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Johnson, Meredith Q. ***Nutrition Facts Label Use and Weight Status.***

Abstract

The rates of obesity have more than doubled since 1980, with the greatest increase in weight gain among young adults, 18-29 years. Increasing rates of obesity have prompted researchers to identify links between behavioral patterns and weight control. Previous research has identified freshman weight gain, lack of physical activity, and eating patterns as factors affecting weight gain, but few researchers have addressed all topics in one study. Identifying whether college students who engage in nutrition facts label reading experience weight change over undergraduate college years could provide evidence of dietary behaviors and nutrition related knowledge gaps for professional nutrition education. The purpose of this study is to examine the relationship between nutrition label utilization, weight change, and other health behaviors in college students attending UW-Stout in the spring of 2013. A 21-question Qualtrics survey was distributed to a stratified random sample of 1,145 UW-Stout juniors and seniors with 137 responses. Results indicate most students are not trying to lose weight, but found physical activity as a significant influence upon weight loss. Most students found healthy eating the most effective weight loss method. Statistically significant relationships resulted from nutrition label use among students who exercised, experienced weight change, and focused on calories and fat components compared to non-label users. Males exercised more frequently than females.

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Chapter I: Introduction

In 2008, 1.4 billion adults, 20 and older, were identified as overweight and 200 million men and 300 million women were identified as obese (World Health Organization, 2013). The rates of obesity have more than doubled since 1980 (World Health Organization, 2013). The greatest increase in weight gain has been among young adults, 18-29 years (Racette, Deusinger, Strube, Highstein, & Deusinger, 2008). Increasing rates of obesity have prompted researchers to identify links between behavioral patterns and weight control (Department of Health & Human Services, 2012). Long-term lifestyle changes to treat and prevent obesity have been the highlight of public policy focusing on lifestyle interventions including healthy eating, exercise, and nutrition label reading (Lowry, Galuska, Fulton, Wechsler, Kann, & Collins, 2000). Michelle Obama created the "Let's Move!" program to advocate staying active and healthy eating patterns (Let's Move!, 2012).

Weight gain among college freshmen, nicknamed the "freshman 15," identifies a weight increase of 15 pounds experienced during their freshman year; but studies have not always found this (Mihalopoulos, Auinger, & Klein, 2008). Mihalopoulos, et al. (2008), determined that college students are 5.5 times more likely to gain weight than the general population. Over 50% of students gained weight: 30% of college freshmen gained 1-5 pounds, 17% gained 6-14 pounds, and 5% gained over 15 pounds (Mihalopoulos, et al., 2008). A study by Hoffman, et al., found a mean change in body weight of 2.86 pounds and participants who gained, experienced a mean increase of 6.82 pounds (2006). Participants' gender specific mean weight change: was 2.90 pounds for men and 2.82 pounds for women (Hoffman, et al., 2006). Researchers indicated the causes behind weight gain remain unclear and warrant further research (Hoffman, Policastro, Quick, & Lee, 2006).

College students face a number of social decisions regarding food, alcohol, and exercise that may influence weight status (Hoffman, et al., 2006). Many environmental and social factors affect

college students' decision making on exercise and food (Hoffman, et al., 2006). The health related decisions made during college years can affect future food habits, exercise, and weight control (Hoffman, et al., 2006). Weight gain may lead to health problems including hypertension, Diabetes Mellitus type 2, or hypercholesterolemia, as well as social anxiety of low self-esteem or decreased academic performance (Hoffman, et al., 2006). Overweight young adults are more likely to maintain overweight tendencies than counterparts (World Health Organization, 2013). College-aged adults are considered an at-risk population surviving on limited budgets with a diet that typically consists of foods high in fat, sodium, and calories, with minimal nutritional value (Raspberry, Chaney, Housman, Misra, & Miller, 2007).

Statistics from the United States Department of Health & Human Services reports health burdens affected by lack of physical activity include 13.5 million people with heart disease, 8 million with type 2 diabetes mellitus, 1.5 million that have suffered heart attacks, with 95,000 citizens diagnosed with colon cancer per year (Department of Health & Human Services, 1999). Over one third of the U.S. population is clinically overweight defined as a BMI of 25 or greater (Department of Health & Human Services, 1999). Regular physical activity may reduce hypertension, heart disease, diabetes mellitus, colon cancer, dying prematurely, and depressive or anxiety symptoms in adults (Department of Health & Human Services, 1999). Physical activity is also important to promote adequate bone, joint, and muscle health.

The Surgeon General recommends 30-60 minutes of rigorous to moderate physical activity every day to maintain a healthy lifestyle and assist in weight control (Department of Health & Human Services, 1999). The Food & Drug Administration (FDA) recommends that people "make every calorie count" by reading nutrition facts labels (2006). National health objectives include daily

rigorous physical activity, increased fruit and vegetable consumption, and completion of activities to promote endurance, bone, and muscle health (Lowry, et al., 2000).

Among college-aged students who purchase groceries, students selected food items based on convenience, price, and ease of preparation (Nurliyana, Norazmir, & Khairil Anuar, 2011). A survey of college students found the majority of students utilize food labels "sometimes" due to limited time and budget (Lin & Yen, 2010). Davy (2006) affirmed individuals who are diagnosed with chronic diseases or food allergies are more apt to read nutrition labels than persons without illnesses. Food label reading has been linked to a significant decrease in health problems and consumption of a healthier diet (Davy, Benes, & Driskell, 2006).

According to the College Health Risk Behavior Survey, the dietary patterns and physical activity of college students fall short of recommended daily allowances by age categories (Racette, et al., 2008). Few studies have provided longitudinal feedback on nutrition label use among college students and weight change over the college years (Racette, et al., 2008). Currently, no literature exists to provide evidence of weight change among UW-Stout undergraduate students in relationship to nutrition facts label use.

