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Defining a snack self-definitions and snack patterns of college freshmen

Rachel Ann Kinney
University of Tennessee

To the Graduate Council:

I am submitting herewith a thesis written by Rachel Ann Kinney entitled "Defining a snack self-definitions and snack patterns of college freshmen." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Marsha Spence, Major Professor

We have read this thesis and recommend its acceptance:

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Hollie Raynor

Betsy Haughton

Acceptance for the Council:

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Defining a Snack:
Self-definitions and Snack Patterns of College Freshman

A Thesis
Presented for the
Masters of Science Degree
Nutrition
University of Tennessee, Knoxville

Rachel Ann Kinney
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Abstract

A consistent definition for snacks has not been developed in dietary research despite the significant contribution of snacks to overall dietary intake. The purpose of this research was to examine self-reported definitions of a snack and to examine snacking patterns among a college freshman population. Aim 1 consisted of a qualitative analysis of self-definitions of the word "snack" (n=663). Aim 2 consisted of a quantitative analysis of snack patterns reported from seven-day food records (n=105).

Participants were 18-19 year old entering freshman of a large state university. Aim 1 participants responded to the question "How would you define the word 'snacks'?" and responses were categorized based upon emergent themes. Aim 2 dietary intake was measured using seven-day food records entered into Nutrition Data System for Research for analysis.

Results showed that the three largest snack definition categories were Not a Meal (72%), Small Portion (39%), and Hungry (26%). Twenty-eight percent of respondents' snack definitions were counted in two of the three categories and 12% were counted in all three. All participants consumed at least one snack during the seven-day period. Snacks contributed less calories to overall dietary intake but had a higher energy density than lunch and dinner. The contribution of snacks to participants' dietary intake increased on weekend days versus weekdays.

In conclusion, defining a snack appears to have multiple criteria that may be subjective. Snack choices may be of dietary concern as they are more energy dense than meals. Providing a consistent definition of a snack in dietary assessment research may be needed to determine trends and associations of snack patterns and obesity. Future research examining snack definition criteria should consider the types of food individuals choose to consume as snacks, motivations to snack, and how these differ on weekdays and weekends.

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Part I

Literature Review

Introduction

The prevalence of overweight and obesity is a significant public health problem among all age groups in the United States, including children aged 2 to 19 years (Hedley, Ogden, Johnson, Carroll, Curtin, & Flegal, 2004; Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006; Strauss & Pollack, 2001). Obesity has been linked to several major chronic diseases, including the primary causes of death in the United States (U.S. Department of Health and Human Services, 2001). The significance of overweight and obesity as a health indicator of the American population is demonstrated by the national objective to reduce the proportion of children, adolescents, and adults who are overweight by 2010 (U.S. Department of Health and Human Services, 2000).

Unhealthy weight gain is caused by an energy imbalance: decreased physical activity and excess energy intake from dietary behaviors including energy dense food choices, large portion sizes, and increased frequency of eating occasions (Bell, Castellanos, Pelkman, Thorwart, & Rolls, 1998; Huang, Howarth, Biing-Hwan, Roberts, & McCrory, 2004; Kant & Graubard, 2006; Rolls, Roe, Kral, Meengs, & Wall, 2004; Rolls, Roe, Beach, & Kris-Etherton, 2005; Waller, Vander Wal, Klurfeld, McBurney, Cho, Bijlani, & Dhrandhar, 2004). Increased eating frequency may be due to consuming food between traditional meals (breakfast, lunch, and dinner) and can lead to increased energy intake (Jahns, Siega-Riz, & Popkin, 2001; Kant & Graubard, 2006). However, some research indicates that increased eating frequency may help individuals maintain healthy weights

by stabilizing blood glucose levels and hunger hormones (Huang et al., 2004; Kant & Graubard, 2006; Rolls et al., 2005; Waller et al., 2004).

Eating occasions between traditional meals are often termed snacks. The prevalence of snacking has increased significantly among children and young adults from the 1970's to 1990's (Jahns et al., 2001; Nielson, Siega-Riz, & Popkin, 2002; Zizza, Siega-Riz, & Popkin, 2001). With nearly 90% of Americans consuming at least one snack per day (Kant & Graubard, 2006; Jahns et al., 2001) and the prevalence of snacking increasing more rapidly in younger Americans (Zizza et al., 2001; Nielsen et al., 2002), snacks and snacking should not be overlooked when researching dietary behaviors linked to unhealthy weight gain. Unfortunately, criteria for defining the snack eating occasion are unclear, therefore hindering the ability to determine a relationship between snacks and obesity.

Defining Eating Occasions

Observational studies using 24-hour recalls obtained from a nationally representative sample often allow participants to define their eating occasions. Nationally representative data are primarily used from two sources: National Health and Nutrition Examination Survey (NHANES) and Continuing Survey of Food Intake by Individuals (CSFII).

NHANES has been conducted in five waves: NHANES I (1971-1975), NHANES II (1976-1980), NHANES III (1988-1994), NHANES 1999-2000, and NHANES 2001-2002. Methods across all waves appear to vary in detail and are further discussed as follows.

NHANES I dietary intake was collected using 24-hour recalls administered by a trained interviewer, generally Monday through Friday. NHANES I eating occasion definitions are unclear but appear to define regular meals (i.e. Breakfast, Lunch, and Dinner) and between-meal foods (i.e. Snacks) (Centers for Disease Control and Prevention [CDC], National Center for Health Statistics [NCHS]). During NHANES II, 24-hour recalls were obtained via trained interviewers by asking "specific and qualitative detail of every food or drink consumed during the previous day" (CDC, NCHS, pg. 43). NHANES III recall methods for the 24-hour recalls excluded plain drinking water from the recall. In addition, dietary interviews were conducted in two-person teams allowing interviewers to complete a 10% cross-check of their partners' recalls (CDC, NCHS).

NHANES 1999-2000 used similar methods as previously described for NHANES III. Two 24-hour recalls were collected in this wave; the second recall was scheduled 4 to 10 days after the initial and was conducted via telephone. This wave of NHANES relied on a four pass method of recall, which included obtaining a quick list of foods consumed that day, entering the time, occasion, and place of each eating occasion, obtaining a detailed description of the foods consumed at each eating occasion, and finally reviewing the recall in chronological order. The consumption of plain drinking water was obtained at the end of the dietary recalls (CDC, NCHS). Meal names were determined by meal name cards. Participants had the option to select from: Breakfast, Brunch, Lunch, Dinner, Supper, Snack, and Beverage.

> If a participant was having difficulty defining the snack eating occasions, interviewers were provided with the definition and instructions as follows: “The ‘snack or beverage’ occasions would include a coffee or beverage break, sipping or tasting a food, or a bottle drunk by a toddler. Sometimes you will encounter a SP (study participant) who has trouble classifying something like ‘a few bites’ of cake eaten at a party. If, after probing, the SP still is not able to choose a selection, you may use the word ‘snack’” (CDC,NCHS pg. 28).

The Snack and Beverage categories were combined in the final data collection in addition to Dinner and Supper categories. Foods were coded as mixed component food items, recipe food items, and single food items (CDC, NCHS).

The Continuing Survey of Food Intake by Individuals (CSFII) originated as the Nationwide Food Consumption Survey (NFCS) for 1977-1978. The survey then became CSFII and data were collected for two waves: CSFII 1989-1991 and CSFII 1994-1996. NFCS and CSFII 1989 collected 24-hour recalls as home interviews and two days of self-administered food records. CSFII 1996 collected two 24-hour recalls via telephone and were at least ten days apart (Popkin & Nielsen, 2003). NFCS and CSFII defined eating occasions by allowing the participant to select the appropriate name of the eating occasion from a card (Breakfast, Lunch, Dinner, and Snack). A snack was defined as a “food and/or beverage break” (Hampl, Heaton, & Taylor, 2003, pg. 5).

Methods of obtaining and defining eating occasions appear to be similar among all surveys, but do differ slightly. Self-reported dietary recalls such as NHANES and CSFII may increase snack eating occasions as participants may report only one traditional meal (Breakfast, Lunch, Dinner) despite having multiple, traditional meals. On the contrary, a participant may graze throughout the day or consume small meals throughout the day and categorize all eating occasions as a snack. Self-reported dietary recalls allow the participants to select the name of their eating occasions based upon their internal thoughts and definitions of eating. However, this method of defining eating occasions is very subjective and is not consistent across all participants, decreasing the accuracy of any relationship between eating occasions and health outcomes. de Graaf suggests that eating occasions occur on a regular time schedule (Breakfast in morning, Lunch at mid-day, Dinner in evening) and snacks are eating occasions between these regularly scheduled times (de Graaf, 2006). Past research has considered the social aspects of eating, the caloric amount, the amount of time from one eating occasion to another, and a mix of these criteria to define eating occasions (Gatenby, 1997). In conclusion, no consensus on how to define eating occasions, most notably the snack eating occasions, has been determined.

Snack Occasions

While there is not consensus on how to define eating occasions, research regarding snacking behaviors has been conducted. It is important to note that research regarding snacking behaviors used differing definitions for the term snack or snacking. Research using CSFII and the NFCS examining snack patterns among children and adolescents

found that snack occasions significantly increased over the study period ($p<0.01$) as well as total energy from snacks ($p<0.01$) (Jahns et al., 2001). Within this study, the researchers grouped any food items consumed within a 15-minute period from the beginning time as one eating occasion, rather than multiple, separate occasions (Jahns et al., 2001).

Zizza and colleagues (2001) utilized the same data from CSFII and NFCS to examine snacking behaviors among young adults aged 19-29 years of age. Determining frequency was done in the same method as reported by Jahns and colleagues (2001), where all food items consumed within a 15-minute period were considered one eating occasion. The findings from this study show that the prevalence of snacking (anyone who reported snacking on any day) increased from 77% to 84%. In addition, those who snacked when compared to those who consumed no snacks had a higher intake of carbohydrates, fat, and saturated fat ($p<0.01$) and snacks contributed a total of 23% of total daily energy intake. Kilocalories and energy density of snacking occasions increased significantly ($p<0.01$) as well, while the energy density of meals remained stable. Energy density of snacks during CSFII 94 was 1.32 ± 0.07 kcals/gram while energy density of other eating occasions remained stable at 1.11 ± 0.02 kcals/gram. Energy density was determined by calculating the contribution of foods reported at snacking occasions. Results showed the top contributors of energy from snacks were desserts, sweetened beverages (soda, diet soda, and fruit drinks), alcohol, milk, and salty snack food (Zizza et al., 2001).

