

A PILOT STUDY ON THE INFLUENCE OF REGULATED MEAL PLAN SYSTEMS
ON STUDENT FOOD PURCHASING AND DINING BEHAVIORS

A THESIS

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ABSTRACT

THESIS: A Pilot Study on the Influence of Regulated Meal Plan Systems on
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College introduces many new experiences to students; it is during this time that students develop behaviors and habits that can affect them throughout their lives. Influences on dietary decisions made by college students have been well researched. However, the college foodservice system, one influencing factor, is evolving with the increase in student attendance and demands. The invention and use of meal plan systems by colleges and universities has added another variable that shapes the decisions and dietary behaviors of students. Regulations in meal plans can limit meal times, monetary amounts and number of meals allowed in a given time frame. The purpose of this pilot study was to examine the impact of a regulated meal plan system on students at a Midwest university. Students who utilized the college meal plan system were asked to complete a survey about their dietary behavior, attitude and beliefs towards the regulated meal plan offered at the Midwest University. The expectation of conducting this research was to better understand how the decisions and purchases by students are shaped when aspects such as time, money and meal allowance per week are controlled and regulated.

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CHAPTER 1

INTRODUCTION

College is a time of exploration and discovery. Students living on campus are independently responsible for themselves for the first time in their lives without the guidance of their family (Graham & Laska, 2011; Haberman & Luffey, 1998). This time is also a time when students shape and change their dietary behaviors. These changes not only continue into adulthood, but also have the potential to influence health later in life (LaCaille, Dauner, Krambeer, & Pedersen, 2011; Small, Bailey-Davis, Morgan, & Maggs, 2013).

Along with this new freedom toward their dietary choices, students also face additional internal and external variables that can influence their dietary behaviors. Time constraints and management, the stress and responsibilities of college workload, and new social influences and activities are just some of the variables that shape the decisions of students in regards to their food and meal selections (Waterhouse et al., 2005) .

Students' dietary decisions are further influenced by the evolving college environment. The increase in student attendance and on-campus dormitory living has forced college and university foodservices to grow and adapt to meet these new demands (Joung, Kim, Choi, Kang, & Goh, 2011). The invention of smart cards and meal plan

systems have added new variables to the dietary decision making process of students (Weichun, 2013).

Researchers continue to examine the effects these new variables have on students' food consumption and purchasing behaviors. In a broad sense, students living on-campus, though still not meeting national guidelines, have increased consumption of fruit, vegetables, and dairy compared to those students living off-campus (Berrman, Jennings, & Crawford, 1990; Spanos & Hankey, 2010). More specifically, there may be possible relationships between the use of college foodservice meal plans and their students' food consumption and purchasing behaviors (Brown, Dresen, & Eggett, 2005; LaCaille et al., 2011). The increased use of the meal plan system, along with the limited research available leaves a need for further exploration and understanding.

Problem Statement

Students entering college find themselves in an environment that affords them the opportunity to learn and explore new experiences and behaviors with minimal influence from their family (Graham & Laska, 2011). The decisions made by students during this time can directly influence their behaviors and health later in life (Small et al., 2013).

Researchers continue to investigate the numerous variables in college that affects students' decisions and lifestyles, including those related to dietary behavior (Waterhouse et al., 2005). The expanding foodservice systems, use of meals plans and the invention of smart cards has compounded the variables that influence students' dining behaviors (Joung et al., 2011; Weichun, 2013).

Many studies have examined variables that influence the food that is purchased and consumed by college students. However, limited research exists that examines the impact of regulated college meal plans on the food selections of college students.

Purpose Statement

The purpose of this pilot study was to examine how the structure of a college meal plan influenced students' food selections and purchases at a Midwest university.

Research Questions

The following research questions were examined in this study:

1. What influence does the set meal time periods have on the purchases made by college students who attended a university that has a regulated meal plan?
2. What influence does the per-meal dollar value have on the purchases made by college students who attended a university that has a regulated meal plan?
3. What influence does the type of meal plan (10 meal, 14 meal, 18 meal or 21 meals per week) have on the purchases made by college students who attended a university that has a regulated meal plan?
4. What factors motivate students' food selections and purchases?

Rationale

A better understanding of the impact regulated meal plans have on college students' food purchases and selections can benefit both students and college foodservice systems. Due to the limited data and research available on regulated meal plans, the

research questions set out to identify if a true relationship exists between the meal plan variables and students' dining behaviors. This pilot study assessed if a possible relationship was present between a regulated meal plan and students' food selections and purchases.

Assumptions

The researchers made the following assumptions during the implementation of the study and in the interpretation of the data:

1. The student respondents would evenly represent the different meal plan options available (10 meal, 14 meal, 18 meal and 21 meals per week).
2. The students who participated in this research project were representative of the Midwest university student population.
3. The students involved answered the survey questions independently and truthfully.

Definitions

For the purpose of this study, the following definitions were used:

- Regulated meal plan – the regulation by time, monetary amount and/or number of meals available to college students by a college or university foodservice system (Brown, Dresen, & Eggett, 2005).
 - Example
 - Breakfast may only be purchased between the hours of 7:00 a.m. – 11:00 a.m.

- Students can spend up to nine dollars at each meal.
 - Students have 18 meals to spend each week.
- Foodservice – the preparation, delivery, serving operational duties of ready-to-eat foods in a particular location (American Heritage Dictionary, 2009).
- Cost effectiveness – economical in terms of tangible benefits produced by money spent ("Cost-effective," 2013).

Summary

Many variables affect the purchasing and consumption patterns of students attending colleges and universities. An emerging variable that has been identified is the regulations placed on the meal plans students use to purchase food. However, there is limited research on the actual influence of a regulated meal plan on the food purchasing and consumption behaviors of students. The purpose of this pilot study was to examine how the structure of a college meal plan influenced students' food selections and purchases at a Midwest university.

CHAPTER 2

REVIEW OF LITERATURE

The purpose of this pilot study was to examine how the structure of a college meal plan influenced students' food selections and purchases at a Midwest university. The college environment consists of many variables that have impacted the diets of the attending students. This chapter presents an overview of the literature that describes the experiences and factors that influence college students' eating behaviors and food purchases.

Introduction

Close to 21.6 million students are enrolled in a college or university, and this number is increasing every year (U.S Department of Education, 2012). This accounts for one quarter of individuals between the ages of 18 -24 years old living in the United States (H. Kim, Lee, & Yuan, 2012). During this time, students must face many new experiences on their own (Poddar, Hosig, Anderson-Bill, Nickols-Richardson, & Duncan, 2012). Food and meal selections are one area where students have had to transition from the guidance and influence of their family, to making decisions independently (Graham & Laska, 2011). They become solely responsible for the development of new behavioral

patterns that have the potential to influence their present health and throughout the rest of their lives (Poddar et al., 2012). These impacts can be seen in both the students' diet quality and weight status (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005).

Numerous psychological and environmental factors affect students' decisions about food and meal selections. These factors include personal preferences, peers, class schedule, stress, money, and the college foodservice system (Waterhouse et al., 2005). These factors influence students in both positive and negative ways. Unfortunately, several studies have found there is a decline in dietary quality and a decrease in physical activity among the population of college students (Racette et al., 2005). The college environment, social influences, and the students' own belief system contribute to this decline in diet quality (LaCaille et al., 2011). Haberman & Luffey (1998) stated there is a need to promote a general healthy lifestyle through increased nutritional education and daily exercise in order to address this nutritional decline. By exploring and addressing the factors that motivate food selection and purchases by students, a better understanding can be gained and utilized to improve health status, customer satisfaction and cost effectiveness of the foodservice system.

Factors that Motivate College Students' Food Selection and Purchases

The quality of students' diets greatly influences their health and well-being. Well balanced diets are associated with improved health, a more optimal weight status, and prevention of some chronic diseases (Racette et al., 2005). College students do not take into consideration that the nutritional choices they make today can influence their risk of

developing conditions like osteoporosis, diabetes, stroke, cardiovascular diseases, and some forms of cancer later in life (Deshpande, Basil, & Basil, 2009).

The United States Department of Agriculture recommends 2 cups of fruit, 2 ½ to 3 cups of vegetables, 6-8 oz. of grains (half consisting of whole-grain), 5 ½ to 6 ½ oz. protein, and 3 cups of dairy daily for a well-balanced diet (Dietary Guidelines for Americans, 2010). Numerous studies investigating college students' diets have determined that students have difficulty meeting these goals and recommendations (Brown et al., 2005). Decreased consumption of fruit, vegetables, whole grains, dairy, fiber, and lean protein sources have been observed in the population of college students (Tanya Horacek & Betts, 1998b; Racette et al., 2005). A study by Kwan, Faulkner, Arbour-Nicitopoulos and Caimey (2013) reported that out of the 8,182 college students surveyed in their study, 88.5% did not meet recommendations of consuming five fruit and/or vegetable servings per day.

By gender, males tend to have lower than the recommended daily servings of fruit and milk; while females have issues in consuming adequate servings of vegetables, fruits, milk and protein (Hiza & Gerrior, 2002). There is an increased risk of developing low or deficient vitamin and mineral levels when consumption of whole food groups is lower than the recommended amounts. Fruits, vegetables, and dairy are sources of vitamins, and minerals that are vital for a healthy life. The vitamins and minerals found in fruits, vegetables and dairy help to decrease the risk of developing certain chronic diseases and some cancers that can occur later in life (Asiimwe, 2008). Unfortunately, research has found that students' diets are typically at low or deficient levels of calcium, iron, Vitamin A, Vitamin C, and fiber (Asiimwe, 2008; Merkle, 1998).

Not only are students consuming suboptimal levels of healthy fruits, vegetables, and other food groups, but there is also a trend in the increased consumption of foods that can increase the risk of developing health problems. Result from the study by Kim, Lee and Yuan (2012), found that students' diets consisted of large amounts of fast food and higher intake of sodium and fat. (H. Kim et al., 2012). The fact that the effects of inadequate consumption of important food groups and the increased consumption of unhealthy foods are not seen until later in life may be one of the reasons why students are not more concerned with meeting recommended levels.

The diverse changes seen in college students' dietary behavior, and the risk of a decline in dietary qualities, makes them an important target population in regards to nutritional intervention measures (Gores, 2008). The growing prevalence of obesity has focused greater attention and efforts on educating students in selecting healthy foods, leading to improved eating patterns. Shopping and preparing food is a new skill for many students in college (Doherty, Cawood, & Dooris, 2011). Increasingly, students are able to obtain information from a vast array of sources on what constitutes healthy eating. Lee, Fowler & Yuan (2013) identified the internet as the primary source students turn to for information on healthy eating. Other sources that students use include their coursework in college, friends, family, magazines, and television (Lee et al., 2013). From these sources, students have learned about and utilized several strategies in order to select and consume a better balanced diet. Lee et al. (2013) also sought to identify what students felt were healthy dietary behaviors. The research revealed that students identified behaviors that included drinking more water, eating vegetables and fruit, drinking fruit juices, reducing consumption of fried and/or fatty foods, eating white meat and avoiding red meat, and

reducing intake of sugar and salt as approaches to a well-balanced diet (Lee et al., 2013). Students also recognized the importance of monitoring calorie intake and the amount of fat within marked portion sizes (Zabriskie & Blackburn, 2006).

Alarmingly, despite knowing about a healthy and well-balanced diet, many students still do not follow these recommendations. In a study by Sakamaki, Toyama, Amamoto, Liu, and Shinfuku (2005), the researchers found that even though almost 86% of their student subjects knew about a balanced diet, only a very small percentage tried to incorporate a healthy eating pattern into their lifestyle. This may be due to the fact that students will return to what is familiar to them from past personal habits, preferences, and home experiences (Zabriskie & Blackburn, 2006).

There are also barriers in the college environment that students felt kept them from eating a healthier diet. The barriers students identified included time, money, and the skills required to consume a balanced diet (Doherty et al., 2011). Therefore, despite students possessing the knowledge of what constitutes a healthy well-balanced diet, there is still a need for further exploration into how to transform knowledge into action and to provide an environment in college dining facilities that is conducive to healthy food selections.

Students in college, who have now become solely responsible for their food and meal selections, have to form their own unique food beliefs (H. Kim et al., 2012). In a study by Doherty et al. (2011), the researchers stated that during college “students undergo significant life transitions, developing independence and life skills and forming new health-related behaviors, particularly in relation to food (p. 218). Unfortunately, many of these changes result in a decline in nutritional quality (Haberman & Luffey,

1998). They also develop and practice unhealthy dietary behaviors, such as increased snacking and skipped meals (Buscher, Martin, & Crocker, 2001). This decrease in dietary quality and irregular meal patterns can lead to increased weight (Spanos & Hankey, 2010). Changes in the students' body weight can lead them to become dissatisfied with their weight and develop a poor relationship with their body image (Haberman & Luffey, 1998). This is only exaggerated by the fact that many students perceive their actual weight higher than it actually is, and believe that they are in a higher weight category than the true classification used to define overweight and obesity (Berrman et al., 1990). Weight gain in college has also been associated with changes in body composition in the form of fat and fat-free mass (Gropper, Simmons, Connell, & Ulrich, 2012). Increased weight can lead to a whole host of health problems including hypertension, dyslipidemia, diabetes, and heart disease (Asiimwe, 2008; Sparling, 2007). Furthermore, weight gain during college years can be an indicator for increased risk of overweight and obesity later on in life (Doherty et al., 2011).

The rates of being overweight and obese in the United States have steadily increased and have reached epidemic proportions (Ogden, Carroll, Kit, & Flegal, 2012). It is no secret to students that college is a time when weight changes can occur. Several studies have reported that the greatest increase in overweight and obesity occurs during the ages of 18-29, a time when many people are in college (LaCaille et al., 2011; Racette et al., 2005). Early on in college, the biggest contributors to weight gain are poor dietary qualities and behaviors and a decrease in physical activity (Racette et al., 2005). This weight gain is abetted by students' introduction to and/or increased consumption of alcohol (LaCaille et al., 2011).

Approximately 30-35% of college students are overweight (BMI 25.0-29.9 kg/m²) or obese (BMI \geq 30.0 kg/m²) (Asiimwe, 2008; Sparling, 2007). It is during students time in college that changes in eating behavior occur that are conducive to gaining weight, and continue on into adulthood (Haberman & Luffey, 1998).

Numerous research studies have both elaborated and documented the reasons and factors that influence weight gain during the college years. Students are affected by the stress of college life, increase in a sedentary lifestyle, and changes in their food selections and eating behaviors. All of which can influence their weight (Asiimwe, 2008). Even though there is abundant research, it is still an area that is commonly overlooked in college and universities dietary intervention programs (Huang et al., 2003).

College students make food choice and consumption decisions multiple times each day. Food choice (what to eat) and food consumption (how much to eat) are made almost automatically. The low mental involvement that is required to make food choices and consumption decisions makes them easily susceptible to outside influences (Wansink, 2004). Several internal and external factors can impact the quality of the students' diets. Internal factors include students' gender, self-control, motivations, cognitive thoughts, and ability to handle the stressors of college life (LaCaille et al., 2011). Externally, students are influenced by their residence, peers, family, and dining environment. These internal and external variables are some of the influencing factors that shape students' food selections (Horacek & Betts, 1998b).

Not only do students have to navigate the internal influences on their food selections on campus, but there are also the influences from external factors such as their fellow patrons and peers. In the home setting, students rely on both verbal and non-verbal

communication and support from family members to make dietary choices that contribute to their overall nutritional health (Shimbo et al., 2004). In a college setting, students use their food and dining practices as a way to gain peer acceptance and as a tool for socialization in place of what they received at home (Merkle, 1998). This makes students' food selections easily susceptible to changes in relation to what they observe from their fellow peers in the dining facilities.

Many times, the act of beginning and ceasing to eat is derived from seeing others initiate in the activity (Wansink, 2004). Even when students are not eating in a group of peers, they will still unknowingly alter their normal food selections because of the food choices they witness from their peers in the dining facility (Wansink, 2004). The support of peers, or lack thereof, can influence what foods students select to purchase and consume. When students have the support of their peers to choose healthier options, they are more likely to select those foods (LaCaille et al., 2011). The same is true for unhealthy behaviors. In group settings, students tend to select a larger variety of food and consume more food than if alone, and eat for a longer duration (Wansink, 2004). Whereas, when eating alone, even if there are others present, the duration is much shorter and less food is selected and consumed (Hartwell, Edwards, & Brown, 2013).

Not surprisingly, many of the same factors that affect students' food consumption also affect purchasing behaviors. The environment that food is presented and served in can influence students' decisions to purchase certain items or ignore others (Wadhera & Capaldi, 2012; Wansink, 2004). The food itself is a significant predictor in food purchases by students (Glanz, Basil, Maibach, Goldberg, & Snyder, 1998). Visually how the food looks, smells, and the palatability are all important in students' judgment and

selection of food items (Zabriskie & Blackburn, 2006). Another big motivating factor in their food purchases is the convenience of both the food and facility (Marquis, 2006). Students view convenience as the variety of food items available, the type of foodservice business, and dining location and hours of operation (Park, Lehto, & Houston, 2013)

The next most often cited reason for students to purchase any particular food item was the price (Lee, Hyeon-Cheol, & Gregoire, 2006). Students associate an increase in food cost with an increase in overall quality and/or nutritional value and health (Lee et al., 2013). Students' dietary selections are influenced by the perceived cost/quality, and many times feel that a higher priced item is indicative of a higher quality product (Joung et al., 2011). However, many studies reported the cost and convenience variables could be interchangeable in various circumstances.

Health and weight were also driving forces behind the food purchases of students. The perception of what is a healthy, or unhealthy, food item can affect the foods that students select.(Haberman & Luffey, 1998). This was especially true in items that are branded from a particular company or organization (Seung Lee et al., 2006). Students feel a sense of security when purchasing from a brand or franchise they are familiar with, because they expect a certain quality for specific products ("Creating student meal plan flexibility is right on the money," 2002).