Statement of the Problem

College students are at risk of obesity related health conditions due to various factors contributing to weight change including decreased physical activity, changes in dietary patterns, and environmental factors (Lowry, et al., 2000). Overweight and obesity are strongly related to dietary habits in late adolescence and young adulthood (Lowry, et al., 2000). With the increase in obesity progression, college students are a population at risk of obesity related health conditions. Identifying whether college students who engage in nutrition facts label reading experience weight change over

undergraduate college years could provide evidence of dietary behaviors and nutrition related knowledge gaps for professional nutrition education.

Purpose of the Study

The purpose of this study is to determine the relationship between label reading and weight change in college students attending UW-Stout in the spring of 2013. After approval by the Committee on Protection of Human Subjects in Research, data was collected through a self-administered online questionnaire consisting of general information on grocery shopping habits, influence of nutrition labels, daily physical activity, and weight change in college. Future long-term research should be done to help understand the food label reading habits of college aged students and how label reading impacts their health. The proposed study will examine the relationship among nutrition label utilization, weight change, and other health behaviors in college students.

Definition of Terms

Nutrition facts label. A nutrition facts label is a federally regulated label attached to a food product exterior indicating product contents including calories, fat, cholesterol, sodium, potassium, carbohydrates, sugar, protein, and various vitamins and minerals (Food & Drug Administration, 2009).

Nutrition Labeling Education Act (NLEA). The Nutrition Labeling and Education Act (NLEA) of 1990 was passed by former United States President Bush and Congress to regulate food labels as factual, eliminate misleading claims, and require every food product to have a nutrition facts label.

Obesity. Obesity or overweight is a weight range above what is considered normal. The body mass index categories for adults are as follow: below 18.5 (underweight), 18.5-24.9 (healthy weight), 25-29.9 (overweight), 30 or higher is considered obese (World Health Organization, 2013).

BMI measures the amount of body weight to height and is used as an estimator of body fat (CDC, 2012). BMI is calculated by dividing weight by height in kg/m² (Hoffman, et al., 2006).

Physical activity. Physical activity is any bodily movement including exercise and other activities that increase the heartbeat such as walking, jogging, gardening, household chores, and spare time activities (World Health Organization, 2013).

Assumptions of the Study

It is assumed that college students purchase inexpensive, high calorie, nutritionally minimal foods, regardless of the information placed on the food and nutrition label. Assumptions include college students are physically inactive, gain weight, consume nutritionally inadequate diets, and have an "I don't care" attitude towards dietary intake. College students may not consider viewing nutritional labels when purchasing or consuming foods.

Limitations of the Study

The results may be biased by friends of the participants or researcher with knowledge of thesis objectives, participants who do not complete the online survey, or participants that answer untruthfully. The data is limited to those students who respond to unsolicited emails requesting completion of a survey online.

Methodology

The research used a 21-question Qualtrics survey, distributed to UW-Stout students, to identify health habits, nutrition label utilization, and weight change during college. Only junior and senior UW-Stout undergraduate students received the electronic survey. An electronic survey provided the simplest method of mass survey distribution to gain adequate college student feedback for the thesis topic.

Chapter II: Literature Review

The literature review will provide nutrition label background information, address the topics of nutrition facts label reading among college students, and explain the factors involved with college weight change. College students are potentially at risk for poor nutritional intake, chronic health conditions, and weight gain. Reading nutrition labels has been linked to better weight control, healthy eating, and physical activity.

Nutrition Label Background

Foods manufactured within or imported into the United States are regulated by the Food & Drug Administration (FDA) to assure food safety, quality, and proper nutritional labeling (Food & Drug Administration, 2009). Food labels are a mode of public nutritional education about individual food product contents and nutritional value (Shapiro, 1995). Some food labels have been shown to be misleading or difficult to decipher due to size and location of labels on food products (Shapiro, 1995). The Nutrition Labeling and Education Act (NLEA) of 1990 was passed by former United States President Bush and Congress to regulate food labels as factual, eliminate misleading labels, and require food products to portray a standard nutritional label (Food & Drug Administration, 2009). The NLEA sought to encourage companies to create healthier food items, facilitate healthy purchasing decisions among consumers, and minimize barriers to nutrition label utilization (Food & Drug Administration, 2009).

Nutrition facts labels identify food contents including calories, total fat, saturated fat, trans fat, polyunsaturated fat, monounsaturated fat, cholesterol, sodium, potassium, total carbohydrate, dietary fiber, sugar, sugar alcohols, and protein as well as vitamin and mineral values such as vitamin A, vitamin C, calcium, iron, and others (Food & Drug Administration, 2009). The FDA encourages Americans to focus on limiting saturated and trans fats, cholesterol, and sodium, while incorporating

fruits, vegetables, lean meat, low-fat or fat-free milk, poultry, and legumes (Food & Drug Administration, 2006).

College Students and Nutrition Labels

Nurliyana, et al., found college students grocery shop based on price, taste, and ingredients (2011). When surveyed to determine frequency of food label reading, 21.6% of students reported using food labels "often," but were pressed for time and money (Nurliyana et al., 2011). Infrequent food label users attributed lack of nutrition label education and unattractiveness of nutrition label as reasons for infrequent label use.

Nutrition label education may assist populations without a college education to better understand daily recommended values, nutrition label reading, and the impact on health (Lin & Yen, 2010). With proper public nutrition education, consumers can better understand how to read food labels and how healthy food consumption can improve current disease management or help prevent future health problems (Raspberry, et al., 2007). Nutrition label reading can be effective for health reasons such as disease management, balancing diet, weight control, and for ingredient monitoring for individuals with food allergies, intolerances or other dietary restrictions (Raspberry et al., 2007).

