs, Grits w/ Biscuit OR
WG Cereal w/ Toast & Jelly
Choice of Juice and Milk

LUNCH
Cheese Pizza on WG Crust OR
Ham & Cheese Stuffed Baked Potato & Crackers
Spinach Salad w/ Dressing
Kidney Beans
Seasoned Steamed Cabbage
Banana
Rusy Applesauce

Monday, February 25

BREAKFAST
Sausage Panini Roll Up w/ Syrup OR
WG Cereal w/ Toast & Jelly
Choice of Juice and Milk

LUNCH
Chicken Sandwich on WG Bun OR
Beli Sliced Turkey on WG Bun
Baked French Fries
Baby Carrots w/ Dip
Pork n Beans
Fresh Apple
Mandarin Oranges

Tuesday, February 26

BREAKFAST
Chicken Biscuit OR
WG Cereal w/ Toast & Jelly
Choice of Juice and Milk

LUNCH
Stuffed Crust Dippers w/ Marinara Sauce OR
Mangoes Choice
Seasoned Green Beans
Glazed Carrots
Fresh Fruit
Applesauce

Wed., February 27

BREAKFAST
Breakfast Pizza OR
WG Cereal w/ Toast & Jelly
Choice of Juice and Milk

LUNCH
Italian Spaghetti OR
Chicken Nuggets w/ Dipping Sauce
Garlic Toast
Golden Salad w/ Dressing
Seasoned Corn
Fresh Fruit
Pineapple Tidbits

Thursday, February 28

BREAKFAST
Sausage Biscuit OR
WG Cereal w/ Toast & Jelly
Choice of Juice and Milk

LUNCH
Mexican Beef Soft Taco w/ Trimmings OR
Teriyaki Dippers over Brown Rice
Black Beans
Veggie Cup w/ Dip
Fruit Cocktail
Diced Peas

HOLLYWOOD HERO

The awards for the best movies and film performances (the "Oscars") are being held this year on February 24. The first Oscars were given out in 1929, but it wasn't until 1954 that an African-American (Dorothy Dandridge, pictured here) was nominated for a best acting award. She didn't win the Oscar, but she set the stage for future African-American winners Sidney Poitier, Denzel Washington, Halle Berry, Jamie Foxx, and Forest Whitaker.

AFRICAN-AMERICAN HISTORY MONTH
Learn more at blackpast.org or do a search for Dorothy Dandridge

NUTRITION TO GO

Try to get in the habit of considering the "Nutrition Facts" label when you're deciding what groceries to buy. Similar products and competing brands can vary widely in the daily values for "good" ingredients (such as vitamins, minerals, and fiber) as well as "bad" ones (like saturated fat, cholesterol, and sodium).

a tasty bite for parents

FEBRUARY BIRTHDAYS

James Joyce -- Feb. 2
Hank Aaron -- Feb. 5
Abraham Lincoln -- Feb. 12
Frederick Douglass -- Feb. 14
Susan B. Anthony -- Feb. 15
George Washington -- Feb. 22

Brain Ticklers

Which month has 28 days?

(Hold the page upside down and read it in a mirror for the answer!)

... to bring your lunch money!

Appendix I

Day and Corresponding Date

Day	Date
1	February 1,2013
2	February 4,2013
3	February 5,2013
4	February 7,2013
5	February 8,2013
6	February 11,2013
7	February 12,2013
8	February 13,2013
9	February 14,2013
10	February 18,2013
11	February 19,2013
12	February 20,2013
13	February 21,2013
14	February 22,2013
15	February 25,2013
16	February 26,2013
17	February 27,2013
18	February 28,2013

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