Influence of Time Constraints on College Students' Food Selections

There are many ways in which students' behaviors are altered while in college. Class schedules, group meetings, work, and social activities take up much of students' time during the day. Students are aware of the influence time has on their food selections

and purchases (Chapman, Melton, & Hammond, 1998). The abundance of time, or lack thereof, can affect students' purchasing decisions. (Waterhouse et al., 2005). Students have cited that a lack of time can be a barrier to choosing healthy meals and snacks (Greaney et al., 2009). A study by Waterhouse et al. (2005) found that on days where there were structured activities, like classes, the eating behavior of individuals are different than on unstructured days when time is not being managed. One study by Driskell, Schake & Detter (2008), documented that many times students are eating their meals in dining halls between classes and meetings, and are more focused on their time constraints than the nutrition of their food. A study by Marquis (2005), examined how convenience was one of the larger motivating and influencing factors in college students' food selection. The study found that the more convenience oriented the mindset of the students, the less they participated in seeking out and including variety in their food selections and purchases (Marquis, 2006). Not surprisingly, an inverse relationship exists between the convenience, seeking behaviors of students, and the variety of their diet and overall quality (Marquis, 2006). When pressed for time, students seek more convenient food items, skip meals, or select smaller more frequent meals or snacks that are quick and easy to consume (Haberman & Luffey, 1998).

The lack of time students' experience leads them to cope by snacking. On average, students skip one meal a day, with breakfast being the most popular meal for students to skip (Spanos & Hankey, 2010). Students compensate by consuming more snacks to replace the foods they normally would have eaten at these missed meals (Merkle, 1998). College students' snack selections tend to gravitate towards foods that are higher in fat, carbohydrates, sugar and sodium, along with sugary soft drinks and

juices for beverages (Marquis, 2006; Merkle, 1998). Another problem identified with students' snack selections are that common foods selected (for snacks) provided more calories but less of a feeling of satiety than foods selected for meals (Wadhera & Capaldi, 2012). Whereas, in more relaxed times, students are able to eat a larger meal and have a greater feeling of enjoyment and satiety afterwards (Waterhouse et al., 2005). Therefore, when students turn to these snack foods as a quick solution to a time crunch, they end up consuming more food and calories throughout the day than if they had eaten a regular meal (Huang, Song, Schemmel, & Hoerr, 1994). A specific example of this behavior can be found in a study by Wansink et al. (2013). In their study, the researchers observed a significant decrease in the purchases of healthy snack options and a significant increase in unhealthy snack options. This drastic shift was observed during the end of the fall and spring semesters when students are pressed for time with upcoming final exams and grades (Wansink, Cao, Saini, Shimizu, & Just, 2013)

A desire for more sleep and the demands from class schedules and course workloads are not the only time sensitive variables that influence students' food selections (Chapman et al., 1998). Psychologically, there are also many variables that influence how students manage time and make food selections. At the most basic level, students' personality type can dictate what foods they choose to purchase. Horacek and Betts (1998a) found that extroverts and introverts differ in their food selections while managing the pressures of life in a college or university. The researchers reported that while extroverts were more influenced by the college environment and all of the pressures that ensues, introverts had more troubles trying new selections and approaches to their dietary behavior (Horacek & Betts, 1998a).

College is a time when there are new demands and responsibilities students have to face. Students experience higher academic workloads than they were accustomed to in high school and a decrease in perceived time to complete tasks (Small et al., 2013). These added responsibilities can create stress in the students' lives that they have to learn to cope with and manage. Stress and attitude are two factors that are correlated in regards to students' food perceptions and selection behaviors. Students' attitudes can greatly affect how they handle the stressors of college life, and how they cope with other situations that are happening simultaneously. When students' attitudes become more liberal, they experience lower self-control in regards to following a structured or regimented diet. This can lead to an increase in impulsive selections and spending toward food (Norvilitis & Mao, 2013). More negative or neutral attitudes, which can be caused from the environment and stressors of college life, also lead students to become more focused towards the convenience and comfort of food, and seek less variety in an attempt to manage and minimize stress they are experiencing (Chien-Huang & Hung-Chou, 2010).

Students' attitudes can also be strongly influenced by the stressors they experience in college life (Hsieh, 2004). The influence of stress on students' attitudes also affects their food purchasing and consumption behavior. Students' dietary response to stress falls into two categories, hyperphagic (over eating) or hypophagic (eating less) (Oliver & Wardle, 1999). Research on the impact of stress on students' consumption behaviors has uncovered why these two responses, of either over or under eating, occur. Wansink et al. (2013) reported in their study that when students are dealing with a single stressor in their lives it greatly impacts their thinking and coping abilities, and negatively impacts their self-control. Another study that supports this relationship was conducted by

Oaten and Cheng (2005). They stated that under academic stress students were “less able to control and direct a broad spectrum of regulatory behavior” (Oaten & Cheng, 2005). The students’ inability to cope with stress can lead them to select unhealthier foods (Hsieh, 2004). In turn, this stress placed on students over a period of time can lead to unintentional weight changes because of their altered food selections (Asiimwe, 2008).

In times of increased stress, students become less likely to participate in the behaviors of seeking variety in their food selection, lose self-esteem, and have less restraint in dietary choices that can lead to an increase in weight (LaCaille et al., 2011). A time that produces a significant increase in perceived stress by students, and can alter food selection, occurs during exam times at the end of each semester. During these brief one to two week periods, students’ stress levels can increase dramatically. In response to this, students tend to choose less healthy options as the pressures from school build (Wansink et al., 2013). Hartwell, Edward & Brown (2013) stated that during these times “emotionally driven food behavior takes over and can ‘trigger’ spontaneous consumption (p. 266).” Students gravitate more towards “comfort” or “reward” foods, which are typically higher fat, sugar, and sodium.

At the same time students’ purchases of healthier food options decline. In a study examining the foods students commonly turn to in times of stress, Oliver et al. (1999) found that chocolates, candies, cakes, and savory snacks were some of the more frequently selected items. Students use these foods as a coping mechanism to deal with feelings induced by increased stress. After consuming foods for comfort, many students associated their consumption with positive emotions, including feeling more satisfied, fulfilled, and enjoyment. (Hartwell et al., 2013). However, these feelings of well-being

are typically short lived. Many students, more so in females than in males, end up having feelings of guilt after consuming food for comfort in times of stress (Hartwell et al., 2013).

Types and Influence of College Foodservice and Meal Plans

For many students, the first time they live on their own is in a college dormitory (Glickman, Holm, Keating, Pannait, & White, 2007). Along with the new responsibilities and challenges of living on their own, students must also navigate the college foodservice system. The living and dining facilities where students have to purchase and consume their food can influence, and be a predictor, of their dietary choices and quality (Asiimwe, 2008; Marquis, 2006). In most circumstances, students in college have complete freedom of choice in the foods and drinks they choose. However, it has been found that the preferences and eating styles from living at home with their families transcend into college and adulthood (Branen & Fletcher, 1999). Students may find it difficult to venture outside of the foods that were normally provided and served by their parents back home and explore new healthier food options (Boek, Bianco-Simeral, Chan, & Goto, 2012).

Nevertheless, the dining facility environment pushes students into exploring new options by relying on cues from fellow students, and the dining facility itself, to forge a new perspective of what to eat (Wansink, 2004). In the college food environment, students are no longer in a “parent-controlled environment” (p.6) and are able to explore the food preferences within the constructs of their college foodservices operations (Gores, 2008). Deviating from the traditions of their home life, students begin to experiment in

skipping various meals and developing a more irregular meal pattern (Shimbo et al., 2004). The foodservice programs physical set-up, method of operation, and intervention measures utilized, can be key sources of information for students to learn about their food environment, the nutritional value of food, and meal options (Gores, 2008). Students will encounter and interpret this information on different food and health opinions and use it to form or modify their own unique food perceptions and beliefs (Chien-Huang & Hung-Chou, 2010). These include the perception of what is considered a meal food or a snack food, perception and misconceptions of the definition of healthy and unhealthy foods, and the beliefs of specific foods as a “reward” or “treat” (Haberman & Luffey, 1998).

In the early 1990s, colleges started to experience an increase in enrollment. This increase became more significant after 2001 when enrollment of students living in a dormitory setting increased by 38 percent by the year 2011 (Snyder & Dillow, 2012). With the pressure to remain competitive, universities and colleges strive to prove they are the best selection for students (Glickman et al., 2007). Colleges and universities also have to contend with providing the most efficient services while maintaining the best level of cost effectiveness (Horacek & Betts, 1998b). This has pushed schools to try to provide the best quality of education and environment for their students. A trend in colleges is to offer the total package concept, which includes housing and a choice in meal plans for one set price (H. Kim et al., 2012).

In an attempt to enhance the college experience, the foodservice has been an area that has been improved in recent years (Hurst, 1997; Joung et al., 2011). In the past, foodservice systems and dining arrangements were not very complex or optional to students (Merkle, 1998). With the change in demand, the system has had to reinvent itself

to offer more variety to students and increase satisfaction (Merkle, 1998). Whether the foodservice system is school-operated or outsourced, many new developments have been implemented to improve quality and satisfaction with the system (Glickman et al., 2007).

Foodservice systems have to cater to the diverse cultural, ethnic, and personal preferences of their students and visitors, and manage a large number of employees and services (Doherty et al., 2011). In addition to meeting their customers' demands, the college foodservice program must also maintain a defined budget utilizing their resources in the most cost effective manner (Horacek & Betts, 1998b). There are several important concepts that foodservice managers have to keep in mind when creating and managing foodservices to remain competitive. Variety is an important factor to both students and outside patrons of the facility, along with menu selection, the presentation or theme of a specific dining area, and a comfortable dining environment (Lee et al., 2006; Park et al., 2013).

Other aspects that college dining facilities have to be mindful of is the service quality of their employees, in regards to both time and demeanor, and the hours they plan to operate (Park et al., 2013). The smallest detail can make a difference in the students' use and satisfaction of the foodservice program. The environment can be a predictor of how well a student will be satisfied with the facility. The cleanliness and atmosphere of a dining facility can influence whether a student chooses a particular location, and if they would return (Lee et al., 2006). By keeping these concepts in mind, foodservices have evolved into a multidimensional food experience.

The environment students are exposed to has the potential to encourage healthy dietary behaviors or promote unhealthy behaviors (Michels, Bloom, Riccardi, Rosner, &

Willett, 2008). The introduction of the “food court” concept has provided greater food variety available to students to meet their various desires (Haberman & Luffey, 1998). This style allows for students to maintain a level of autonomy that research has shown is a key component in the satisfaction of a foodservice system. Students select foods in structure similar to a fast-food style system with which they are familiar (Merkle, 1998). Unlike the older cafeteria style environment, the food court system allows for several different cuisines to be represented at the same time and selected in a fast-food style operation (Lee et al., 2006). Foodservice locations can include canteens, food halls, catered events, smaller convenience outlets, vending machines, and specialty branded or franchised sites (Doherty et al., 2011). The price of providing greater variety and healthful options can be a barrier to college and university foodservice systems (Brunt & Rhee, 2008). However, vegetarian, ethnic, and other healthy options are emerging trends that are now included in these new foodservice systems (Merkle, 1998). The different food stations have been used to meet the demands of the students while increasing their satisfaction with the operation (Lee et al., 2006). While this style of foodservice has increased the overall variety of food offered at each location per meal, the variety of food from a day-to-day standpoint is more limited (Haberman & Luffey, 1998).

Students living on campus have access to a large variety of foods through new venues and outlets (Poddar et al., 2012). Vending machines, cafes, franchises, and all-you-can-eat dining hall, are some of the varieties of foodservice operations that students can choose from (Peterson, Duncan, Null, Roth, & Gill, 2010). However, they have limited access to full kitchens and equipment. Mini-refrigerators, with limited freezer space, and microwaves are the two most common pieces of equipment students are

allowed to have on campus (LaCaille et al., 2011). Students have expressed that convenience, lack of time and cooking difficulties associated with dorm living influence the types of foods they select (Marquis, 2006). They utilize the grab-and-go areas of foodservices systems to choose items that can be taken out of the dining area and either prepared and eaten in their rooms, or to other locations to socialize or study (Merkle, 1998). The limited capacity and cooking capabilities afforded to students in their dorm rooms leads them to purchase higher fat, sodium, and sugar foods that can withstand either non-frozen or refrigerated storage and/or the capabilities of being fully cooked in a microwave (LaCaille et al., 2011). Nelson and Story (2009) found that the most common foods and snacks kept in students' dormitory rooms were cereals, granola bars, chips and salty snacks, desserts, candy, and sugar sweetened beverages. They acquired these foods through their campus dining facilities, parents, and off campus vendors (Nelson & Story, 2009). Therefore it is important for foods that require minimal preparation to be available to on-campus students (Marquis, 2006).

There are positive attributes from on-campus dining facilities towards student eating behaviors. Colleges are able to offer a larger variety of foods, at a prepaid cost, with little to no preparation required by the students. Off-campus students tend to gravitate toward a smaller selection of foods that they must prepare themselves (Brunt & Rhee, 2008). The variety of selections from on-campus foodservices has been linked to an increased intake in fruits, vegetables, and dairy for students living on-campus, compared to those students living off-campus (Berrman et al., 1990; Brunt & Rhee, 2008). While the intake of fruits and vegetables is still below the national recommendations, on-campus students still had a better diet quality than students living

off-campus at the same college or university (Nelson, Larson, Barr-Anderson, Neumark-Sztainer, & Story, 2009). It is believed the availability, convenience, and decreased costs are the contributing factors to improved dietary characteristics of students living on-campus (Brown et al., 2005; Peterson et al., 2010). Adversely, it has also been recognized that students living on-campus consume snacks and meals more frequently because of their close proximity to the dining locations (Kapinos & Yakusheva, 2011). Students living on-campus can also quickly become tired of the same food selections and establishments that their college foodservice meal plans have to offer. (LaCaille et al., 2011).

Colleges and universities recognize the diverse characteristics of their student bodies in regards to age, race, ethnicity, dietary preferences, and culture (Kim, Moreo, & Yeh, 2005). Foodservices offer a greater variety to cater to this diversity and to meet the dietary need of all their students. This increase in available food options influences how and what students eat. They are allowed to explore new foods they may not have had access to at home. The majority of meals on-campus students eat will come from their college foodservice facilities (Driskell et al., 2008). Students can become overwhelmed with all of the variety and revert back to foods that are comfortable and familiar to them (Haberman & Luffey, 1998). Past research has identified that many students end up eating the same foods day after day and mimic foods they were fed as children (Branen & Fletcher, 1999). The increase in available foods can also lead to a loss in self-controlling behaviors in the presence of so many tempting food choices (LaCaille et al., 2011). Not surprisingly in a study by Levitsky, Halbmater and Mrdjenovic (2004), the

greatest increase in weight changes in freshman college students occurred during the first three months of college.

Students' satisfaction with a college foodservice can also influence and shape their food selections. In the college foodservice systems, constant monitoring and adapting needs to take place to ensure the various demands of their clientele are being met in order to maintain satisfaction (H. Kim et al., 2012). At the most basic and obvious level, students' satisfaction is dictated by the appearance and taste of their food (H. Kim et al., 2012). However, students' satisfaction is also dictated by many other factors including food quality, service, atmosphere, and religious and ethnic expectations (H. Kim et al., 2012; Y. Kim et al., 2005). Numerous studies support that food quality is the first and main focus of students and customers in regards to on-campus dining satisfaction levels (Bojanic & Kashyap, 2000). The next important factor was service quality (Estepa, Shanklin, & Back, 2005). This can be a hard category for a dining service to excel in because it covers a wide array of services. The hours of operation, abilities of employees, portions and variety of food offered, timeliness of service, and the offerings of dining facilities are all encompassed into this category (Bojanic & Kashyap, 2000; Park et al., 2013). It is not surprising that of the different areas in customer satisfaction, service quality is the area students most often cited for improvements (Bojanic & Kashyap, 2000). Finally, the cleanliness, presentation, and menu theme were also among the aspects students found important in their satisfaction and affected their overall perceptions of quality of a foodservice location. (Bojanic & Kashyap, 2000; Y. Kim et al., 2005).

College Foodservice Programs and Students' Health

The growing health concerns associated with being overweight, obese, having suboptimal nutrition on future health has prompted more research to be conducted on college foodservice, and the relation to its students and their food consumption patterns as an intervention point. Studies have found that students living on campus have better dietary intake of healthful foods than students living off campus or individuals of the same age who do not attend school (Peterson et al., 2010). However, these students still fail to meet the recommended guidelines, and the increased food availability a college dining services can cater to an obesogenic environment (Giskes, van Lenthe, Avendano-Pabon, & Brug, 2011).

Exploration of how college foodservices can improve the health of their students should also be an interest to researchers. Research has highlighted that students are interested and have a desire to obtain more knowledge and skills to eat healthier while in college (Driskell et al., 2008). To better address these needs and provide for their student bodies, colleges and universities must examine key influencing factors such as lifestyle, culture, and specific dietary needs. (Joung et al., 2011). Colleges need to consider the importance students place on availability, convenience, and cost of food selection (Buscher et al., 2001; LaCaille et al., 2011). Students have expressed concerns that a lack of time, money, and their personal preferences have negatively impacted their health (Silliman, Rodas-Fortier, & Neyman, 2004). Many effective interventions have focused on increasing knowledge, modifying behavior in a supportive manner, and addressing misconceptions students have in a point-of-purchase intervention or multifaceted structured support system. (Chien-Huang & Hung-Chou, 2010).

Education can be a major factor in the dietary interventions of college students (Deshpande et al., 2009). To be successful, interventions should also address the access to food, the social environment and support of their systems, and address key influencing factors through lifestyle managements (Nelson et al., 2009). Point-of-purchase interventions focused around healthy food selections, and their benefits, have been shown to increase the purchases of those foods (Buscher et al., 2001). Small et al. (2012) recommended from the findings in their research that improving students' dietary quality may be achieved by adopting an all you can eat approach to foods, like fruits and vegetables, and require payment for less healthy foods.