The average college student's diet depends on factors such as time, money, taste, health, environment, and weight control (Nurliyana, et al., 2011). Students who eat away from home or in cafeteria settings, often eat high calorie, large portioned meals with low nutritional value (Nurliyana, et al., 2011). A study by Larsen, et al., determined whether students who dined-out made healthier meal choices if provided nutrition labels to menu options (2010). Participants given the nutrition labels and a 2,000 calorie recommendation message consumed 14% less calories than participants without nutrition labels (Larson, Nelson, Neumark-Sztainer, Story, & Hannon, 2010). Svederberg et al. identified a relationship between reading nutrition labels and purchasing low-fat food products

(2008). Infrequent label users attribute limited time, the "I don't care" attitude, and personal desire to purchase calorie-dense food products as reasons for lack of label usage (Raspberry, et al., 2007).

College students typically consume diets high in fat and sodium, scarce in other nutrients, and rarely including many fruits or vegetables (Raspberry, et al., 2007). College students are at risk of developing chronic diseases with unhealthy diet consumption and weight gain, which can follow into late adulthood, causing further health problems (Davy, Benes, & Driskell, 2006). Consumers with chronic diseases were more apt to read nutrition labels due to dietary restrictions and to decrease disease symptoms (Post, Mainous, Diz, Matheson, & Everett, 2010). Only 60% of consumers without chronic diseases utilize nutritional labels (Post, et al., 2010). Consumers with chronic diseases reported more awareness of nutrition labels and label utilization than counterparts (Lewis, Arheart, LeBlanc, Fleming, Lee, Davila, Caban-Martinez, Dietz, McCollister, Bandier, & Clark, 2009). Awareness of nutrition labels were inconsistently associated with dietary guideline compliance (Lewis, et al., 2009).

Excessive consumption of unhealthy foods places young adults at risk of chronic diseases and unintentional weight gain (Post, et al., 2010). From the study by Nelson, Lust, Story, & Ehlinger, eating on the run was associated with an increased intake of fast food, soft drinks, and fat, with a decreased intake of fruits and vegetables (2009).

Not all students are aware of the impact of nutrition knowledge on health status or how reading nutrition labels can affect food consumption and grocery purchasing habits (Davy, et al., 2006). At a Midwestern university, 76% of students lived off-campus and typically ate most meals in dorm rooms, cafeterias, or apartments; few went out to eat at restaurants (Davy, et al., 2006). When students were surveyed about personal nutrition label usage, women focused on sugar, carbohydrates,

and fat intake, whereas men were concerned with only fat intake (Davy, et al., 2006). Both genders agreed that the best way to manage weight is to watch energy intake (Davy, et al., 2006).

Norazmir, et al., measured college student utilization, frequency, and understanding of nutrition facts labels (2012). Results indicate 30.5% of young adults had a good knowledge of labels, 37.5% had low knowledge, and 69.5% were unable to complete tasks using the nutrition label (Norazmir, et al., 2012). Students focused most on ingredient lists rather than percent daily value (Norazmir, et al., 2012). The lack of knowledge regarding nutrition labels resulted in minimal label reading. The education level of young adults is significantly associated with nutrition label utilization (Norazmir, et al., 2012).

Temple, et al., observed the effect nutrition labels had on males' and females' food choices in a buffet style meal and whether education affected the impact of nutrition labels (2010). Consumers who used nutrition labels consume less fat and calories, and more fruits, vegetables, and fiber than counterparts (Temple, et al., 2010). Nutrition label use is associated with a decreased consumption in sodium, fat, and sugar (Temple, et al., 2010). Students surveyed focused on calories and fat on nutrition labels (Temple, et al., 2010).

College Students and Weight Status

Multiple factors affect the weight status of college students. The Dietary Guidelines for Americans, 2010, recommends calorie balance over time to maintain weight control (USDA & HHS). The overweight and obesity epidemic identifies Americans in calorie imbalance; nutrient intake exceeding energy expenditure (United States Department of Agriculture & Department of Health & Human Services). The Dietary Guidelines for Americans encourages Americans to consume healthy diets to prevent future diseases and include physical activity for a healthy weight (Healthy People, 2010).

Healthy People 2010 and Healthy Campus 2010 set national nutritional goals to increase physical activity of all ages and reduce obesity rates and occurrence of chronic diseases within the next decade (Healthy People, 2010). Wallace and Buckworth found that college students who engaged in physical activity coupled with social support did not gain weight during the 6-month study (2003).

A study by Lowry, et al., researched the associations among physical activity, food choices, and weight management goals (2000). The study indicated 35% of students were overweight and 46% actively attempting to lose weight (Lowry, et al., 2000). Women were less apt to be overweight, but more likely to pursue a diet regimen (Lowry, et al., 2000). Females or males attempting to lose weight were more likely to engage in vigorous exercise, consume over 5 servings of fruits and vegetables, and less than 2 servings of high-fat foods daily compared to sedentary counterparts (Lowry, et al., 2000).

A longitudinal study by Racette et al. assessed exercise, weight change, and dietary patterns of college students from freshman to senior year (2008). Results indicate students gained 3.75 ± 9.92 pounds (females) and 9.26 ± 14.11 pounds (males) from freshmen to senior year (Racette, et al., 2008). Nelson et al. found that binge drinking was associated with weight gain, poor dietary patterns, and sedentary behavior among college students (2009).

Chapter III: Methodology

Subject Selection and Description

A stratified random sample of 1,145 UW-Stout juniors and seniors was selected to receive the online survey. Juniors and seniors were selected to identify weight change and habits during college years.