These results are similar to those found by Kant and Graubard (2006) who used NHANES I through NHANES 2001-2002 to assess eating behaviors among adults. Methods of determining frequency of eating occasions were conducted differently than those reported by Jahns et al. (2001) and Zizza et al. (2001). This research study determined eating episodes by the discrete number of clock times reported on the 24-hour recall. For example, all food items reported at one time as part of the same eating occasion were considered one eating occasion. To determine consumption of breakfast, evening eating, and snack intake, the researchers grouped eating occasions by AM, Noon, PM, and between meals. Energy density of snacks was calculated considering all foods and beverages consumed at that eating occasion. Results from this study found the number of snack occasions (2.5 ± 0.05 to 2.2 ± 0.04, $p<0.0001$) and the prevalence of snacking (91% ± 0.7 to 86% ± 0.6, $p<0.0001$) among men declined across the survey time periods, but remained the same in women. Energy density of a snack increased across the survey time periods (0.89 kcal/g ± 0.02 to 1.32 kcal/g ± 0.03, $p<0.0001$), similar to that of Zizza and colleagues (2001). The number of eating and snack episodes, reporting a snack, the amount in grams of food and beverages, and the energy density of foods and beverages were positively correlated with higher energy intake ($p<0.0001$) (Kant & Graubard, 2006).

Snacks' contribution to energy intake and association with BMI was examined by Hampl and colleagues (2003). This study used data from CSFII 1994-1996 examining these relationships among adults. The study results suggested that those who consumed

multiple snacks had a higher energy intake than those who never consumed snacks or those who only snacked once per day ($p<0.0001$). However, there was no difference in BMI among these groups (Hampl et al., 2003).

Energy Density

Energy density can be calculated using various methods. Cox and Mela (2000) conducted a study using eight different methods. Methods ranged from food only, food and liquid meal replacement, food and energy containing beverages, food and all beverages (including water), and food and selected beverages. Energy density across all methods ranged from 5.02 kcal/g (food only and food and liquid meal replacement) to 0.76 kcal/g (food and all beverages) (Cox & Mela, 2000). As previously discussed, Zizza and colleagues (2001) calculated energy density by including all foods reported at the snack eating occasion, including some beverages. However, it is unclear whether plain drinking water was considered with this calculation. Kant and Graubard (2006) calculated energy density by including all foods and beverages during a snack occasion. NHANES methods have varied across the survey waves and it is unclear whether plain drinking water was considered as part of a snack in earlier survey waves. Energy density of snacks from these studies ranged from 0.85 to 1.37 kcal/g (Kant & Graubard, 2006) and 1.05 to 1.32 kcal/g (Zizza et al., 2001).

If snacks are defined as a high energy dense food item consumed between meals, rather than any food item consumed between meals (including both low and high energy dense foods), nutritionists should be concerned with what Americans are

commonly choosing to consume as snacks (e.g. fruits and vegetables versus chocolate chip cookies) and not the snacking behavior. Researchers conducting dietary assessments have expressed great concern for the inconsistency of snack definitions within the literature as it is difficult to establish a relationship between snack patterns and obesity (Gregori & Maffeis, 2007). Researchers have called for a universal snack definition to define clearlyunhealthy eating patterns and its link to obesity (Gregori & Maffeis, 2007).

College population and dietary patterns

College freshman are at risk for unhealthy eating patterns including lack of diet variety and decreased intake of fruits and vegetables (Haberman & Luffey, 1998; DeBate, Topping, & Sargent, 2001) that may lead to weight gain while transitioning to young adult life. Young adults aged 18 to 19 years enrolled in college may differ from their peers not enrolled in college due to environmental factors, including dorm rooms, on-campus dining facilities with all-you-can-eat style buffets, and class schedules that may lead to abnormal sleep schedules (Hoffman, Policastro, Quick, & Lee, 2006; Levitsky, Halbmaier, & Mrdjenovic, 2004). This transition period of weight gain in college students is often termed the “Freshman 15.” The weight change noted in college freshman has been studied and despite results not supporting the “Freshman 15” weight gain, significant weight changes have been observed over the first year of college (Anderson, Shapiro, & Lundgren, 2003; Hoffman et al., 2006; Levitsky et al., 2004; Morrow, Heesch, Dinger, Hull, Kneehans, & Fields, 2006). Despite the significant weight gain and significant increase in body mass index (BMI) observed, the BMI

remained within the normal-weight range (Anderson et al., 2003; Hoffman et al., 2006; Levitsky et al., 2004; Morrow et al., 2006).

Levitsky and colleagues (2004) conducted a study at Cornell University with 60 freshman students. Participants completed two questionnaires that evaluated dietary, sleeping, and exercise behaviors from their high school to freshman year of college lifestyle. Also, each participant completed height and weight measurements to assess change in body weight. When examining factors that contribute to weight gain and controlling for previous weight status, the consumption of junk foods explained 24% of the weight gain, followed by recent dieting (9%), amount of evening snacks (6%), eating lunch at a restaurant (5%), eating at a "pay for cash" facility (4%), number of hours of sleep (4%), and 29% was unexplained. Consuming meals in all-you-can-eat style facilities was positively associated with eating larger size meals (r=0.465) (Levitsky et al., 2004.) These results suggest junk foods and snacking behaviors may have a strong role in freshman weight gain.

Altered lifestyle patterns that lead to increased consumption of junk food and snacking (Levitsky et al., 2004) are key factors when examining the common weight gain experienced by college freshmen (Anderson et al., 2003; Hoffman et al., 2006; Levitsky et al., 2004; Morrow et al., 2006). Although previous study results do not support the theory behind the "Freshman 15" weight gain, significant weight changes have been observed over the first year of college (Anderson et al. 2003; Hoffman et al. 2006; Levitsky et al. 2004; Morrow et al. 2006). For these reasons, this population may be

ideal for researching unhealthy meal patterns leading to weight gain due in part to lifestyle changes that affect snacking behaviors. However, research focusing on snack behaviors of college freshman is inconsistent in the literature.

Secondary Data Analysis

Secondary data are the utilization of another data source that was developed for purposes other than the primary research question. NHANES and CSFII are both examples of secondary data sources. One advantage to using secondary data are cost and time savings. The time and money spent on data collection have already taken place, allowing the researcher to analyze the data immediately. Collecting large, national representative samples can be costly and not all researchers can afford the expense. Because large samples yield stronger, more reliable results, studies such as NHANES and CSFII are ideal when researching dietary eating behaviors of the nation. If a research question is examining one specific population, secondary data may not be ideal. Disadvantages of using secondary data can include lack of data available for the specific research question (a specific region, study population, etc.), the original data collection process may not have obtained all variables that are needed to answer the research question, and the many obstacles faced in data collection are now unknown to the researcher (Boslaugh, 2007).

This study described in this thesis utilized secondary data from two studies, “Promoting Happy, Healthy UT Graduates” and its adjunct study, “Life in Motion,” to examine the study aims. By using secondary data, this study was conducted under the collaboration

of an interdisciplinary team at the University of Tennessee. The researcher of the present study had an established working relationship with the Primary Investigator of "Promoting Happy, Healthy UT Graduates" in addition to working on the research collection team for the "Life in Motion" study. This opportunity provided the researcher with the ability to identify data collection problems that were faced during the study, which under other circumstances would be unknown when using secondary data. The large sample size of college freshman and the collection of 7-day food records (not a 24-hour recall) are advantages of this data set. The breadth of data collected may not have been possible with a small research team and limited resources. Disadvantages of utilizing secondary data from these two studies include incomplete demographic information for the "Life in Motion" study that may have otherwise been collected. In addition, the design of the two studies could have been better interfaced to examine the research aims.

Research Aims

As with all eating occasions, snacking patterns may differ between and within individuals. To aid with research in examining the influence of snacking on dietary intake and health outcomes, increased understanding regarding snacking patterns is necessary. To date, research examining definitions of a snack and actual snacking patterns is lacking in the literature. This study consisted of two aims: (1) increase understanding of how a snack is defined among the freshman college population using qualitative analysis of self-definitions of the term "snack:; and (2) identify meal and

snack patterns of college freshman's daily dietary intake using quantitative analysis reported from seven-day food records.

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Part II

Defining a Snack:

Self-definitions and Snack Patterns of College Freshmen

Introduction

The prevalence of overweight and obesity is a significant public health problem among all age groups in the United States, most notably in children aged 2 to 19 years (Hedley, Ogden, Johnson, Carroll, Curtin, & Flegal, 2004; Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006; Strauss & Pollack, 2001). Obesity has been linked to several major contributors to chronic diseases, including the primary causes of death in the United States (U.S. Department of Health and Human Services, 2001). Unhealthy weight gain is caused by an energy imbalance: decreased physical activity and excess energy intake from dietary behaviors including energy dense food choices, large portion sizes, and increased frequency of eating occasions (Bell, Castellanos, Pelkman, Thorwart, & Rolls, 1998; Huang, Howarth, Biing-Hwan, Roberts, & McCrory, 2004; Kant and Graubard 2006; Rolls, Kral, Meengs, & Wall, 2004; Rolls, Roe, Beach, & Kris-Etherton, 2005; Waller, Vander Wal, Klurfeld, McBurney, Cho, Bijlani, & Dhrandhar, 2004). Increased eating frequency may be due to consuming food between traditional meals (breakfast, lunch, and dinner) and can lead to increased energy intake (Jahns,Siega-Riz, & Popkin, 2001; Kant & Graubard, 2006). However, some research indicates that increased eating frequency may actually help individuals maintain healthy weights by stabilizing blood glucose levels and hunger hormones (Huang et al., 2004; Kant & Graubard, 2006; Rolls et al., 2005; Waller et al., 2004).

Eating occasions between traditional meals are often termed a snack. The prevalence of snacking has increased significantly among children and young adults from the

1970's to 1990's (Jahns et al., 2001; Nielson, Siega-Riz, & Popkin, 2002; Zizza, Siega-Riz, & Popkin, 2001). With nearly 90% of Americans consuming at least one snack per day (Kant & Graubard, 2006; Jahns et al., 2001) and the prevalence of snacking increasing more rapidly in younger Americans (Zizza et al., 2001; Nielsen et al., 2002), snacks and snack patterns should not be overlooked when researching dietary behaviors linked to unhealthy weight gain.