Non-verbal visual cues can also be a source for intervention in the foodservice system. A study by Lee, Fowler and Yuan (2013), examined the characteristics students associated with healthy foods. They found that students perceived certain colors of foods as healthy. Due to this connection Lee et al. (2013), recommended that foodservice managers could increase the selection of healthy foods by pairing color queues with their menus in the hope it will encourage healthier food selections (S. Lee et al., 2013).

Positive relationships have been shown between interventions and an increase in selections of healthy food options (Haberman & Luffey, 1998). Students have also reported that their satisfaction toward a college dining services facility increase when healthier food options are available (Timken, 2012). It should also be noted that the sooner an intervention is introduced at the beginning of the semester, the more effective it is in altering student behaviors (Zabriskie & Blackburn, 2006). At the beginning of the year, students are more willing to make changes to their food and dining habits. However, by the second semester, many of the student's dietary habits are well

established and harder to modify (Zabriskie & Blackburn, 2006). Students' selection of healthy foods can be promoted by having healthy snacks and meal options, readily available and easy to access, as well as, quick and inexpensive food options (Haberman & Luffey, 1998; LaCaille et al., 2011; Racette et al., 2005). The creation of a supportive environment that emphasizes self-regulation and efficacy are key to guiding students to making healthier decisions (Boek et al., 2012; Poddar et al., 2012). Wansink (2004) sites that even seemingly small changes made to the food environment can unknowingly alter behaviors in a more healthful way.

Monetary Influences on College Students' Food and Meal Selections

In addition to food choice and environment, monetary plans for students to pay for food during their time at college has evolved. As technology has advanced, new avenues for payment have been introduced to college foodservice systems. One such avenue is the invention of "smart cards" which have been used by universities to streamline their services (Weichun, 2013). Smart cards have improved the management and service abilities of universities through their multidimensional use including functioning as an identification card, library card, payment in campus bookstores and shops, vending machines and even off campus food retailers (Boek et al., 2012; Zheng, Sun, & Hou, 2011). The smart card systems have allowed foodservices in colleges and universities to use a single identification card as a multifaceted tool for payment (Weichun, 2013). Smart cards provide a convenient system for students to purchase food, but also work within a dining facility by improving operations and services, and

collecting valuable data that can be analyzed and provide feedback to foodservice management (Zheng et al., 2011).

The college meal plan is a defined program that prescribes when, where, and how many meals students can purchase and eat. The increased demand for food choices by students determines the meal plan type (Seung Lee et al., 2006). Traditionally, meal plans regulate the number of meals allowed to students in a week (Merkle, 1998). Meal plans typically derive from two concepts, consumption or access driven.

Consumption driven plans have been more common in the college setting, and work by regulating how much food is consumed at each time ("Creating student meal plan flexibility is right on the money," 2002). These types of plans operate with a declining dollar system where set number of meals are allowed per week or semester ("Creating student meal plan flexibility is right on the money," 2002). Simple meal plans use student identification cards as a debt card and pull money from a preloaded account (Hurst, 1997). More restricted meal plans can regulate the amount of meals per semester, per week, or per day (Brown et al., 2005; LaCaille et al., 2011). The amount available at each meal, and even the times in which meals can be purchased, can also be regulated through this type of meal plan.

On the other hand, access driven plans are more liberal meal plans that function where students pay a fixed rate for unlimited access to the school cafeterias. Access can be limited to a set number of days during the week or to the full seven days a week (Gator Dining Services University of Florida, 2013). This allows students to come and go as they please, selecting as much or as little food as they want during set operating hours ("Creating student meal plan flexibility is right on the money," 2002). This system

can be coupled with a daily monetary allowance for other campus food sources and vending machines. While both plans have different advantages, schools must evaluate which meal plan approach best suits their financial and customer demands.

It is, also, economically important for colleges to assess and implement a meal plan that best suits their customer population. The different types of meal plans can impact the amount of food waste seen at the dining facilities (Kwon, Bednar, Kwon, & Bush, 2010). While consumption driven plans are prepaid, students still become concerned with the monetary amount of meals, and their meal allowance throughout the week and semester (Porter, 2010). H. David Porter, president and CEO of Porter Knouw Consulting, Inc., states that these plans lead to wasteful spending (2010). The restricted dollar amounts cause students to become concerned about using their purchases to the fullest potential, without regard to dietary needs (Porter, 2010). On the contrary, access driven plans allow students to access dining halls whenever they please without monetary limits. While this type of meal plan may seem to be more expensive to operate, than a consumption driven plan, it makes up for operating costs in allowing labor to be adjusted based on service demand. The plan also helps in decreasing food waste, because students no longer feel a monetary pressure to purchase unnecessary foods to meet specified monetary amounts (Porter, 2010).

The type of meal plan implemented by colleges or universities can also influence the food purchases made by their students and satisfaction of the foodservice. A study by Horacek & Betts (1998b), reported that students could be grouped into categories by what was important in their purchasing behaviors. The first group was influenced by their internal desires and external environment more so than the other groups in the study.

Another group was more focused on the perceived healthiness of their food selections. A third group was the least influenced by the variables being studied. But, the fourth group had cited that above the other variables, such as the healthiness of a food, they were most influenced by their allowed budget (Horacek & Betts, 1998b).

Students have expressed in research studies that the cost of food affects the foods they select to purchase (Waterhouse et al., 2005). The use of smart cards and meal plan systems by college foodservices have moderately decreased the students concerns with monetary issues. However, students still have to deal with restrictions on their meal plans. Previous research has highlighted the concerns with consumption of unhealthy fat, sugar, and salt foods because of their lower costs. Even though students have bought into these prepaid meal plans, they still feel the constraints of the plan and feel healthier food options are more expensive to purchase (Greaney et al., 2009).

Encouragingly, one study found that interventions can reduce the stereotype of the price of healthy food (Michels et al., 2008). In this study, when the price of healthy foods were reduced below average cost, students purchased more healthy foods and sale of unhealthy foods decreased (Michels et al., 2008). After the reduced prices were returned to normal, students still continued to purchase food at an increased level, suggesting that with some support students can overcome the price stigma placed on healthy foods (Michels et al., 2008).

Research has also identified that students worry if they are using the entire fund allocated to them and not wasting money that has been set aside for food purchases (LaCaille et al., 2011). One key study by LaCaille, Dauner, Krambeer and Pedersen (2011) found that students were concerned about getting their “money’s worth” and

would purchase and/or eat extra foods regardless of hunger to fulfill that need. These concerns can shape what purchases students make despite their true feelings of hunger, or lack thereof. This need to fulfill their mandatory meal plan, or “get their money’s worth,” can lead to students gaining weight (Merkle, 1998). Other studies have found that type of foodservice and meal plan can also affect the specific food groups that students select (Brown et al., 2005). The more flexibility that is allowed in a meal plan the higher the students overall satisfaction (Lee et al., 2006).

Sources have highlighted that students are more satisfied with meal plans that increase their flexibility in both hours of operation and access to food. In a study examining environmental factors on food intake and consumption, Wansink (2004) noted that customers are most satisfied when they know they can “personally adjust, modify or design the immediate food environment” (p. 466). This is also true when applied to meal plans. Students want to know that they have some control of their food environment and meal plans. However, a study by Greaney et al. (2009), found there were negative attributes to meal plans that allow unlimited access to food. They reported that students, females more than males, “had difficulty controlling intake of unhealthful foods” when their access to campus foods was unrestricted (Greaney et al., 2009).

While information is available on the general relationship between the uses of a prepaid meal plan in an on-campus setting versus students off campus, there is need for further exploration. Limited identifiable publically accessible research has been conducted on the impact of a specific prepaid meal plan types (ie, restricted versus liberal, time control versus monetary control versus meals per time period control) on the food selection and purchasing behavior of students.

Study University

Ball State University is a Midwest University that utilizes meal plans system that restricts the dollars per meal, meals per week, and time periods for meal purchases in their foodservice program. The campus is composed of several self-serve cafeterias, convenience stores, franchised restaurants, micro cafes and vending machines. The meal plan system in use offers students the options of 10, 14, 18 and 21 meals per week. Each meal has a monetary restriction: \$4.45 for breakfast, \$7.85 for lunch and dinner. Each meal plan also has a “dining plus” system where additional funds are provided for extra meal spending. When students make purchases outside of meal times, or when meals exceed the allocated amount, this extra fund covers the expenses like a debit card. The “dining plus” dollar amounts are specific to each meal plan. The 10 and 14 meal plans allow \$100 of dining plus per semester, whereas the 18 and 21 meals per week plans allow \$75. Students, who have opted-in to the two-year housing and dining Premium Plan, are also allocated \$50 extra of dining plus each semester, which is a total of \$150.00 additional dollars per semester. Meals offerings are also regulated by specific time periods. Breakfast is available from 6:45 a.m. to 10:29 a.m. Lunch is available between 10:30 a.m. to 4:29 p.m., and dinner available from 4:30 p.m. to midnight. A meal plan refund is offered in approved campus absence cases, including field trips, bereavement leave, medical emergencies, and military services. However, students who have missed or failed to use any meal or dining plus is not refunded their monetary amounts (Ball State University, 2013).

Commuting and off-campus students at this university have the ability to purchase one of the five commuter meal plan options available to them. Commuter and off-campus

students can purchase meal blocks of 25, 50, 75 or 100 meals per academic semester. With these options, students can select any meal period throughout the academic year to spend against their block allowance. Students wanting to maximize their monetary amount should select the higher priced lunch or dinner meal periods over the lower priced breakfast periods. Commuting and off-campus students also have the option of “Any 5 Meals” plan. This plan allows students to pick any five meals each week and allocates \$50 of dining plus per semester (Ball State University, 2013).

Meals plans for on-campus students are included in room and board fees and vary depending on type of living arrangements and meal plans selected. A commuter meal block of 25 meals can be purchased for \$196. A meal block of 50 meals can be purchased for \$384. A 75 meal block can be purchased for \$566 and meal block of 100 meals can be purchased at \$738. “Any 5 Meals” can be purchased for \$630. These prices reflect a per semester purchase (Ball State University, 2013).

Summary

The food selections, purchases, and consumption patterns of college students are affected by complex interrelated variables. Time, stress, peers, availability, and convenience are just a few of the factors that affect students. The environment of the college foodservice system also influences the selections made by students. Ultimately, it is the freedom college students’ gain while living on campus that compounds these variables. College foodservice programs try to provide a satisfactory and quality product to their consumers. While offering a wide variety of food options to meet student needs, the foodservice adds an additional influencing variable to students’ decisions on food

purchases. The evolution of the meal plan system and use of smart cards have only complicated students' decision making. Although many studies have been conducted on the effects on students' health, due to food selections and monetary influences, there is still a need for further exploration into the true impact of meal plan systems.

CHAPTER THREE

METHODOLOGY

The purpose of this pilot study was to examine how the structure of a college meal plan influenced students' food selections and purchases at a Midwest university. The college environment consists of many variables that have impacted the diets of the attending students. This chapter presents the methods and procedures used to conduct the study.

Institutional Review Board

This pilot study was reviewed by the Ball State University Institutional Review Board prior to implementing the survey and received exempt status. The exemption letter can be found in Appendix A (Appendix A-1). All research personnel involved in this study completed the Collaborative Institutional Training Initiative training (Appendix A-2).

Participants

Undergraduate and graduate students that had purchased a meal plan from the university (N = 5,854) who were 18 years of age or older were invited to participate in the study. Every Wednesday, beginning February 26th, 2014 to April 2nd, 2014, an email

was sent to all students who had purchased one of the meal plan options, including commuter plans, inviting them to participate in the study. Inclusion criteria included students who had purchased regular or commuter meal plans and were 18 years or older were invited to complete the survey. Exclusion criteria were students under the age of 18 and/or did not purchase a meal plan. Informed consent was obtained from all participants, and students were allowed to exit the survey at any time. Students that completed the survey were given the opportunity to enter into a weekly prize drawing for \$20.00 coupons towards their meal plans.

Materials and Methods

Survey Design

No prior surveys that specifically addressed meal plans that restricted purchasing time periods for meals coupled with set monetary amounts and food purchasing behaviors were identified from the literature. Therefore, a survey was designed and tested for validity and reliability. The Ball State Qualtrics Portal system, version 57448, 1.812s (2014) was utilized to administer the survey. The Meal Plan Survey (Appendix B) created by the primary researcher measured student demographics (11 questions), factors that influence dietary behaviors (7 questions), attitudes toward nutrition (8 questions), attitudes toward spending (10 questions), spending behaviors (17 questions), attitudes toward monetary and food waste (3 questions), attitudes and behavior related to time (7 questions), and attitudes toward the meal plan system (6 questions).

The survey was reviewed for content and face validity by professors in the Family and Consumer Science Department and Ball State University Dining Services personnel.

Three iterations were created and a final version was administered. The survey was designed to take 15-20 minutes to complete.

Survey Protocol

Before the survey was distributed to students, the primary researcher met with resident hall directors and assistants to explain the purpose of the study, the study protocol, and the survey instrument. Resident hall directors and assistants were also encouraged to notify their residents of the study and encourage them to complete the survey. Students were told that the study investigated the relationship between their food selections and purchases and their selected meal plan type. Participants were also informed that survey responses were completely anonymous.

To protect student identities, no identifying factors were used in the data collection. The survey was emailed by a third party who worked in Ball State University Dining Services. A targeted approach was used, wherein only students who had purchased a meal plan received an email invitation once a week for five weeks. The email contained a hyperlink to the survey and instructions on how to register for the weekly prize drawing for \$20 in university foodservice coupons. To remain anonymous, participants who completed the survey were provided with an email address they could contact to enter their name into the drawing. The email for the prize drawing was separate from the survey and could not be traced back to an individual participant and their responses. Prior to access to the on-line survey, students had confirmed consent by clicking a button stating they had read the attached consent form and agreed to the terms listed. Students who did not provide consent were thanked for their time and were exited from the survey. (Appendix B).

Surveys were distributed in the spring semester from February 26th, 2014 to April 2nd, 2014, after regular scheduled classes had begun. The survey ran for five weeks and was redistributed every week to generate more responses. The school's spring break was during the period of distribution. The survey was not distributed to students during that week and was not counted as one of the five distribution weeks.

Data Analysis

Responses from the survey were exported from the Qualtrics website into Microsoft Excel and then imported into SPSS. Data was analyzed using SPSS v.22.0 for Windows (SPSS, 2014). Descriptive statistics and frequency counts were ran on all variables. Nominal (such as meal plan and enrollment status) and ordinal data were analyzed using Chi-Square and test of independence. Analysis of variance (ANOVA and independent samples t-test were utilized to compare differences. These tests were used to determine if relationships were present between meal plan types, food purchasing and dining behavior. Relationships identified in interval data were analyzed using Pearson's correlation coefficient. Statistical significance was set at $p \leq 0.05$.

Summary

The purpose of this pilot study was to examine how the structure of a college meal plan influenced students' food selections and purchases at a Midwest university. Students enrolled at Ball State University, who were 18 years old or older, and had purchased the school's regulated meal plan, were asked to complete a survey about their attitudes, beliefs, and behaviors related to food purchases and meals. Participants who

completed the meal plan survey during the five week collection period were offered an opportunity to be entered into a prize drawing. Data from the survey was used to analyze if a relationship was present between regulated meal plans and what affect it potentially had on the food purchasing and meal pattern behavior of students.

CHAPTER FOUR

RESULTS

The purpose of this pilot study was to examine how the structure of a college meal plan influenced students' food selections and purchases at a Midwest university. The college environment consists of many variables that have impacted the diets of the attending students. This chapter presents the results of the study.

Demographics

A total of 1,425 individuals participated in the survey with 1,137 participants completing the survey. The sample population was 74% female (n = 843), and 25% male (n = 284), others and those who preferred not to disclose represented 1%. During the study period, the total female population at the participating university was 60%, and males accounted for 40%. Participants of the study were predominately European-Caucasian descent (n = 935, 82%), followed by African-American (n = 68, 6%), other (n = 47, 4%), Hispanic (n = 28, 2%). Asian (n = 19), Native American (n = 7) each represented 1 % of study subjects. Middle Eastern subjects (n = 4) represented less than 1% of the study population. Finally, 3% of the study population preferred not to disclose their ethnicity (n = 29). During the study period, ethnic minorities accounted for 12.0%

of the total student undergraduate and graduate population at the participating university (Ball State University, 2014).

The majority (76%) of participants in the study were freshmen ($n = 521$, 46%) or sophomores ($n = 344$, 30%) students. Juniors ($n = 171$) accounted for 15%, while seniors ($n = 93$, 8%) and graduate students ($n = 8$, 1%) represented a smaller percentage of the total study sample population [Table 1]. Figure 1 illustrates the breakdown of participants by academic level.