Data Collection Procedures

The survey consisted of 21 questions to determine the relationships among nutrition label utilization, weight change, and other health behaviors in college students. The survey ends by asking students demographic questions including age and year in college. Other questions inquire about students' label usage, what parts of the label students focused on most, exercise and dietary habits, and weight status among college years.

Participation in the study was entirely voluntary, with no direct compensation. Participants had the option to withdraw from the study or discontinue survey completion without adverse consequences. Identities of participants are kept completely anonymous once survey responses have been submitted. After survey submission, the data cannot be linked to individuals and cannot be withdrawn. An electronic survey provided the simplest method of mass survey distribution to gain adequate college student feedback for the thesis topic.

There is little risk from completing the survey. Participants might feel uncomfortable about answering weight status questions. There is no direct benefit to participants, but the results will be contributing to the knowledge of college student habits and label reading which will help professionals provide nutrition education.

Data Analysis

The survey was approved by the UW-Stout Institutional Review Board to assure protection of human subjects. The electronic surveys were processed with Qualtrics statistical analysis tools of chi-square comparisons and Microsoft excel spreadsheets.

Chapter IV: Results

The purpose of the study was to determine the relationship among nutrition label utilization, weight change, and the health behaviors of college students. The results will answer the following research questions.

1. Does label reading influence purchasing habits?
2. What do students focus on when using nutrition labels?
3. Is physical activity related to label reading?
4. Is label reading related to weight change?
5. Do students who exercise experience weight change and are students trying to lose weight?
6. What are the methods of weight change utilized?
7. What other factors influence weight change?

While these questions will be answered, the chapter will also address additional survey results. To answer the research questions, the results were analyzed using chi-square comparison tests to identify relationships, differences, and statistical significance.

Demographics

A 25% stratified random sample, of 419 juniors and 726 seniors, a total of 1,145 students at UW-Stout, received the online Qualtrics survey in the spring of 2013. One hundred thirty-seven (137) of the 1,145 students completed the survey, a response rate of 12%. The participants included 56 (41%) male and 81 (59%) female students. Sixty-four juniors (47%) and 71 (53%) seniors at UW-Stout completed the survey. Applicants' ages ranged from 18-27 or more years with the majority (61%) between 21-23 years of age. See Figure 1 for age range clarification.

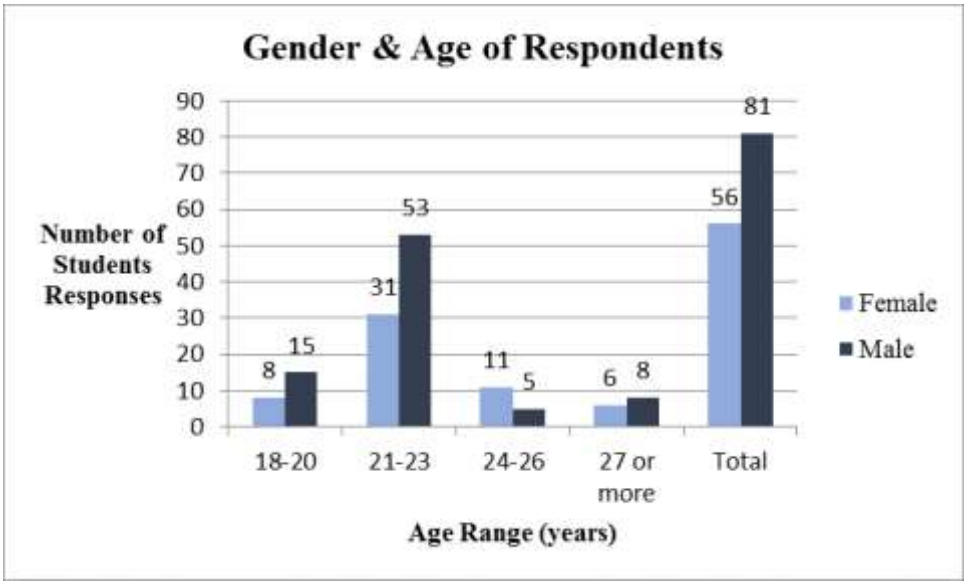

Figure 1. Gender & age ranges of student respondents.

Students identified "yes" or "no" to having a chronic health condition that affected dietary intake. One-hundred and twenty-eight (93%) students' diets were not affected by a health condition. Health conditions affected 9 (7%) students including celiac disease, gluten intolerance, lactose intolerance, food allergies, seizures, lupus, multiple sclerosis, and chronic gastritis.

Does label reading influence purchasing habits? In a typical week, 99 (72%) students grocery shopped 1-2 days a week and 31 (23%) didn't shop at all. When students were asked whether or not they utilized nutrition labels before purchasing food items, 81 (59%) students indicated "yes" and 56 (41%) indicated "no." Survey data identified more females 51 (63%) compared to 30 (54%) males used nutrition labels before food purchasing. Figure 2 identifies how often subjects' food purchasing habits are affected by reading nutrition label information.