Even though snack patterns may be very important for obesity research, criteria for defining the snack eating occasion are unclear and hinder the ability to determine a relationship between snacks and obesity. Nationally representative dietary assessment research, such as National Health and Nutrition Examination Survey (NHANES) and Continuing Survey of Food Intake by Individuals (CSFII), utilized 24-hour recalls and allowed the participants to self-define their eating occasions (breakfast, lunch, dinner, or snack) (Jahns et al., 2001; Kant & Graubard, 2006; Zizza et al., 2001). If a participant was unable to define the snack eating occasion, research protocols were used.

> Protocols for NHANES 1999-2000 state: "The 'snack or beverage' occasions would include a coffee or beverage break, sipping or tasting a food, or a bottle drunk by a toddler. Sometimes you will encounter a SP (study participant) who has trouble classifying something like 'a few bites' of cake eating at a party. If, after probing, the SP is still not able to choose a selection, you may use the word 'snack.'" (CDC, NCHS pg.28).

While this method allows the participants to consider their own criteria for defining each eating occasion, it does not inform researchers of the unique criteria that the participants' used to categorize the eating occasions.

Researchers conducting dietary assessments have expressed great concern for the inconsistency of snack definitions within the literature and believe a universal snack definition may be the resolution to define clearly unhealthy eating patterns and the link to obesity (Gatenby, 1997; Gregori & Maffeis, 2007).

College freshman are at risk for unhealthy eating patterns, including lack of diet variety and decreased intake of fruits and vegetables (Haberman & Luffey, 1998; DeBate, Topping, & Sargent, 2001) which may lead to weight gain while transitioning to young adult life. Some research has shown college students with a body mass index (BMI) within a healthy range are more likely to report snacking (Brunt, Rhee, & Zhong, 2008). However, altered lifestyle patterns that lead to increased consumption of junk food and snacking are key factors when examining the common weight gain experienced by college freshman (Anderson, Shapiro, & Lundgren, 2003; Hoffman, Policastro, Quick, & Lee, 2006; Levitsky, Halbmaier, & Mrdjenovic, 2004; Morrow, Heesch, Dinger, Hull, Kneehans, & Fields, 2006). For these reasons, this population may be ideal for researching meal and snack patterns that could lead to weight gain. However, little research has been conducted on snack patterns in the college freshman population.

Snack choices may differ between individuals and within an individual. Self-definitions of a snack are pertinent in dietary research as they acknowledge the individualization of

eating occasions. To our knowledge, research examining definitions of a snack and snack patterns among college students is lacking in the literature. This study consisted of two aims. Aim 1 was to examine self-definitions of the term “snack” among college freshman. Aim 2 was to identify meal and snack patterns of college freshmen’s daily dietary intake as reported from seven-day food diaries. Approval for this study was obtained from the University of Tennessee Institutional Review Board.

Aim 1

Methods

Participants and Design

Aim 1 was completed by using cross-sectional data collected by the University of Tennessee from a two-part, web-based survey about health beliefs and behaviors. Permission to utilize this database was secured from the primary investigator. The survey was created using mrInterview^{TM} software (SPSS, 2005) and an email invitation to complete the survey was sent to all incoming traditionally aged (18 to 22 years old) freshmen at a large, Southeastern university during the time period of July and August 2006. Eligibility criteria included having an eligible student identification number and being at least 18 years-of-age. A recruitment e-mail was sent to all eligible participants (n= 3,951.) Consent was obtained from participants by clicking on a link and reviewing study information provided in the recruitment e-mail. After reading the study information, the participants then clicked the web-survey link, which acknowledged

consent to participant and linked them to the actual online survey instrument. The survey was open for four weeks and reminder e-mails were sent on a weekly basis. Participants were entered into a drawing to win one of 100 iPods for each survey section completed to compensate them for their time.

Of the eligible participants, 1,289 (32.6%) participated in part one of the web-based survey and 1,100 (27.8%) participated in part two, which contained the study question for the first aim of the study. The final sample consisted of 663 students who replied to the study question (60.3% of those who participated and 16.8% of those eligible to participate).

Data Collection

The question, "How do you define the word 'snack'?" was asked as an open-ended, non-mandatory question in part two of the survey. Age, gender, and race variables were derived from University admission records and linked to each participant's respective survey data via student identification number by a University statistician.

Data Analysis

To better understand how college freshman defined a snack, responses to the study question, "How do you define the word 'snack'?" were uploaded into SPSS Text Analysis for Surveys (SPSS, Version 2.1). This program uses a natural language

process to group words. Initially, 26 broad categories were formed (see Table 1 for more detailed categorization) including: meals, food, portion, hunger, chips, fruit, social gatherings, tide, lunch, snack, cakes, crackers, sweets, breakfast, time, energy, courses, drink, stomach, cereal, item, curb, salad, intake, extras, and uncategorized. Responses were not mutually exclusive to reflect the multi-faceted aspects of snacking, so an individual's response could be included in several definition categories. These categories were examined by the researcher to condense and categorize based upon emergent themes. For example, the initial categories of chips, fruit, cakes, crackers, cereal, and salad were combined to form the definition category of Type of Food. In addition, the researcher examined each individual response to determine accuracy of the categorization and to assure that no other themes were implied within the definition. For example, "Small portions of food between meals; usually junk food," included definition categories of Small Portions, Not a Meal, and Type of Food. In the response, "Something to hold over until next meal, nothing more than a few bites" was categorized into Hunger, Not a Meal, and Small Portion.

Self-definitions were independently coded by two research assistants to assure accuracy and verify results. Both research assistants developed seven definition categories, six of which matched. The category Small Portion had 95% agreement (Kappa=0.85), Not a Meal had 92.5% agreement (Kappa=0.85), Quick and Easy had 99.5% agreement (Kappa=0.87), Not Hungry had 98.2% agreement (Kappa=0.52), Types of Food had 94.4% agreement (Kappa=0.57), and Hungry had 87.5% agreement

(Kappa=0.38). Both research assistants developed a definition category that did not coincideL Caloric Amount and Energy. Both categories contained very few responses with a total of 10 and 11 responses, respectively. One research assistant consistently categorized more responses than the other, decreasing the agreement rate and correlated Kappa value.

Results

The final sample consisted of 663 participants who responded to the study question. Of those who responded, 58.1% (n=385) were female, 92.1% (n=567) were white, and 89.4% (n= 592) were 18 years of age (see Table 1). Based on survey responses, snack definition categories are presented in Figure 2. Not a Meal was the most commonly reported self-definition of a snack, reported by 71.6% (n= 475) of participants followed by Small Portion (38.8%, n= 257) and Hungry (26.4%, n= 175). Twenty-eight percent (n= 186) of participant responses were counted in two of the three main definition categories. All three of the main definition categories were included in 12% (n= 80) of responses. Other definition categories included Types of Food (16.1%, n=107), Not Hungry (4.1%, n=27), Quick and Easy (2.9%, n=19), and Caloric Amount (1.5%, n=10).

Aim 2

Methods

Participants and Design

Of the participants who completed the web-based survey in Aim 1, 111 were recruited via the web-survey used in Aim 1 to complete an adjunct lifestyle study about health behaviors. Within the survey, a question regarding their interest in participating in future research triggered a new list of participants who were contacted to participate in this phase of the study. Upon recruitment, informed consent was collected from all participants.

This study was a prospective design where participants were asked to complete a seven-day food and physical activity record, wear an accelerometer, and complete a body composition assessment. For the purposes of this study, only the seven-day food record was used. Of the 111 participants enrolled, four participants did not complete the seven-day food record and two participants only completed six days of the food record. All six participants were excluded from the study. The final sample consisted of 105 participants with completed diet records.

Data Collection

Food records were collected from August 2006 to October 2006. Dietary intake data were collected and analyzed using Nutrition Data System for Research software Version 2006, developed by the Nutrition Coordinating Center (NCC), University of Minnesota, Minneapolis, MN. Protocols for collecting seven-day food records were

derived from materials provided by NCC. Each participant met with a trained research assistant prior to completing the seven-day food records to receive the materials with a brief instruction and sample food diary for completion. The food record required the participant to list the name of the food item, amount consumed, time of consumption, and meal classification (breakfast, lunch, dinner, or snack). Participants were asked to record the brand name of products and name of the dining facility. Participants were provided visual examples of food items accompanied by an example of how to record the food items properly. Directions on the food records instructed participants to record the time of consumption and identify the eating occasion as breakfast, lunch, dinner, or snack. Directions did not discourage reporting multiple meals in one day (i.e. two breakfasts in one day). After completing the food record, students returned to meet with a trained research assistant to review their food records for completion and probe for additional details.

Food records were entered into an NDSR data file from November 2006 through March 2007, using the standard entry rules developed by NCC. If no data entry rule was applicable to a food item, the project manager developed an entry rule. Food items identified as the same eating occasion and consumed within 30 minutes of each other were considered one eating occasion by the research assistant. For example, if a participant reported breakfast at 9 a.m. and again at 9:30 a.m. with no other eating occasion listed between them, the research assistant considered it one eating episode

(one breakfast, not two separate breakfasts). Once all food records were initially entered, each record was manually checked to ensure consistency and accuracy.

Variables

Independent variables for this analysis were gender, race, eating occasions and weekday/weekend classifications. Gender was obtained via University records and was missing for eight participants. For all analyses examining gender, the final sample size was n=97. Race was obtained via the University records (Alaskan Native, American Indian, Asian, black or African American, Native Hawaiian or Pacific Islander, or white). Due to the small sample of minorities, two final race categories were formed: white and Non-white. Race information was missing for nine participants. For all analyses examining race, the final sample size consisted of 96 participants. Eating occasions were defined from the self-report seven-day food records as breakfast, lunch, dinner, or snack. Weekday and weekend classifications were determined using the date of intake provided on the seven-day food record. Each individual reported five weekdays and two weekend days.