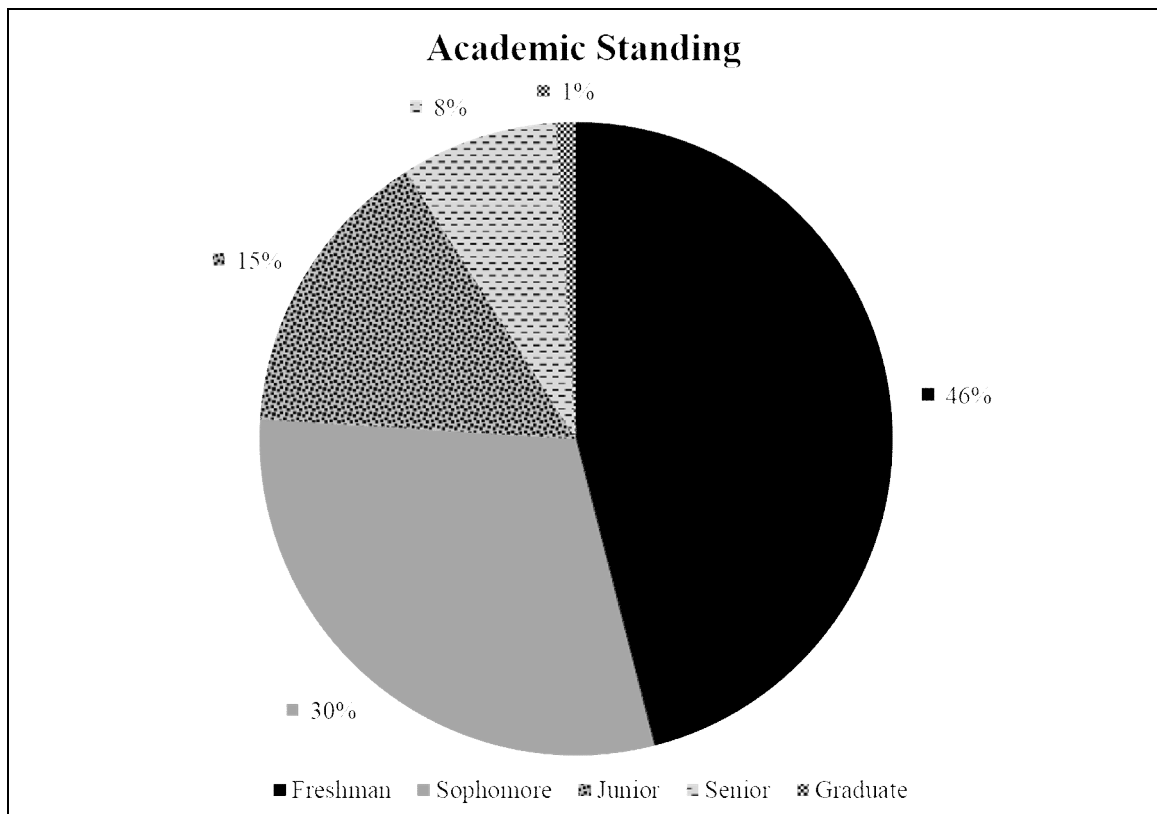


Figure 1. Academic standing of participants in the study

Table 1. *Demographic Characteristics of Participants*

	n	%
Started Survey	1,425	
Surveys Completed	1,137	79.8
Gender		
Male	284	25
Female	843	74
Other	3	<1
Prefer Not to Disclose	7	1
Ethnicity		
European/Caucasian	935	82
African-American	68	6
Hispanic	28	2
Asian	13	1
Chinese	6	1
Native American	7	1
Middle Easter	4	<1
Other	47	4
Prefer Not to Disclose	29	3
Academic Class Standing		
Freshman	521	46
Sophomore	344	30
Junior	171	15
Senior	93	8
Graduate Students	8	1

Participants who lived on-campus in residence halls represented 93% of subjects (n = 1,052). Participants who lived off-campus represented 6% of subjects (n = 65). Those who lived either in on-campus apartments (n = 13) or off-campus in fraternity or sorority houses (n = 7) each represented 1% of the sample population.

The type of meal plan purchased by participants varied by meals per week, including 10 (20%), 14 (45%), 18 (16%), or 21 (12%) meals per week, with the 14 meals per week plan as the preferred choice. The commuter meal plan options were used only by 7% of the population. Enrolled average student participation at the study university for each meal plan option consisted of 900 students using the 10 meals per week, 2,821

students using 14 meals per week, 1,215 students using 18 meals per week, and 860 students using the 21 meals per week plan, from February to May 2014 [Table 2] (T. Banter, personal communication, 2014). Figure 2 illustrates the comparison between study and university meal plan participation.

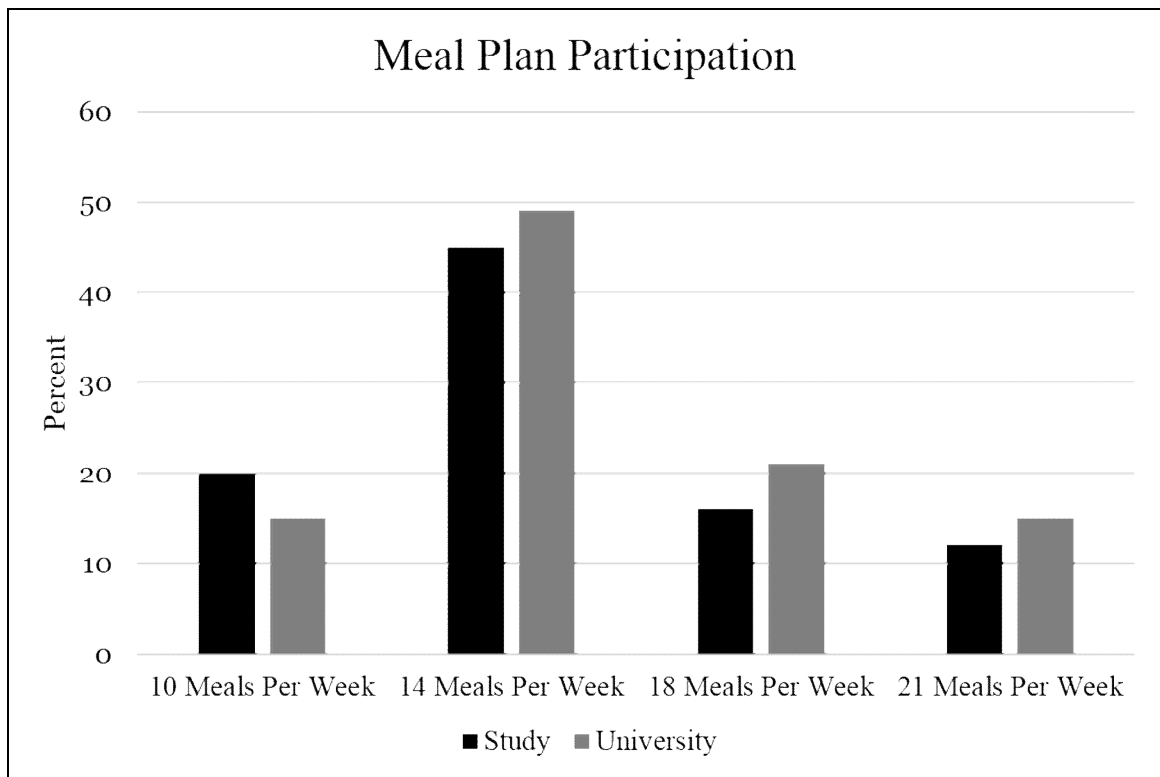


Figure 2. Meal plan participation between the study and university population

Table 2. *Demographic Characteristics of Participants*

	n	%
Living Arrangement		
On-campus, residence halls	1,052	93
On-campus, apartments	13	1
Off-campus, other	65	6
Off-campus, fraternity or sorority	7	1
Meal Plan Participation		
10 meals per week	228	20
14 meals per week	508	45
18 meals per week	186	16
21 meals per week	161	12
Commuter plans	84	7
Meal Plan Payment		
Parent/guardian	333	29
Parent/guardian and self (including loans)	258	23
Self (including loans)	173	15
Scholarship	90	8
Combinations of parent/guardian, self (including loan), and scholarship	247	22
Other	36	3

Attitudes on Dietary Health Choices

Participants were asked if the different food choices available on campus had the potential to support a healthy diet. Participants who felt that the available choices had the potential to support a healthy diet represented 43% (n = 489) of responses. Roughly one-third (31%, n = 352) of participants thought available choices might be able to support a healthy diet. While 23% (n=267) thought the food choices did not have the potential to support a healthy diet, and 3% (n=29) were unsure if choices supported a healthy diet. There was no significant difference between participants who purchased the various meal plan options and the plans perceived ability to support a healthier diet, $p = 0.501$. Figure 3 represents participant responses on if the on-campus food choices could support a healthy diet.

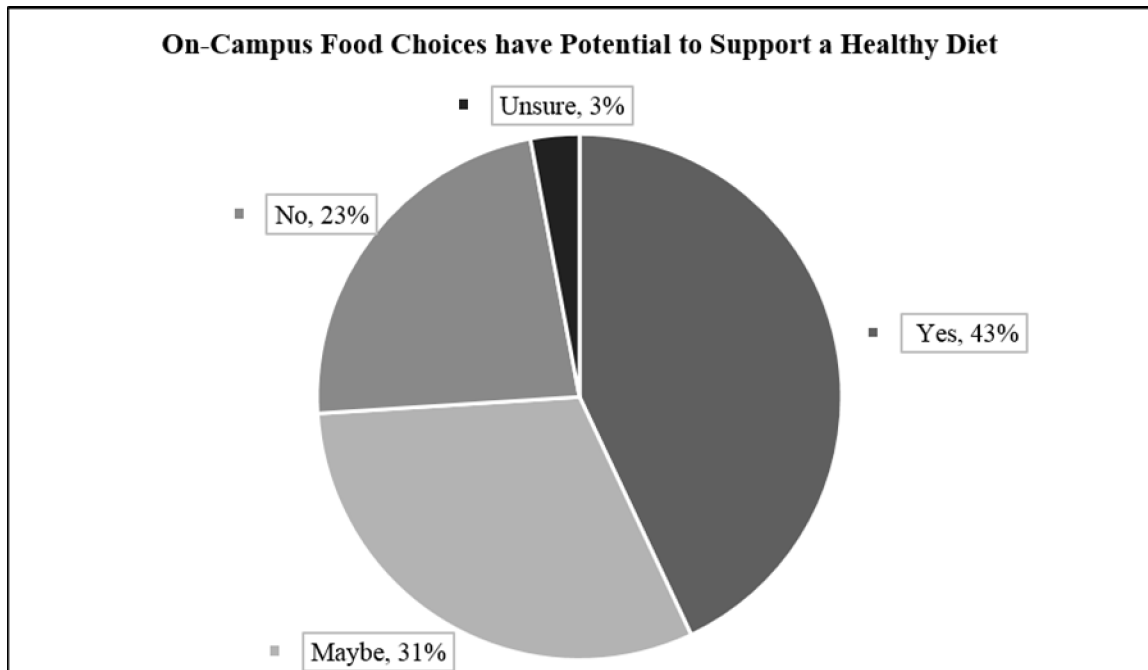


Figure 3. Potential for on-campus food choices to support a healthy diet

However, over half (59%, $n = 669$) of the participants *felt* that the meal plan currently did not help meet their dietary goals. Only 11% of participants ($n = 123$) felt the meal plan helped to meet their dietary goals. Figure 4 illustrates participants' responses towards the meal plans' ability to help them reach their dietary goals.

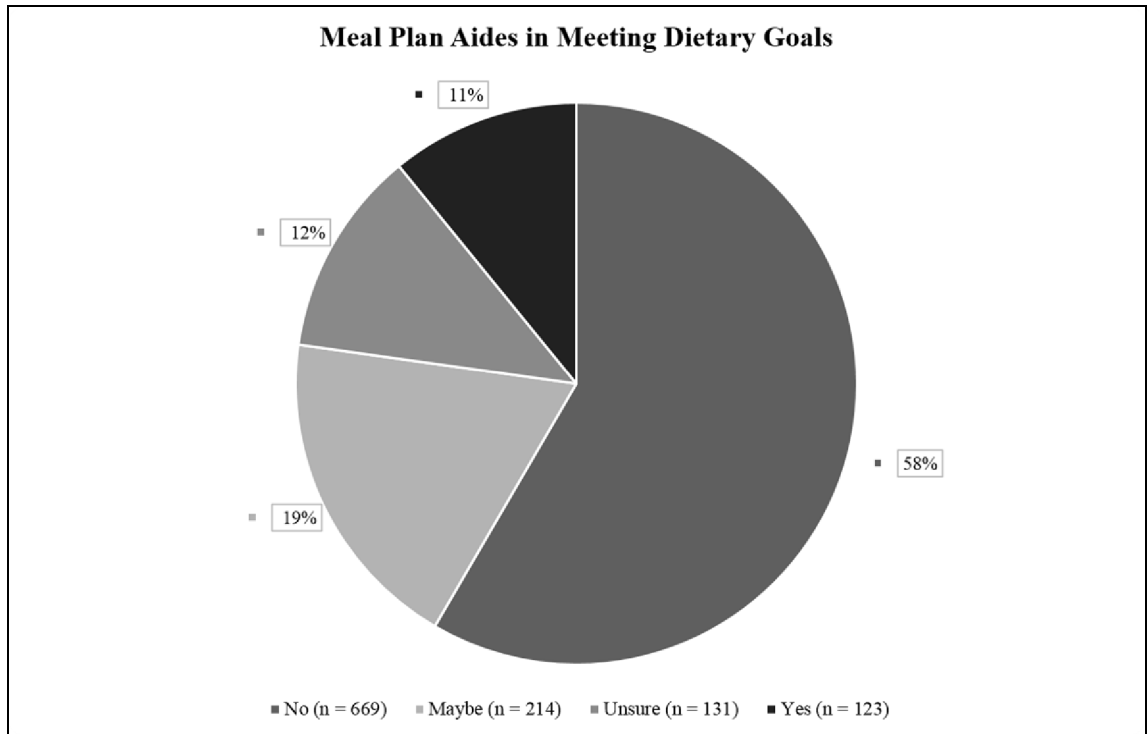


Figure 4. Ability of meal plan to help meet dietary goals.

Focusing on the participants' health conscious behaviors, a five-point Likert scale was used to assess how much consideration participants gave to a food or drink purchase when nutritional information was available, with 1 = never giving consideration to 5 = always giving consideration. The mean participant response was 3.29 (SD = 1.13). Participants reported 'sometimes' looking at and considering the nutritional information 36% (n=408), while 25% (282) responded most of the time considered nutritional information. A smaller percentage of participants reported always considering nutritional information when available (17%, n = 188), while 16% (n = 181) rarely considering nutritional information, and 7% (n = 76) never considered nutritional information.

Finally, participants were asked to rank their current dietary pattern. Using a five-point Likert scale responses were on a range of 1 = very healthy, 2 = moderately healthy, 3 = neutral, 4 = moderately unhealthy, 5 = very unhealthy. The majority of participants

felt that their diets were neither healthy nor unhealthy (32%, $n = 366$) to moderately healthy (48%, $n = 542$) ($M = 2.57$, $SD = 0.84$). Less than 6% of participants felt their current diet was very healthy ($n = 65$), while 15% rated their diet moderately ($n = 146$, 13%) to very unhealthy ($n = 18$, 2%). The perceived health of the participants' diets were not significantly different between the various meal plans purchased ($p = 0.337$).

Research Question 1 – Factors that Influence Dietary Behavior

Several survey questions addressed the factors that influenced participants' food selection and their perceived dietary health status. Hunger, food cravings, price of food, and the convenience were four factors that participants ranked as highly influential on the dietary choices, while peers, nutrition, and dining environment were perceived to have some influence on participants' food selection and purchases. Table 3 illustrates the mean scores for the various influencing factors. These factors were not significantly different among the meal plan options.

Table 3. *Influencing factors on food selections and purchases*

Factors	Mean	SD	P
Convenience	3.29	0.74	0.434
Cravings	3.18	0.78	0.232
Dining environment	2.39	0.93	0.422
Hunger	3.43	0.73	0.109
Nutrition	3.10	0.77	0.905
Peers	2.46	1.06	0.665
Price of food	3.24	0.81	0.190

Note: Responses were recorded on a 4-point scale (1 = None, 2 = Little, 3 = Some, 4 = A lot)

The study also explored perceived barriers to eating healthy on campus. Participants were allowed to select all the factors they felt were barriers to eating healthy on campus. The food choices available (76%) and the price of food (75%) were the two

factors that participants felt were the biggest barriers to eating healthy. Slightly over one-third of participants (n = 390, 34%) felt that time restrictions were a barrier to healthy eating. Participants were also allowed to select “other” and comment on other perceived barriers, or further explain barriers. In this section, many participants stated that the cheaper and more available foods were the ones that were highly processed, high in sugar and salt. Several participants restated and commented in the “other” section that the time restrictions were also a barrier and forced them when to buy and/or eat. A small percentage of participants felt there were no barriers to eating healthy on campus or did not think about eating healthy (7%). Figure 5 illustrates participants’ perceived barriers to healthy eating.

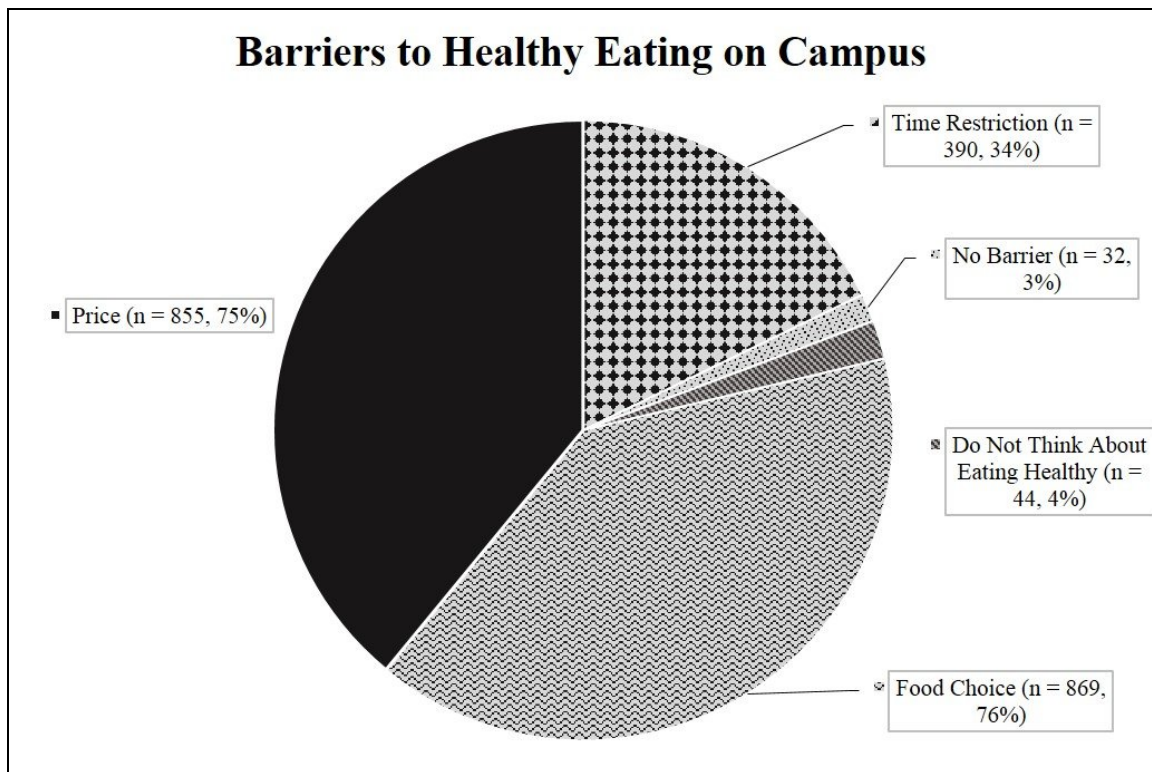


Figure 5. Participants’ perceived barriers to healthy eating (allowed to select all that applied).