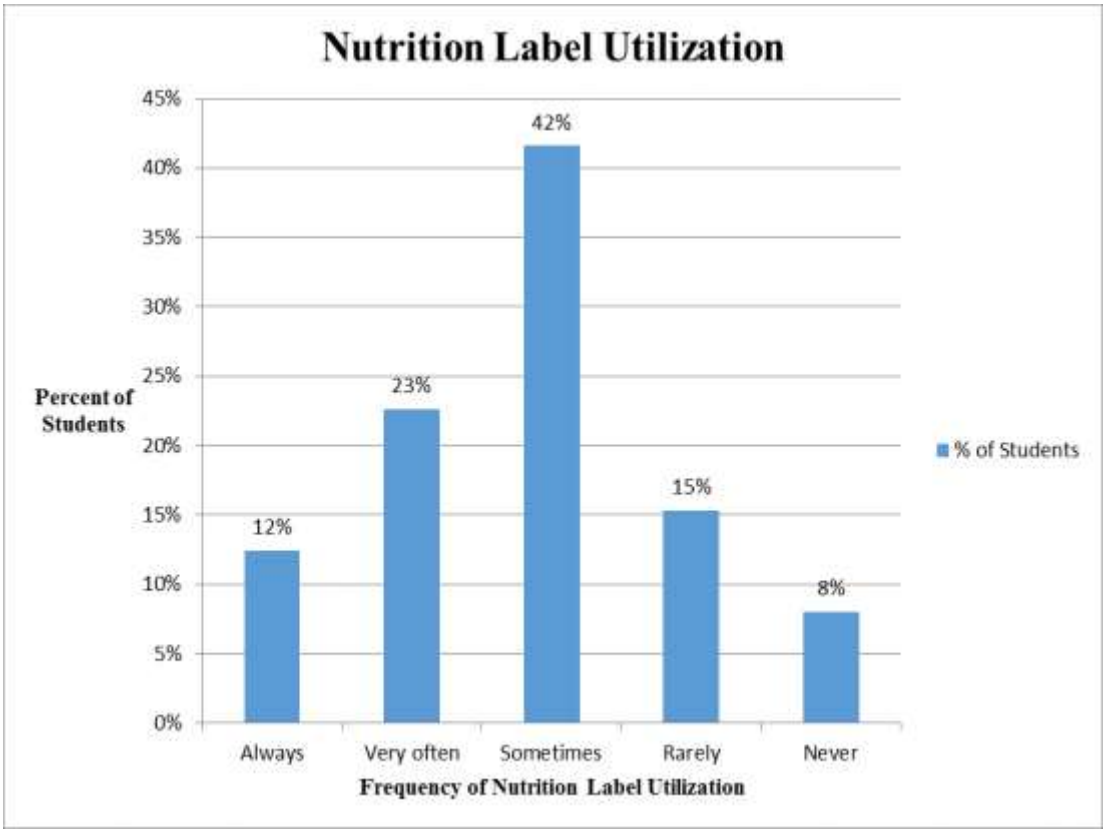

Figure 2. Frequency of nutrition label utilization for intent to purchase

A chi-square statistic compared the influence of label reading on purchasing habits. Results indicate of the students who utilized nutrition labels before purchasing ($p<0.05$), 57 (40.7%) students' food purchasing habits were influenced "sometimes" by nutrition labels, 31 (34.6%) said "very often," 17 (21.0%) said "always," 21 (2.5%) said "rarely," and 11 (1.2 %) claimed "never" compared to non-label reading counterparts. Significantly more students utilized nutrition labels "sometimes" compared to "very often, always, rarely," or "never," indicated in Table 1.

Table 1

Gender, Label Reading & Influence of Nutrition Labels Upon Food Purchases

		How often does the information from nutrition facts labels influence your food purchase?					
		Always	Very often	Sometimes	Rarely	Never	Total
Do you currently read nutrition facts labels before purchasing food items?	Yes	17	28	33	2	1	81
	No	0	3	24	19	10	56
	Total	17	31	57	21	11	137
What is your gender?	Male	6	13	19	11	7	56
	Female	11	18	38	10	4	81
	Total	17	31	57	21	11	137

The chi squares comparison of the influence of nutrition facts label information upon food purchasing and nutrition facts label reading deemed statistically significant (p=0.00), whereas the nutrition label information influence on food purchasing and gender comparison was not statistically significant (p=0.28). 63% of women compared to 54% of men utilized nutrition facts labels before purchasing food items.

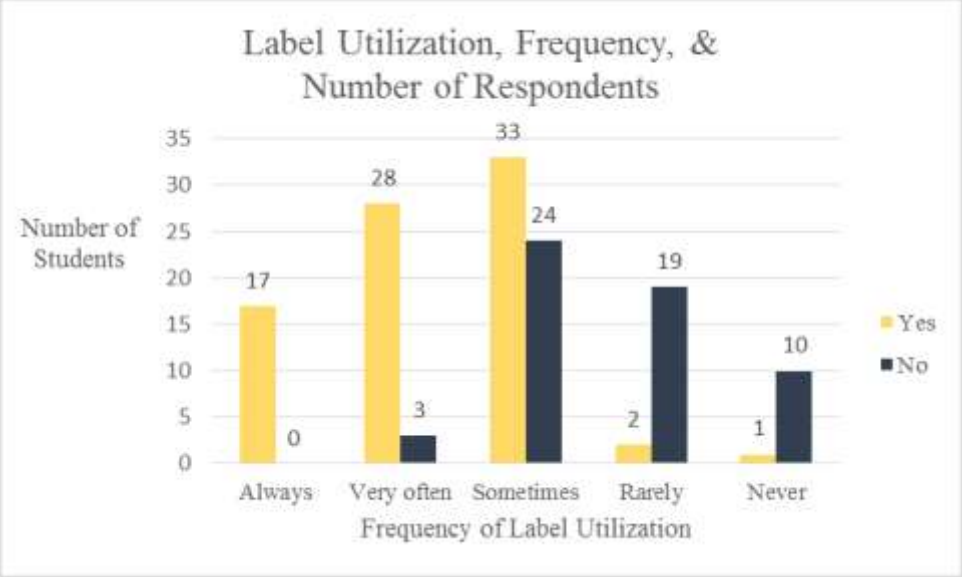

Figure 3. Comparison of students who do or do not utilize nutrition labels before food purchasing to frequency of nutrition label utilization.

