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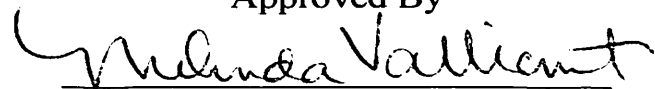
AN ASSESSMENT OF SORORITY MEMBERS' MEAL CONSUMPTION
PATTERNS

by
Blair Harris

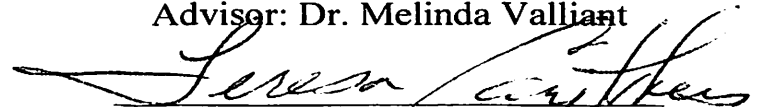
A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of The Sally McDonnell Barksdale Honors College.

Oxford
May 2010


Approved By



Advisor: Dr. Melinda Valliant



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ACKNOWLEDGEMENTS

I would like to express my deepest appreciation to my thesis advisor, Dr. Melinda Valliant, for her guidance and persistent help throughout the writing of this thesis. Without her help, this thesis would not have been possible.

I would like to thank the Sally McDonnell Barksdale Honors College and the Department of Nutrition and Hospitality Management for their continued support and for funding my Nutrient Data System for Research training and certification through The University of Minnesota's Nutrition Coordinating Center.

I am grateful Dr. Teresa Carithers and Dean Linda Chitwood for serving as readers on my committee. I would also like to thank Dr. Yunhee Chang for her assistance in the statistical analysis of my data.

I owe my deepest gratitude to my loving parents and fiancé who have offered continuous loving support and encouragement during the completion of this thesis.

ABSTRACT
BLAIR HARRIS: AN ASSESSMENT OF SORORITY MEMBERS' MEAL
CONSUMPTION PATTERNS

College women are at increased risk of developing poor eating habits and disorders due to a higher frequency of dieting and obesity; therefore, due to the large number of women who are active in college sororities, these subgroups warrant significant attention concerning their nutritional knowledge and behaviors. Research points to a need to study sorority women's eating patterns and diets in relationship to MyPyramid national recommendations for daily food consumption.

The purpose of this study was to determine sorority members' frequency of meal consumption versus meals offered at University of Mississippi sorority houses and to identify resulting health outcomes in sorority members compared to their frequency of meal consumption at their sorority houses. Another objective of the study was to identify the main barrier to meal consumption at sorority houses as reported by sorority members.

A 24-hour dietary recall and questionnaire about eating behaviors and meal patterns associated with membership in a sorority was given to 72 University of Mississippi Panhellenic Sorority Women ages 18-22 at the time of participation. Next, subjects were weighed and their heights recorded. Using Nutrient Data System for Research software, number of servings of fruits, vegetables, grains, protein, dairy, and fat intake were recorded for each subject.

The majority of sorority members studied reported eating six or more meals at their sorority house during the week. Most subjects did not believe their nutritional needs were met through the meals provided at their sorority houses; however, the most frequently reported barrier to meals consumption was "I do not like what is being served

at that meal.” Regardless of members’ food preferences and other barriers to consumption, subjects who reported consuming six or more meals during the week did not eat a balanced diet according to the Food Guide Pyramid. Subjects who reported consuming six or more meals per week at their sorority house reported inadequate consumption of fruit, dairy, protein, and fats; however, subjects who consumed fewer than six meals per week at their sorority house reported lower consumption of all food groups analyzed. No statistically significant differences in intake were found between subjects who ate six or more meals per week and those who ate less than six meals per week at their sorority houses. Sorority members who reported consumption of six or more meals had higher levels of intake and a lower mean Body Mass Index than those who reported consuming fewer than six meals per week at their sorority houses.

The meals served at the sorority houses may not be completely balanced; however, they are likely better than the alternatives. Additional research is needed to determine whether or not sorority houses are offering all components of balanced meals according to MyPyramid Guidelines. It is possible that balanced meals are offered, yet sorority members do not choose to consume each component. Such information may aid in determining the prevalence of the barrier of health-related issues to sorority meal consumption.

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CHAPTER I

INTRODUCTION

College is a period of one's life in which numerous changes occur. For many young adults, college is their first time to live away from home or to make their own decisions. Many of the dietary habits formed during a student's college years are continued for the rest of his or her life. Among the choices students must make on a daily basis are the decisions about what, where, what time, and with whom they will eat. Many college students report encountering barriers to healthy food consumption due to inconvenience, too little time, and lack of knowledge about healthy options (Haberman, 1998).

College women are at increased risk of developing poor eating habits and disorders due to a higher frequency of dieting and obesity observed in this subgroup (Koszewski, 1996). Due to the large number of women who are active in them, college sororities are subgroups that warrant significant attention concerning their nutritional knowledge and eating behaviors (Schulken, 1997). Research reveals that some sorority women feel pressure to conform to a certain body shape or size in order to be accepted by other members of their organization; therefore, many questions have arisen regarding whether or not sorority women are more likely to develop disordered eating patterns or weight management issues upon joining a sorority (Allison, 2004). On a larger scale,

research points to a need to study sorority women's eating patterns and diets in relationship to USDA's national recommendations for daily food consumption.

The purpose of this study is to determine sorority members' frequency of meal consumption versus meals offered at University of Mississippi sorority houses and to identify resulting health outcomes in sorority members compared to their frequency of meal consumption at their sorority houses. Another objective of the study is to identify the main barrier to meal consumption at sorority houses as reported by sorority members.

Hypothesis

The following hypotheses were tested:

H₁: The majority of sorority members eat less than 6 out of 14 meals offered at their sorority house during the week (Monday-Friday).

H₂: Sorority members report the perceived healthfulness of meals served to be the largest barrier to meal consumption at their sorority houses.

H₃: Sorority members who consume 6 or more meals during the week (Monday-Friday) do not eat a balanced diet according to the Food Guide Pyramid.

H₄: Sorority members who consume 6 or more meals during the week (Monday-Friday) at their sorority houses have a higher Body Mass Index than those who consume less than 6 meals per week at their sorority house (Monday-Friday).

Limitations

A specific procedure was followed to ensure the accuracy and reliability of the data; however, this study had some limitations. Subjects consisted of a convenience sample of volunteers from each of the nine sororities. Although attempts were made to

recruit an equal number of subjects from each sorority, some sororities may be underrepresented in this investigation.

Subjects were required to complete a twenty-four hour dietary recall on the day after they had an opportunity to eat at their sorority house. With only one day's consumption reported, some records may not be a true representation of the subject's usual diet. Twenty-four hour diet recalls also rely on the subject's self-reported food and beverage intake; as a result, some subjects may have over- or underestimated food and beverage consumption during the previous day. Since few of the subjects prepared their own meals, they did not know the specific ingredients in each item consumed at their sorority house and elsewhere.

In addition to the twenty-four hour dietary recall, subjects completed the "Questionnaire of Eating Behaviors," however, this questionnaire was not validated. In future studies, the use of a validated questionnaire may result in more exact information and statistics.

CHAPTER II

REVIEW OF LITERATURE

The following discussion includes evidence in the literature related to trends, influences, and possible explanations in college students' weight management and eating behaviors. It also includes a discussion of dieting practices, body dissatisfaction, and disordered eating among college students. Finally, Greek sororities are introduced as organizations whose members include a population warranting further research.

Trends in College Students' Weight Management and Eating Behaviors

The College Transition

College is a time of transition for young adults; the groups in which students become involved have the potential to shape their thoughts and actions throughout the rest of their lives (Schulken, 1997). It is also a period during which students sometime feel less confident in themselves and more anxious about their futures (Cilliers, 2005). Students' thoughts may change in significant areas such as politics, philosophy, or religion, and they also may be altered in the areas of body image and weight control (Schulken, 1997). Despite the other changes in students' lives, college is not always a period in which students develop unhealthy or disordered eating habits; instead, it can be

a time of development of a positive body image and a greater knowledge about healthy eating (Martz, Graves, & Sturgis, 1997).

College Student Eating Behaviors and Patterns

When young adults come to college, they acquire a new level of freedom and control over their lifestyles (Dinger, 1999; Cilliers, 2006). With this new level of independence also comes a change in the young adult's food environment. The effects of a lack of parental control on diet, a greater variety of available foods, and an increased emphasis on social events can eventually lead to weight changes in college students (Pliner, 2008).

A student's diet and exercise habits during his or her college years have the potential to form a foundation to be carried into the rest of his or her life (Racette, 2008; Haberman, 1998). The new lifestyle formed during this portion of one's life can help or hurt America's chances of reaching the goals specified in *Healthy People 2010* and *Healthy Campus 2010*; in fact, Americans between ages 18 and 29 have shown the greatest average weight gain in recent years (Racette, 2008). Some harmful dietary practices of college students include the avoidance of certain foods coupled with excessive dieting, unhealthy snacking, and meal skipping (Harless, 1996). Consequently, the nation's BMI goals are moving further away from the national goal of decreasing the national average BMI (Racette, 2008).

Diet Quality

Despite an array of available food choices, college students' diets often lack variety; many students eat the same foods daily (Haberman, 1998). The Healthy Eating

Index is a useful tool for analyzing the quality of one's diet (Bowman, 1998; Hiza, 2002). It provides insight into the variety of foods included in people's diet in relation to their level of compliance with The Dietary Guidelines for Americans and other federal guidelines. The more knowledge health officials have about Americans' diets, the greater ability they will have in helping to improve them in the areas in which they are lacking. According to the results of a study assessing college students' diets using the Interactive Healthy Eating Index, students generally met the recommended number of servings of grains each day; however, females did not consume enough fruits, vegetables, dairy products, and meats. The same study found that depending on one's major, science or nonscience, he or she could be more or less likely to meet the appropriate dietary recommendations. Healthy Eating Index scores were higher for females in the categories of variety, total and saturated fats, cholesterol, and fruits. Younger students had a tendency to score higher for each food group (Hiza, 2002). Another study reported students' diets to be too high in sodium and cholesterol (Haberman, 1998).

National dietary recommendations have become increasingly important for influencing the types of foods people consume. For example, a person should increase his or her complex carbohydrate and fiber intake while reducing fat and cholesterol consumption (Hiza, 2002). Results from the Survey of Selected Nutritional Health Practices of College Students suggested that females were more likely to control their fat consumption by staying away from fried and high-fat foods (Haberman, 1998).

Meal Patterns

Little is known about college students' adherence to current dietary guidelines or the reasoning behind various eating patterns of college students (Kolodinsky, 2007).

According to the College Health Risk Behavior Survey and the National College Health Assessment, many college students are not meeting their dietary and physical needs suggested by health professionals from their freshman to senior years of college. Throughout their college careers, less than one third of the college students studied reported consuming the recommended amounts of fruits and vegetables (Racette, 2008).

Restricting one's intake of certain foods or food groups can lead to nutrient deficiencies as well as energy deficits; however, it is important for students to learn how to choose nutrient rich foods without high fat content (Hiza, 2002). In a study of first and second year college students living on campus, subjects consumed less fruits, vegetables, whole grains, and fiber than the recommended amount. Throughout this study, students attempted to incorporate more of these food groups into their diets; however, they often failed to monitor their intakes of energy and fat. Their snacks consisted of chips, crackers, and sweets that could be easily stored in a dorm room; students did not regularly purchase fresh fruits or vegetables due to their short shelf life. Many students in this study also skipped breakfast or ate on-the-run (Strong, 2008).

The results of another study consisting of 116 college women showed that those who did not regularly skip breakfast were more likely to be healthy and physically active. They also consumed less fatty, energy dense foods such as doughnuts, pizza, and french fries. Those who consumed high fat diets also drank less water and more juice and sodas; additionally, they had higher Body Mass Indexes and worse overall health statuses (Clement, 2004).