In regards to food choices, the variety and availability of healthy food options at dining locations across the campus were a reoccurring theme in the comments sections. Several participants commented on the availability of healthy food options stating “some locations don’t have as many healthy options as others,” and “the availability of healthy food at the different dining locations were not consistent throughout the campus.” While other participants commented that even at locations where healthier food options were available, there was limited variety and times when they were out of stock. Other participants commented that while there were healthy food options at each dining location, if they wanted to eat healthy everyday they “would essentially be eating the same four or five foods each day” implying they would quickly become bored of those options.

The quality of healthy foods was also a reoccurring theme that participants added as barriers to healthy eating. Several participants commented that many of the fresh fruits and vegetables that were available “appear rotten,” “moldy,” “unsanitary,” or “overall poor” in quality. One participant stated “sometimes I aim for healthy foods, but once purchased, I have found the[m] undesirable, like mushy apple slices, then I think I don’t want that to happen again, so I avoid them.” This behavior was reflected by other respondents who stated similar experiences and then decided to avoid purchasing those foods in the future.

Participants also commented on the price differences between food they perceived as healthy and unhealthy. One participant commented that “price is a HUGE issue... salads are like \$5 here... you get a salad and you’ve already used a big chunk of your money.” Participants also felt there were a greater variety of less healthy food options

than healthier food options, and that less healthy foods were more predominantly displayed around the food court aisles and cash registers. One participant stated that there were “unlimited access to candy, soda, and crap food all the time,” while healthier options were not always in stock, or were put away after certain hours.

Research Question 2 – Influence of Time

As a component to the meal plan system, time regulations on when meals can be purchased and how this affected participants were examined. When asked if there were no time limits placed on breakfast, lunch, and dinner meal periods, 77% ($n = 873$) of participants stated the way they purchased and ate food would change. Only 13% ($n = 153$) reported that ‘maybe’ the way they purchased and ate food would change, and less than 10% answered no change at all ($n = 88$) or unsure what it would be ($n = 23$). Using ANOVA, it was revealed there were significant differences among different meal plan groups ($p = 0.034$). In their responses, individuals who purchased 10-meal or 14-meal plans are more likely to change the way they purchased and ate food compared to those with 18 and 21 meal plans. However, there were no significant differences in responses in regards to academic standing ($p = 0.674$) or gender ($p = 0.861$).

When asked if they had ever skipped or missed a meal because of the time periods, approximately half of the participants said they sometimes did skip or miss a meal ($n = 595$, 52%). About 25% of participants reported they always ($n = 97$) or most of the time ($n = 175$) missed or skipped a meal because of the time periods. While 19% of the participants said they rarely skipped a meal ($n = 212$) and 4% ($n = 51$) said they never missed or skipped any meal. ANOVA identified a statistical significant difference ($p =$

0.000) among groups for missing or skipping a meal due to the time period restrictions. Multiple comparisons showed that the participants on the 18 and 21 meals per week skipped or missed meals more frequently than participants on the 14 meals per week ($p = 0.002$) and 10 meals ($p = 0.000$).

When asked how much they agreed with the statement “I like the time zones allowed for each meal,” 60.4% of students either strongly disagreed ($n = 281$) or disagreed ($n = 407$). Less than 20% agreed ($n = 183$) or strongly agreed ($n = 22$) with the statement. ANOVA yielded significant differences between the responses from participants in the various meal plan groups on how much they agreed with the statement ($p = 0.024$). A post hoc analysis revealed that participants on the 21 meal plan significantly disagreed more with the statement than participants on the 10 ($p = 0.020$) and 14 ($p = 0.035$) meal plans. Responses from participants were not significantly different based on academic standing ($p = 0.840$) or gender ($p = 0.466$).

When asked what areas would they change, if they could change the current meal plans, the majority of the participants wanted to change the time allowed for each meal ($n = 845$, 74%). Several participants commented that in a deductible system they would be willing to have a weekly allowance of money, if they were allowed to spend how much or little they pleased in the week and with no time restrictions.

Research Question 3 – Influence of Monetary Limits

Survey questions explored both the attitude and behavior of participants in relationship to the set dollar amounts for each meal to examine how the impact of the different meal plan restrictions affected students’ food selections and purchases.

Participants were asked (1) how much consideration and concern they gave to the price of food when selecting what to buy; (2) if they were concerned with meeting the set dollar amounts; and (3) if that concern influenced their purchases.

When deciding what to purchase, 75% of participants reported they always ($n = 408$) or most of the time ($n = 439$) considered the price of a food or drink before they selected the item to buy. A smaller amount of participants ($n = 196$, 17%) reported sometimes they considered the price of a food or drink when selecting what to eat. Less than 10% stated they rarely ($n = 72$) or never ($n = 22$) considered price when deciding what foods and drinks to purchase.

In regards to the meal plans set dollar amounts for each meal, 84% participants' reported always ($n = 530$) or most of the time ($n = 424$) thinking about trying to meet the set dollar amount for their meals. A little over one-tenth of participants ($n = 138$, 12%) sometimes tried to meet the set dollar amount. Less than 5% of participants reported rarely ($n = 35$) or never ($n = 9$) thinking about trying to meet the dollar amount with their food purchases.

Finally, the majority of participants reported they were concerned about the price of food and drinks, and meeting the meal plans set dollar amount either all of the time ($n = 380$, 33%) or often ($n = 356$, 31%). While 21% of participants reported that sometimes their choices were influenced by their concerns toward price and meeting the required monetary amounts ($n = 242$). Less than 15% stated they rarely ($n = 94$) or never ($n = 61$) were concerned about food and drink prices and meeting the meal plans required amounts. Figure 6 illustrates the responses by participants toward the consideration for price, concern, and influence in food selections to meet set dollar amounts.

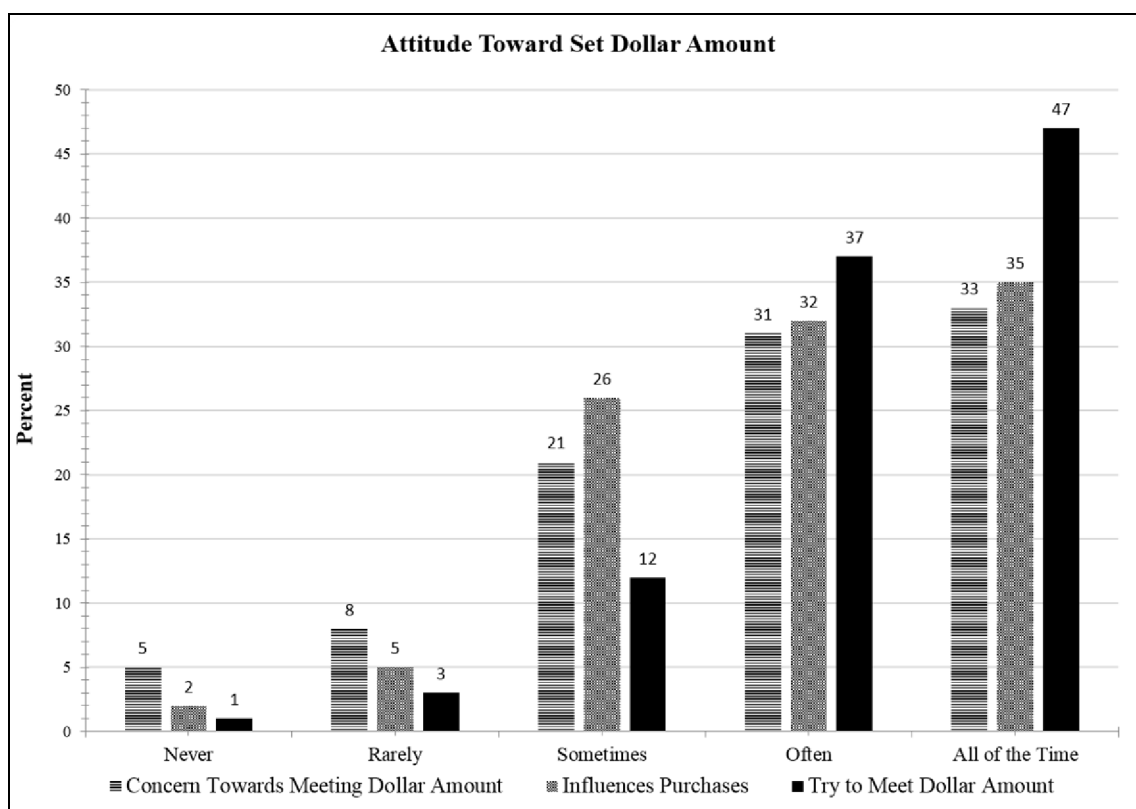


Figure 6. Participants' consideration towards price, concern toward meeting set dollar amount and influence on food and drink purchases

The data revealed there were a strong correlation between the amount of concern participants had towards meeting the set dollar amount and the influence it had on their purchases ($r=.521, p = 0.000$). When asked if the participants' concern of meeting the set dollar amount at each meal influenced their food choices and purchases, 67% reported it affected their purchases all of the time ($n = 394$) or often ($n = 359$). Less than 8% of the participants stated their concerns rarely ($n = 55$) or never ($n = 28$) influenced what they selected and purchased to eat. Table 4 illustrates the mean scores for concern and influence towards meeting the set dollar amount at each meal.

Table 4. *Concern towards meeting dollar restrictions and influence on food purchases*

Frequency	Concern				Influence			
	n	(%)	Mean	SD	n	(%)	Mean	SD
All of the time	380	33	3.81	1.15	394	35	3.92	1.01
Often	356	31			359	32		
Sometimes	242	21			299	26		
Rarely	94	8			55	5		
Never	61	5			28	2		
$r = 0.521, p = 0.000$								
Based on a 5-point Likert scale (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = All of the Time)								

To meet meal plan dollar limits, more than two-thirds of the participants indicated they commonly purchased extra food in order to meet the set dollar amount (n=765, 67%). Around a quarter of participants (n = 295, 26%) reported that they would sometimes purchase extra food to take back to their residences. Less than 7% of participants rarely (n = 62) or never (n = 12) purchased extra food. When asked about the key attributes participants took into account when selecting extra food to purchase, the participants reported: snack foods (86%), beverages (72%), non-perishables (63%), the taste (54%), nutrition of the item (43%), fresh fruits or vegetables (40%), and whether the item was good for a meal (33%).

When asked if participants' would alter their behavior towards food purchases and/or consumption patterns if there were no dollar limits placed on the meal plans, 76% of participants said their behavior would change. Less than 5% of participants (n = 37, 3%) felt their food purchasing and consumption behaviors would not change if there were no dollar limits. Statistical testing revealed males are more likely to change their

behaviors than females ($p = 0.033$). There were no significant differences based on academic standing ($p = 0.828$) or meal plan participation ($p = 0.451$).

Participants were asked how much they agreed with the statement that “the meal plan system allows enough money for each meal.” On a 5-point Likert scale, with 1 being strongly disagreed and 5 being strongly agreed, the results suggested that the majority of the participants neither agreed nor disagreed with the statement ($M = 3.07$, $SD = 1.15$). ANOVA revealed a statistical significant difference ($p = 0.005$) among participants in the various meal plan groups on how much they agreed or disagreed with the statement. Post hoc multiple comparison identified that the participants who purchased the 10 meals per week and 18 meals per week meal plans were significantly different ($p = 0.003$) in their responses to the statement. The participants with 18 meals per week plan either disagreed or strongly disagreed with the statement more than the participants in the 10 meals per week plan group. There was no statistical significant difference based on academic standing ($p = 0.346$) or gender ($p = 0.137$).

Finally, when asked if they could change the monetary aspects of the current meal plans, the majority of participants wanted to change the dollar amount for each meal ($n = 767$, 67%). One of the issues with the monetary limits explored by the study was participants’ perception of unused funds from the meal plan due to under usage and/or missing time periods being forfeited back to the university. Participants were concerned ($n = 983$, 87%) that money not used to meet dollar amounts for the meal plan meals was forfeited back to the university. Participants reported that having their money forfeited back to the university made them feel “treated unfairly” (72%, $n=799$), “frustrated” (61%, $n=685$), “angry” (48%, $n=533$), and discouraged (17%, $n=189$). Many of the

participants commented they were confused and angry about the money not being returned to them and felt “it should roll over or come back (to student dining account) to us somehow because we paid for it.”

Several participants expressed a desire for the unused money to be returned to their accounts for use at a later time. One participant commented that it would be nice to have the unused money returned to their account instead of being forfeited back because that way they wouldn’t feel “forced to spend a certain amount every time.” While others commented they felt they had to buy and/or eat food at a given time in fear of losing their money, even though it was against the times they normally and naturally preferred to eat.

Research Question 4 – Influence of Limited Meals per Day and Week

There are several different meal options available to participants in the study. Some of the meal plans offered to participants did not allow enough meals per week to eat breakfast, lunch, and dinner every day throughout the seven day week. Almost two-thirds of the participants (65%) reported using all of their meals allowed per week most of the time ($n = 373$) or always ($n = 360$). Equally split groups of participants reported they sometimes ($n = 153$, 13%) or rarely ($n = 149$, 13%) use all of the meals allotted. Less than 10% ($n = 86$) reported never using all of the meals allowed to them during the week.

When asked if they had ever run out of the number of meals allowed per week before the week was over, half of the participants responded yes ($n = 570$), and slightly less than half answered no ($n = 533$). ANOVA identified a statistical significance ($p = 0.00$) between participants who used up all of their allowed meals per week before the

week was over, and which meal plan they were using. Multiple comparisons found that participants on the 10 and 14 meals per week are more likely to use all of their meals allowed before the week was over, compared to participants on the 18 and 21 meals per week plans ($p = 0.000$).

Participants were divided when asked how much they agreed to the statement “I like the number of meals allowed per week.” A little over one-third (35%) of the participants ($n = 400$) agreed, 28.6% felt they neither agreed nor disagreed with the statement ($n = 325$). A little under one-third (30.7%) of the participants disagreed ($n = 189$) or strongly disagreed ($n = 161$) and only 5.5% strongly agreed or disagreed with the statement ($n = 62$). ANOVA identified a statistical significant difference in the responses from participants in the various meal plan groups ($p=0.00$) and how much participants agreed with the statement. Results indicated that participants who were on the 18 meals per week ($p = 0.028$) and 21 meals per week plans ($p=0.002$) agreed and strongly agreed more with the statement than participants on the 10 meals per week plan. There was also a statistical significant difference in responses between genders ($p = 0.050$). Female participants more strongly disagreed that the meal plan allowed enough meals than male participants ($p = 0.026$). The responses from participants were not statistically significant based on academic standing ($p = 0.063$).

When asked about any suggested changes to the current meal plans and restriction on meals allowed per day or week, 53% of participants wanted to change the meals allowed per day ($n = 605$). A reoccurring theme in the comments section was allowing a deductible payment system. Students proposed to have a total balance where meals and

snacks were subtracted, regardless of the time of day food was purchased, or the number of visits made per day to foodservice areas.

Summary

The purpose of this pilot study was to examine how the structure of a college meal plan system influenced participants' food selections and purchases at a Midwest university. The results from the study indicated that the regulations of time, dollar amount per meal, and meals per week have varying degrees of influence on participants' food purchasing and dining behaviors. In regards to dollars allowed at each meal, participants expressed concern in making sure they met these amounts by either planning their purchases ahead of time or purchasing extra food when they realized they under spent their allotment. Participants also expressed a negative association towards the money that was forfeited back to the college when they did not meet their set dollar amounts. There were also significant findings on the influence that the time restrictions had on participants purchasing behaviors. Analyses found that most participants strongly disagreed with the restricted time periods set by the meal plan system. Furthermore, participants with more meals per week plans, like the 21 meals per week, more strongly disliked the time restricted periods and had a harder time using all of their meals per week. Finally, if given the opportunity, most participants would prefer to change the system through time and/or payment method, and stated the way they purchased food and ate meals would change if there were no restrictions in place.

CHAPTER FIVE

DISCUSSION

The purpose of this pilot study was to examine how the structure of a college meal plan influenced participants' food selections and purchases at a Midwest university. The college environment consists of many variables that have impacted the diets of the attending students. A discussion of the results is presented in this chapter.

Student Demographics

Students who volunteered to participate in the meal plan study consisted primarily of European-Caucasian decent. These characteristics were similar with Ball State University's student population during the time of the study, where 88% of students identified as Caucasian (Ball State University, 2014). Participants in the study were also predominantly female. This was slightly higher than the university population, where females accounted for 60% of undergraduate and graduate students (Ball State University, 2014). The participants' meal plan usage ratios were similar to that of the university's student population with 14 meals per week being the most popular meal plan option, followed by 10, 18 and 21 meals per week.

Student Dietary Health, Attitude, and Behavior

The growing awareness of health risks associated with overweight and obesity have led colleges and universities to adapt their foodservices to encourage healthier dietary lifestyles (Driskell et al., 2008). This was reflected in the study by the majority of participants feeling that food options on campus had the potential to support a healthy dietary pattern.

When trying to decide which foods on campus to select, whether healthy or not, participants felt their level of hunger, specific food cravings, and convenience of the food were more influential than nutritional information, dining environment and peers. These influencing factors toward food purchases in college students were consistent with previous studies that have also identified convenience, peers, dining foodservice, price, and the food appearance/quality as factors that influence their food purchasing and dining behaviors (La Caille et al., 2011; Park et al., 2013; Horacek & Betts, 1998b; Zabriski & Blackburn, 2006).