Figure 3 demonstrates that students who indicated using nutrition labels before purchasing food items utilized labels more frequently compared to students who did not utilize labels. Students who did not utilize nutrition labels more frequently indicated using nutrition labels sometimes to never in comparison to students who utilized labels very often to always.

Table 2

Students' Purchasing Decisions as Influenced by Price, Convenience, Nutritional Value, Taste, & Availability by Students Who Indicate Yes or No to Nutrition Label Utilization.

		What other factors influences your food purchasing decisions?									
		Price		Convenience		Nutritional Value		Taste		Availability	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Do you currently read nutrition facts labels before purchasing food items?	Yes	76	3	58	19	74	4	77	2	60	12
	No	55	1	47	8	37	16	55	1	48	6
	Total	131	4	105	27	111	20	132	3	108	18

A chi-square statistic compared students who utilized nutrition labels with factors influencing purchasing decisions, indicated in Table 2. Students were asked to identify what factors influenced purchasing decisions: price, convenience, nutritional value, taste, and availability. Fifty-six percent (56%) of respondents were most commonly influenced by taste. Those who used nutritional labels valued nutritional information, which significantly influenced food purchasing decisions ($p=0.00$) compared to non-label reading counterparts.

What do students focus on when using nutrition labels? Students had the option to indicate yes or no to focusing on specific components of the nutrition label before food purchasing including calories, fat, sodium, carbohydrates, fiber, sugar, and protein (Table 3). Ninety-eight students (71%) who utilized nutrition labels focused on calories, 93 (67%) on fat, 78 (56%) on sugar, 74 (54%) on protein, 60 (43%) on fiber, 59 (43%) on sodium, and 56 (40%) on carbohydrates. Students tended to focus more on calories (77%) and fat (72%) compared to other components, with statistical significance ($p<0.05$). Table 3 indicates among the factor comparisons, calories ($p=0.00$) and fat ($p=0.05$) are statistically significant nutrition label focuses among both genders. Results indicate males focus more on reading the protein (65%) and carbohydrate (53%) contents compared to women who focus on fiber (49%) and sugar (67%). Fifty-one (63%) women at UW-Stout utilized nutrition facts labels before purchasing food items compared to men with 30 (37%). Sixty-six females (87%) focused on calories and 61 (78%) on fat, almost twice as much as men. Calories and fat ($p<0.05$) had a significant impact upon purchasing decisions when utilizing nutrition facts labels.

Table 3

The Components Students Focused Most on When Utilizing Nutrition Facts Labels Based on Gender

		Male	Female	Total
Calories	Yes	32	66	98
	No	19	10	29
	Total	51	76	127
Fat	Yes	32	61	93
	No	20	18	38
	Total	52	78	130
Sodium	Yes	23	36	59
	No	30	39	69
	Total	52	74	126
Carbohydrates	Yes	27	29	56
	No	24	42	66
	Total	51	71	122
Fiber	Yes	21	39	60
	No	29	35	64
	Total	50	73	123
Sugar	Yes	27	51	78
	No	22	25	47
	Total	49	76	125
Protein	Yes	33	41	74
	No	19	34	53
	Total	51	74	125

The table identifies the components students focused most on when utilizing nutrition facts labels based on gender.

Is physical activity related to label reading? A chi-square test compared physical activity frequency and nutrition label reading habits before food purchasing. Of the students who indicated nutrition label utilization, 28 (35%) exercised 3-4 days a week, 27 (33%) exercised 1-2 days a week, 21 (26%) exercised 5 or more days a week, and 5 (6%) exercised 0 days a week. Students who exercised 3 or more days a week tended to utilize nutrition labels more than counterparts.

Table 4

Exercise Frequency Compared with Label Reading & Influence of Food Labels on Food Purchasing

		In a typical week, how often do you exercise 30 or more minutes a day?				
		5 or more days a week	3-4 days a week	1-2 days a week	0 days a week	Total
Do you currently read nutrition facts labels before purchasing food items?	Yes	21	28	27	5	81
	No	10	12	23	11	56
	Total	31	40	50	16	137
How often does the information from nutrition facts labels influence your food purchase?	Always	10	3	4	0	17
	Very often	8	15	5	3	31
	Sometimes	7	15	27	8	57
	Rarely	3	4	9	5	21
	Never	3	3	5	0	11
	Total	31	40	50	16	137

Students who utilize labels tend to exercise 3 or more days a week (p=0.04). The comparison of how often nutrition labels influence purchasing decisions was significant to the amount of exercise per week (p=0.00). Table 4 indicates that if the students who utilize labels "sometimes," 54% engaged in physical activity 1-2 days a week compared to students who exercised 3 or more days a week (p=0.00). Between males and females, more males exercised 5 or more days a week compared to females that exercised 4 or less days a week (p=0.00).

Is label reading related to weight change?

Table 5

Gender Differences in Weight Perception of Respondents

	Do you feel that you are at a healthy body weight right now?		Are you satisfied with your current body weight?	
	Yes	No	Yes	No
Male	45	11	40	16
Female	50	31	46	35
Total	95	42	86	51

When students were asked about their current body weight, 86 (63%) students were satisfied with their current weight and 51 (37%) were unsatisfied. Seventy-one percent (71%) of males compared to 57% of females were satisfied with their current body weight, no statistical significance (p=0.08). Ninety-five (69%) students indicated that they were at a healthy body weight compared to 42 (31%) students who indicated being at an unhealthy weight. The chi-square comparison of gender and healthy current body weight resulted in statistical significance (p=0.02).