Dependent variables for this analysis were nutrients including: kcals, gram amount of food, grams of carbohydrates, grams of added sugars, grams of protein, grams of fat, and grams of saturated fat. Energy density was measured as kcal/grams for each eating occasion. Because energy density cannot be 'zero,' if a participant skipped an eating occasion, that participant was removed from the energy density analyses. The sample size for energy density by eating occasion was 100 participants. When

examining energy density by gender and race, the sample size was 93 and 82 participants, respectively. However, when examining energy density by weekday/weekend intake, the sample size fell to 58 participants. To examine three-way interactions of energy density by gender, weekday/weekend intake, and eating occasion, the sample size was 53 (37 Female, 16 Male) and the sample size for energy density by race, weekday/weekend intake, and eating occasions was 53 (43 white, 10 non-white). The sample size to examine three-way interactions was too small for accurate analyses.

Data Analysis

To identify meal patterns and contribution of snacks to freshman students' overall dietary intake, mean daily totals across the seven-day period were obtained. If a meal or snack eating occasion was not listed on the food record, the researcher assumed the participant did not consume it that day. In this case, a 'zero' was entered to calculate the mean daily intake across the seven-day period for that eating occasion. For example, one participant did not report consuming breakfast across the seven-day period except one day on which two breakfasts were consumed, totaling 617 calories. The researcher entered 'zero' for all days breakfast was not consumed to average 88 calories across the seven-day period rather than 617 calories. Energy density was calculated excluding water and other calorie-free beverages (diet soda, plain coffee, tea, etc.) for all eating occasions.

In addition to differences in eating occasions, differences between weekday and weekend intake and gender were examined. The mean intake of five weekdays was compared to the mean intake of two weekend days in the seven-day food record. By not using an equal number of weekdays and weekend days to obtain a mean, the weekday mean intake may be more representative than the mean weekend intake. Regardless, this method does reflect the true intake of a seven-day period.

Descriptive statistics including snacking prevalence and frequency, calculated as mean ± standard deviation, were determined. To examine differences between eating occasions and variables, repeated measures Analysis of Variance (ANOVA) using the within subject factor of eating occasion i.e., breakfast, lunch, dinner, and snack, significance at $p<0.05$. Post-hoc tests of Pairwise comparisons with a Bonferonni adjustment were completed. Repeated measures ANOVA with the between subject factor of gender and within subject factor of eating occasion was used to examine intake differences by gender and eating occasions. Repeated measures ANOVA with the between subject factor of race and within subject factor of eating occasion was used to examine intake differences by race and eating occasions. Repeated measures ANOVA using a within subject factor of weekday/weekend and within subject factor of eating occasion was used to determine intake differences by weekday/weekend and eating occasions. To examine three-way interactions, repeated measures ANOVA using the between subject factors of gender and weekday/weekend and within subject factor of eating occasion was used to examine intake differences by gender on

weekday/weekend by eating occasion. To examine intake differences by race, weekday/weekend, and eating occasion, repeated measures ANOVA using the between subject factors of race and weekday/weekend and within subject factor of eating occasion was used.

Results

The final sample demographics were 62.9% (n=61) female and 37.1% (n=47) male; 81.3% (n=78) of participants identified themselves as were white and 18.7% (n=18) black. Demographic information is incomplete for gender (n=8), race (n=9), and age (n=8). Of those participants who did not complete seven-day food records, four participants were male, one female and all five participants were white. Chi Square analyses showed no significant relationship between gender and race (p=0.179) or gender and age (p=0.675).

Snacking descriptive statistics are presented in Table 2. All participants reported snacking at least once during the seven-day period. The mean number of snacks consumed per day was 1.4 ± 0.87 and per week was 9.82 ± 6.12. When considering only days when snacks were consumed over the seven-day period, the mean number of snacks consumed per day increased to 1.81 ±0.72. The mean number of days on which snacks were consumed was 5.14 ± 1.76.

Repeated measures ANOVAs were used to determine significant nutrient differences by eating occasions. Significant differences between meals were found for kcals, gram amount of food, energy density, grams of carbohydrates, grams of added sugars, grams

of protein, grams of fat, and grams of saturated fat. To determine how eating occasions differed, paired sample t-tests were completed. The mean nutrient descriptive statistics and results of these comparisons are presented in Table 3.

Significant differences were found for kcals by eating occasion, $F(3,102)= 34.349$, $p<0.001$. Snacks consisted of significantly fewer kcals (437.88 kcal ± 29.09) than lunch (621.28 kcal ± 25.66, $p<0.001$) and dinner (745.62 kcal ± 29.60, $p<0.001$), but did not differ from breakfast (374.14 kcal ± 24.63, $p=0.602$).

Significant differences were found for gram amount of food by eating occasion, $F(3,102) = 16.408$, $p<0.001$. Snacks were significantly smaller amount in grams (395.98g ± 31.98) than dinner (549.25g ± 27.33, $p=0.003$), but did not differ from breakfast (306.73g ± 20.64, $p=0.150$) or lunch (459.44g ± 19.57, $p=0.402$).

Significant differences were found for energy density by eating occasion, $F(3, 97)= 3.050$, $p=0.032$. Snacks were significantly more energy dense (1.94 kcal/g ± 0.11) than lunch (1.61 kcal/g ± 0.05, $p= 0.025$) and dinner (1.62 kcal/g ± 0.04, $p=0.025$), but did not differ from breakfast (1.65 kcal/g ± 0.08, $p=0.07$).

Significant differences were found for carbohydrates by eating occasion, $F(3,102)= 11.718$, $p<0.001$). Snacks had significantly fewer grams of carbohydrates (64.55g ± 4.24) than dinner (88.92g ±3.97, $p<0.001$). There were no significant differences for carbohydrates at breakfast (56.32g ± 3.86, $p=0.862$) or lunch (75.65g ± 3.21, $p=0.217$).

Significant differences were found for added sugars by eating occasion, $F(3,102)=4.457$, $p=0.006$). Snacks contained significantly more grams of added sugars (32.43g ± 2.55) than breakfast (22.94g ± 1.90, p=0.021) and lunch (24.41g ± 1.68, p=0.024). There was no significant difference at dinner (27.22g ± 1.76, p=0.560).

Significant differences were found for protein by eating occasion, $F(3,102)=81.606$, $p<0.001$. Snacks contained significantly less grams of protein (9.12g ± 0.70) than lunch (22.93g ± 1.01, p<0.001) and dinner (28.55g ± 1.17, p<0.001). There was no significant difference at breakfast (10.80g ± 0.80, p=0.743).

Significant differences were found for fat by eating occasion $F(3,102)=57.207$, $p<0.001$. Snacks contained significantly less grams of fat (14.92g ± 1.17) than lunch (25.81g ± 1.22, p<0.001) and dinner (30.94g ± 1.28, p<0.001). There was no significant difference at breakfast (12.60g ± 0.95, p=0.747).

Significant differences were found for saturated fat by eating occasion, $F(3,102)=50.710$, $p<0.001$. Snacks contained significantly less saturated fat (5.20g ± 0.41) than lunch (8.77g ± 0.48, p=0<0.001) and dinner (10.75g ± 0.49, p<0.001). There was no significant difference at breakfast (4.16g ± 0.33, p=0.321).

Repeated measures ANOVA were used to determine significant differences of nutrients at eating occasions by gender. Significant eating occasion by gender interactions were found for kcals, gram amount of food, grams of carbohydrates, and grams of protein. No significant gender effect was found for energy density, grams of added sugars,

grams of fat, or grams of saturated fat. To explore this interaction, independent sample t-tests were run comparing eating occasion by gender. Mean nutrient intakes at each eating occasion by gender for significant nutrient interactions are presented in Table 3.

The results showed that differences in kcals by gender and eating occasion were significant $F(3,93)= 3.478$, $p=0.019$. Gender differences were found for lunch ($p<0.001$) and snack ($p=0.004$). For lunch and snacks, the males had a higher mean intake of kcals (762.87 kcals ± 39.64 and 509.72 kcals ± 49.03) compared to females (528.42 kcals ± 30.46 and 409.54 kcals ± 37.67). No significant differences were found for breakfast ($p=0.919$) or dinner ($p=0.108$).

The results showed that differences in gram amount of food by gender and eating occasion were significant $F(3,93)= 2.815$, $p=0.043$. Gender differences were found for lunch ($p<0.001$), dinner ($p=0.015$), and snack ($p=0.004$). At lunch, males had a significantly greater intake amount in total grams (572.35g ± 31.12) compared to females (393.38g ± 23.91). For dinner, males had a higher mean intake (669.17g ± 46.17) than females (482.95g ± 35.47). Snacks were significantly larger in grams for males than females, 527.90g ± 53.55 and 329.14g ± 41.13, respectively. No significant differences were found for breakfast ($p=0.725$).

The results showed significant differences in grams of carbohydrates by gender and eating occasion, $F(3,93)= 3.072$, $p=0.032$. Gender differences were found for lunch ($p<0.001$) and dinner ($p=0.013$). At lunch, males had a significantly higher mean intake of carbohydrates (95.93g ± 5.02) compared to females (63.85g ± 3.86). For dinner,

males had a higher mean intake (104.35g ± 6.72) than females (63.85g ± 3.86). No significant differences were found for breakfast (p=0.960) or snacks (p=0.086).

The results showed significant differences in grams of protein by gender and eating occasion, $F(3,93)= 4.776$, p=0.004. Gender differences were found for lunch (p<0.001) and dinner (p=0.007). At lunch, males had a significantly greater mean intake of protein (28.15g ± 1.53) compared to females (19.23g ± 1.18). For dinner, males had a higher mean intake (33.01g ± 41.95) than females (25.51g ± 1.50). No significant differences were found for breakfast (p=0.901) or snacks (p=0.322).

Repeated measures ANOVA were used to determine significant differences of nutrients at eating occasions by race. No significant race effect was found for any nutrients (results not shown).

Repeated measures ANOVA were used to determine significant differences of nutrients at eating occasions by weekday/weekend intake. Significant eating occasion by weekday/weekend interactions were found for kcals, gram amount of food, grams of carbohydrates, grams of added sugars, and grams of saturated fat. No significant weekday/weekend effect was found for energy density, grams of protein, or grams of fat. To explore this interaction, paired sample t-tests were run comparing weekday/weekend for each eating occasion. Mean nutrient intakes at each eating occasion by weekday/weekend for significant nutrient interactions are presented in Table 4.

The results showed that there were significant differences for kcals by weekday/weekend intake and eating occasion, $F(3,102)= 4.570$, p=0.005. Weekday/weekend differences were found for breakfast (p=0.023) and snack (p=0.006). At breakfast, mean weekday intake of kcals was significantly greater (398.24 kcals ± 29.25) compared to weekend intake (313.86 kcals ± 30.57). However, mean kcal intake of snacks on weekdays was significantly less (406.85 kcals ± 28.67) than weekends (515.45 kcals ± 44.34). No significant differences were found for lunch (p=0.158) or dinner (p=0.113).