College Students and Weight Gain

Of two hundred college students participating in a study at a private St. Louis, Missouri university from their freshman to senior years of college, 23% more students were overweight or obese by the time they graduated (Racette, 2008). In order to understand this phenomenon, it is important to look at eating patterns and weight control measures before, during, and after students' freshman year of college (Delinsky, 2008). Numerous studies have concluded that a college student's freshman year may result in considerable weight gain; however, not all students are equally likely to gain weight (Delinsky, 2008; Pliner, 2008).

"The Freshman 15" is a term used to describe the anticipated 15 pound weight gain during a student's first year of college. The first year of college is a time when students are at high risk for weight gain due to changes in their environment and other lifestyle factors (Lowe, 2006; Pliner, 2008). Anxiousness about the "Freshman 15" may lead freshmen women to be excessively concerned with their food intake in order to maintain their shape, weight, and level of self esteem (Delinsky, 2008). This preoccupation with food coupled with the increased control over one's own caloric intake may place students at a higher risk for weight gain (Lowe, 2006).

Though weight gain during one's freshman year of college is common; the average weight gain is three pounds rather than fifteen (Delinsky, 2008). Although the average weight gain is significantly lower than fifteen pounds, any amount of weight gain may lead to an increased possibility of obesity, higher BMI, and elevated body fat percentage (Lowe, 2006).

Restricted food intake can lead to disordered or binge eating episodes; therefore, one factor contributing to weight gain may be dietary restriction (Delinsky, 2008). One study determined food-restricting adolescents to be more likely to gain weight over time than those adolescents who did not restrict (Field, 2003). In a study of female college freshmen, subjects' level of dietary restraint was compared to their respective weight gain or loss. Compared to subjects who gained weight, this study concluded that students who lost weight revealed higher levels of dietary restraint (Delinsky, 2008). An increase in freshman females' scores on the Eating Disorder Examination-Questionnaire Restraint and Shape Concern subscales indicate a higher risk for disordered eating (Delinsky, 2008).

Another factor leading to freshman weight gain may be a decrease in physical activity among students combined with higher levels of consumption of high fat foods and alcoholic beverages (Anderson, 2003). College students often find themselves sitting in front of a computer or studying rather than participating in physical activities (Strong, 2008).

Meal Plans

College eateries often offer "all-you can eat" dining; such settings have the potential to encourage unhealthy food choices and overeating due to larger portion sizes, increased variety, and continuous availability of food. In contrast, when college eateries sell items "a la carte," students typically purchase less food due to financial and other factors; however, this style does not always facilitate a balanced diet (Pliner, 2008). "A la carte" style dining is often set up with various food stations in which long lines make it

time consuming for a student to get a variety of foods (Strong, 2008). College students often have little or no cooking experience, leading them to resort to fast food or processed food items instead of eating at home (Haberman, 1998). On-campus dining facilities and other foods prepared in environments away from home often serve foods that are lower in nutrients and higher in fat and energy than those prepared at home (Kolodinsky, 2007).

Increased availability of healthy foods such as fruits, vegetables, and low fat items has been shown to increase students' consumption of said foods; such foods should also be easily identifiable in university food service areas to encourage healthful eating (Pliner, 2008). Some students believe they would be less likely to purchase unwholesome foods if they were made less convenient (Strong, 2008). One study suggests that meal plans and grocery lists may help students to choose less energy dense foods. Researchers note that students may under or overeat for extended periods if they do not know the amount of energy they are consuming versus the amount their body requires (Pliner, 2008). If patterns of over-consumption develop, weight gain may result.

Lack of Nutrition Knowledge: A Possible Explanation for College Students' Eating and Weight Management Issues

A base of nutrition knowledge is a valuable tool during the formation of one's eating behaviors and weight management practices. Kolodinsky reports that those with greater knowledge of the dietary guidelines make healthier food choices, and those who had a greater understanding of food and nutrition ate the appropriate number of servings of fruit and dairy. Those who are familiar with nutrition and the variety of components in a balanced diet may also have more effective weight management skills and strategies

(Cilliers, 2006). In contrast, a prior study by Frazao (1999) revealed some Americans have appropriate nutrition knowledge; however, they continue to eat unhealthy foods.

Without a base of knowledge about nutrition and eating, it is difficult for anyone to follow a balanced and nutritious diet (Hiza, 2002). The lack of variety in some students' diets may be due to a lack of knowledge about healthy foods; for instance, many young adults have misconceptions leading them to believe they should only consume "diet or low calorie" foods in order to maintain their weight (Haberman, 1998). Moderation and balance are key points of emphasis in teaching people how to choose which foods to eat. It is recommended that women ages 19-30 consume at least 6 servings of grains, 2 cups of fruits, 2 ½ cups of vegetables, 3 cups of milk products, and 5 ½ ounces of meat and beans each day. Women of this age should also limit their oil consumption to 6 teaspoons per day (U. S. Department of Agriculture, 2009).

Many students claim to have a desire to learn how to eat balanced, healthy meals; however, they feel their opportunities to acquire such skills are limited. When students consume a balanced diet, they report feeling more energetic and in control of their weight (Strong, 2008). In some cases, the promotion of positive body esteem can also encourage better eating habits in those who already know significant information about nutrition (Koszewski, 1996).

A study by Strong, et al asked college students to utilize a variety of dietary strategies to control their intake of certain components of their diets. Strategies included regulating fat and energy intake, controlling fiber, fruit, and vegetable intake, or planning and monitoring consumption. Those participating in each of these three types of dietary control made significant improvements to their diets such as consuming less added

sugars, increased amounts of fiber, and lower intake of sodium. Students in this study also reported having a desire to consume a healthy diet; however, their lack of meal planning hindered them from achieving this goal.

College Students and Dieting Practices

Weight-Loss Methods

The term “dieting” can have several meanings and connotations, with most involving the intent to lose weight (Ackard, 2002). When a person “diets,” he or she likely alters the variety and amount of foods eaten on a daily basis (Gonzalez, 2004). In this sense, those who diet utilize a variety of strategies, some flexible and others strict (Stewart, 2002). A person trying to lose weight may reduce his or her energy consumption while increasing his or her energy expenditure using physical activity (Ackard, 2002). Other weight-loss methods include restricting the number of times or amount of energy a person eats throughout the day; someone who is dieting may also develop specific eating guidelines such as eating high carbohydrate lunches and high protein dinners (Gonzalez, 2004; Herman, 2005; Coelho, 2006). When one begins dieting, he or she may also limit added sugar and fat intake while increasing the amounts of fruits and vegetables he or she consumes (Ackard, 2002). This approach to weight management is generally deemed healthy.

When a person takes extreme measures such as eliminating certain foods from one’s diet, taking appetite suppressants or laxatives, smoking, fasting, or meal skipping, he or she is utilizing unhealthy weight control measures (Brownell, 1994; Cilliers, 2005).

Some weight-loss methods can lead to both emotional and physical problems (Ackard, 2002). A person may forbid himself or herself from eating certain foods perceived to be fattening or unhealthy and resort to repeatedly eating the same “safe” foods despite high energy density (Eisenberg, 2005; King, 1987). It has also been hypothesized that restricting one’s nutrient intake can lead to cravings for the types of food avoided (Coelho, 2006).

Restrained Versus Unrestrained Eating

Westenhoefer hypothesizes that there are varying degrees of dieting. Some people exhibit “rigid control” or an “all or nothing” approach to dieting while others have “flexible control” of their diets (Westenhoefer, 1999). Those who were more flexible in their eating habits tended to have lower body mass indexes and lower likelihood of overeating and binge eating compared to those with rigid control (Stewart, 2002).

People with rigid control of their diets may set rules with little, if any, logical reasoning behind which foods they will allow themselves to eat. Though a person may enjoy the “forbidden” foods, he or she may refuse to eat them or formulate excuses to avoid them out of worry about the guilt, shame, or weight gain that might result from their consumption. The slightest thought of eating such foods can often induce anxiety. Restricted food items may not be the most nutritious choices; however, consumption of one non-nutritious food is not diet-breaking (Gonzalez, 2004). A person’s level of dietary restraint exhibited in order to influence his or her weight and shape can be measured by questionnaires examining cognitive restraint. Results of such questionnaires often confirm the inconsistent eating patterns of restrained eaters (Lowe, 2006).

A study of the relationship between body weight and level of dietary restraint found that restrained eaters often ate less energy per pound of body weight; however, they still weighed more than non-restrained eaters (Klesges, 1992). One explanation for this trend could be the idea that obese people tend to be restrained eaters; another rationalization includes the idea that restrained eaters may have greater metabolic efficiency. It may seem logical for higher levels of dietary restraint to predict weight loss; however, restrained eating is actually a factor helping to determine likely weight gain (Lowe, 2006). Dietary restraint does not always lead to a negative energy balance or levels of intake below one's needs. In fact, it can often lead to binge eating episodes (Neumark-Sztainer, Wall, Eisenberg, & Story, 2005; Stice, et al., 2002a, b). Restrained eaters often cycle through periods of restraint followed by periods of overeating (Coelho, 2006).

Lowe's study of the relationship between dieting and weight gain during one's freshman year of college concluded that those with higher levels of weight suppression gained an average of 2.97 kilograms as opposed to those with lower levels of weight suppression who gained only 1.20 kilograms. Researchers speculate that "weight suppressors", or those who maintain a weight that is significantly less than their highest weight, may be concerned about their weight because of their tendency to gain weight easily. Subjects with higher levels of weight suppression and a reported history of dieting gained the most weight of those studied.

When 380 college students' eating behaviors were studied, researchers found those exhibiting high levels of dietary restraint had higher BMIs yet less energy consumption than those who did not restrict themselves as much (Moreira, 2005). Most

restrainers require less energy because of their lower total energy expenditure (De Castro, 1995; Laessle, Tuschl, Kotthaus, & Pirke, 1989). Restrained eaters may use certain strategies to control their diets. For example, restrained women consumed more nutrient dense diets by eating more fruits, legumes, and fish and less starchy foods such as pastries or bread. This type of diet is usually lower in energy density, and can be beneficial for weight control if not taken to extreme levels (Moreira, 2005). Various factors can lead to disinhibition in restrained eaters (Pliner, 2008). Consequently, such eating behavior may lead to a combination of disordered eating behaviors, appetite deregulation, increased metabolic efficiency, and weight gain (Garner & Wooley, 1991; Polivy & Herman, 1985; Tuschl, Platte, Laessle, Stichler, & Pirke, 1990).

Restrictive Diets in College Females

College females may have low levels of energy and nutrient intake due to the number of times they eat each day or their weight management strategies (Koszewski, 1996). Some women go to extreme measures to control their weight (Kessler, 1992; Koszewski, 1996). Since vegetarianism is now considered an acceptable diet practice, researchers are seeing a trend in some college women who claim to be vegetarians in order to avoid consuming animal products perceived to be high in fat or unhealthy (Klopp, 2003). Such women often exhibit strict control over their diets, and they are more likely to have bulimic behaviors (Neumark-Sztainer, 1997). A study of vegetarians who took the Eating Attitudes Test revealed weight management as the number two reason college women chose to become vegetarians. Vegetarians in this study were found to be more likely to have disordered eating tendencies. For example, some women reported an

excessive preoccupation with weight and exercise to burn energy. They also reported frequent weighing and a desire to vomit after food consumption (Klopp, 2003).