The many influencing factors that affect students' food selections can be either beneficial or detrimental to their health. Several of these factors can become barriers to students eating behaviors and contribute to the marked decline in overall dietary quality in college students (Racette et al., 2005; Horacek & Betts, 1998b). Numerous research studies have identified the different barriers in the college environment that can keep students from eating a healthy, well-balanced diet. These barriers included time, money, food availability and the skills required to consume a balanced diet (Doherty et al., 2011; Glanz et al., 1998). The participants in this study also identified these areas as barriers to eating healthy on campus. Food choice was the most selected barrier to eating healthy by

participants (75%). While this is contradictory to the survey question asking if the food choices on campus could support a healthy diet, wherein close to half of participants agreed (43%), the participants' write-in comments on why food choice was also a barrier to healthy eating may elucidate why they also felt food choice was a barrier.

Many participants commented on the variety and availability of healthy food options at dining locations. Participants stated that if they tried to eat healthy all the time, they would end up eating the same foods every day due to a lack of variety of healthy food options. Many participants also felt the price of food was a barrier to eating healthy, commenting that "the price of healthy foods were higher" than the price of less healthy options, and they did not want to pay more for food even though it was considered healthy. Participants felt that the cheaper food options were foods that were highly processed and contained a lot of sugar and salt. The quality of perceived healthy foods was also a barrier that participants commented that "sometimes fresh food was visibly displeasing, moldy and unsanitary or of poor quality."

This may be why participants seemed to contradict themselves by saying the food choices on campus may be able to support a healthy diet, but the available food choices were a barrier to healthy eating. While the campus had healthy options available to students, secondary factors like the variety, price, and quality may be keeping students from actually selecting and eating healthier foods.

Influence of Set Time Periods

College students are aware of the factors that influence their dining behaviors. One of those influencing factors is time, either a lack or abundance of, and it impacts

students' food selections and purchasing decisions (Chapman et al., 1998). Studies have found that a lack of time is one of the barriers that can negatively influence students' selection of healthy snacks and meals and overall dietary health (Doherty et al., 2011). Participants from this study also felt that time was a barrier to eating healthy on campus. Students' desire to sleep in, adhere to class schedules and increased work load also contributed to their food selections and when they chose to eat.

Time can influence a college students' food selections and dietary behaviors not only by the students' schedules, but also through the dining locations' hours of operation (Park et al., 2013). When participants were asked if the time zones dictated by the meal plan system affected their food selections and dining behaviors, the majority (77%) felt that the restriction did affect their dietary behavior and these behaviors would change if there were no time limits to abide by. More specifically, participants felt that the time periods to purchase meals caused them to eat because of the time limits instead of eating when they were actually hungry because of the fear of missing a purchasing period. One participant stated "it would be nice to be able to use the plans whenever I wanted, and not waste the money if I miss the time slot." Another participant commented that sometimes they ate not because they were hungry, but because the time period was about to end and they did not wish to lose the money set aside for that period. This is alarming because participants are overriding a biological cue to eat in order to not miss or waste a portion of their meal plan.

Another alarming trend is skipping meals due to lack of time. Buscher et al. (2001) found that skipping meals was one of the unhealthy dietary behaviors that students develop and practice once entering the college environment. Other studies have

documented that breakfast is the most popular meal for students to skip when they are in the college environment (Spanos & Hankey, 2010). This was also reflected in the participants' survey responses. Participants reported they frequently skipped a meal because of the time periods set for meal purchases. Driskell et al. (2008) documented that many times students are sleeping in, or eating their meals in dining halls between classes and meetings, and are more focused on their time constraints than the nutrition of their food. When pressed for time, students will seek quick and easy meals or snacks to consume or end up skipping meals completely (Haberman & Luffey, 1998). In the comments sections for how participants' eating patterns would change, several cited that if there were no time limits on when meals could be purchased, they would eat breakfast more. This was the most common meal for participants to skip. The responses by participants demonstrated that the current plan restrictions on when meals can be purchased were also restricting students' abilities to meet dietary goals.

When asked about overall satisfaction with the time zones allowed on the meal plan system, over half of the participants did like the time zones allowed for meals. This could be due to the fact that if they had to have a defined time zone, students felt that the set time periods to eat breakfast, lunch, and dinner were within normal daily meal schedules they were accustomed to when under no regulations. However, participants on the 21 meals per week plan felt a stronger dislike toward the time zones than participants on the 10 ($p = 0.020$) and 14 ($p = 0.035$) meals per week. This should be expected because participants on the 21 meal plan would need to purchase three meals per day, every day of the week, in order not to lose and forfeit that meal and corresponding benefit. Whereas participants on the 10 and 14 meals per week have fewer meals to use

during the week period and would have some flexibility in when they choose to purchase their meals, and more opportunity to use a meal purchase they originally missed.

Influence of Per-Meal Dollar Limits

A study by Porter (2010) found that even though these meal plan systems are already prepaid for by the students, the students will still be concerned about trying to meet the monetary amount for each meal, day, week, or semester when there are limits placed on their spending. Lee et al. (2006) found that one of the most cited reasons for college students to select and purchase a particular food item was price. Participants in the meal plan study reported that they mostly or always were concerned and thought about the price of food (75%) and tried to meet the set dollar amounts (84%) dictated by the meal plan. Participants also reported their concern toward price, and trying to meet or go over the set dollar amount per meal influenced the foods they selected and purchased.

If there were no limits on how much money was obligated to be spent for each meal, participants said they would purchase healthier foods, eat less at each meal and eat different foods than they currently consumed. This could be due to the fact that students are concerned about how much they are spending at each meal and associate healthier foods with a higher food cost (Joung et al., 2011). Even though the meal plans are already prepaid, students still become concerned when there are restrictions on the amount of money that can be spent, and may avoid healthier food options because of the increased cost (Greaney et al., 2009).

When asked to comment on the barriers of healthy eating, many participants mentioned the price difference between healthy and unhealthy food options, stating they

could purchase more unhealthy options that were less expensive than purchasing the more expensive healthy options. Addressing the price difference between healthy and unhealthy foods can be an area for intervention to improve students' dietary health. Michels et al. (2008) studied how lowering the price of healthy food can increase students' purchases of those healthy foods and even when prices on healthy items were raised again, students still continued to purchase those healthy items. There could be several reasons why this was observed. One might be that students, like participants in this study, are afraid to take a chance with their set dollar amounts on foods they had not tried before or considered to purchase. By lowering the price of the healthier items students are able to explore these healthy food options and can determine if they are worth spending extra money on and overcome the price stigma.

Participants also reported they would rarely spend under the dollar amount for their various meals and that most of the time they would purchase extra food to reach or go over the dollar limit set for a meal. When determining what extra foods to select to help them reach the set dollar amount, participants reported the following attributes: foods that were good for a snack, beverages, non-perishable, tasted good, considered the nutrition and if the food was good for a meal.

Living in residence halls, apartments, and on their own for the first time, many students have limited cooking knowledge and access to equipment. Because of this, students gravitated toward foods that require little to no refrigeration or freezing and can be fully cooked in a microwave. Unfortunately, these foods also tend to be higher in fat, sodium, and sugar (Nelson & Story, 2009). The most common foods participants said they purchased in order to meet price allocations were: salty snacks, drinks,

granola/energy bars, candy, fruit, cereal, pre-packaged meals, frozen foods, and snack sized cakes and cookies. Nelson and Story's (2009) research findings also found that cereals, salty snacks, granola bars, sugar sweetened beverages and prepackaged meals were the most common foods for students to take back to the residence hall. This behavior outcome is consistent with previous research studies because participants in this study had similar purchasing behaviors as students from the other studies. These foods were taken back to the participants' place of residence where it was very unlikely for them to end up throwing the items away; instead, they would eat them as a snack or later as a meal.

The behavior of taking food back for a later snack or meal is not surprising because some of the lower meal plans only allow for 10 or 14 meal swipes throughout the seven-day week. Students on these lower meal plans would need to find other means to either pay for additional meals or have supplies to make meals in their residence. A study by LaCaille et al. (2011) highlighted the impact this behavior can have on students' health. In the study, they found that students who were worried about meeting monetary limits and wasting money would purchase and/or eat extra food in order to use up the entire funds allocated to them, despite if they were truly hungry (LaCaille et al., 2011). Merkle (1998) supported this notion stating that students' need to "get their money's worth" can lead them to purchasing and eating extra food that can lead to unintentional weight gain. However, participants said they would only purchase this extra food if there was not a long line behind them, or they were not pressed for time. Participants also commented that when they were not able to purchase extra food to reach the dollar allotment for a meal, they were upset that the difference between their actual purchase

and the set dollar amount would not be returned to them and was forfeited back to the university.

Participants had very negative feelings towards the management of money that was not used to meet the set dollar amount at each meal and throughout the week. The majority (86%) of participants were very angry and upset that money not used was forfeited back to the university, and they felt that it should, instead, be returned to the students' account to be used at another time. This is not surprising, given that other studies have pointed out the concern students have in the management of the meal plan money, even when it is a prepaid system, and there are no requirements to meet specific dollar amounts. (Greaney et al., 2009; Porter, 2010)

Influence of Meals Allowed Per Week

The numerous meal plan restrictions that can be placed on students by college foodservice can affect the students' food purchases in many ways (Brown et al., 2005). The more restrictions placed on students, either through time, money, or meals allowed per day or week can lower the students' overall satisfaction with the system (Lee et al., 2006; Wansink, 2004). Not surprisingly, in this study, participants who used the 10 and 14 meals per week plans more strongly disagreed with the statement that the system allowed enough meals for the week. While the students using the higher 18 ($p = 0.028$) and 21 ($p = 0.002$) meals per week plan agreed the plan had an adequate number of meals per week.

Participants on the 10 and 14 meals per week plan also reported running out of meals before the week was over more than students on the higher 18 and 21 meal plans.

This would be expected since users of the lower 10 and 14 meals per week plans had a limited number of meals to be used throughout the seven days. Some participants commented they would plan ahead for the lack of meals at the end of the week by having food stored in their rooms from earlier purchases, eating off campus, or had planned on going home for the weekend. Participants would also use their dining plus accounts to purchase additional meals. A few participants would use other means of payment, like cash, debt, or credit cards. Alarming, some participants stated they would just go hungry until the new week started.

Finally, when asked how their dietary behavior would change if there were no limits on the meals allowed per day or week, participants felt they would eat more frequently throughout the spending periods. This could be both a positive and a negative dietary behavior change. Students may eat more frequently because they are eating when they truly feel hungry. In contrast though, increased frequency in meals and snack consumption can also lead to increase calorie and weight gain, which can negatively impact students' health.

Study University's Meal Plan System

Unfortunately, over half of the participants (59%, n = 669) in the study felt that the current system did not help them meet their dietary goals. Participants felt that if all the restrictions were removed from the plan they would eat breakfast more and at a different time, eat an increased variety of foods, eat more fruits and vegetables, and eat a different amount at each meal. Participants who were on the 10 and 14 meal plans felt they would eat less at each meal if there were no restrictions than students on the higher

18 and 21 meals per week plans. Students on the 10 and 14 meal per week plan may be eating more at each meal due to the fact they know they are limited on meals they can eat during the week.

Overall, the restrictions placed on the various plans through dollars per meal, meals allowed per day, and purchasing time periods were all areas that participants wished to change. Participants wanted a system that did not dictate specific meal times or limit the number of meals that could be purchased in a given time block. They also did not want to feel pressured into spending a specific amount for each meal or have to fear losing money not used. Finally, participants felt that a more liberal meal plan system would assist them in achieving their dietary goals. This is supported by other studies that have found the more flexible a meal plan system design as a whole, the more satisfied students were with their food purchases and the foodservice (Wansink et al., 2013).

Summary

Participants' food selections and spending behaviors were similar to other studies of college students in regards to common food and snack selections, meal skipping behaviors, and attitudes towards money. Participants identified several influencing factors of the current meal plan that affected their food selections and purchases including the restrictions placed on time, dollars allowed per meal, and meals allowed per week. Many participants felt that if there was a more liberal approach to the meal plan, their dietary behaviors would change. These changes included purchasing different foods for meals, eating at different times, eating breakfast more, and eating less at each meal. These are all areas that can affect students' health. Specifically, many participants

commented on the price of healthy food as being a barrier to selecting those foods because of the meal plans dollar per meal restriction. Colleges and universities should examine and possibly modify restrictions utilized on time, money and meals allowed by meal plans. Educational institutes implementing these actions will encourage healthier eating habits and dietary behaviors in college student populations.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

The purpose of this pilot study was to examine how the structure of a college meal plan influenced participants' food selections and purchases at a Midwest university. The college environment consists of many variables that have impacted the diets of the attending students. This chapter presents the conclusion of results, limitations, and recommendations for further research.

Conclusion

Participant demographic ethnic characteristics were consistent with the university's student population, while participation by gender was slightly higher than the student population (Ball State University, 2014). The usage of the different meal plan options of the study participants was similar to the university students, with 14 meals per week being the more popular option, followed by 10, 18 and 21 meals per week (Ball State University, 2014).

The results from the study indicated the restrictions placed on time, dollars allowed per meal, and meals allowed per day and week were consistent with other research as factors that affect students' dietary behaviors (Doherty et al., 2011; Glanz et

al., 1998; Zabriski & Blackburn, 2006). Participants felt that as a whole these restrictions influenced when they ate, how much they ate, and what type of foods they selected to purchase. This influence is significant because this can affect the students' overall health in both a short and long term setting.

Participants reported that the time restrictions placed on them through the meal plan system influenced their behaviors in missing and skipping meals, specifically breakfast. Meal skipping has been an area of focus for many studies on college student populations (Buscher et al., 2001; Spanos & Hankey, 2010). There are many negative aspects to skipping meals, such as breakfast, on dietary behaviors. Participants in the study reported they will miss the purchasing period for meals for various reasons, including a desire to sleep more, class schedule conflicts, and trying to juggle an increased work load.

The monetary limits placed on each meal also influenced the participants' food selections and purchases in several ways. Participants felt concerned about the price of each food item and that concern influenced the items they ultimately selected to buy. On top of the concern for price, participants also worried about meeting the dollar limit set by the meal plan for each meal. Participants commented that many times the items they perceived as being healthier also cost more than the less healthy options that are typically foods higher in calories, sugar, sodium, and fat. In order to get the most out of their meal plan limited dollar amounts, participants would choose the less expensive options over the healthier options.

Participants also felt their meal pattern would change if there were no monetary limits. Responses from participants indicated that without monetary restrictions they were

likely to purchase less food at each meal. Overall, the participants stated that the monetary limits placed on them by the meal plan system was an area they would like to change and would prefer a system that was based more on a deductible type account.

Finally, the restrictions on how many meals were allowed per day and per week were also an area that participants felt affected their food selections and dietary behaviors. The meal plan system offered 10, 14, 18 or 21 meals per week, with three meal swipes allowed per day. Not surprisingly, when asked if the system allowed enough meals per week, participants on the 10 and 14 meal plans disagreed more strongly than the other plans. However, the higher meal plans, 18 and 21 meals per week, had a harder time using up all of their meals allowed per week and were frustrated that the money for these meals was forfeited back to the school.

When participants did run out of meals for the week, they either had to pay for extra food through their dining plus accounts, with their own money, or find food elsewhere (off-campus, going home, etc.). Alarming, some participants reported they would just go hungry when they no longer had enough meals for the remainder of the week.

Participants had many suggestions on how the meal plan system could be improved. Each area of restriction in the meal plan was an area participants wished to change. In regards to time, participants felt there should not be restrictions on when and how frequently they can purchase a meal from the foodservice locations. As for the dollar limit on each meal, participants preferred to have a deductible debt type system. This system would allow students to choose how much food they selected based on their physical hunger levels and not because they felt a need to avoid wasting money if it was

not completely used. Finally, participants were more lenient towards the meals allowed per day or week. While the participants would prefer to be able to purchase meals each day without a set limit, they stated they would be more willing to abide by this restriction if the time and dollar amount restrictions were not in place.

Limitations

The limitations for this study include:

1. The survey administration was through the campus email system. Students receive numerous campus emails and surveys throughout the year. Thus, students may have overlooked or deleted the link to the survey. This could have ultimately biased the data to only report on students with strong views on the campus meal plan. Students who were neutral or happy with the plan may not have felt the need to engage in the survey.
2. Survey administration was done solely through online recruitment. Administration of in person surveys may have yielded increased participation.
3. Surveys were administered at the beginning of the spring semester, whereas it may have proven beneficial to administer the survey during both the fall and spring semesters.
4. The survey instrument was not validated.
5. Survey data included students on the commuter meal plans, and this may have influenced results due to the fact commuter students do not depend solely on their meal plans for every day food and meals.

6. Only 19.4% of the student body purchasing the meal plan participated in the study.

Recommendations for Future Research of Meal Plan Systems

Based on the results of this study, the following recommendations are made for future research:

1. In addition to the selected Midwestern university, survey other universities with varying meal plan systems to measure similarities and differences between the populations.
2. Replicate the study in three years at the study site location, since this was a pilot test and measure differences between respondents.
3. Include more open-ended questions for participants to express their opinions without categories or restrictions.
4. Add a separate section to the survey to separate participants and data of those who purchased the on-campus meal plans from the participants who purchased commuter meal plans.
5. Increase participation by offering a high ticket prize such as a tablet or iPad.
6. Create a more visually interesting and interactive survey instrument to increase participation.