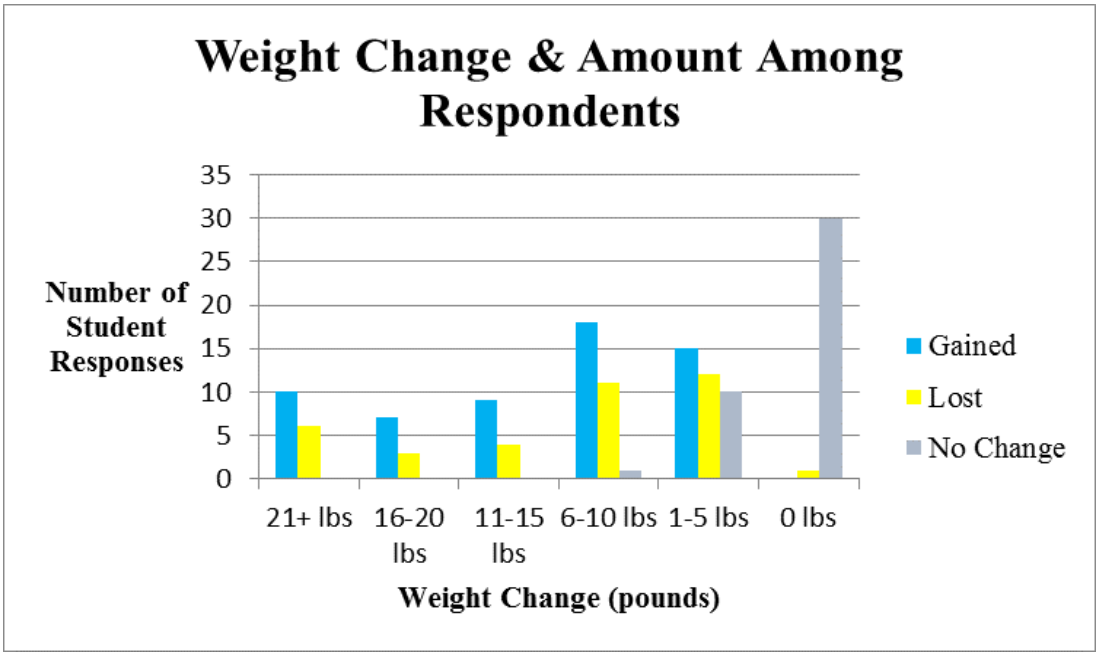

Figure 4. Weight change in students who said they had gained, lost, or had no change in body weight since their freshman year of college.

Figure 4 indicates the most students gained between 6-10 pounds or lost 1-5 pounds or experienced no change of 0 pounds. The data in Figure 2 may seem slightly contradictory based upon students who indicated no change in body weight, but also indicated weight change in the weight ranges above. This probably means that students' current weight is the same as when they started college but it has changed during that time, for example, they have gained and lost weight or reverse.

Table 6

Weight Change Compared to Label Reading & Gender

		From the beginning of freshman year to now, have you gained or lost weight?			
		Gained	Lost	No Change	Total
Do you currently read nutrition facts labels before purchasing food items?	Yes	35	27	19	81
	No	24	10	22	56
	Total	59	37	41	137
What is your gender?	Male	24	12	20	56
	Female	35	25	21	81
	Total	59	37	41	137

The comparison in Table 6 of weight change from freshman year and label reading is not statistically significant (p=.06) and neither is gender (p=0.34).

Do students who exercise experience weight change and are students trying to lose weight? A chi-square analysis compared the frequency of 30 or more minutes of exercise a day and amount of weight gained since freshman year, with no statistical significance (p>0.05). Results indicated 50 (36%) students exercised 1-2 days a week, 40 (29%) exercised 3-4 days a week, 31 (22%) exercised 5 or more times a week compared to the inactive 16 (11%) students.

Table 7

Exercise Frequency Comparison to Weight Change & Trying to Lose Weight

		In a typical week, how often do you exercise 30 or more minutes a day?				
		5 or more days a week	3-4 days a week	1-2 days a week	0 days a week	Total
From the beginning of freshman year to now, have you gained or lost weight?	Gained	12	16	26	5	59
	Lost	10	15	7	5	37
	No Change	9	9	17	6	41
	Total	31	40	50	16	137
Are you currently trying to lose weight?	Yes	10	22	19	8	59
	No	21	16	31	8	76
	Total	31	38	50	16	135

A chi-square test compared frequency of exercise with weight lost since freshman year with no statistical significance ($p>0.05$). From greatest to least weight change: 59 students gained weight, 41 experienced no change, and 37 lost weight. Results indicate 22 (58%) students who tried to lose weight exercised 3-4 days a week compared to 16 (42%) students did not try to lose weight, but there was no statistical significance in exercise levels and trying to lose weight. Students who experienced no change, 41% exercised 1-2 days a week, similar to weight gain results.

Students identified yes or no to currently trying to lose weight. Results identify 59 (43%) students were trying to lose weight and 76 (57%) were not trying to lose weight. Chi-squares compared gender to weight change variables of nutrition facts label reading, components of label focused on, and daily exercise.

Table 8

Gender & Trying to Lose Weight or Not

		Are you currently trying to lose weight?		
		Yes	No	Total
What is your gender?	Male	17	38	55
	Female	42	38	80
	Total	59	76	135

A chi-square analysis compared whether or not students are trying to lose weight based on gender. Results indicate significantly more females than males were trying to lose weight (p=0.01).