Sorority members may be a university subgroup prone to utilize various weight management and weight-loss strategies. Dieting methods such as excessive exercise, food avoidance, and purging have been reported as being acceptable in various sororities (Schulken, 1997). A previous study by Hoerr found sorority members more frequently avoiding high fat foods, taking diet pills, and experiencing extreme weight concerns when compared to nonmembers.

Influences on College Students' Eating Behaviors

Eating behavior can be influenced by both internal and external factors (Moreira, 2005). The most important signs one must recognize when choosing whether or not to eat are those of hunger and satiety; however, such signals are often overruled by other less important ones (Herman, 2005). Each person has his or her own relationship with food. This relationship combined with a person's specific eating patterns, preferred foods, and consumed portions comprise one's "eating behavior" (Moreira, 2005; Herman, 2005).

Environmental Influences

Herman hypothesizes that, over time, humans' appetites have increased. People often eat out of a desire for food and for many other reasons having nothing to do with hunger (Lowe, 2006). From childhood, a person begins to develop food habits; furthermore, general environment can impact one's food preferences (Booth, 2008). Even the simplest smell, thought, or sight of food may trigger one to begin eating (Pliner,

2008). Such an action relates to one's environment rather than his or her physiological hunger and satiety cues (Herman, 2005). Some researchers have also speculated that one's field of study can have an influence on his or her eating habits (Hiza, 2002).

Unconscious Physical Influences

Along with various sensory signals, social and unconscious physical signals may spark a person's desire to eat (Booth, 2008). People commonly eat according to their emotions, moods, stress levels, or social settings (Booth, 2008; Lowe, 2006). People may choose foods based on the level of physical or emotional satisfaction they provide (Booth, 2008). Scales such as The Disinhibition Scale from the Eating Inventory and The Emotional Eating Scale from the Dutch Eating Behaviors Questionnaire have revealed that eating for the wrong reasons, such as high levels of palatability or availability of large portions, may cause a person to exhibit higher levels of disinhibition, sometimes leading to caloric intake surpassing one's needs (van Strien, 1986; Eisenberg, 2005). Research findings are inconsistent regarding whether or not emotional eating and disinhibition lead to weight gain (Lowe, 2006). Large restaurant portions lead people to believe such portions are appropriate to eat in one sitting (Herman, 2005).

Peer Influences

When students arrive at college, they want to be accepted by their peers (Cilliers, 2006). Because of the number of meals eaten with their peers and other similar reasons, college students report their friends influencing their food choices more during college than high school (Strong, 2008). Additionally, when a student has a health or nutrition

related question or problem, he or she often turns to friends for help before seeking professional guidance (Prouty, 2002).

Social influences may contribute to which and how much food a student consumes (Booth, 2008). Most students consume two or more meals per day with friends. Such eating patterns may help or hinder students' diets depending on how healthy their friends eat (Strong, 2008). A study by Herman, et al, 2005 required subjects to fast for 24 hours. At the conclusion of the subject's fast, he or she was offered appetizing food. Despite the subject's physiological hunger, the amount he or she ate was directly related to the amount consumed by the other person in the room. Previous research shows that having more people present during a meal causes a person to eat larger quantities and for a longer time period (Booth, 2008).

Researchers believe eating habits can be heavily influenced by the groups of which a student is a member. It is possible that gender groups, college athletic teams, sororities, and various ethnicities sometimes push members to maintain a certain weight or size (Schulken, 1997; Hoerr, 2002). Such expectations are often unrealistic, leading members to feel forced to turn to extreme weight control practices (Hoerr, 2002).

Though little research has been conducted with these organizations, sorority women may be influenced to adhere to certain methods of weight maintenance based on the degree other members emphasize the importance of a certain body type. Additionally, they may be lead to believe that their adherence to such an ideal will affect their status within the sorority (Schulken, 1997).

In addition to organized groups of people, groups of friends may exhibit strong influences on each other by sharing dieting strategies, disordered eating habits, and

weight management techniques (Desmond, Prince, Gray, & O'Connell, 1986). One study concluded that the eating behaviors of certain groups of friends eventually were acknowledged as norms (Crandall, 1988). In normal weight individuals especially, a member of a group of friends may have a tendency to compare his or her body to others in the group (Wertheim, Paxton, Schutz, & Muir, 1997). A person may tend to select friends with similar dieting behaviors and weight control practices; this suggestion may be important for understanding the strong influence of friendship groups.

Campus Housing Influences

The results of the Survey of Selected Nutritional Health Practices of College Students noted that 84.9% of students living on campus consumed the same foods each day, whereas students living off campus were more likely to have variety in their diets (Haberman, 1998). A study was recently conducted to examine a freshman's vulnerability to weight gain related to where they lived. Some students in the study lived on-campus, whereas others were commuters living off-campus. The on-campus students in this study were not required to purchase a meal plan since their apartments were equipped with a kitchen. Instead, students had the option to cook at home or eat at a restaurant, fast food establishment, or campus dining hall. Subjects were asked to complete a series of questionnaires about with whom, where, and what they ate throughout their freshman year of college. The freshmen were also questioned about their eating habits prior to coming to college. Although the commuters who were restrained eaters showed little change in BMI, the on-campus restrained eaters showed significant increases in BMI. In fact, Pliner's study found restrained eaters living in on-campus

housing to have the greatest possibility for weight gain. Factors contributing to a higher BMI included decreased consumption of fruits and vegetables coupled with increased consumption of soft drinks, high fat foods, and dessert items (Pliner, 2008).

A study of students living in fraternity and sorority housing and residence halls concluded that such living arrangements can affect the quality of students' diets and the frequency of their physical activity (Dinger, 1999; Brevard and Ricketts, 1996). In 2005, the Center for Disease Control recommended consuming between 20% and 35% of total calories from fat per day, and the United States Department of Agriculture and Department of Health and Human Services suggested consuming five or more servings of fruits and vegetables per day. Despite these guidelines, members of fraternities or sororities consumed an average of 2.80 servings of fruit, juice, and vegetables as compared to 2.94 servings consumed by unaffiliated students and 2.47 servings of high fat foods as compared to 2.38 servings consumed by nonmembers in a given day (Dinger, 1999).

Cost and Convenience Influences

The cost and convenience of food may also be a determining factor in a student's dietary choices (Pliner, 2008). Some people may not have transportation to a place where they can purchase the quality foods they desire (Koszewski, 1996). Healthier on-campus dining locations often close early, leaving students with only fast food options (Strong, 2008). Students often have busy schedules in which they do not allow adequate time to plan, prepare, and eat nutritious meals (Haberman, 1998). Though students have been known to have little money to spend on foods, healthy or unhealthy, many believe

healthy foods are worth the price if they can help with weight management, increased energy, and better overall quality of life (Strong, 2008).

Body Dissatisfaction and Disordered Eating

Body Dissatisfaction

American society emphasizes a specific picture of the ideal body size and shape; this standard is believed to lead people with a desire for an unrealistic level of thinness to choose low energy foods and irregular eating patterns in order to achieve their ideal body (Heatherton, 1995). During the transition from high school to college, students often develop dissatisfaction with their bodies (Delinsky, 2008). Such discontent with one's appearance may explain college students' high rates of dieting and disordered eating patterns (Heatherton, Nichols, Mahamedi, & Keel, 1995). Unusual diet habits are increasingly likely to develop in those who have a poor body image. Students who maintain good eating habits throughout college tend to have improved confidence, whereas self esteem often decreases over time in those who exhibit disordered eating habits (Cilliers, 2006).

Specifically, researchers believe an increased focus on body shape and size has lead to body dissatisfaction in many college women (Greenleaf, 2006). In a study of college-aged females, a positive relationship was found between disordered eating, frequency of dieting, poor body image, and other related insecurities. This study also found that those who dieted more often tended to be dissatisfied with their current body sizes, had various psychological issues, and were often preoccupied with intense physical

activity. Those who were satisfied with their bodies dieted less frequently (Ackard, 2002).

Koszewski's study of college women found that those who were not content with their weight ate less frequent meals and had poorer diets overall. Women are becoming increasingly consumed with reaching a weight that is unattainably low; therefore, they begin a cycle of extreme dieting behaviors as a result of their dissatisfaction with their bodies and a distorted body image. For example, the results of the Body Mass Index Silhouettes Survey in the study showed that 62.1% of the subjects selected the underweight silhouette after being asked about a woman's appropriate body size (Schulken, 1997).

Over time, sorority members have become a specific subgroup of women known to be preoccupied with their appearances (Schulken, 1997). A study by Hoerr found members living in sorority housing to be more anxious about their weight because of dissatisfaction with their appearances. Members also feared weight gain and often utilized extreme dieting measures to prevent it, occasionally developing disordered eating in the process. Sorority members may be more fearful or experience greater dissatisfaction with their bodies than previously studied college women according to research conducted to determine the behaviors and attitudes of sorority members regarding their weight (Schulken, 1997).

A popular theory that has developed out of the rise in body dissatisfaction is called the objectification theory (Fredrickson & Roberts, 1997). Body shame, disordered eating, low self esteem, and appearance anxiety are several characteristics that may develop from high levels of self objectification (Fredrickson et al., 1998; Noll &

Fredrickson, 1998; Tiggemann & Slater, 2001). In the future, this theory may prove to be useful for understanding the development and prevalence of disordered eating among college women (Greenleaf, 2006).

Disordered Eating

Concerns about weight gain lead to increased risk for the development of disordered eating during the first year of college (Delinsky, 2008). Additionally, a study looking at rigid versus flexible dieting patterns revealed that those who were more strict dieters were at higher risk for mood swings, anxiety issues, and eating disorder indicators (Stewart, 2002). Many with disordered eating enjoy a feeling of control over their diets that results eating very little and only eating certain foods (Klopp, 2003).

Disordered eating and other eating issues are primarily associated with women (Heatherton, 1995). Within college communities, some subgroups tend to be more at risk for disordered eating than others (Schulken, 1997; Prouty, 2002). College females comprise a group of such individuals at increased risk. (Koszewski, 1996). Some research also shows that women who belong to various religious, sports, or social groups may be at higher risk for the development of an eating disorder (Rosen, McKeag, Hough, & Curley, 1986; Sykes, Gross, & Subishin, 1986; Sykes, Leuser, Melia, & Gross, 1988).

Usually the most vulnerable groups include athletes and those interested in entertainment careers; however, sorority members have also been noted in this category (Schulken, 1997). A study of college women's eating behaviors showed that sorority members were more likely to have an eating disorder than nonmembers (Prouty, 2002). Another study of 1,620 students found that those living in sorority housing had a 15%

risk of developing an eating disorder, the highest of all subgroups studied. Fortunately, sorority members not living in sorority housing did not differ significantly from nonmembers living in campus housing (Hoerr, 2002).

It has not yet been determined if women who join sororities are predisposed to have disordered eating behaviors more so than nonmembers (Allison, 2004). Researchers speculate that certain variables or cultural influences may lead specific types of women to want to join sororities or to be selected for initiation into one (Prouty, 2002). If sorority women are, in fact, found to be more prone to disordered eating, another question arises: “Does membership in a sorority ultimately bring out such a tendency” (Allison, 2004)? Universities offer opportunities to join a variety of subgroups; therefore, it is vital for college campuses to monitor the amount of students with eating disorders (Prouty, 2002).

Greek Membership

Women join sororities for a variety of reasons; sororities offer opportunities for social interaction, leadership, and community involvement. Members become so deeply involved in their organizations that they become a component of their identities throughout their college years and beyond; therefore, it is important to support the development of healthy eating behaviors throughout the time each member is active (Allison, 2004).