Summary

It is important to understand the factors that influence college and university students' food purchases and dining behaviors. These influences can shape their dietary behaviors for the rest of their lives and impact their current and future health. The

participants of the study were affected by the restrictions of the meal plan system in the food purchases and dining behaviors. Restrictions on time affected participants' behaviors in missing and skipping meals, and if or how often they ate breakfast. Regulating the number of meals allowed per day and week influenced the frequency of how often participants ate each day and during the week. Finally, having a limit on the dollars per meal may affect the types of food that the participants selected. In an attempt to get their money's worth, many participants would choose less healthier options over the healthier food options because they were less expensive and could purchase more food at one time. While participants would like to change each area of the meal plan system, they also reported that reducing one or two of the three restrictions would help to improve their overall dietary behaviors and satisfaction with the foodservice system. Colleges and universities can improve their students' dietary behaviors and overall health by encouraging healthy eating styles. By examining their current meal plan systems, colleges and universities must decide if and how their current meal plan systems meet these objectives, and what modifications can be made to improve students' health. Further research is needed to validate the current study findings, and to expand on both the impact of meal plan systems like the one under study, and to explore other meal plan systems used at the college and university level.

REFERENCES

- Asiimwe, J. K. (2008). *Dietary intake and nutritional status of University of Wisconsin-Stout students*. (Masters of Science Masters Thesis), University of Wisconsin-Stout
- Ball State University (2014). Fact book: Students/enrollment. Retrieved August 28, 2014
- Ball State University. (2013). Value plan and dining plus. Retrieved November 2, 2013, 2013
- Berrman, K. A., Jennings, G., & Crawford, S. (1990). The effect of student residence on food choice. *Journal of American College Health*, 358, 215-220.
- Boek, S., Bianco-Simeral, S., Chan, K., & Goto, K. (2012). Gender and race are significant determinants of students' food choices on a college campus. *J Nutr Educ Behav*, 44(4), 372-378. doi: 10.1016/j.jneb.2011.12.007
- Bojanic, D. C., & Kashyap, R. (2000). A customer oriented approach to managing noncommercial foodservice operations. *Journal of Restaurant & Foodservice Marketing*, 4(1), 5-18. doi: 10.1300/J061v04n01_02
- Branen, L., & Fletcher, J. (1999). Comparison of college students' current eating habits and recollections of their childhood food practices. *Journal of Nutrition Education*, 31(6), 304-310. doi: 10.1016/s0022-3182(99)70483-8
- Brown, L. B., Dresen, R. K., & Eggett, D. L. (2005). College students can benefit by participating in a prepaid meal plan. *J Am Diet Assoc*, 105(3), 445-448. doi: 10.1016/j.jada.2004.12.030
- Brunt, A. R., & Rhee, Y. S. (2008). Obesity and lifestyle in U.S. college students related to living arrangements. *Appetite*, 51(3), 615-621. doi: 10.1016/j.appet.2008.04.019
- Buscher, L. A., Martin, K. A., & Crocker, S. (2001). Point-of-purchase messages framed in terms of cost, convenience, taste, and energy improve healthful snack selection in a college foodservice setting. *J Am Diet Assoc*, 101(8), 909-913. doi: 10.1016/s0002-8223(01)00223-1
- Chapman, G. E., Melton, C. L., & Hammond, G. K. (1998). College university student's breakfast consumption patterns. *Canadian Journal of Dietetic Practice and Research*, 59(4), 176-182.

- Chien-Huang, L., & Hung-Chou, L. (2010). How health information affects college students' inclination toward variety-seeking tendency. *Scand J Psychol*, 51(6), 503-508. doi: 10.1111/j.1467-9450.2010.00815.x
- Creating student meal plan flexibility is right on the money. (2002, July 15). *Foodservice Director*, 14.
- Deshpande, S., Basil, M. D., & Basil, D. Z. (2009). Factors influencing healthy eating habits among college students: an application of the health belief model. *Health Mark Q*, 26(2), 145-164. doi: 10.1080/07359680802619834
- Dietary Guidelines for Americans, 2010*. (2010). Washington D.C.: U.S. Government Printing Office.
- Doherty, S., Cawood, J., & Dooris, M. (2011). Applying the whole-system settings approach to food within universities. *Perspectives in Public Health*, 131(5), 217-224. doi: 10.1177/1757913911413344
- Driskell, J. A., Schake, M. C., & Detter, H. A. (2008). Using nutrition labeling as a potential tool for changing eating habits of university dining hall patrons. *J Am Diet Assoc*, 108(12), 2071-2076. doi: 10.1016/j.jada.2008.09.009
- Estepa, A., Shanklin, C., & Back, K. (2005). Students' perceived service quality and customer satisfaction in a Midwest university foodservice operation. *Journal of Foodservice Management & Education*, 1, 40-61.
- Gator Dining Services University of Florida. (2013). Meal Plan. Retrieved January 2, 2014, from <http://gatordining.com/meal-plan-information/>
- Giskes, K., van Lenthe, F., Avendano-Pabon, M., & Brug, J. (2011). A systematic review of environmental factors and obesogenic dietary intakes among adults: Are we getting closer to understanding obesogenic environments? *Obes Rev*, 12(5), e95-e106. doi: 10.1111/j.1467-789X.2010.00769.x
- Glanz, K., Basil, M., Maibach, E., Goldberg, J., & Snyder, D. (1998). Why americans eat what they do; taste, nutrition, cost, convenience, and weight control concerns as influences on food consumption. *J Am Diet Assoc*, 98(10), 1118-1126.
- Glickman, T. S., Holm, J., Keating, D., Pannait, C., & White, S. C. (2007). Outsourcing on American campuses: National developments and the food service experience at GWU. *International Journal of Educational Management*, 21(5), 440-452. doi: 10.1108/09513540710760219

- Gores, S. E. (2008). Addressing nutritional issues in the college-aged client: Strategies for the nurse practitioner. *Journal of American Academy of Nurse Practitioners*, 20(1), 5-10.
- Graham, D. J., & Laska, M. N. (2011). Nutrition label use partially mediates the relationship between attitude toward healthy eating and overall dietary quality among college students. *J Am Diet Assoc*. doi: 10.1016/j.jada.2011.08.047
- Greaney, M. L., Less, F. D., White, A. A., Dayton, S. F., Riebe, D., Blissmer, B., . . . Greene, G. W. (2009). College students' barriers and enablers for healthful weight management: a qualitative study. *J Nutr Educ Behav*, 41(4), 281-286. doi: 10.1016/j.jneb.2008.04.354
- Gropper, S. S., Simmons, K. P., Connell, L. J., & Ulrich, P. V. (2012). Weight and body composition changes during the first three years of college. *Journal of Obesity*.
- Haberman, S., & Luffey, D. (1998). Weighing in college students' diet and exercise behaviors. *Journal of American College Health*, 46(4), 189.
- Hartwell, H., Edwards, J., & Brown, L. (2013). Relationship between emotions and food consumption in a FS college setting. *International Journal of Food Sciences and Nutrition*, 64(3), 261-268.
- Hiza, H., & Gerrior, S. (2002). Using the interactive healthy eating index to assess the quality of college students' diets. *Family Economics and Nutrition Review*, 14(1), 3-12.
- Horacek, T. M., & Betts, N. M. (1998a). College students' dietary intake and quality according to their Myers Briggs type indicator personality preferences. *Journal of Nutrition Education*, 30(6), 387-395. doi: 10.1016/s0022-3182(98)70361-9
- Horacek, T. M., & Betts, N. M. (1998b). Students cluster into 4 groups according to the factors influencing their dietary intake. *Journal of American Dietetic Association*, 98(12), 1464-1467.
- Hsieh, P. (2004). Factors influencing students decisions to choose healthy or unhealthy snack at the university of Newcastle, Australia. *Journal of Nursing Research*, 12(2), 83-90.
- Huang, T., Harris, K. J., Lee, R. C., Nazir, N., Born, W., & Kaur, H. (2003). Assessing overweight, obesity, diet, and physical activity in college students. *Journal of American College Health*, 52(2), 83-86.
- Huang, Y., Song, W., Schemmel, R., & Hoerr, S. (1994). What do college students eat. Food selection and meal pattern. *Nutrition Research*, 14(8), 1143-1153.

- Hurst, A. (1997). Emerging trends in college and university food service. *Journal of College & University Foodservice*, 3, 17-32.
- Joung, H., Kim, H., Choi, E., Kang, H., & Goh, B. (2011). University foodservice in South Korea: A study of comparison between university-operated restaurant and external foodservice contractors. *Journal of Foodservice Business Research*, 14(4), 405-413. doi: 10.1080/15378020.2011.624055
- Kapinos, K. A., & Yakusheva, O. (2011). Environmental influences on young adult weight gain: evidence from a natural experiment. *J Adolesc Health*, 48(1), 52-58. doi: 10.1016/j.jadohealth.2010.05.021
- Kim, H.-S., Lee, S.-M., & Yuan, J. J. (2012). Assessing college students' satisfaction with university foodservice. *Journal of Foodservice Business Research*, 15(1), 39-48. doi: 10.1080/15378020.2011.624048
- Kim, Y.-S., Moreo, P. J., & Yeh, R. J. M. (2005). Customers' satisfaction factors regarding university food court service. *Journal of Foodservice Business Research*, 7(4), 97-110. doi: 10.1300/J369v07n04_05
- Kwan, M., Faulkner, G., Arbour-Nicitopoulos, K., & Cairney, J. (2013) Prevalence of health-risk behaviours among Canadian post-secondary students: descriptive results from the National College Health Assessment. *BMC Public Health*, 13(548), 1-6.
- Kwon, S., Bednar, C. M., Kwon, J., & Bush, R. M. (2010). An investigation of college and university foodservice administrations' perceptions of food waste reduction activities and food waste disposal methods. *Journal of Foodservice Management & Education*, 4(1), 16-21.
- LaCaille, L. J., Dauner, K. N., Krambeer, R. J., & Pedersen, J. (2011). Psychosocial and environmental determinants of eating behaviors, physical activity, and weight change among college students. *Journal of American College Health*, 59(6), 531-538.
- Lee, S., Fowler, D., & Yuan, J. (2013). Characteristics of health foods. *Journal of Foodservice Business Research*, 16(2), 169-182.
- Lee, S., Hyeon-Cheol, K., & Gregoire, M. (2006). University students' perceptions of brand name foodservice. *Journal of Foodservice Management & Education*, 2(1), 1-10.

- Levitsky, D., Halbmaier, C., & Mrdjenovic, G. (2004) The freshman weight gain: A model for the study of the epidemic of obesity. *International Journal of Obesity and Related Metabolic Disorders*. 28(11), 1435-1442
- Marquis, M. (2006). Exploring convenience orientation as a food motivation for college student living in residence halls. *International Journal of Consumer Studies*, 29(1), 55-63.
- Merkle, E. (1998). *The relationship between meal plans and nutritional intake of college students*. (Masters of Science Masters Thesis), Ohio State University.
- Michels, K. B., Bloom, B. R., Riccardi, P., Rosner, B. A., & Willett, W. C. (2008). A Study of the importance of education and cost incentives on individual food choices at the Harvard School of Public Health cafeteria. *Journal of the American College of Nutrition*, 27(1), 6-11. doi: 10.1080/07315724.2008.10719669
- Nelson, M. C., Larson, N. I., Barr-Anderson, D., Neumark-Sztainer, D., & Story, M. (2009). Disparities in dietary intake, meal patterning, and home food environments among young adult nonstudents and 2- year 4-year college students. *American Journal of Public Health*, 99, 1216-1219.
- Nelson, M. C., & Story, M. (2009). Food environments in university dorms: 20,000 calories per dorm room and counting. *Am J Prev Med*, 36(6), 523-526. doi: 10.1016/j.amepre.2009.01.030
- Norvilitis, J. M., & Mao, Y. (2013). Attitudes towards credit and finances among college students in China and the United States. *Int J Psychol*, 48(3), 389-398. doi: 10.1080/00207594.2011.645486
- Oaten, M., & Cheng, K. (2005). Academic examination stress impaires self-control. *Journal of Social and Clinical Psychology*, 24(2), 254-279.
- Ogden, C., Carroll, M., Kit, B., & Flegal, K. (2012). *Prevalence of Obesity in the United States, 2009-2012*. (82). National Center for Health Statitistics
- Oliver, G., & Wardle, J. (1999). Percieved effects of stress of food choices. *Physiology & Behavior*, 66(3), 511-515.
- Park, O.-J., Lehto, X. Y., & Houston, C. R. (2013). Assessing competitive attributes of service quality in university foodservice. *Journal of Foodservice Business Research*, 16(3), 235-254. doi: 10.1080/15378020.2013.810526
- Peterson, S., Duncan, D. P., Null, D. B., Roth, S. L., & Gill, L. (2010). Positive changes in perceptions and selections of healthful foods by college students after a short-

- term point-of-selection intervention at a dining hall. *J Am Coll Health*, 58(5), 425-431. doi: 10.1080/07448480903540457
- Poddar, K. H., Hosig, K. W., Anderson-Bill, E. S., Nickols-Richardson, S. M., & Duncan, S. E. (2012). Dairy intake and related self-regulation improved in college students using online nutrition education. *J Acad Nutr Diet*, 112(12), 1976-1986. doi: 10.1016/j.jand.2012.07.026
- Porter, H. D. (2010). Consumption vs. access driven meal plans. Which is right for your campus. *Food Management*, 20.
- Qualtrics (2014). Qualtrics (version 57448 1.812s). Utah: Provo
- Racette, S. B., Deusinger, S. S., Strube, M. J., Highstein, G. R., & Deusinger, R. H. (2005). Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American College Health*, 53(6), 245-2581.
- Sakamaki, R., Toyama, K., Amamoto, R., Liu, C., & Shinfuku, N. (2005). Nutritional Knowledge, food habits and health attitude of Chinese university students. *Nutritional Journal*, 4(4). doi:10.1186/1475-2891-4-4
- Shimbo, S., Zhang, Z., Matsuda-Inoguchi, N., Higashikawa, K., Nakatsuka, H., Watanabe, T., & Ikeda, M. (2004). Effects of life away from home and physical exercise on nutrient intake and blood serum parameters among girl students in Japan. *Journal of Experimental Medicine*, 203, 275-286.
- Silliman, K., Rodas-Fortier, K., & Neyman, M. (2004). A survey of dietary and exercise habits and perceived barriers to following a healthy lifestyle in a college population. *Californian Journal of Health Promotion*, 2(2), 10-19.
- Small, M., Bailey-Davis, L., Morgan, N., & Maggs, J. (2013). Changes in eating and physical activity behaviors across seven semesters of college: living on or off campus matters. *Health Educ Behav*, 40(4), 435-441. doi: 10.1177/1090198112467801
- Snyder, T. D., & Dillow, S. A. (2012). Digest of education statistics 2012 (NCES 2014-015). *National Center for Education Statistics, U.S Department of Education*.
- Spanos, D., & Hankey, C. R. (2010). The habitual meal and snacking patterns of university students in two countries and their use of vending machines. *J Hum Nutr Diet*, 23(1), 102-107. doi: 10.1111/j.1365-277X.2009.01005.x
- Sparling, P. B. (2007). Obesity on campus. *Prevention Chronic Disease*, 4(3), 1-4.

- Timken, K. (2012). *Perceptions and satisfaction of healthy food choices among college-aged females in a self-serve dining facility setting*. (Masters of Science Masters Thesis), Southern Illinois University Carbondale.
- U.S Department of Education. (2012). *Digest of Education Statistics*.
- Wadhera, D., & Capaldi, E. D. (2012). Categorization of foods as "snack" and "meal" by college students. *Appetite*, 58(3), 882-888. doi: 10.1016/j.appet.2012.02.006
- Wansink, B. (2004). Environmental factors that increase the food intake and consumption volume of unknowing consumers. *Annual Review of Nutrition*, 24, 455-479.
- Wansink, B., Cao, Y., Saini, P., Shimizu, M., & Just, D. R. (2013). College cafeteria snack food purchases become less healthy with each passing week of the semester. *Public Health Nutr*, 16(7), 1291-1295. doi: 10.1017/S136898001200328X
- Waterhouse, J., Bailey, L., Tomlinson, F., Edwards, B., Atkinson, G., & Reilly, T. (2005). Food intake in healthy young adults: effects of time pressure and social factors. *Chronobiol Int*, 22(6), 1069-1092. doi: 10.1080/07420520500398023
- Weichun, L. (2013). Design of campus smart card system. *International Symposium on Computer, Communication, Control and Automation*, 4083-4086.
- Zabriskie, M., & Blackburn, R. (2006). Designing purposeful educational interventions and assessments in collegiate dining environments; the great plate program. *Journal of Foodservice Management & Education*, 2(1), 1-11.
- Zheng, J., Sun, G., & Hou, X. (2011). Campus card; strengthen the informatization of financial management in colleges and universities. *Information computing and applications internation conference*, 244(Part II), 606-613.

APPENDIX A

A-1: Institutional Review Board Materials

A-2: CITI Certificate of Completion

A-1: Institutional Review Board Materials



Office of Research Integrity
Institutional Review Board (IRB)
2000 University Avenue
Muncie, IN 47306-0155
Phone: 765-285-5070

DATE: February 4, 2014
TO: Emily Wilson
FROM: Ball State University IRB
RE: IRB protocol # 564896-1
TITLE: The Influence of Regulated Meal Plan Systems on Student Food Purchasing and Dining Behaviors
SUBMISSION TYPE: New Project

ACTION: APPROVED
DECISION DATE: February 4, 2014
REVIEW TYPE: EXEMPT

The Institutional Review Board reviewed your protocol on February 4, 2014 and has determined the procedures you have proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol, and you are cleared to proceed with the procedures outlined in your protocol. As an exempt study, there is no requirement for continuing review. Your protocol will remain on file with the IRB as a matter of record.

Exempt Categories:

	Category 1: Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
X	Category 2: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior
	Category 3: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under category 2, if: (i) the human subjects are elected or appointed officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
	Category 4: Research involving the collection of study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or

	if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.
	Category 5: Research and demonstration projects which are conducted by or subject to the approval of Department or agency heads, and which are designed to study, evaluate or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in methods or levels of payment for benefits or services under these programs.
	Category 6: Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed which contains a food ingredient at or below the level and for a use found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

Editorial Notes:

1. Approved- Exempt

While your project does not require continuing review, it is the responsibility of the P.I. (and, if applicable, faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. **Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project.** Please contact (ORI Staff) if you are unsure whether your proposed modification requires review or have any questions. Proposed modifications should be addressed in writing and submitted electronically to the IRB (<http://www.bsu.edu/irb>) for review. Please reference the above IRB protocol number in any communication to the IRB regarding this project.