The results showed that there were significant differences for total grams by weekday/weekend intake and eating occasion, $F(3,102)= 4.587$, p=0.005. Weekday/weekend differences were found for breakfast (p=0.003), dinner (p=0.031), and snacks (p=0.010). At breakfast, mean weekday amount consumed in total grams was significantly more (333.41g ± 25.06) compared to weekend intake (240.02g ± 24.55). At dinner, mean weekday amount consumed was 570.14g ± 28.45 and on a weekend was 497.03g ± 37.31. However, mean amount of snacks consumed in grams on weekdays was significantly less (362.87g ± 30.07) than weekends (478.75g ± 52.19). No significant differences were found for lunch (p=0.447).

The results showed that there were significant differences for grams of carbohydrates by weekday/weekend intake and eating occasions, $F(3,102)= 4.570$, p=0.005. Weekday/weekend differences were found for breakfast (p=0.007) and snack (p=0.018). At breakfast, mean weekday intake of carbohydrates was greater at 60.41g ± 4.45

compared to weekend intake of 46.10g ± 4.65. However, mean carbohydrate intake of snacks on weekdays was significantly less (60.71g ± 4.17) than weekends (74.15g ± 6.45). No significant differences were found for lunch (p=0.093) or dinner (p=0.094).

The results showed that there were significant differences for grams of added sugars by weekday/weekend intake and eating occasion, $F(3,102)= 2.758$, p=0.046). Weekday/weekend differences were found for breakfast (p=0.020) and snack (p=0.026). At breakfast, mean weekday intake of added sugars was significantly greater (24.62g ± 2.16) when compared to weekend intake (18.74g ± 2.32). However, mean added sugar intake of snacks on weekdays was significantly less (30.36g ± 2.39) than weekends (37.61g ± 3.99). No significant differences were found for lunch (p=0.554) or dinner (p=0.548).

The results showed that there were significant differences for grams of saturated fat by weekday/weekend intake and eating occasion, $F(3,102)= 3.173$, p=0.027. Weekday/weekend differences were found for breakfast (p=0.028) and snack (p=0.038). At breakfast, mean weekday intake of saturated fat was significantly greater (4.51g ± 0.43) when compared to weekend intake (3.27g ± 0.38). However, mean saturated fat intake of snacks on weekdays was significantly less (4.85g ± 0.40) than weekends (6.06g ± 0.64). No significant differences were found for lunch (p=0.918) or dinner (p=0.062).

Repeated Measures ANOVA was used to determine an interaction of eating occasion, race and weekday/weekend intake for each nutrient. A significant three-way interaction

was found for protein, *F*(3,92)=3.423, p=0.020. To explore this interaction, weekday and weekend protein intake differences were compared using paired sample t-tests for each eating occasion and within each race. No significant differences were found between weekday and weekend protein intake for breakfast (p=0.418), lunch (p=0.341), dinner (p=0.086), and snack (p=0.305) for white participants. However, significant differences were found for lunch (p=0.038) and snack (p=0.049) for non-white participants. For non-white participants, protein intake at lunch on weekdays was significantly higher (26.06g ± 2.94) than weekends (17.04g ± 2.86). However, for snacks, weekday intake of protein was lower (8.75g ± 1.75) when compared to weekends (14.00g ± 2.80). No differences were found with breakfast (p= 0.052) and dinner (p=0.348). The results of these findings are presented in Table 5.

Repeated Measures ANOVA was used to determine an interaction of eating occasion, gender and weekday/weekend intake for each nutrient. There were no significant interactions (results not shown).

Discussion

The purpose of this study was to understand snack definition criteria of a college freshman population and to identify meal and snack patterns of college freshman's daily dietary intake. Aim 1 results show snack definitions appear to have multiple criteria that are subjective to the individual consuming it. Most participants (71.6%, n=475) included the criteria of Not a Meal (i.e., not breakfast, lunch, or dinner) when defining a snack.

However, following Not a Meal was the snack definition category of Small Portion (38.8%, n=257) and Hungry (26.4%, n=175). Small Portion indicated that a snack is a smaller amount of food than what is consumed in meals, (i.e. “a few bites”) and the Hungry category indicates that a snack is consumed when Hungry, (i.e. “something to tide me over”) (versus Not Hungry, which was also a category). Current dietary assessment such as NHANES 1999-2000 and CSFII acknowledge the snack definition category of Not a Meal (food and/or beverage break) and Small Portion (a few bites) but do not identify the category of Hungry (Hampl et al., 2003; CDC, NCHS). It is important that dietary recalls use the same method and protocols of defining a snack occasion for all survey waves. However, providing a participant with a definition of each eating occasion may be considered probing and alter dietary recall results. It remains important that studies consistently define eating occasions, as inconsistency is noted even in previous waves of the same survey.

Aim 2 of this study was to identify meal and snack patterns of college freshman’s daily dietary intake. Our results showed snacking was a common meal pattern in college freshman, as 100% of participants reported snacking within the seven-day period. Snacks contributed less to overall daily nutrient intake than lunch and dinner and were similar to breakfast in dietary contribution. Males consumed more kcals and gram amount of food in snacks than females. The amount of snacks as measured in grams increased on weekends, as did kcals, grams of carbohydrates, grams of added sugars, and grams of saturated fat.

Study results suggested snacking was a common, daily practice among college freshmen as 100% of study participants reported consuming a snack at least once during the seven-day study period. This result was higher than that found by previous research, which showed 86% of Americans reporting snack consumption in 24-hour recalls collected during NHANES 1999-2002 (Kant & Graubard, 2006). When examining snack prevalence among young adults, Zizza and colleagues (2001), found 84% of young adults were snacking from 24-hour recalls collected during CSFII 1994-1996. Our results may be higher than those previously found due to the specific study population of college freshmen. The college environment may promote less structured meal times, increased social activities, and other environmental factors that promote snacking when compared to environments of high school students or young adults not enrolled in college.

The mean number of snack episodes was 1.4 per day and 1.81 per day when looking at days when snacking was reported. Previous research using data from CSFII 1994-1996 found 1.97 snack episodes among children and adolescents ages 12-18 years old (Jahns et al., 2001) and 1.92 snack episodes among adolescents and young adults ages 19-29 years old (Zizza et al., 2001). These differences may be due to the use of seven-day food records in this study, while the other studies used 24-hour recalls. To our knowledge, no research has been conducted on snack consumption using seven-day food records. Study methods using other dietary assessment measures, such as 24-hour recalls, may be less accurate when examining eating patterns (Klesges, Eck, &

Ray, 1995; MacDiarmid & Blundell, 1998). College students may have different schedules (class schedules, organization/ social activities) on certain days of the week that may impact the amount of snacking each day, allowing a seven-day food record to capture differences in eating patterns within an individual.

Snacks had significantly fewer kcals than lunch and dinner, were significantly smaller amount in grams than dinner and had significantly fewer grams of protein, fat, and saturated fat than lunch and dinner. However, snacks did have significantly more grams of added sugar than dinner and a higher energy density than lunch and dinner. This finding provides insight as to how dietary assessment participants are defining a snack, supporting the Small Portion definition category found in Aim 1. Snacks are a smaller portion (measured in amount of grams) than dinner and have fewer kcals than lunch and dinner. However, despite these findings, the energy density of snacks was significantly higher than lunch and dinner. This finding suggests that the types of food being consumed as snacks may be high-calorie, high-sugar foods, which may be less nutrient dense. Levitsky and colleagues (2004) found that consumption of an evening snack and consumption of junk food were top contributors to weight gain among college freshman. In addition, the consumption of energy contributing beverages may be high among this population when considering alcohol, soda, milk, juice, energy drinks, and specialty coffee beverages. Including these beverages with the energy density calculation may have lowered the energy density despite their unavoidable, overall daily caloric contribution. Our results are similar to previous research that found that snacks

were more energy dense than other eating occasions (Jahns et al., 2001; Zizza et al., 2001).

Results from the study showed males consumed consistently more nutrients than females at all eating occasions. However, males consumed significantly more kcals and gram amount of food at snacks than females. Differences in meal consumption on weekdays and weekend days show breakfast contributes significantly more nutrients on weekdays than on weekends, whereas, snacks contribute significantly more nutrients on weekends than weekdays. This may be due to different operation hours for the on-campus dining facilities, students sleeping in and skipping breakfast, and social activities that increase the occasion for food and beverage breaks throughout the day. To our knowledge, no published research has compared snack patterns and their contribution on weekdays versus weekends using seven-day food records. However, the snack patterns on weekends may be of importance when examining eating patterns of college freshman. Previous research has indicated that number of meals consumed on weekends may have a significant impact on college freshman weight gain (Levitsky et al., 2004).

Non-white participants consumed significantly more grams of protein at lunch during the weekday versus the weekend, but significantly more grams of protein for snacks during the weekend than the weekday. This may be accounted for by increased snacking on the weekends. However, the sample of non-white participants was small and these

results may not reflect accurate eating patterns between races among college freshmen.

This study is unique to dietary assessment research as it collected seven-day food records from the specific population of college freshmen. Most published dietary assessment research examines dietary behaviors by collecting one 24-hour recall, two 24-hour recalls, or food frequency questionnaires. This study collected five weekdays and two weekend days potentially capturing a more complete picture of an individual's usual dietary intake. Mean daily intake may be more accurate as it reflects several days rather than two days of recalls. In addition, these data were collected prospectively rather than retrospectively, which may have decreased under-reporting of individuals due to poor recall. However, under-reporting has been found to be a problem among all methods of dietary assessment. Under-reporting has been most common among women, overweight/obese, and less-educated participants (MacDiarmid & Blundell, 1998). In regards to under-reporting of food items, carbohydrates, alcohol, and food items that are viewed as unhealthy tend to be under-reported. However, protein and foods with a healthy image may be over-reported (MacDiarmid & Blundell, 1998). In addition, despite assurance of confidentiality, the under-reporting of alcohol consumption may be greater within this study population as study participants were under-age. However, to overcome mis-reporting, each study participant met with a trained research assistant before and after completing the food records and participants were provided with visual aides to assist in accurate reporting of portion sizes.