On many campuses, including The University of Mississippi, members of sororities are required to purchase meal plans that include breakfast, lunch, and dinner Monday through Thursday and breakfast and lunch on Friday. Although the price of all said meals is paid at the beginning of the semester, members’ attendance at meals is not

required. Meals at The University of Mississippi sorority houses are served buffet style, and each girl can serve themselves as much or as little of each item as she chooses. A study by Dinger shows that, for this reason, healthy food choices should be offered consistently, and members should have access to the nutritional information of the foods served in their sorority houses.

Summary of Findings

This discussion has primarily focused on a growing number of studies on the meal plans, nutrition knowledge, restrained/unrestrained eating habits, and eating behavior trends involving general college student populations as related to their body mass indices and overall body image. Despite large Greek systems across United States universities, little research has been conducted to study the effects, if any, of Greek life on members' nutrition-related thoughts and practices (Schulken, 1997). Information about sorority members' adherence to dietary guidelines or the reasoning behind their eating patterns is virtually nonexistent; therefore, it is important to acquire knowledge regarding such behaviors of these subgroups in order to know what is needed to improve them.

CHAPTER III

METHODOLOGY

This chapter describes the methods and procedures used in this investigation. It includes a discussion of the subjects, experimental tests and procedures, and statistical analysis of data.

Subjects

Data from seventy-two recruited University of Mississippi sorority members were obtained for analysis in this investigation. Subjects were Caucasians ranging from 18-22 years of age. Each sorority member was recruited through announcements in classes and weekly sorority chapter meetings. An attempt was made to recruit a sample from each of the nine sororities on the University of Mississippi Oxford campus.

Experimental Tests and Procedures

All components of this investigation were conducted in a quiet, private setting in the University of Mississippi (UM) Nutrition Laboratory and approved by the University of Mississippi's Institutional Review Board (Appendix A). When a subject arrived at the UM Nutrition Lab, she was asked to sign a consent form (Appendix B).

Questionnaire

Each subject was asked to complete a Questionnaire of Eating Behaviors (Appendix C). This questionnaire was designed to examine sorority members' diet and weight management practices and the various influences on their food choices. Although it was not validated before use in this investigation, it was a needed tool in evaluating the sorority subgroup. Questions were formatted as short answer, true/false, ranking, and multiple selection. Each subject was allowed unlimited time to complete the questionnaire.

Dietary Assessment

A 24-hour dietary recall was completed for the previous day (Monday-Thursday) using the Nutrient Data System for Research 2009 (NDS-R). NDS-R is a nutrient database containing approximately 17,000 foods and 108 nutrients. Maintained by the Nutrition Coordinating Center (NCC) in Minneapolis, Minnesota, it is a useful tool for many types of dietary research involving diet and recipe analysis. The program also provides a detailed nutrient profile with accurate calculations for each food item (Schakel, 2001). Although this program is not routinely used in analyzing sorority member diets, it was a vital component in analyzing each sorority member's 24-Hour Dietary Recall.

Each dietary recall was conducted the day after three meals were available at the subject's sorority house. The purpose of the dietary recall was to provide a general representation of the types and amounts of foods sorority members consume on a daily basis. A Food Amounts Handbook provided by the NCC was available to assist subjects

in the estimation of the amount of a certain food eaten. Subjects reporting atypical consumption were asked to reschedule in order to allow assessment of a more “usual consumption” pattern. Specific data of interest included numbers of servings of grains, protein, fruits, vegetables, dairy, and fats.

Anthropometric Measurement

Height for each subject was self-reported on their questionnaire. After completing the questionnaire and dietary recall, each participant was weighed on a scale calibrated according to the manufacturer’s instructions. Finally, each subject’s Body Mass Index (BMI) was calculated using her measured weight and self-reported height. Each subject’s BMI was calculated by dividing weight in kilograms by height in meters squared (Garrow & Webster, 1985).

Statistical Analysis

Data were analyzed using Stata statistical software (StataCorp, SE Version 10). To test hypotheses H1 and H2, frequencies of responses regarding the number of meals consumed at the sorority house during the week and barriers to meal consumption at the sorority house were reported. To test hypotheses H3 and H4, means and standard deviations were reported and T-tests were performed with significance set at $p=0.05$.

Results

Subjects

Subjects included 72 sorority members ranging from 18-22 years of age. Average subject age was 20.097 ± 1.115 . The mean height of subjects was 64.814 ± 2.403 inches, and their average weight was 132.670 ± 17.147 pounds. Subjects' BMIs ranged from 16.862-29.130 with an average BMI of 22.459 ± 2.859 (Table 1.1). The BMIs of two subjects could not be calculated due to missing height information. Tables 1.2 and 1.3 show specific demographic information for subgroups divided based on subjects' frequency of meal consumption.

Table 1.1 Subject demographics

Variable	Number Observed	Mean	Std. Dev.	Min	Max
Age	72.000	20.097	1.115	18.000	22.000
Height	70.000	64.814	2.403	60.000	71.000
Weight	69.000	132.670	17.147	97.000	178.000
BMI	70.000	22.459	2.859	16.862	29.130

Table 1.2 Demographics for Subjects Consuming ≥ 6 meals/week at their sorority houses

Variable	Number Observed	Mean	Std. Dev.	Min	Max
Age	59.000	20.102	1.094	18.000	22.000
Height	58.000	64.828	2.423	60.000	71.000
Weight	57.000	130.860	16.115	97.000	178.000
BMI	58.000	22.114	2.631759	16.862	28.738

Table 1.3 Demographics for Subjects Consuming <6 meals/week at their sorority houses

Variable	Number Observed	Mean	Std. Dev.	Min	Max
Age	13.000	20.077	1.256	18.000	22.000
Height	12.000	64.750	2.407	61.000	70.000
Weight	12.000	141.267	19.949	111.000	173.000
BMI	12.000	24.123	3.426	19.429	29.130

H₁: The majority of sorority members eat less than 6 out of 14 meals offered at their sorority house during the week (Monday-Friday).

The frequencies of responses regarding the number of meals consumed at the sorority house during the week were calculated for subjects who ate six or more meals at their sorority house during a typical week versus subjects who ate less than six meals per week at their sorority houses. Of the subjects included in this study, 81.94% consumed six or more meals during a typical week, whereas 18.06% of subjects consumed less than six meals at the sorority house per week (Table 2.1). Based on these findings, H₁ was rejected.

Table 2.1 Frequency of Meal Consumption at Sorority House

Subjects	Frequency	Percentage
6 or more meals per week	59	81.94
Less than 6 meals per week	13	18.06
Total	72	100.00

H₂: Sorority members report the perceived healthfulness of meals served to be the largest barrier to meal consumption at their sorority houses.

Participants were asked the following question: “Do you feel that the food served at your sorority house meets your dietary needs according to recommendations of the *Food Guide Pyramid*?” Of the subjects studied, 52.11% answered “no” to this question, and 47.89% marked “yes.” Results of this frequency test support H₂; however, other items from the questionnaire were also used to analyze H₂ (Table 3.1).

Table 3.1 “Do you feel that the food served at your sorority house meets your dietary needs according to recommendations of the *Food Guide Pyramid*?”

Response	Frequency	Percentage
No	37	52.11
Yes	34	47.89

Another item in the questionnaire asked: “What are some obstacles to eating at your sorority house?” For analysis of this question, the frequency of selection of each item by subjects was calculated individually (Table 3.2). Next, all statements were classified as either “health-related” or “non-health-related” to determine which items presented the greatest barrier to meal consumption at the sorority houses. Based on the averages of health-related statements versus non-health-related statements, the mean percentage of health-related statements selected was 26.39%, a higher percentage than the 22.04% of selected non-health related statements.

Although the percentage of health-related statements chosen was higher, the highest-ranking obstacle marked by subjects was “I do not like what is being served at that meal,” and the fourth-highest ranking obstacle was “I do not like the lack of nutrition labels and the unknown nutrition content of the food.” Interestingly, 53.8% of those consuming less than six meals reported the lack of nutrition labels and unknown nutrition

content of the food as obstacles to meal consumption; this statement was the second-highest ranking among this subgroup. In subjects of both subgroups, mean percentage selection of health-related statements was higher (Table 3.3).

Table 3.2 Obstacles to eating at sorority house

Response	Frequency	Total Percentages	Six or more meals consumed	Less than six meals consumed
I have a class that conflicts with meal service.	35	48.61	47.5%	53.8%
I live off campus.	28	38.89	35.6%	53.8%
I do not like what is being served at that meal.	52	72.22	72.9%	69.2%
My close friends aren't eating there for that meal.	6	8.33	6.8%	15.4%
I do not have time.	24	33.33	32.2%	38.5%
I feel self conscious if I eat there.	3	4.17	3.4%	7.7%
I do not have transportation to and from the sorority house.	0	0.00	0%	0%
I want to get the most for my money.	11	15.28	16.9%	7.7%
I do not like the lack of nutrition labels and the unknown nutrition content of the food.*	26	36.11	32.2%	53.8%
The food seems like it is low quality.	17	23.61	23.7%	23.1%
I do not like the times food is served.	20	27.78	28.8%	23.1%
It is inconvenient.	9	12.50	8.5%	30.8%
I do not have to time to eat a meal.	4	5.56	6.8%	0%
I am not able to use nutrition labels to choose which foods I will eat.*	12	16.67	11.9%	38.5%
There is a lack of available parking.	21	29.17	25.4%	46.2%
Other	7	9.72	11.9%	0%
None of these	1	1.39	1.7%	0%

*Denotes a health-related statement.

Table 3.3 Health- versus Non-Health-Related Statements Based on Table 2.2

Subjects	Health-Related Statements	Non-Health-Related Statements
6 or more meals/week	22.05%	21.47%
Less than 6 meals/week	46.15%	24.62%
Total	26.39%	22.04%

When comparing the health-related statement to the mean number of selected responses to the non-health-related statements in the question “What would make you want to eat at your sorority house more often?”, 38.03% of subjects selected the health-related statement “If the food had available nutrition labels or I knew the nutrition content of the food.” The mean percentage of subjects who chose non-health related statements was 25.45%. In subjects consuming six or more meals, 34.5% of subjects reported access to nutritional information to be a factor causing a potential increase in frequency of meal consumption at their sorority houses, whereas a mean percentage of 24.63% selected non-health-related statements. In subjects consuming less than six meals, 53.8% of subjects reported health-related changes to be factors that may increase their meal consumption. An average of 29.14% selected non-health-related changes (Table 3.4). Although subjects were not asked to rank the barriers to meal consumption at the sorority house, it is important to note that a high percentage of students identified healthfulness as a barrier; however, other available options presented a confounding effect to clearly establishing whether healthfulness was be considered the “largest barrier” by sorority members.

The highest frequency of responses to the question occurred for the statement “If I liked what is being served at each meal,” and the fourth-highest ranking statement was

the health-related: “If the food had available nutrition labels or I knew the nutrition content of the food.”

The majority of sorority members included in this study did not believe their nutritional needs were met through the meals provided at their sorority houses. Additionally, the percentage of selected health-related statements was higher than the percentage of those that were considered non-health related in the questions about the perceived barriers to dining at the sorority house and factors that could potentially increase sorority members’ frequency of sorority meal consumption. Despite said results, H₂ was rejected due to the fact that the most frequently reported barrier to meals consumption was “I do not like what is being served at that meal.”