Reminder: Even though your study is exempt from the relevant federal regulations of the Common Rule (45 CFR 46, subpart A), you and your research team are not exempt from ethical research practices and should therefore employ all protections for your participants and their data which are appropriate to your project.



Bryan Byers, PhD/Chair
Institutional Review Board



Christopher Mangelli, JD, MS, MEd, CIP/Director
Office of Research Integrity

Appendix A – CITI Certificate of Completion

CITI Collaborative Institutional Training Initiative

Social & Behavioral Research - Basic/Refresher Curriculum Completion Report Printed on 3/11/2013

Learner: Emily Wilson (username: eawilson89)

Institution: Ball State University

Contact Information

Department: Family and Consumer Science

Email: eawilson89@gmail.com

Social & Behavioral Research - Basic/Refresher: Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

Stage 1. Basic Course Passed on 03/06/13 (Ref # 9572687)

Required Modules	Date Completed	Score
Belmont Report and CITI Course Introduction	01/24/13	3/3 (100%)
Students in Research	01/24/13	10/10 (100%)
History and Ethical Principles - SBR	01/24/13	5/5 (100%)
Defining Research with Human Subjects - SBR	03/06/13	5/5 (100%)
The Regulations and The Social and Behavioral Sciences - SBR	03/06/13	5/5 (100%)
Assessing Risk in Social and Behavioral Sciences - SBR	03/06/13	5/5 (100%)
Informed Consent - SBR	03/06/13	5/5 (100%)
Privacy and Confidentiality - SBR	03/06/13	5/5 (100%)
Research with Prisoners - SBR	03/06/13	4/4 (100%)
Research with Children - SBR	03/06/13	4/4 (100%)
Research in Public Elementary and Secondary Schools - SBR	03/06/13	4/4 (100%)
International Research - SBR	03/06/13	3/3 (100%)

Internet Research - SBR	03/06/13	5/5 (100%)
Research and HIPAA Privacy Protections	03/06/13	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees	03/06/13	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects	03/06/13	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research	03/06/13	3/3 (100%)
Ball State University	03/06/13	no quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Course Coordinator

[Return](#)

APPENDIX B

MEAL PLAN SURVEY INSTRUMENTS

APPENDIX B: Meal Plan Survey

Meal Plan Influence

Study Purpose and Rationale

The purpose of this study is to examine the impact of regulated meal plans on the food selection patterns of college students. The study will examine the attitudes and behaviors towards food purchases and meal patterns of students who participate in a regulated meal plan system. Findings from this study may be beneficial in understanding the impact of regulations on food choice and ways to improve student satisfaction in college food services.

Inclusion/Exclusion Criteria

To be eligible to participate in this study, you must be 18 years of age or older, enrolled at Ball State University and have purchased and used a school meal plan.

Participation Procedures and Duration

For participation in this study, you will be asked to complete a survey containing questions about your buying and eating patterns. The survey consists of multiple-choice and fill-in-the-blank questions and should take approximately 15 minutes to complete.

Data Confidentiality

All data will be collected anonymously. You will not be asked to provide any identifiable information. Email addresses entered for the prize drawing will be kept separate from the survey and cannot be linked back to the participant.

Risks or Discomforts

There are no anticipated risks or discomforts associated with taking this survey. You are not required to answer all of the questions and may choose not to answer any question that makes you feel uncomfortable. You may also quit the study at any time.

Prize Drawing

Upon completing the survey you will have the option to participate in a prize drawing. Emails collected to be entered for the drawing will not be linked with the survey and will be kept separately from survey responses. The prize includes being entered into random drawings each week (5 weeks) worth \$20.

IRB Contact Information

For questions about your rights as a research subject, please contact the Director, Office of Research Compliance, Ball State University, Muncie, IN 47306, (765) 285-5070, irb@bsu.edu.

By selecting the "I agree" button you acknowledge that you have read the information above and agree to participate in the survey by giving your informed consent. If you do

not wish to participate in the survey and do not give your informed consent please select the "I do not agree" button

I agree

I do not agree

Q1 Are you 18 years old or older?

Yes

No

Q2 Do you have a Ball State Meal Plan?

Yes

No

Q3 Who pays for your meal plan (not tuition)?

Parent or guardian

Parents/guardian and self

Self (including loans)

Scholarship

Combination of parents/guardian, self (including loans) and scholarship

Other

Q4 Please select the gender you identify with.

Male

Female

Other

Prefer not to disclose

Q5 What race/ethnicity do you most identify with?

African-American

Asian

Chinese

European-Caucasian decent

Hispanic

Native American

Middle Eastern

Other

Prefer not to disclose

Q6 Please select your academic standing.

Freshman

Sophomore

Junior

Senior

Graduate Student

Q7 Please select your living arrangement.

- On-campus, in residence halls
- On-campus, in apartment
- Off-campus, in fraternity or sorority house
- Off-campus, other

Q7a Please select the residence hall building you live in.

- DeHority Complex
- Elliott Hall
- Johnson Complex
- Kinghorn Hall
- LaFollette Complex
- Noyer Complex
- Park Hall
- Studebaker East
- Studebaker West
- Woodworth Complex

Q7b Please select the apartment complex you live in.

- Anthony Apartments
- Scheidler Apartments

Q8 Do you have any special dietary requirements?

- None
- Completely vegetarian
- Partially vegetarian
- Allergic to certain foods
- Avoid certain foods for religious or cultural reasons
- Avoid certain foods for medical reasons
- Other _____

Q9 Please indicate the meal plan you currently purchase.

- 10 meals per week
- 14 meals per week
- 18 meals per week
- 21 meals per week
- Commuter 25 meal block
- Commuter 50 meal block
- Commuter 75 meal block
- Commuter 100 meal block
- Commuter "Any 5 Meals"

Q9a Have you ever purposefully skipped or missed purchasing a meal because you lacked enough meals?

- Never
- Rarely
- Sometimes
- Most of the Time
- Always
- Unsure

Q10 How frequently do you eat at the following locations during the school week?

	Never	1-5 times a week	6-10 times a week	11-15 times a week	More than 15 times a week
The Atrium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bookmark Café	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elliott Dining	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jamba Juice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Out of Bounds (LaFollette Square)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Courtside (LaFollette Square)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Micro Café (Studebaker West)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Noyer Centre Food Mall/Market place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quiznos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Center Tally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tom John Food Shop (Kinghorn Hall)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Woodworth Commons	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Retreat (Noyer Centre)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
America's Buffet (LaFollette Square)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q11 How often do you purchase food off campus during the school week that is not paid for with your meal plan (ordering pizza, take out)?

- Never
- Less than Once a Month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- Daily

Q12 How often do you consider the price of a food or drink when selecting what to eat?

- Never
- Rarely
- Sometimes
- Most of the Time
- Always

Q13 Have you ever run out of Dining Plus before the semester was over?

- Yes
- No
- Unsure

Q14 How concerned are you with meeting the set dollar amounts for your meals?

Breakfast = \$4.45 Lunch = \$7.85 Dinner = \$7.85

- Never
- Rarely
- Sometimes
- Often
- All of the time
- I do not know

Q14a Does your concern of meeting the set dollar amount for your meals influence your purchasing and eating choices?

- Never
- Rarely
- Sometimes
- Often
- All of the time
- I do not know

Q15 How often do you spend **over** the dollar amount for each meal?

	Never	Rarely	Sometimes	Most of the time	Always	I do not eat this meal	I do not know
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Breakfast (\$4.45)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lunch (\$7.85)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dinner (\$7.85)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q16 When you are over the dollar amount for a meal what do you do?

- ☐ I purchase the food and use dining plus to cover extra charges
- ☐ I purchase the food and use other methods to pay for the extra charges
- ☐ I return the food to meet the maximum allowable amount
- ☐ I do not worry about being over the dollar amount
- ☐ I do not know

Q17 How often do you spend **under** the dollar amount for each meal?

	Never	Rarely	Sometimes	Most of the time	Always	I do not eat this meal	I do not know
Breakfast (\$4.45)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lunch (\$7.85)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dinner (\$7.85)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q18 When you spend under the allowed dollar amount for a particular meal what do you do? (Select all that apply.)

- ☐ I do not worry about spending the full dollar amount
- ☐ I go ahead and pay for my food, but I am unhappy to waste money
- ☐ I purchase more items to reach the full amount
- ☐ I purchase more items if I have the time
- ☐ I purchase more items only if the line behind me is not long
- ☐ Other

Q19 Money that is not spent for each meal is forfeited back to Ball State. Does this concern you?

- Very concerned
- Somewhat concerned
- Neutral
- Somewhat unconcerned
- Unconcerned

Q19a The concerns I have about the money forfeited back to Ball State make me feel?
(Select all that apply)

- Angry
- Treated unfairly
- Nervous
- Discouraged
- Frustrated
- Uninterested
- Empowerment
- Optimistic
- Happy
- Other _____

Q20 When you have not met your dollar amount for a meal, how often do you purposefully purchase extra food with your meals to take back to your room/apartment/house?

- Never
- Rarely
- Sometimes
- Often
- All of the time
- Unsure

Q20a Please select the common foods that you purchase to take back with you.

- Chips, popcorn, other salty snack
- Drinks (soft drinks, juice, water)
- Candy
- Cookies
- Snack size cakes
- Frozen foods
- Fruit
- Prepared meals (canned or boxed)
- Prepared fresh meals (cold or hot)
- Granola bars
- Cereal
- Other _____

Q20b What do you do with the extra food you have purchased to meet the dollar amount for meals?

	Very unlikely	Unlikely	Neutral	Likely	Very likely
Eat the food with my meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat the food as a snack	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Store the food in my room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use for another meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Give to friend or donate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End up throwing the food away	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q21 Would the way you eat and purchase food change if there were no set dollar amount on each meal of the meal plan?

- Yes
- Maybe
- No
- Unsure

Q22 Would the way you eat and purchase food change if there were no time limits during the breakfast, lunch, or dinner meal periods?

- Yes
- Maybe
- No
- Unsure

Q23 Does the way the meal plan is structured (set time and dollars allowed per meal) help you meet your dietary goals?

- Yes
- Maybe
- No
- Unsure

Q24 How would the way you eat change if there were no money or time limits on the meal plans?

Eat more food at each meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat less food at each meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat more frequently than I do now	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat less frequently than I do now	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat different foods than I do now	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat breakfast at a different time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat more fruits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat more vegetables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat more snacks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat fewer snacks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The way I eat wouldn't change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q25 If you could change the current Ball State meal plans, what areas would you change (Select all that apply)

- Change the time allowed for each meal
- Change the dollar amount for each meal
- Change the meals allowed per day
- Change the meals allowed per week
- I would not change the meal plan system
- Other _____

Q26 Thinking about your food purchases, how influential are the following factors?

Hunger	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Craving certain foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price of food item	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nutrition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
What/where friends are eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dining environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q27 When you are buying food for breakfast, lunch or dinner do you think about trying to meet the dollar amount for each meal?

- Never
- Rarely
- Sometimes
- Most of the time
- Always
- Unsure

Q28 What factors do you consider when purchasing extra food items to reach your dollar limit? (Select all that apply)

- Non-perishable items
- Items good for a meal
- Items good for a snack
- Fresh items (fresh fruit, vegetables)
- Frozen items
- Prepared items (prepared sandwiches, salads and meals)
- Beverages
- Taste
- Nutrition
- Other _____

Q29 Have you ever run out of the number of meals allowed by your plan before the week was over?

- Yes
- No
- Unsure

Q29a If you have run out of meals on your meal plan before the week was over, how did you purchase the rest of your meals and/or food? (Select all that apply)

- I have never run out of meals
- Purchased meals with Dining Plus
- Purchased meals with cash or debt/credit card
- Purchased meals with Cardinal Cash
- Ate off campus
- Ate food that I had stored in my room, apartment or house
- I did not eat more meals
- Acquired food through others
- Went hungry
- Other_____

Q30 Have you ever skipped or missed a meal because of the time periods for each meal?

- Never
- Rarely
- Sometimes
- Most of the time
- Always
- Unsure

Q31 How would the way you purchase food change if there were no money or time limits on the meal plan (Select all that apply)

- It would not change
- I would purchase different foods than I do now
- I would purchase more food at each meal
- I would purchase less food at each meal
- I would purchase food more frequently than I do now
- I would buy foods at different times than I do now
- Other _____

Q32 How often do you use up ALL of your meals allowed for a week?

- Never
- Rarely
- Sometimes
- Most of the time
- Always
- Unsure

Q33 The meal plans have designated times for breakfast, lunch and dinner when food can be purchased. Have you ever skipped or missed a meal because you missed the purchasing time period? Breakfast = 6:45 a.m. - 10:29 a.m. Lunch = 10:30 a.m. - 4:29 p.m. Dinner = 4:30 p.m. - Midnight

- Never
- Rarely
- Sometimes
- Most of the time
- Always
- Unsure

Q34 How often do you change the time you would normally or prefer to eat breakfast because of the set times of the meal plan? Breakfast = 6.45 a.m. - 10:29 a.m.

- Never
- Rarely
- Sometimes
- Most of the time
- Always
- Unsure

Q35 What influence do the following factors have on the time you choose to eat breakfast, lunch or dinner?

Being able to eat with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Class schedule	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meal plan set times	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Studying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q36 When nutritional information is available for a food or drink, how often do you consider this information when selecting an item?

- Never
- Rarely
- Sometimes
- Most of the time
- Always
- Unsure

Q37 How much do you agree with the following statements?

The meal plan allows enough money for each meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the time zones allowed for each meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the number of meals allowed per week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q38 If you could choose how to pay for your food and meals, which payment method would you prefer?

I like the current plan

Flat fee per semester, where each item is deducted from the total regardless of time period

One price per day, eat when I want

Flat fee per semester, even if it cost more, but have unlimited access to food

I do not think about cost

Q39 There are many different food choice options on campus, do you think the availability of choices can support a healthy diet?

Yes
Maybe
No
Unsure

Q40 What are the barriers to eating a healthy diet on campus? Select all that apply.

Price
Food choice
Time restrictions
There are no barriers
I do think about eating a healthy diet
Other_____

Q41 Please rate your current dietary pattern

Very healthy
Moderately healthy
Neutral
Moderately unhealthy
Very unhealthy

Q42 Do you think the Ball State University meal program supports a healthy dietary pattern?

Yes
Maybe
No
Unsure

APPENDIX C

LETTER OF CONSENT

Appendix C – Letter of Informed Consent

Study Purpose and Rationale

The purpose of this study is to examine the impact of regulated meal plans on the food selection patterns of college students. The study will examine the attitudes and behaviors towards food purchases and meal patterns of students who participate in a regulated meal plan system. Findings from this study may be beneficial in understanding the impact of regulations on food choice and ways to improve student satisfaction in college food services.

Inclusion/Exclusion Criteria

To be eligible to participate in this study, you must be 18 years of age or older, enrolled at Ball State University and have purchased and used a school meal plan.

Participation Procedures and Duration

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Risks or Discomforts

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Prize Drawing

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IRB Contact Information

For questions about your rights as a research subject, please contact the Director, Office of Research Compliance, Ball State University, Muncie, IN 47306, (765) 285-5070, irb@bsu.edu.

By selecting the "I agree" button you acknowledge that you have read the information above and agree to participate in the survey by giving your informed consent. If you do

not wish to participate in the survey and do not give your informed consent please select the "I do not agree" button

I agree

I do not agree

Researcher Contact Information

Principal Investigator:

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APPENDIX D
STUDY RECRUITMENT LETTERS

D-1: Letters to Resident Hall Assistant

D-2: Letter to Students

APPENDIX D-1: Letters to Resident Hall Assistant

Subject line: Meal Plan Survey

Dear Resident Hall Assistants:

Hello, my name is Emily Wilson and I am a dietetics graduate student here at Ball State University. As part of my thesis to complete my degree, I am studying how the meal plan here at Ball State University influences food selection and purchases.

For the study I am asking all students who have a meal plan to please take the following survey. I would appreciate your help in encouraging your residents to take the survey by passing along the link to the survey and mentioning it in your meetings. The survey should take approximately 15 minutes to complete. The survey may be accessed by clicking on the link below:

[\[Click here\]](#)

Or you can cut and paste the following link into a web browser:

[\[Full link here\]](#)

Participation in the survey is completely voluntary. Please be assured that answers are confidential and anonymous. No individual's answers will ever be identified in any report. Should you have any questions about the project or our interest in using the results, I encourage you to contact me for answers.

Upon completing the survey students will be given the option to enter into a prize drawing worth \$20 dining coupons once a week for five weeks. Email addresses collected for the drawing will be separate from the survey and cannot be linked back to any individual survey.

Thank you for your help!

Sincerely,

Emily Wilson
Dietetic Graduate Student
Ball State University
eawilson@bsu.edu

D-2: Letter to Students

Subject line: Meal Plan Survey

Dear Student:

Hello, my name is Emily Wilson and I am a dietetics graduate student here at Ball State University. As part of my thesis to complete my degree, I am studying how the meal plan here at Ball State University influences food selection and purchases.

For the study I am asking all students who have a meal plan to please take the following survey. The survey should take approximately 15 minutes to complete. You may access the survey by clicking on the link below:

[\[Click here\]](#)

Or you can cut and paste the following link into your web browser:

[\[Full link here\]](#)

Your participation in the survey is completely voluntary. Please be assured that your answers are confidential and anonymous. Your answers will never be identified, not will dining services have access to individual student answers. Should you have any questions about the project, I encourage you to contact me at eawilson89@gmail.com. Results will be aggregated and shared through publications.

Upon completing the survey you will be given the option to enter into a prize drawing, which is worth \$20 in dining coupons. Email addresses collected for the drawing will be separate from the survey and cannot be linked back to any individual survey.

Thank you for your participation!

Sincerely,

Emily Wilson
Dietetic Graduate Student
Ball State University
eawilson@bsu.edu