Limitations of this study include the selected study population of primarily white, traditionally aged college students, and over-representation of females. This may reduce the generalizability of this study to the overall national population. However, this study population may accurately reflect usual eating patterns of college students in the US. Study participants may have been more likely to live on-campus or be highly motivated to complete the study and have different dietary behaviors than other college students and the general population. Approximately 50% of participants were previously high-school varsity athletes, which may have impacted the eating behaviors noted in this study.

Snacks contribute a significant amount of calories to one's daily intake. The relationship of snacks to overweight and obesity is unclear due to the inconsistency in snack definitions. However, Aim 1 results suggest a snack can be defined as an eating occasion that takes place when an individual is hungry between traditional meals, consisting of a small portion of food (low-energy dense or high-energy dense). The second aim of this study shows that snacks appear to be more similar to breakfast in nutrient contribution, size, and energy density, whereas lunch and dinner are similar. However, the mean number of snacking occasions per day was 1.4 and on days when snacks were consumed increased to 1.8 snacking occasions per day. In addition, the results from this study suggest snacking behaviors differ on days of week and may slightly differ between gender and race. These differences may be due to the college environment, but nonetheless may promote unhealthy eating patterns that could impact

college students as they age. This study suggests that snacks are an important component of college freshmen's diets. Further research examining types of food selected as snacks by college freshmen should be examined to determine public health interventions and nutrition recommendations. In addition, a standard definition of a snack should strongly be considered by dietary assessment researchers and provide this information to participants allowing a more standardized method of dietary data collection. However, determining the link between snacking and obesity may include more than snack's contribution to daily dietary intake. Future research examining snack definition criteria should consider the types of food individuals choose to consume as snacks, motivations to snack, and how these differ on weekdays and weekends.

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Appendices

Appendix A: Tables and Figures

Table 1: Sample characteristics of Aim 1 and Aim 2 including gender, race, and age

	Aim 1 Sample	Aim 2 Sample
Total Sample Size	663	105[1]
Gender		
Female	385 (58.1%)	61 (62.9%)
Male	278 (41.9%)	36 (37.1%)
Race		
White	567 (85.5%)	78 (81.3%)
Non-white	96 (14.5%)	18 (18.7%)
Age		
18	593 (89.4%)	94 (96.9%)
>19	70 (10.6%)	3 (3.1%)

[1] Missing information for gender (n=8), race (n=9), and age (n=8)

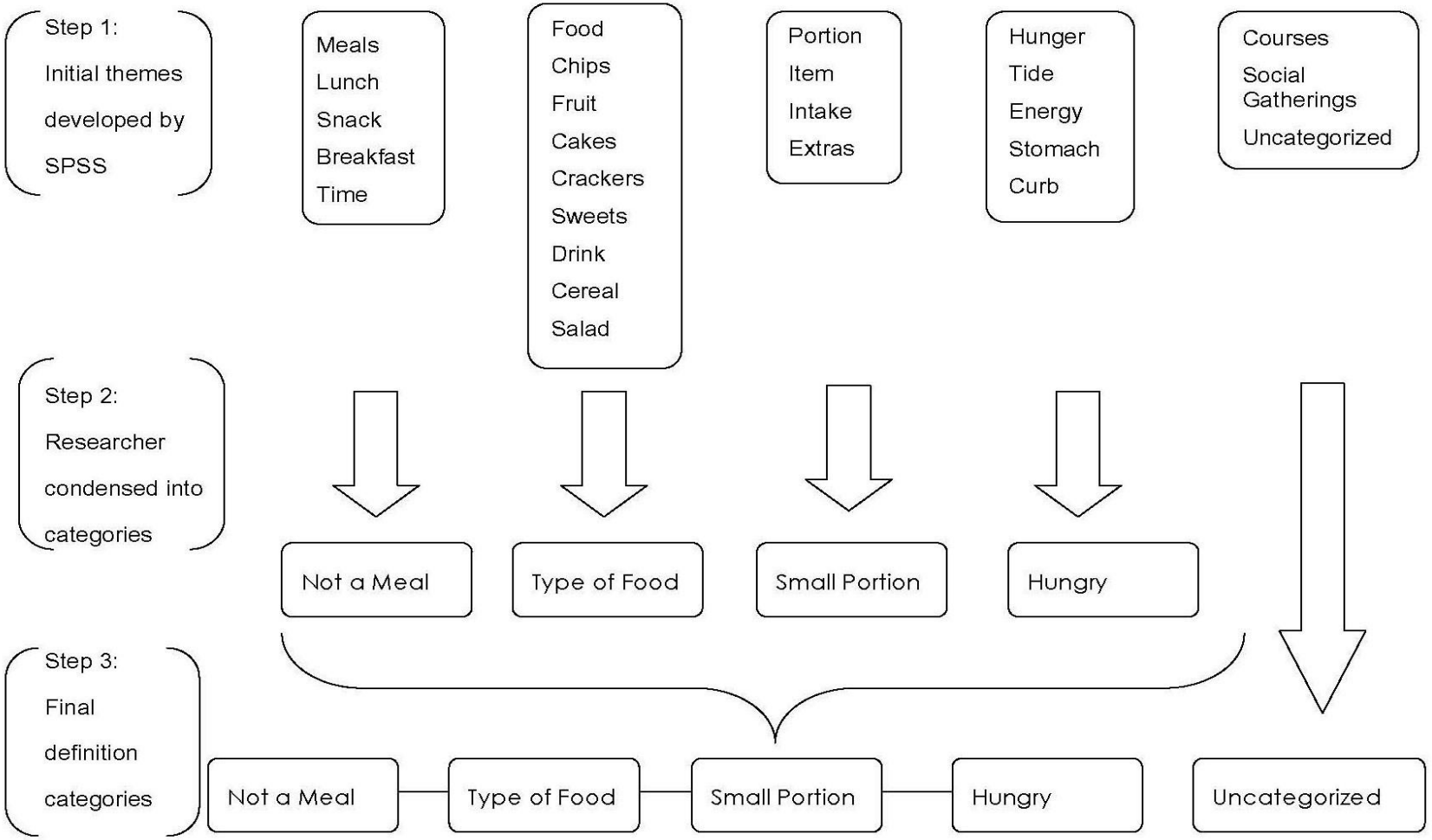
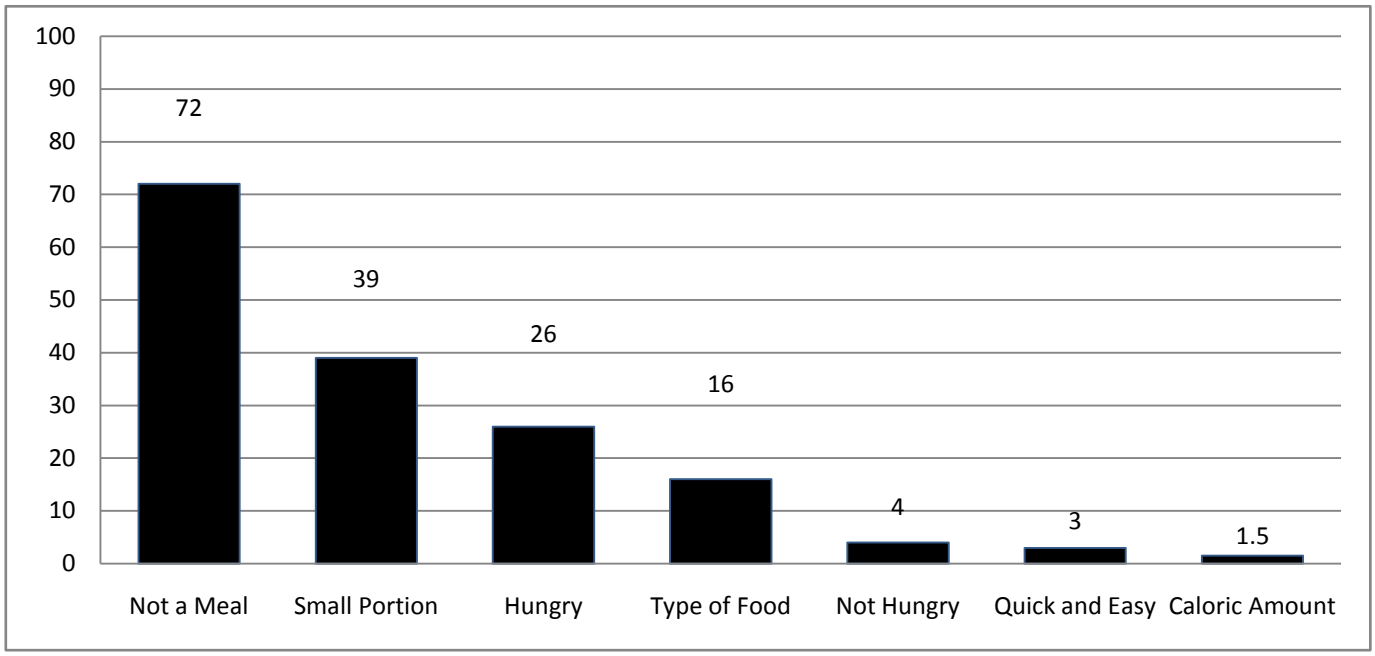


Figure 1: Flow chart of initial themes developed by SPSS Text Analysis for Surveys condensed into definition categories by researcher from the question, “How do you define the word ‘snack’?” participants aged 18-19 years old (n=663)



Note: Categories are not mutually exclusive and total > 100%

Figure 2: Self-reported snack definition categories of 663 college freshman

Table 2: Mean number of snacks consumed across a seven-day period per week and day

Variable	Mean	Range
Mean number of snacks consumed per week	9.82 ± 6.12	1.00 – 40.00
Mean number of snacks consumed per day	1.40 ± 0.87	0.14- 5.71
Mean number of snacks on days when snacks consumed	1.81 ± 0.72	1.00- 5.71

Table 3. Mean kcals, grams, energy density, carbohydrates, added sugars, protein, fat, and saturated fat content of eating occasions across a seven-day period (n=105)