Table 3.4 Factors leading to possible increases frequency of meal consumption

Response	Frequency	Percentage	Six or More Meals Consumed	Less than Six Meals Consumed
If my classes did not conflict with meal service times.	27	38.03	37.9%	38.5%
If I lived on campus	25	35.21	32.8%	46.2%
If I liked what is being served at each meal.	49	69.01	69.0%	69.2%
If my close friends ate there also.	11	15.49	17.2%	7.7%
If I had time.	19	26.76	27.6%	23.1%
If I did not feel self conscious when I ate there.	3	4.23	3.4%	7.7%
If I had transportation to and from the sorority house.	1	0	0%	0%
If I did not have extra money for another meal.	23	32.39	31.0%	38.5%
If the food had available nutrition labels or I knew the nutrition content of the food.*	27	38.03	34.5%	53.8%
If the food was higher quality.	32	45.07	43.1%	53.8%
If the food service times were longer.	30	42.25	43.1%	38.5%
If it was more convenient.	10	14.08	12.1%	23.1%
If I had time to eat the meal.	6	8.45	6.9%	15.4%
If there was more available parking.	15	21.13	15.5%	46.2%
Other	3	4.23	5.2%	0%

*Denotes a health-related statement.

H₃: Sorority members who consume 6 or more meals during the week (Monday-Friday) at their sorority houses do not eat a balanced diet according to the Food Guide Pyramid.

The MyPyramid recommendations for women ages 18-23 are listed in Table 3.1. The MyPyramid recommendation for women ages 18-23 for fruits is 2 cups per day. According to subjects' 24 hour dietary recall, average consumption of fruit was 1.199 ± 1.656 cups; therefore, sorority members did not meet their fruit needs according to the Food Guide Pyramid.

It is also recommended that women ages 18-23 consume 2 ½ cups of vegetables per day; however, subjects' 24-hour dietary recalls showed an average consumption of 2.682 ± 2.111 cups per day; therefore, the majority of subjects met the recommended intake of vegetables. Interestingly, the subgroup of subjects who consumed less than six meals per week at their sorority houses did not meet the MyPyramid recommendations for vegetables, consuming 2.438 ± 1.962 servings.

Overall, subjects consumed the MyPyramid-recommended six ounces of grains (6.250 ± 3.454 ounces); however, when divided into subgroups, the mean grain intake for the group consuming less than six meals at the sorority house per week fell below the recommendations due to an average of 4.658 ± 3.640 ounces.

MyPyramid recommends consuming 3 cups of dairy on a daily basis; however, the overall mean dairy intake was 1.678 ± 1.135 cups. This level of reported intake suggests that sorority members do not consume adequate amounts of dairy products.

Women ages 19-23 should be consuming 5 ½ ounces per day of protein (meats and beans), and 18 year old women should be consuming 5 ounces in the same time period. According to subjects' 24-hour dietary recall, average consumption of protein was 4.547 ± 2.936 ounces; therefore, sorority members did not meet their protein needs according to the MyPyramid guidelines.

Finally, MyPyramid recommendations are for the daily consumption of 5 and 6 teaspoons of oils for 18 year olds and 19-23 year olds, respectively; however, the overall mean fat/oil intake was 3.046 ± 2.825 teaspoons. This level of reported intake suggests that sorority members do not consume adequate amounts of oils on a daily basis.

The mean food group intake from subjects' 24-hour dietary recalls shows that the sorority members included in this study failed to eat a balanced diet according to the MyPyramid guidelines due to their inadequate consumption of fruit, dairy, protein, and fats/oils (Table 3.2). No statistically significant differences were found between subjects who ate six or more meals per week and those who ate less than six meals per week at their sorority houses. In fact, average food group intakes were generally higher for those who reported eating six or more meals at their sorority houses, although statistically insignificant. Those who reported eating six or more meals per week also had a higher consumption of grains than those who ate less than six meals, which is statistically significant at $p=0.10$ level but insignificant at the $p=0.05$ level. Based on these results, H_3 is accepted.

Table 4.1 MyPyramid Recommendations for a balanced diet

Age	Grains	Fruits	Vegetables	Dairy	Protein	Oils
18	6 oz	2 c.	2 ½ c.	3 c.	5 oz.	5 teaspoons
19-30	6 oz	2 c.	2 ½ c.	3 c.	5 ½ oz.	6 teaspoons

Table 4.2 Mean MyPyramid servings consumed by sorority members as reported in 24 hour dietary recall*

MyPyramid food groups	MyPyramid Recommendations	Total Sample (Mean ± Std. Dev.)	6 or more meals (Mean ± Std. Dev.)	Less than 6 meals (Mean ± Std. Dev.)
Grains	6 ounces	6.250±3.454	6.601±3.343	4.658±3.640*
Vegetables	2 ½ cups	2.682 ± 2.111	2.736 ± 2.155	2.438 ± 1.962*
Fruits	2 cups	1.199±1.656*	1.207±1.761*	1.161±1.111*
Dairy	3 cups	1.678±1.135*	1.775±1.177*	1.235±0.817*
Protein	Age 18: 5 ounces Age 19-23: 5 ½ ounces	4.547±2.936*	4.728±2.921*	3.728±2.979*
Oils	Age 18: 5 teaspoons Age 19-30: 6 teaspoons	3.046 ± 2.825*	3.040 ± 2.398*	3.076 ± 4.406*

*Denotes values are lower than the recommended minimum number of MyPyramid servings.

H₄: Sorority members who consume 6 or more meals during the week (Monday-Friday) at their sorority houses have a higher Body Mass Index than those who consume less than 6 meals per week at their sorority house (Monday-Friday).

The mean BMI for subjects consuming six or more meals per week at their sorority houses was significantly lower at the p=.05 level than the BMIs of those subjects consuming less than six meals per week at their sorority houses (p=.0256). Based on these results, Hypothesis H₄ was rejected (Table 5.1).

Table 5.1 Body Mass Index of Subject Subgroups

Group	Number Observed	Mean \pm Std. Dev.	[95% Conf. Interval]	
6 or more meals	58	22.11434 \pm 2.631759	21.42235	22.80632
Less than 6 meals	12	24.12322 \pm 3.425516	21.94675	26.29969

Discussion

Studies have reported a number of barriers to college students' meal consumption and their tendencies to skip breakfast or consume meals at their residences; however, the majority of sorority members studied reported eating six or more out of 14 meals offered at their sorority house during the week (Monday-Friday) (Strong, 2008). One of several possible explanations for such results is sorority members' often limited time for meals due to their busy schedules; the consumption of meals at one's sorority house may be an easier and faster option than standing in long lines at other on- and off-campus dining facilities. Additionally, with the limited funds of many college students, sorority members may also find consuming meals that have already been purchased at their sorority houses to be more economical (Strong, 2008).

Although sorority members report feeling as though their dietary needs are not met according to the MyPyramid guidelines, members who ate more frequently at their sorority houses came closer to meeting their nutritional recommendations. In contrast, the group reporting eating less than six meals per week at the sorority house also fell below the MyPyramid recommendations in their intake of all food groups. Ironically, the majority of those consuming less than six meals at the sorority house per week reported the lack of nutrition labels and unknown nutrition content of the food as obstacles to more frequent meal consumption; among this subgroup, this statement was the second-

most frequently selected response to the question “What are some obstacles to eating at your sorority house?” Hiza’s use of the Interactive Healthy Eating Index shows Americans’ confusion about general healthy eating concepts. Of those who understand basic nutrition, many continue to fail at following healthy eating practices. More research is needed to examine whether or not such people experience limited access or other barriers to healthful food consumption.

The most frequently selected barrier to meal consumption at the sorority house was “I do not like what is being served at that meal.” Palatability and availability of food play important roles in a person’s meal choices. It is possible sorority members who eat their meals at the house do not like the taste of the healthier or more nutrient-rich foods being served at each meal; however, studies show that palatability decreases with each bite of food eaten. Since many people have begun eating and snacking more often, it is possible that sorority members report not liking the food served at a particular meal due to the fact that they are not truly hungry (Goldman, 1991). More research is needed to determine whether or not sorority members snack instead of or in addition to eating the meals provided at their sorority houses.

Another explanation to the frequency of sorority members responses is provided by another study finding those with disordered eating habits to justify their avoidance of certain foods by saying they dislike them. Such disordered eaters abide by self-imposed diet rules such as consuming limited quantities of food or specific nutrients such as carbohydrates or fat and/or eating less frequently (Ackard, 2002). More research is needed to determine whether or not a relationship exists between sorority members’ responses and disordered eating behaviors.

Additionally, Eisenberg's study provides a possible explanation of sorority members' perceptions of the foods served at their sorority houses. He explains that groups of friends tend to exhibit similar dieting and eating behaviors (Eisenberg, 2005). As a result of this trend, it is possible that sorority members' opinions or their perceptions about the healthfulness of the food served at their sorority houses may be affected by other members.

Regardless of their food preferences, ease of access to food, nutrition knowledge, or social influences on their eating behaviors, subjects who reported consuming six or more meals during the week (Monday-Friday) did not eat a balanced diet according to the Food Guide Pyramid. In the present study, subjects who consumed six or more meals per week at their sorority house reported inadequate consumption of fruit, dairy, protein, and fats/oils. Interestingly, subjects who consumed less than six meals per week at their sorority house consumed too few servings of all food groups analyzed. T-tests were conducted to determine whether levels of consumption by the group eating more than six meals per week at their sorority houses differed significantly from the group that consumed less than six meals per week; however, the levels of intake of each food group compared to the MyPyramid recommendations were not tested to determine a significant difference. Although average food group intakes were higher for those who reported eating six or more meals per week at their sorority houses, no statistically significant differences in intake were found between subjects who ate six or more meals per week and those who ate less than six meals per week at their sorority houses. MyPyramid is a useful tool in helping to recognize inadequate diets; however, when using self-report

measures, underreporting and over reporting consumption is a common issue that must be taken into consideration.

Koszewski's study reports that college women may be prone to unhealthy eating behaviors due to a higher probability of dieting and obesity among such individuals. Nevertheless, increased availability of reasonably priced food and sufficient time to eat meals consequently increased college women's chances of meeting 80% of the Recommended Daily Allowance for each nutrient (Koszewski, 1996). After learning of their inadequate intake, students in Strong's study reported wanting to increase their consumption of those food groups in which they were lacking; however, they faced various barriers to fulfilling this desire. According to this study, students do not usually plan their meals in advance; however, they reported wanting to consume regular, balanced meals. The meals offered at sorority houses may meet these desires many sorority members, leading them to eat more frequently at their sorority houses. At each sorority house, meals are planned in advance, and food is arranged buffet-style. This type of arrangement may encourage balanced meal consumption. Despite this style of foodservice, sorority members report other barriers to healthful eating to be a lack of access to nutrition labels and/or disliking the food served at various meals.

The findings of the present study are similar to others that have been conducted involving college students. For example, Strong's study showed subjects' average intake of fruits, vegetables, and whole grains to be well below national recommendations. At both the freshman and senior year assessments in Racette's study, less than one-third of subjects consumed the recommended number of servings of fruits and vegetables. In Dinger's study of dietary intake among college students, fraternity and sorority members

consumed a mean of 2.94 servings of the recommended five or more servings per day of fruits, vegetables, and juices in the twenty-four hours prior to their assessments. In Hiza's study, female participants tended to meet or exceeded the recommended servings of grains; however, they consumed fewer than the recommended servings of fruits, vegetables, milk, and meats. The students included in Haberman's study reported consuming less than the recommended number of servings of grains, fruits, vegetables, and dairy. Over eighty percent of students consumed less than recommended servings of grains, and 81.7% reported inadequate consumption of fruits and vegetables. In addition, 83.3% ate less than the adequate amount of dairy products, and 35.5% consumed less than the recommended amount of meat (Haberman, 1998). In the present study, a lower consumption of fruits and vegetables by those who consume less than six meals at their sorority houses may be due to a perceived inability to store fresh fruits and vegetables at their residence due to the limited shelf life of such foods.

Hiza's research shows that many college students skip meals, and some have tendencies to avoid or choose inappropriate foods. Such choices often lead to low intakes and imbalances of nutrients in students' overall diets as seen in sorority members' 24 hour dietary recalls. Of the subjects included in the present study, those who ate more frequently at their sorority houses had higher intakes of each of the five major food groups compared to those who consumed fewer than six meals per week at the sorority house. Some girls may operate under different "regulatory forces" that determine when or how much to allow themselves to eat. Due to the prevalence of body dissatisfaction, disordered eating behaviors, and dieting among college women, some sorority members may eat fewer meals at their sorority houses, places where they have little control over

the ingredients in each meal consumed (Gonzalez, 2004; Heatherton, 1995; Koszewski, 1996). Such food avoidance may lead to the lower levels of intake found in sorority members who eat fewer meals per week at their sorority houses. Koszewski's study found a positive relationship between weight satisfaction and number of total meals eaten per week; the less satisfied college women were with their weights, the fewer meals they ate, and the less they met their nutritional needs (Koszewski, 1996).

Each person forms different dietary norms based on various influences such as his or her environment, social influences, and various factors other than hunger and satiety. Research shows that people tend to eat more when in the presence of others who are eating, a potential explanation for the increased consumption of certain food groups by those who reported eating more than six meals at their sorority houses per week (Goldman, 1991). Fortunately, social support has been previously correlated with healthier eating behaviors (i.e. increased fruit and vegetable consumption); therefore, it may be possible that the social dining environment found at sorority houses is conducive to more healthful food choices (Strong, 2008).

Research has shown foods prepared away from home or included in meal plans are often less nutritious and/or higher in energy and fat than meals prepared at home. In a study of 200 males and females on university meal plans (with 136 of the subjects being female), only one-third of the students were consuming the recommended servings of the five major food groups. Others included in the study consumed less than one-third of the recommended amounts of fruits, vegetables, dairy, and protein. Only half of the subjects consumed the recommended amount of grains (Kolodinsky, 2007). Compared to other on- and off-campus dining facilities, sorority houses may better organize food items in a

way that promotes balanced eating as evidenced by the higher consumption of each food group by those eating more frequent meals at the sorority house.

Pliner's study notes the increased ease of eating healthful foods as they are more readily available for consumption. Many of the sorority houses on the University of Mississippi campus have fruits and vegetables available at each meal; however, sorority members do not always choose to consume them (Pliner, 2008). Although the mean intake of fruits and vegetables was low in the sorority members studied, those who ate more frequent meals at their sorority houses consumed higher average servings of fruits and vegetables according to their 24 hour dietary recalls.

Although sorority members who consumed six or more meals had higher levels of intake for each food group, they ironically had a lower mean Body Mass Index than those who reported consuming fewer than six meals per week at their sorority houses. Physical activity and other lifestyle factors may also account for this unexpected outcome; however, no data was collected or reported on subjects' level of activity. Over recent years, some sororities have become known as groups that emphasize a specific weight and size (Hoerr, 2002). As a result, subjects in the present study who ate more frequently at their sorority house may have felt as though they were an appropriate size for their sorority, leading to feel accepted by the sorority as a whole; however, additional research is needed to confirm the reasons for these results.

Several studies have shown that individuals with high dietary restraint tend to have higher BMIs. Klesges's study showed the following relationship between dietary restraint and body weight: subjects with higher BMIs consumed less energy, and those with higher levels of restraint had a mean BMI of 26.96 ± 5.01 , whereas individuals with

low restraint had a mean BMI of 22.50 ± 4.47 ($p < .01$). One potential explanation cited in this study was that the tendency of obese people to be restrained eaters. Individuals exhibiting high restraint tend to consume more energy as fat and less as carbohydrate than those with low restraint (Klesges, 1992). Some of the subjects included in Coelho's study reported engaging in carbohydrate or protein restriction. This study also showed a significant effect of restraint on BMI. The restrained eaters in this study had a significantly higher mean BMI of 25.2, and the unrestrained eaters' mean BMI was 21.4 ($p < .001$). In a study of 226 women, restrained eaters reported eating less bread and pastries coupled with higher intakes of fish, fruits, and vegetables. In this sample, restrained eaters had a mean BMI of 22.6 ± 2.5 ; however, unrestrained eaters had a BMI of 21.4 ± 2.8 ($p < .001$) (Moreira, 2005).

In analyzing the rationale behind a sorority member's frequency of meal consumption at her sorority house, research into the selection of alternative meals and where they are consumed is needed. Some sorority members may cook for themselves, consume fast food, or dine at other on-campus facilities. Those who eat less often at the sorority house may also have easier access to or prefer the taste of snack foods to the meals served at their sorority houses (Goldman, 1991). Due to the higher mean BMI of those who eat at their sorority house less frequently, the foods sorority members are eating elsewhere may be higher in fat and/or more energy dense than those served at the sorority house. It is also important to note that alcohol, carbonated beverages, and some sweets were not included in the food group count of the present study.

In the future, a validated questionnaire of sorority members may be helpful in analyzing these subgroups; however, the present study confirmed the fact that sorority

members do not consume balanced diets according to MyPyramid Guidelines. The meals served at the sorority houses may not be completely balanced; however, they seem to be better than the alternatives. Additional research is needed to determine whether or not sorority houses are offering all components of balanced meals according to MyPyramid Guidelines. It is possible that balanced meals are offered, yet sorority members do not choose to consume each component. Such information may aid in determining the prevalence of the barrier of health-related issues to sorority meal consumption. Energy consumption and physical activity may give more insight into sorority members' BMIs. Additionally, more research is needed to determine where sorority members are consuming meals when choosing not to eat at their sorority houses.

LIST OF REFERENCES

- Ackard, D., Croll, J., & Kearney-Cooke, A. (2002, March). Dieting frequency among college females: Association with disordered eating, body image, and related psychological problems. *Journal of Psychosomatic Research*, 52(3), 129.
Retrieved August 5, 2009, from Academic Search Premier database.
- Allison, K., & Park, C. (2004, April). A prospective study of disordered eating among sorority and nonsorority women. *International Journal of Eating Disorders*, 35(3), 354-358. Retrieved August 5, 2009, from Academic Search Premier database.
- American College Health Association. *Healthy Campus 2010*. Baltimore, Md: 2002.
- Anderson, D. A., Shapiro, J. R., & Lundgren, J. D. (2003). The freshman year of college as a critical period for weight gain: An initial evaluation. *Eating Behaviors*, 4(4), 363-366.
- Booth, D. (2008, November). Physiological regulation through learnt control of appetites by contingencies among signals from external and internal environments. *Appetite*, 51(3), 433-441. Retrieved August 5, 2009, doi:10.1016/j.appet.2008.06.008
- Bowman, S. A., Lino, M., Gerrior, S. A., & Basiotis, P. P. (1998) *The Healthy Eating Index 1994-96*. CNPP-5. U. S. Department of Agriculture, Center for Nutrition Policy and Promotion.
- Brevard, P. B., & Ricketts, C. D. (1996). Residence of college students affects dietary intake, physical activity, and serum lipid levels. *Journal of American Dietetic Association*, 96, 35-38.

Brownell KD, Rodin J. The dieting maelstrom: is it possible and advisable to lose weight? *Am Psychol* 1994; 49:781-91.

Centers for Disease Control and Prevention (1997, November 14). Youth risk behavior surveillance: National college health risk behavior survey. United States, 1995 (CDC surveillance summaries). *Morbidity and Mortality Weekly Report*. 46 (SS-6).

Cilliers, J., Senekal, M., & Kunneke, E. (2006, April). The association between the body mass index of first-year female university students and their weight-related perceptions and practices, psychological health, physical activity and other physical health indicators. *Public Health Nutrition*, 9(2), 234-243. Retrieved August 6, 2009, from Academic Search Premier database.

Clement, J., Schmidt, C., Berriaix, L., Covington, N., & Can, T. (2004, July). Obesity and Physical Activity in College Women: Implications for Clinical Practice. *Journal of the American Academy of Nurse Practitioners*, 16(7), 291-299. Retrieved August 6, 2009, from Academic Search Premier database.

Coelho, J., Polivy, J., & Herman, C. (2006, November). Selective carbohydrate or protein restriction: Effects on subsequent food intake and cravings. *Appetite*, 47(3), 352-360. Retrieved August 10, 2009, doi:10.1016/j.appet.2006.05.015

Crandall, C. (1988). Social contagion of binge eating. *Journal of Personality and Social Psychology*, 55, 588-598.

De Castro, J. M. (1995). The relationship of cognitive restraint to the spontaneous food and fluid intake of free-living humans. *Physiology and Behavior*, 57, 287-295.

- Delinsky, S., & Wilson, G. (2008, January). Weight gain, dietary restraint, and disordered eating in the freshman year of college. *Eating Behaviors*, 9(1), 82-90. Retrieved August 5, 2009, doi:10.1016/j.eatbeh.2007.06.001
- Desmond, S. M., Prince, J. H., Gray, N., & O'Connell, J. K. (1986). The etiology of adolescents' perceptions of their weight. *Journal of Youth and Adolescence*, 15(6), 461-474.
- Dinger, M. (1999, June). PHYSICAL ACTIVITY AND DIETARY INTAKE AMONG COLLEGE STUDENTS. *American Journal of Health Studies*, 15(3), 139-148. Retrieved August 5, 2009, from Academic Search Premier database.
- Douglas KA, Collins JL, Warren C, et al. Results from the 1995 National College Health Risk Behavior Survey. *J Am Coll Health*. 1997; 46:55-66.
- Eisenberg, M., Neumark Sztainer, D., Story, M., & Perry, C. (2005, March 15). The role of social norms and friends' influences on unhealthy weight-control behaviors among adolescent girls. *Social Science & Medicine*, 60(6), 1165-1173. Retrieved August 6, 2009, doi:10.1016/j.socscimed.2004.06.055
- Field, A. E., Austin, S. B., Taylor, C. B., Malspeis, S., Rosner, B., Rockett, H. R., et al. (2003) Relation between dieting and weight change among preadolescents and adolescents. *Pediatrics*, 900-906.
- Frazeo, E. (1999). High costs of poor eating patterns in the United States. In E. Frazao (Ed.), *America's Eating Habits: Changes & Consequences*. Agriculture Information Bulletin No. 750. U. S. Department of Agriculture, Economic Research Service.

- Fredrickson, B. L., & Roberts, T. A. (1997). Objectification theory: Towards understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly*, 21, 173-206.
- Fredrickson, B. L., Roberts, T. A., Noll, S. M., Quinn, D. M., & Twenge, J. M. (1998). That swimsuit becomes you: Sex differences in self-objectification, restrained eating, and math performance. *Journal of Personality and Social Psychology*, 75, 269-284.
- Garner, D. M., & Wooley, S. C. (1991). Confronting the failure of behavioral and dietary treatments for obesity. *Clinical Psychology Review*, 11, 729-780.
- Garrow JS, Webster J. Quetelet's index (W/H²) as a measure of fatness. *Int J Obes Relat Metab Disord*. 1985;9:147-153.
- Goldman, S. J., Herman, C. P., Polivy, J. (1991). Is the effect of a social model attenuated by hunger? *Appetite*, 17, 129-140.
- Gonzalez, V., & Vitousek, K. (2004, October). Feared food in dieting and non-dieting young women: a preliminary validation of the Food Phobia Survey. *Appetite*, 43(2), 155-173. Retrieved August 6, 2009, doi:10.1016/j.appet.2004.03.006
- Greenleaf, C., & McGreer, R. (2006, May). Disordered Eating Attitudes and Self-Objectification Among Physically Active and Sedentary Female College Students. *Journal of Psychology*, 140(3), 187-198. Retrieved August 6, 2009, from Academic Search Premier database.
- Haberman, S., & Luffey, D. (1998, January). Weighing in college students' diet and exercise behaviors. *Journal of American College Health*, 46(4), 189. Retrieved August 6, 2009, from Academic Search Premier database.