	Breakfast	Lunch	Dinner	Snack	P- Value
Kcals	374.14 [b c] ± 24.63	621.28 [a c d] ± 25.66	745.62 [a b d] ± 29.60	437.88 [b c] ± 29.09	<0.001
Grams	306.73 [b c] ± 20.64	459.44 [a c] ± 19.57	549.25 [a d] ± 27.33	395.98 [c] ± 31.98	< 0.001
Energy Density*	1.65 ± 0.08	1.61 [d] ± 0.05	1.62 [d] ± 0.04	1.94 [b c] ± 0.11	0.032
Carbohydrates	56.32 [b c] ± 3.86	75.65 [a c] ± 3.21	88.92 [a b d] ± 3.97	64.55 [c] ± 4.24	<0.001
Added Sugars	22.94 [d] ± 1.90	24.41 [d] ± 1.68	27.22 ± 1.76	32.43 [a b] ± 2.55	0.006
Protein	10.80 [b c] ± 0.80	22.93 [a c d] ± 1.01	28.55 [a b d] ± 1.17	9.12 [b c] ± 0.70	<0.001
Fat	12.60 [b d] ± 0.95	25.81 [a c d] ± 1.22	30.94 [a d] ± 1.28	14.92 [b c] ± 1.17	<0.001
Saturated Fat	4.16 [b c] ± 0.33	8.77 [a c d] ± 0.48	10.75 [a b d] ± 0.49	5.20 [b c] ± 0.41	<0.001

Mean
± Standard Error
Denotes Significant Difference between each meal occasion:
[a]Breakfast [b]Lunch [c]Dinner [d]Snack
*Energy density (n=100) due to skipped meals

Table 4: Mean kcals, grams, carbohydrates, and protein content of meals across a seven-day period by gender (n= 97)

	Meal	Male	Female	P-value
Kcals	**Breakfast**	379.39 ± 41.90	374.01 ± 32.19	0.919
	Lunch	762.87 ± 39.64	528.42 ± 30.46	<0.001
	Dinner	855.93 ± 50.02	669.24 ± 38.43	0.010
	Snack	509.72 ± 49.03	409.54 ± 37.67	0.108
Grams	**Breakfast**	320.55 ±35.84	304.59 ± 27.53	0.725
	Lunch	572.35 ± 31.12	393.38 ± 23.91	<0.001
	Dinner	669.17 ± 46.17	482.95 ±35.47	0.006
	Snack	527.90 ± 53.55	329.14 ± 41.13	0.015
Carbohydrates	**Breakfast**	55.74 ± 6.44	56.15 ± 4.95	0.960
	Lunch	95.93 ± 5.02	63.85 ± 3.86	<0.001
	Dinner	104.35 ± 6.72	79.78 ± 5.16	0.013
	Snack	75.35 ± 7.08	59.85 ± 5.44	0.086
Protein	**Breakfast**	11.05 ± 1.33	10.84 ± 1.02	0.901
	Lunch	28.15 ± 1.53	19.23 ± 1.18	<0.001
	Dinner	33.01 ± 1.95	25.51 ± 1.50	0.007
	Snack	10.38 ± 1.21	8.86 ± 0.93	0.322

Table 5: Mean kcals, grams, carbohydrates, added sugars, protein, and saturated fat content of meals across a seven-day period by weekday and weekend intake (n= 105)

	Meal	Weekday	Weekend	P-value
Kcals	**Breakfast**	398.24 ± 29.25	313.86 ± 30.57	0.023
	Lunch	636.67 ± 27.06	582.83 ± 38.69	0.158
	Dinner	764.91 ± 31.72	697.38 ± 42.72	0.113
	Snack	406.85 ± 28.67	515.45 ±44.34	0.006
Grams	**Breakfast**	333.41 ± 25.06	240.02 ± 24.55	0.003
	Lunch	466.69 ± 21.05	441.32 ± 31.94	0.447
	Dinner	570.14 ± 28.45	497.03 ± 37.31	0.031
	Snack	362.87 ± 30.07	478.75 ± 52.19	0.010
Carbohydrates	**Breakfast**	60.41 ± 4.45	46.10 ± 4.65	0.007
	Lunch	78.16 ± 3.54	69.36 ± 4.90	0.093
	Dinner	91.77 ± 4.19	81.80 ±6.00	0.094
	Snack	60.71 ±4.17	74.15 ± 6.45	0.018
Added Sugars	**Breakfast**	24.62 ± 2.16	18.74 ± 2.32	0.020
	Lunch	24.81 ± 1.84	23.40 ± 2.32	0.554
	Dinner	27.77 ± 1.94	25.85 ± 2.96	0.548
	Snack	30.36 ± 2.39	37.61 ± 3.99	0.026
Protein	**Breakfast**	11.43 ± 0.93	9.22 ± 0.94	0.067
	Lunch	23.62 ± 1.09	21.19 ± 1.47	0.102
	Dinner	29.33 ± 1.30	26.62 ± 1.61	0.114
	Snack	8.57 ± 0.71	10.51 ± 1.08	0.057
Saturated Fat	**Breakfast**	4.51 ±0.43	3.27 ±0.38	0.028
	Lunch	8.79 ±0.47	8.72 ±0.76	0.918
	Dinner	11.13 ±0.56	9.79 ±0.65	0.062
	Snack	4.85 ±0.40	6.06 ±0.64	0.038

Table 6: Mean protein intake at eating occasions across a seven-day period by race and weekday and weekend intake (n=96)

	Meal	Weekday	Weekend	P-value
White	**Breakfast**	10.21±1.05	9.20±1.11	0.418
	Lunch	22.76±1.27	21.17±1.65	0.341
	Dinner	29.62±1.49	26.52±1.89	0.086
	Snack	8.83±0.85	10.06±1.27	0.305
Non-white	**Breakfast**	17.98±2.18	10.03±2.32	0.052
	Lunch	26.06±2.65	17.04±3.43	0.038
	Dinner	24.56±3.12	28.86±3.94	0.348
	Snack	8.75±1.76	14.00±2.64	0.049

Appendix B: Expanded Methods

Aim 1

Methods

Participants and Design

A web-based survey about health beliefs and behaviors was sent to all incoming traditionally aged (18 to 22 years old) freshmen at a large, southeastern university. The survey was created using mrInterview™ software (SPSS, 2005) and included two parts. Part one was a general overview of physical activity level, intake of fruits, vegetables, and fast food, stress eating, and subjective social status. Part two included questions regarding eating, sleeping and snacking behaviors. Some questions required a response to proceed with the survey whereas more sensitive, behavior questions were not mandatory for survey completion. A recruitment e-mail was sent to all eligible participants (n= 3,951.) All data were managed by a university statistician. The Student Data Resources center at the University Registrar's office supplied the statistician with all incoming freshman university identification numbers. The statistician then created a list-serve of all eligible participants e-mail addresses to provide the primary investigator. Eligibility criteria included participants be traditional college students at least 18 years of age. A recruitment e-mail was sent to all eligible participants (n= 3,951) from the list-serve created by the UT statistician. The recruitment e-mail, study information sheet, and survey read as follows:

Recruitment E-mail

July 24, 2006

TO: UT Freshmen
FROM: Freshman 15 Study Coordinators
SUBJECT: Your invitation to participate in the "Healthy, Happy UT Graduates: Combating Stress and the Freshman 15 Study" and a chance to win one of 100 1GB iPod nanos!

Dear UT Freshman,

Several departments on campus are asking your help to understand your opinions about eating, physical activity, stress, and other interesting facts by completing a survey. The information gathered from the survey will be confidential and the results will only be presented as group means – no individual identifiers will be used and no one will be able to link you to your responses.

There are two parts to the survey. Each part will take about 5-10 minutes to complete. If you choose to complete only part I, you will be eligible to win one of 100 1GB iPod nanos to start your freshman year!

If you choose to complete BOTH parts I and II, your name will be entered into the drawing TWICE!

We hope you will enjoy taking both parts of the survey and we thank you for Volunteering!!

To begin, please click on this link: http://cehhs.utk.edu/mylife.html

Please keep this email; if you run out of time, you can come back and finish the survey any time until August 25

The participants could click on the link provided above in the recruitment e-mail. Upon entering the web-survey, participants reviewed a study information sheet. Consent for participation was acknowledged by clicking on the survey link provided at the end of the study information sheet. The study information sheet read as follows:

Study Information Sheet

Promoting Healthy, Happy, UT Graduates:

Combating Stress and the Freshman 15 web-based survey

Introduction

You have been invited to participate in a research project. The purpose of this study is to understand your opinions about weight change, eating, physical activity, stress, and other interesting facts. The primary researchers for this study are professors from The University of Tennessee and there are no commercial sponsors. In addition, if you complete the survey, you will be eligible to be entered into a drawing to win one of 100 1GB iPod nano Mp3 players! Also, at the end of this survey, you will be able to to complete a second, optional survey. If you complete the second survey, your name will be entered twice into the drawing and you will double your chances of winning!

Information about your involvement in this study

To participate in this study, you must be at least 18 years old, and a first-time freshman student enrolled in the fall 2006 semester. As a participant in this study, your task is to

complete an online survey that asks a series of questions regarding your life before you begin college.

To begin, you will be asked to register by providing your NetID. No identifying information will be associated with your responses. A statistician at the Statistical Consulting Center (SCC) will first link your demographic information (age, sex, etc.) that you provided to the University to your NetID. Then, the statistician will remove your NetIDs and replace them with a random number before giving the data to the research team. All results will be reported as group means or averages. No one other than the research team will have access to the data.

The first few questions will ask general information about you. The next questions will ask about your diet, physical activity, stress, and other interesting things about yourself. The second survey asks more detailed questions.

The expected amount of time needed to complete each survey is 5-10 minutes (a total of 10-20 minutes if you complete both surveys).

Risks

The risks of participating in this study are minimal and no greater than those encountered in daily life. Confidentiality of data will be maintained by the investigators. No identifiers will be used to link you back to the information you have entered into the survey unless you choose to participate in a more detailed laboratory study and give us permission. All data will be stored on secure servers in the SCC. Although all efforts will be made to maintain confidentiality, researchers cannot fully control confidentiality of research conducted through the internet. The presence of internet hackers poses minimal risk to this study.

Benefits

The results from this study will provide greater knowledge regarding how eating, physical activity, stress, and other health behaviors change between high school and college. The long term benefit of such research is to assist students' health behaviors while in college so that you may have better health outcomes later in life. Nevertheless, specific benefits cannot be guaranteed for any individual participant. The chance to win an iPod is an added incentive.

Confidentiality

As previously stated above, confidentiality of data will be maintained throughout the study and all data will be stored securely. Data will only be available to the persons conducting the study unless you specifically give permission in writing to do otherwise. No reference will be made in oral or written reports which could link you to the study.