- Harless, T., Koch, J., & Slapar, H. (1996). Diet and health among college students. HPER C511 Course for Epidemiology, pp. 1-17.
- Heatherton, T. F., Nichols, P., Mahamadi, F., & Keel, P. (1995). Body weight, dieting, and eating disorder symptoms among college students, 1982 to 1992. *American Journal of Psychiatry*, *15*, 1623-1629.
- Heatherton, T., & Nichols, P. (1995, November). Body weight, dieting, and eating disorder symptoms among college students, 1982 to 1992. *American Journal of Psychiatry*, *152*(11), 1623. Retrieved August 6, 2009, from Academic Search Premier database.
- Herman, C., & Polivy, J. (2005, December 15). Normative influences on food intake. *Physiology & Behavior*, *86*(5), 762-772. Retrieved August 6, 2009, doi:10.1016/j.physbeh.2005.08.064
- Hiza, H., & Gerrior, S. (2002, January). Using the Interactive Healthy Eating Index to Assess the Quality of College Students' Diets. *Family Economics & Nutrition Review*, *14*(1), 3. Retrieved August 5, 2009, from Academic Search Premier database.
- Hoerr, S. L., Bokra, R., Lugo, B., Bivins, T., Keast, D. R. (2002). Risk for disordered eating relates to both gender and ethnicity for college students. *Journal of the American college of nutrition*, *21*(4), 307-314.
- Kessler, L. A., Gilham, M. B., Vickers, J. (1992) Peer involvement in the nutrition education of college students. *J Am Diet Assoc*, *92*, 989-991.
- King, G. A., Herman, C. P., & Polivy, J. (1987). Food perception in dieters and non-dieters. *Appetite*, *8*, 147-158.

- Klesges, R., & Isbell, T. (1992, November). Relationship between dietary restraint, energy intake, physical activity, and body weight: A... *Journal of Abnormal Psychology, 101*(4), 668. Retrieved August 6, 2009, from Academic Search Premier database.
- Klopp, S., Heiss, C., & Smith, H. (2003, June). Self-reported vegetarianism may be a marker for college women at risk for disordered eating. *Journal of the American Dietetic Association, 103*(6), 745-747. Retrieved August 6, 2009, doi:10.1053/jada.2003.50139
- Kolodinsky, J., Harvey-Berino, J., Berlin, L., Johnson, R., & Reynolds, T. (2007, August). Knowledge of Current Dietary Guidelines and Food Choice by College Students: Better Eaters Have Higher Knowledge of Dietary Guidance. *Journal of the American Dietetic Association, 107*(8), 1409-1413. Retrieved August 6, 2009, doi:10.1016/j.jada.2007.05.016
- Koszewski, W. (1996, December). Factors that influence the food consumption behavior and nutritional adequacy of college women. *Journal of the American Dietetic Association, 96*(12), 1286. Retrieved August 6, 2009, from Academic Search Premier database.
- Laessle, R. G., Tuschl, R. J., Kotthaus, B.C., & Pirke, K. M. (1989). Behavioral and biological correlates of dietary restraint in normal life. *Appetite, 12*, 83-84.
- Lowe, M., Annunziato, R., Markowitz, J., Didie, E., Bellace, D., Riddell, L., et al. (2006, July). Multiple types of dieting prospectively predict weight gain during the freshman year of college. *Appetite, 47*(1), 83-90. Retrieved August 5, 2009, doi:10.1016/j.appet.2006.03.160

- Martz, D. M., Graves, K. D., & Sturgis, E. T. (1997). A pilot peer-leader eating disorders prevention program for sororities. *Eating Disorders: The Journal of Treatment and Prevention*, 5, 294-308.
- Moreira, P., de Almeida, M., & Sampaio, D. (2005, June). Cognitive restraint is associated with higher intake of vegetables in a sample of university students. *Eating Behaviors*, 6(3), 229-237. Retrieved August 6, 2009, doi:10.1016/j.eatbeh.2005.01.005
- Neumark-Sztainer, D., Story, M., Resnick, M. D., & Blum, R. W. (1997). Adolescent Vegetarians. A behavioral profile of a school-based population in Minnesota. *Arch Pediatr Adolesc Med*, 151, 833-838.
- Neumark-Sztainer, D., Wall, M. M., Eisenberg, M. E., & Story, M. (2005). Obesity and eating disorders in older adolescents: Does early dieting make things better or worse? *Abstract from the Society of Adolescent Medicine Annual Meeting*, vol. 36 (pp.152-153).
- Noll, S. M., & Fredrickson, B. L. (1998). A mediational model linking self-objectification, body shame, and disordered eating. *Psychology of Women Quarterly*, 22, 623-636.
- Pliner, P., & Saunders, T. (2008, January 28). Vulnerability to freshman weight gain as a function of dietary restraint and residence. *Physiology & Behavior*, 93(1/2), 76-82. Retrieved August 6, 2009, doi:10.1016/j.physbeh.2007.07.017
- Polivy, J., & Herman, C. P. (1985). Dieting and binge eating: A causal analysis. *American Psychologist*, 40, 193-204.

- Prouty, A., Protinsky, H., & Canady, D. (2002, Summer). COLLEGE WOMEN: EATING BEHAVIORS AND HELP-SEEKING PREFERENCES. *Adolescence*, 37(146), 353. Retrieved August 6, 2009, from Academic Search Premier database.
- Racette, S., Deusinger, S., Strube, M., Highstein, G., & Deusinger, R. (2008, January). Changes in Weight and Health Behaviors from Freshman through Senior Year of College. *Journal of Nutrition Education & Behavior*, 40(1), 39-42. Retrieved August 5, 2009, from Academic Search Premier database.
- Rosen, L. W., McKeag, D. B., Hough, D. O., & Curley, V. (1986). Pathogenic weight-control behavior in female athletes. *The Physician and Sports-medicine*, 14, 79-86.
- Schakel SF. Maintaining a nutrient database in a changing marketplace: Keeping pace with changing food products - A research perspective. *J Food Comp and Anal*. 2001;14:315-322.
- Schulken, E., & Pinciario, P. (1997, September). Sorority women's body size perceptions and their... *Journal of American College Health*, 46(2), 69. Retrieved August 5, 2009, from Academic Search Premier database.
- Stewart, T., Williamson, D., & White, M. (2002, February). Rigid vs. flexible dieting: association with eating disorder symptoms in nonobese women. *Appetite*, 38(1), 39. Retrieved August 5, 2009, doi:10.1006/appe.2001.0445
- Stice, E. (2002a). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin*, 128, 825-848.

- Stice, E. (2002b). Body image and bulimia nervosa. In T. F. Cash & T. Pruzinsky (Eds.), *Body images: A handbook of theory, research, and clinical practice* (pp. 304-311). New York: Guilford Press.
- Strong, K., Parks, S., Anderson, E., Winett, R., & Davy, B. (2008, October). Weight Gain Prevention: Identifying Theory-Based Targets for Health Behavior Change in Young Adults. *Journal of the American Dietetic Association*, *108*(10), 1708-1715. Retrieved August 6, 2009, doi:10.1016/j.jada.2008.07.007
- Sykes, D. K., Gross, M., & Shubishin, S. (1986). Preliminary findings of demographic variables in patients suffering from anorexia nervosa and bulimia. *International Journal of Psychosomatics*, *33*(4), 27-30.
- Sykes, D. K., Leuser, B., Melia, M., & Gross, M. (1988). A demographic analysis of 252 patients with anorexia nervosa and bulimia. *International Journal of Pyschosomatics*, *35*(1-4), 5-9.
- The American College Health Association. The American College Health Association National College Health Assessment (ACHA-NCHA), Spring 2003 Reference Group report. *J Am Coll Health*. 2005; *53*: 199-210.
- Tiggemann, M., & Slater, A. (2001). A test of objectification theory in former dancers and non-dancers. *Psychology of Women Quarterly*, *25*, 57-63.
- Tushl, R. J., Platte, P., Laessle, R. G., Stichler, W., & Pirke, K. (1990). Energy expenditure and everyday eating behavior in healthy young women. *American Journal of Clinical Nutrition*, *52*, 81-86.
- U. S. Department of Agriculture. (2009). *Inside the Pyramid*. Retrieved October 2, 2009, from MyPyramid Web Site: <http://www.mypyramid.gov/pyramid/>

- U. S. Department of Agriculture & U. S. Department of Health and Human Services. (1995). Nutrition and your health: Dietary guidelines for Americans (4th ed). (Home and Garden Bulletin No. 232) Washington, DC: Author.
- U. S. Department of Health and Human Services. Healthy People 2010 (Conference Edition, in 2 volumes). Washington, DC: 2000.
- van Strien, T., Frijters, J. E., Bergers, G. P. A., & Defares, P. B. (1986). Dutch eating behavior questionnaire for assessment of restrained, emotional and external eating behaviour. *International Journal of Eating Disorders*, 5, 295-315.
- Wertheim, E. H., Paxton, S. J., Schutz, H. K., & Muir, S. L. (1997). Why do adolescent girls watch their weight? An interview study examining sociocultural pressures to be thin. *Journal of Psychosomatic Research*, 42(4), 345-355.
- Westenhoefer, J., Stunkard, A. & Pudel, V. (1999). Validation of the flexible and rigid control dimensions of dietary restraint. *International Journal of Eating Disorders* 26, 53-64.
- Youth Risk Behavior Surveillance: National College Health Risk Behavior Survey- United States, 1995. *MMWR CDC Surveill Summ.* 1997; 46:1-56.

APPENDICES

APPENDIX A:

Institutional Review Board Approval Letter



The
University of Mississippi

Oxford • Jackson • Tupelo • Southaven

Office of Research and
Sponsored Programs
100 Barr Hall
Post Office Box 907
University, MS 38677
(662) 915-7482
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March 16, 2009

Ms. Blair Harris
2100 Old Taylor Road #227
Oxford, MS 38655

Dr. Melinda Valliant
Family and Consumer Sciences
University, MS 38677

IRB Protocol #: **09-128**
Title of Study: **Sorority Members' Diet and Weight Management Practices**
Approval Date: **March 14, 2009**
Expiration Date: **March 13, 2010**

Dear Ms. Harris and Dr. Valliant:

This is to inform you that your application to conduct research with human participants has been reviewed by the Institutional Review Board (IRB) at The University of Mississippi and approved as Expedited under **45 CFR 46.110, categories 4 and 7**.

Research investigators must protect the rights and welfare of human research participants and comply with all applicable provisions of The University of Mississippi's Federalwide Assurance 00008602. Your obligations, by law and by University policy, include:

- Research must be conducted exactly as specified in the protocol that was approved by the IRB.
- Changes to the protocol or its related consent document must be approved by the IRB prior to implementation except where necessary to eliminate apparent immediate hazards to participants.
- Adverse events and/or any other unanticipated problems involving risks to participants or others must be reported promptly to the IRB.
- **Only the approved, stamped, consent form may be used throughout the duration of this research unless otherwise approved by the IRB.**
- A copy of the IRB-approved informed consent document must be provided to each participant at the time of consent, unless the IRB has specifically waived this requirement.
- Signed consent documents and other records related to the research must be retained in a secure location for at least three years after completion of the research.
- If you wish to continue your study beyond the expiration date given above, please request a renewal when submitting the *Progress Report* which we will send to you in approximately nine months.
- Please include the IRB protocol number and the study title in any electronic or written correspondence.

If you have any questions, please feel free to contact me or Diane W. Lindley, IRB Coordinator, at (662) 915-7482.

Sincerely,

Thomas W. Lombardo, Ph.D.
Member, Institutional Review Board
Director, Division of Research Integrity & Compliance

APPENDIX B:

Questionnaire of Eating Behaviors

Questionnaire of Eating Behaviors

Blair Harris
University of Mississippi

100 Lenoir Hall
P.O. Box 1848
University, MS 38677-1848

Please answer each of the following questions honestly and to the best of your ability. All of your answers will be kept confidential.

I eat a balanced diet according to the *Food Guide Pyramid*.

- True.
- False.
- I don't know.

True or False: I typically eat only when I am hungry.

- True
- False

True or False: I typically eat everything on my plate at a meal.

- True
- False

How frequently do you stop eating when you are still hungry?

- Always
- Usually
- Sometimes
- Rarely
- Never

I go back for seconds at a meal if: (choose all that apply)

- I am still hungry.
- The food tastes good.
- My friends go back for seconds.
- I never go back for seconds.
- Other _____

How many times do you eat in a typical day? _____

Do you eat breakfast?

- Yes. If yes, where do you typically eat breakfast? _____
- No

Do you eat lunch?

- Yes. If yes, where do you typically eat lunch? _____
- No

Do you eat dinner?

- Yes. If yes, where do you typically eat dinner? _____
- No

Do you eat snacks on a typical day?

- Yes. Where do you get your snacks? _____
What do you typically eat for a snack? _____
- No.

How many servings per day do you typically eat of the following food groups?

- Grains (1 oz/serving) _____
- Fruits (1 medium piece of fruit) _____
- Vegetables (1/2 c. cooked, 1 c. raw) _____
- Dairy (1 cup/serving) _____
- Protein (1 oz/serving) _____
- Fats/oils (1 tsp/serving) _____

On a scale from 1-10 (1=very important, 10=not important at all), how important is consuming a healthy diet to you? _____

What do you consider to be a healthy, balanced meal? (Examples: meal contains a certain number of calories, includes/excludes specific foods/food groups) _____

Do you plan your meals in advance?

- Always
- Usually
- Sometimes
- Rarely
- Never

How do you choose which foods you will eat? (choose all that apply)

- Based on the amount of time remaining before consuming the next meal
- Based on foods that will help me to control my weight
- Based on the perceived caloric, fat, etc. level of the food
- Based on the *Food Guide Pyramid*
- Taste of the food/Sensory Appeal
- My body's level of hunger
- I choose my foods based on what my friends or other sorority members choose
- Based on the perceived healthfulness of the food
- Based on ease and convenience
- Based on the expense/Price of the food
- Based on ethical considerations
- Based on the fatteningness or "dangerousness" of the food
- Based on my mood
- Based on how much money I have to purchase the food
- Based on the natural content of the food
- Based on my familiarity with the food or menu item
- Based on what foods are available
- Based on the time available to eat
- Based on the ability to use nutrition labels to choose foods
- Based on access to transportation to buy food
- Based on the quality of foods in stores nearby
- Based on portion sizes
- It depends on the social context.
- Other _____

Do you eliminate or restrict your consumption of certain foods or food groups?

- Yes. Which foods or food groups do you restrict or eliminate?

Why do you restrict or eliminate these foods?

- No.

Have you ever restricted your food intake to lose weight?

- Yes. How many times have you restricted how much you eat? _____

How long did you limit your food intake? _____

What was the outcome of this period of time?

- I lost weight. How much weight did you lose? _____

How did you maintain your weight loss?

- I maintained my weight.

- I gained weight.

- No.

Which of the following *have* you used (Select all that apply)?

- Increased fruit consumption.
- Increased vegetable consumption.
- Increased protein consumption.
- Increased fiber consumption.
- I monitored/decreased the number of calories I ate.
- I exercised more.
- I took laxatives.
- I took diuretics.
- I used self-induced vomiting.
- I skipped meals.
- I fasted.
- I took diet pills.
- I smoked.
- I decreased my fat intake.
- I decreased my sugar/carbohydrate intake.
- I followed a diet.

-Which ones? _____

- Other _____
- None of these

Which of the following methods are you *currently* using? (Select all that apply.)

- Increased fruit consumption.
- Increased vegetable consumption.
- Increased protein consumption.
- I monitored the number of calories I ate.
- I exercised more.
- I took laxatives.
- I took diuretics.
- I used self-induced vomiting.
- I skipped meals.
- I fasted.
- I smoked.
- I took diet pills.
- I decreased my fat intake.
- I decreased my sugar/carbohydrate intake.
- I followed a specific diet.

-Which diet did you follow? _____

- Other _____
- None of these

Do your friends' food choices and portion sizes affect the types of foods and/or the amount of food you choose to consume?

- Yes. How? (choose all that apply)
 - I eat less than I would if I were eating alone.
 - I eat more than I would if I were eating alone.
 - I eat more healthfully than I would if I were eating alone.
 - I eat less healthfully than I would if I were eating alone.
 - Other _____
- No.

Do you order the same entrees as your friends or serve yourself the same foods?

- Yes.
- No.

True or False: I eat differently while away at college than when I eat at home.

- True. How do you eat differently while at college?
-
-

- False.

True or False: Since I have joined a sorority, my eating patterns or diet has changed.

- True. How have your eating patterns or diet changed?
- False.

True or False: I have experienced weight related teasing or rejection from peers in my sorority?

- True.
- False.

Do you feel that the food served at your sorority house meets your dietary needs according to recommendations of the *Food Guide Pyramid*?

- Yes.
- No.

How many meals per week do you consume at your sorority house?

- All of my meals
- 10-13 meals
- 6-9 meals
- 3-5 meals
- 0-2 meals

Of the meals consumed at your sorority house, how many are:

Breakfast? _____
Lunch? _____
Dinner? _____

Where do you most often eat when you do not eat at the sorority house?

- At my residence
- At a restaurant
- At a friend's house
- At a fast food establishment
- I do not eat that meal.
- Other _____

What are some obstacles to eating at your sorority house (Choose all that apply)?

- I have a class that conflicts with meal service.
- I live off campus.
- I do not like what is being served at that meal.
- My close friends aren't eating there for that meal.
- I do not have time.
- I feel self conscious when I eat there.
- I do not have transportation to and from the sorority house.
- I want to get the most for my money.
- I do not like the lack of nutrition labels and the unknown nutrition content of the food.
- The food seems like it is low quality.
- I do not like the times food is served.
- It is inconvenient.
- I do not have time to eat a meal.
- I am not able to use nutrition labels to choose which foods I will eat.
- There is a lack of available parking.

- Other _____
- None of these

What would make you want to eat at your sorority house more often? (Select all that apply)

- If my classes did not conflict with meal service times.
- If I lived on campus.
- If I liked what is being served at each meal.
- If my close friends ate there also.
- If I had time.
- If I did not feel self conscious when ate there.
- If I had transportation to and from the sorority house.
- If I did not have extra money for another meal.
- If the food had available nutrition labels or I knew the nutrition content of the food.
- If the food was higher quality.
- If the food service times were longer.
- If it was more convenient.
- If I had time to eat the meal.
- If there was more available parking.
- Other _____

What is your age?

- 18
- 19
- 20
- 21
- 22
- 23

What is your undergraduate classification?

- Freshman
- Sophomore
- Junior
- Senior

Where are you currently living (while classes are in session)?

- My parent's house
- Northgate
- Off campus Apartment
- Residence Hall
- Sorority House
- Other _____

Are you majoring in science or nonscience field of study?

- Science If science, which of the following categories best states your major?
 - Dentistry
 - Dietetics and Nutrition
 - Engineering science
 - Agricultural science and forestry
 - Medicine
 - Nursing
 - Pharmacy
 - Other _____
- Nonscience If nonscience, which of the following best states your major?
 - Arts and science
 - Business and economics
 - Creative arts
 - Human resources
 - Education
 - Journalism
 - Law
 - Social work
 - Other _____

What is your height? _____

What is your current weight? _____

Rank the following items in order of your priorities (1=highest priority, 5=lowest priority).

- _____ Exercise
- _____ Healthy diet
- _____ Socializing with friends
- _____ School
- _____ Work

Are you satisfied with your current weight?


- Yes.
- No. If no, do you feel you need to lose or gain weight in order to be satisfied?
 - Lose weight
 - Gain weight

Thank you for taking the time to complete this questionnaire. Your participation is greatly appreciated. Please write any additional comments in the space below.

If you have any further questions, please contact Blair Harris at (901) 619-1942 or bsharri1@olemiss.edu.

Additional comments:

APPENDIX C:
Informed Consent Form

	The University of Mississippi Institutional Review Board
Protocol #	<u>09-128</u>
Approval date	<u>3-14-09</u>
Expiration date	<u>March 13 2010</u>
Signature	<u>Diann W. Lindley</u>

CONSENT FORM

Consent to Participate in an Experimental Study

Title: Sorority Members' Diet and Weight Management Practices

Investigator

Blair Harris
Department of Family and Consumer Sciences
100 Lenoir Hall
The University of Mississippi
(901) 619-1942

Advisor

Melinda Valliant, PhD
Department of Family and Consumer Sciences
100 Lenoir Hall
The University of Mississippi
(662) 915-1437

Description

We are conducting a study on the effects of and relationships between sorority meal plans and other factors of sorority members' eating behaviors and weight management practices. In order to gain more information, we are asking you to participate in a short survey developed specifically for the purpose of assessing sorority women as well as a 24 Hour Dietary Recall that will be entered and analyzed in a Nutrient Data System. We ask you to fill out the survey honestly and to the best of your knowledge. Your height and weight will be recorded, and we will collect your completed survey. You will then be asked by the investigator to describe all of the foods you consumed in detail during the previous day. It will take you about 30 minutes to finish both the survey and the dietary assessment.

Risks and Benefits

You may feel slightly uncomfortable answering some questions on the survey if you have/have had an eating disorder; however, we do not think that there are any other risks. Also, we will talk with you about our experiment, and we think you may learn more about the importance of the nutrients contained in foods you consume on a regular basis.

Cost and Payments

The tests will take about 30 minutes to finish, and we will talk to you for about three more minutes. There are no other costs for helping us with this study.

Confidentiality

We will not put your name on any of your tests; instead, your information will be identified by a random number. The only information that will be on your test materials will be your age, height, and weight; therefore, we do not believe that you can be identified from any of your tests.

Right to Withdraw

You do not have to take part in this study. If you begin the study and decide that you do not want to complete it, all you have to do is tell Blair Harris or Dr. Valliant in person, by letter, or by telephone at the Department of Family and Consumer Sciences, 100 Lenoir Hall, The University of Mississippi, University MS 38677, or (662) 915-1437. Whether or not you choose to participate or to withdraw will not affect your standing with your sorority or with the University, and it will not cause you to lose any benefits to which you are entitled. The researchers may terminate your participation in the study without regard to your consent and for any reason, such as protecting your safety and protecting the integrity of the research data.

IRB Approval

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). The IRB has determined that this study fulfills the human research subject protections obligations required by state and federal law and University policies. If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482.

Statement of Consent

I have read the above information. I have been given a copy of this form. I have had an opportunity to ask questions, and I have received answers. I consent to participate in the study.

Signature of Participant

Date

Signature of Investigator

Date

**NOTE TO PARTICIPANTS: DO NOT SIGN THIS FORM
IF THE IRB APPROVAL STAMP ON THE FIRST PAGE HAS EXPIRED.**