Compensation

If you complete this study, you will be eligible for a random drawing for one of 100 1GB iPod nano Mp3 players! In addition, if you complete the second optional survey, you will be entered into the drawing again and your chances of winning will be doubled! You must complete each survey in its entirety to be entered into the drawing. Only one entry per person per survey will be accepted.

Contact

If you have questions at any time about the study or procedures, you may contact the researcher, Dr. Lisa Jahns, at 213C Jessie Harris, or (865) 974-6248. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466.

Participation

Your participation in this study is voluntary, and you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed, your data will be destroyed. Completion of the online survey (questionnaire) constitutes your consent to participate.

Appendix C: Survey Instrument

Promoting Healthy, Happy, UT Graduates:

Combating Stress and the Freshman 15 web-based survey (Wave 1) pilot.

PART II

Thank you for agreeing to participate in Part II of this survey! After you complete this part of the survey, your name will be entered TWICE into a random drawing for a 1GB iPod nano! Good luck!

Three-Factor Eating Questionnaire

All answers T or F

1. When I smell a sizzling steak or see a juicy piece of meat, I find it very difficult to keep from eating, even if I have just finished a meal.
2. I usually eat too much at social occasions, like parties and picnics.
3. When I have eaten my quota of calories, I am usually good about not eating any more.
4. I deliberately take small helpings as a means of controlling my weight.
5. Sometimes things just taste so good that I keep on eating even when I am no longer hungry.
6. When I feel anxious, I find myself eating.
7. Life is too short to worry about dieting
8. Since my weight goes up and down, I have gone on reducing diets more than once.
9. When I am with someone who is overeating, I usually overeat too.
10. I have a pretty good idea of the number of calories in common food.
11. Sometimes when I start eating, I just can't seem to stop.
12. It is not difficult for me to leave something on my plate.
13. While on a diet, if I eat food that is not allowed, I consciously eat less for a period of time to make up for it.
14. When I feel blue, I often overeat.
15. I enjoy eating too much to spoil it by counting calories or watching my weight.
16. I often stop eating when I am not really full as a conscious means of limiting the amount that I eat.
17. My weight has hardly changed at all in the last ten years.
18. When I feel lonely, I console myself by eating.
19. I consciously hold back at meals in order not to gain weight.
20. I eat anything I want, any time I want.
21. Without even thinking about it, I take a long time to eat.
22. I count calories as a conscious means of controlling my weight.
23. I do not eat some foods because they make me fat.
24. I pay a great deal of attention to changes in my figure.
25. While on a diet, if I eat a food that is not allowed, I often then splurge and eat other high calorie foods.

26. How often are you dieting in a conscious effort to control your weight?
    1 rarely

2 sometimes

3 usually

4 always

27. Would a weight fluctuation of 5 lbs affect the way you live your life?
1 not at all

2 slightly

3 moderately

4 very much

28. Do your feelings of guilt about overeating help you to control your food intake?
1 never

2 rarely

3 often

4 always

29. How conscious are you of what you are eating?
1 not at all

2 slightly

3 moderately

4 extremely

30. How frequently do you avoid 'stocking up' on tempting foods?
1 almost never

2 seldom

3 usually

4 almost always

31. How likely are you to shop for low calorie foods?
1 unlikely

2 slightly unlikely

3 moderately likely

4 very likely

32. Do you eat sensibly in front of others and splurge alone?
1 never

2 rarely

3 often

4 always

33. How likely are you to consciously eat slowly in order to cut down on how much you eat?
1 unlikely

2 slightly likely

3 moderately likely

4 very likely

34. How likely are you to consciously eat less than you want?
1 unlikely

2 slightly likely

3 moderately likely

4 very likely

35. Do you go on eating binges though you are not hungry?
1 never

2 rarely

3 sometimes

4 at least once a week

36. On a scale of 0 to 5, where 0 means no restraint in eating (eating whatever you want, whenever you want it) and 5 means total restraint (constantly limiting food intake and never 'giving in'), what number would you give yourself?

0 eat whatever you want, whenever you want it

1 usually eat whatever you want, whenever you want it

2 often eat whatever you want, whenever you want it

3 often limit food intake, but often 'give in'

4 usually limit food intake, rarely 'give in'

5 constantly limiting food intake, never 'giving in'

37. To what extent does this statement describe your eating behavior? 'I start dieting in the morning; but because of any number of things that happen during the day, by evening I have given up and eat what I want, promising myself to start dieting again tomorrow.'

1 not like me

2 little like me

3 pretty good description of me

4 describes me perfectly

Do you currently take prescription medications?

1.yes

2.no

3 no answer

If answer yes, will go to:

What do you currently take prescriptions medication for?

1. Allergies

    a. How long have you been taking this prescription or another for allergies? ***(after each medical condition)***
2. Asthma
3. ADD/ADHD
4. Depression/Anxiety
5. Cold/flu/infection
6. Others?

During the past month, when you did snack or eat between meals, how often did you eat the following foods?

	Never	Almost Never	Sometimes	Fairly Often	Very Often
Fruits and vegetables					
Potato Chips					
French fries					
Candies/Chocolate					
Dessert foods (cookies, cakes, etc.)					
Other					

Q31 How would you define the word "snacks"? (Answer not required)

_____
_____
_____

_____**No Answer**

PSQI

The following questions relate to your usual sleep habits during the past month **only**. Your answers should indicate the most accurate reply for the **majority** of days and nights in the past month. Please answer all questions.

1. **During the past month, what time have you usually gone to bed at night?**
   BED TIME _____

   If you would like, please explain:_____

2. **During the past month, how long (in minutes) has it usually taken you to fall asleep each night?**
   NUMBER OF MINUTES_____

   If you would like, please explain: _____

3. **During the past month, what time have you usually gotten up in the morning?**
   GETTING UP TIME_____

   If you would like, please explain:_____

4. **During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)**
   HOURS OF SLEEP PER NIGHT_____

   If you would like, please explain:_____

For each of the remaining questions, check the one best response. Please answer <u>all</u> questions.

Possible answers: Not during the past month, less than once a week, once or twice a week, three or more times a week

5. **During the past month, how often have you had trouble sleeping because you…**
   a. Cannot get to sleep within 30 minutes
   b. Wake up in the middle of the night or early morning
   c. Have to get up to use the bathroom
   d. Cannot breathe comfortably
   e. Cough or snore loudly
   f. Feel too cold
   g. Feel too hot
   h. Had bad dreams
   i. Have pain
   j. Other reason(s), please describe

      _____
      _____

   How often during the past month have you had trouble sleeping because of this?

   [Not during the past month, less than once a week, once or twice a week, three or more times a week]

6. During the past month, how would you rate your sleep quality overall?
   1 very good

   2 fairly good

   3 fairly bad

   4 very bad

7. During the past month, how often have you taken medicine to help you sleep (prescribed or “over the counter”)?

   1 Not during the past month

   2 Less than once a week

   3 Once or twice a week

   4 Three or more times a week

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

   1 Not during the past month

   2 Less than once a week

   3 Once or twice a week

   4 Three or more times a week

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

   1 No problem at all

   2 Only a very slight problem

   3 Somewhat of a problem

4 A very big problem

The following set of questions deal with how you feel about yourself and your life. Please remember that there are no right or wrong answers. Select the answer that best describes your present agreement or disagreement with each statement.

Answer scale: 1=strongly disagree, 2=moderately disagree, 3=slightly disagree, 4=slightly agree, 5=moderately agree, 6=strongly agree.

1. I tend to be influenced by people with strong opinions.
2. I live life one day at a time and don't really think about the future.
3. In general, I feel I am in charge of the situation in which I live.
4. Maintaining close relationships has been difficult and frustrating for me.
5. When I look at the story of my life, I am pleased with how things have turned out.
6. I have confidence in my opinions, even if they are contrary to the general consensus.
7. Some people wander aimlessly through life, but I am not one of them.
8. The demands of everyday life often get me down.
9. People would describe me as a giving person, willing to share my time with others.
10. I like most aspects of my personality.
11. I judge myself by what I think is important, not by the values of what others think is important.
12. I sometimes feel as if I've done all there is to do in life.
13. I am quite good at managing the many responsibilities of my daily life.
14. I have not experienced many warm and trusting relationships with others.
15. In many ways, I feel disappointed about my achievements in life.

The following questions ask about your feelings on forgiveness. **For each of the following statements, select the answer which best describes how you feel about the statement, using the scale below.**

Answer scale: 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree

1. Compromise is a sign of weakness.
2. I have to admit, I harbor more than a bit of anger toward those who have wronged me.
3. I believe in the importance of forgiveness.
4. I try not to judge others too harshly, no matter what they have done.
5. I tend to be a pessimistic person.

6. I am slow to forgive.
7. No matter what has happened with a friend or family member, after thorough discussion, all can be forgiven.
8. I don't believe in second chances.
9. Some misdeeds are so horrible that forgiveness is out of the question.

We value your opinion, and thank you for comments and/or suggestions regarding this survey. Please provide any comments and/or suggestions in the space provided.-

No answer

CONGRATULATIONS! For completing both surveys, you have now been entered *TWICE* into a random drawing to win one of 100 1GB iPod nano Mp3 players!!! If you are selected as a winner of the drawing, you will be contacted by email after August 28 to collect your prize.

UT provides support for students as you transition into college. If you have questions or concerns please contact the student counseling center:

Address: 900 Volunteer Blvd, Knoxville, TN 37996-4250

Phone: (865) 974-2196

Email: studentcounseling@utk.edu

End of interview. Thank you for your participation.

Vita

Rachel was born and raised in Cynthiana, KY where she was involved in many small farm agriculture tasks. The expectation of fresh fruits and vegetables fostered her interest in and respect for good food. During Rachel's high-school years, she participated in several courses and extra-curricular activities that sparked her interest in healthcare. However, her interest in health and food led her to Eastern Kentucky University where she obtained her Bachelor of Science in General Dietetics. She is currently pursuing a Master's of Science in Nutrition (Public Health Nutrition option) and Master's in Public Health (Health Planning and Administration concentration) at the University of Tennessee, Knoxville. Currently Rachel is working as a Registered Dietitian with the geriatric population here in Knoxville where she resides with her husband, David, her dog Sydney, and two cats Caroline and Chloe.