Table 9

Gender & Frequency of Exercise

		In a typical week, how often do you exercise 30 or more minutes a day?				
		5 or more days a week	3-4 days a week	1-2 days a week	0 days a week	Total
What is your gender?	Male	22	13	18	3	56
	Female	9	27	32	13	81
	Total	31	40	50	16	137

More males exercised 3 or more days a week (63%) compared to females. Sixteen percent of women compared to 5% of men exercised 2 or fewer days a week (p=0.00). Results indicate a statistically significant comparison between exercise and gender: 22 (39%) males exercised 5 or more days a week compared to 32 (40%) females who exercised 1-2 days a week (p=0.00).

A chi-square analysis compared the amount of weight change since freshman year to the identification of reading food labels before purchasing. Of the students who read nutrition labels

before purchasing food items, 35 (43%) students gained weight, 27 (33%) lost weight, and 19 (24%) experienced no weight change, not statistically significant (p=0.06).

What are the methods of weight change utilized?

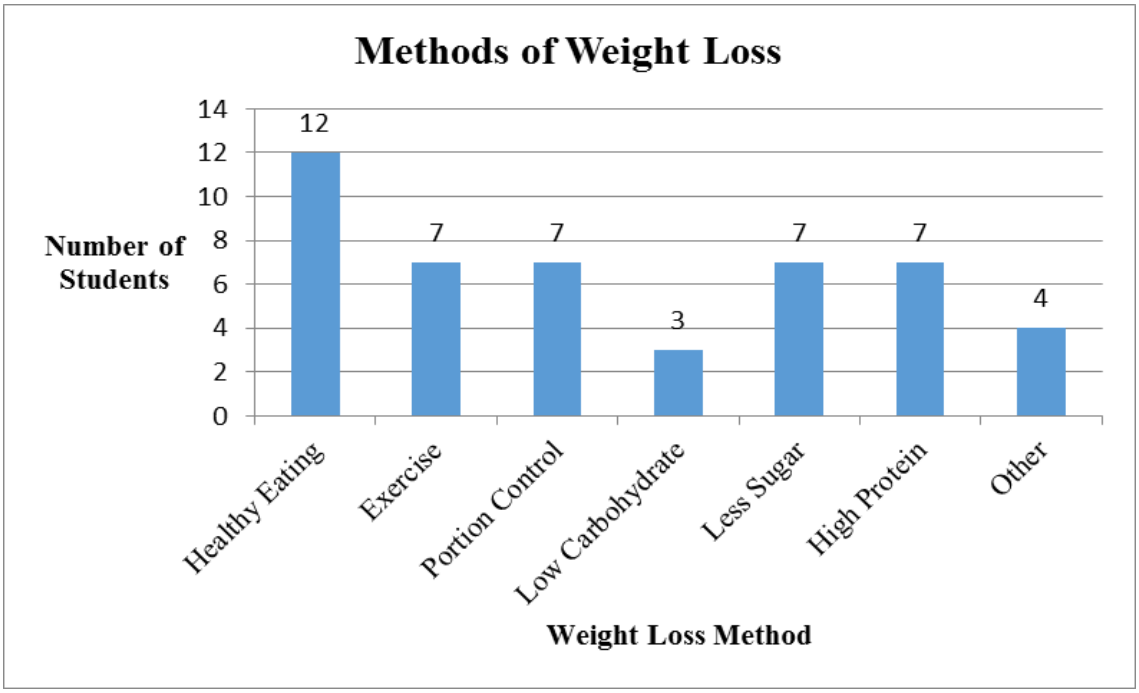

Figure 5. Methods of weight loss omitting the "no diet" group.

Students who tried to lose weight identified specific methods of weight loss categorized under healthy eating, exercise, portion control, low carbohydrates, high protein, less sugar, no diet, and other diets. The "other" category contained restrictions including a military diet, food allergies, doctor specifications, and metabolism boosting items.

Figure 3 shows 26% of students indicates healthy eating to be the most common weight loss method compared to other methods. Left out of the figure were 42 students who indicated not pursuing a diet currently.

What other factors influence weight change?

Table 10

Factors Influencing Weight Change of Students

Factors Influencing Weight Change	Yes	No	Total Responses
Physical activity	102	21	123
Change in eating patterns	92	28	120
Limited budget	79	43	122
Social environment	69	51	120
Having to prepare own food	59	60	119
Eating cafeteria food on campus	50	69	119
Eating fast food	39	79	118

Students were asked to specify whether or not college weight change was influenced by social environment, physical activity, change in eating patterns, eating cafeteria food on campus, eating fast food, having to prepare food, and limited budget. Students identified college weight change was primarily influenced by physical activity ($p=0.02$) and having to prepare their own food ($p=0.03$). A change in eating patterns and limited budget were the next most common factors influencing weight change. Seventy-four percent (74%) of students indicated weight change was most influenced by physical activity compared to other factors indicated above.

Chapter V: Discussion

The purpose of the study was to determine the relationship between nutrition label utilization, weight change, and health behaviors. During the spring of 2013, a 21-question online survey was administered to 1,145 UW-Stout juniors and seniors, with 137 responses. This chapter will further discuss the study's limitations, conclusions, and recommendations.

Limitations

As previously mentioned, there are limitations affecting the study. First, participants who had prior knowledge of the study's objectives or were acquainted with the researcher may have presented biased results. The results were limited to students who responded to surveys, had time to complete surveys, or were interested in nutrition-based topics. It was assumed that students answered survey questions truthfully and completely. The population was limited to junior and senior level undergraduate students to assess weight change over college years. This research study only identified the relationship among exercise, weight change, and health behaviors. Students were not asked their actual body weight because students would be less likely to complete the survey if that question was asked. Students were also not asked if they had gained and lost weight since freshman year, which may have skewed data making participants chose either the gained or lost category when in fact they had experienced both.

Conclusions

The study's results indicate similarities to previous research in this field. Within this study, statistically significant relationships resulted from nutrition label use among students who exercised, experienced weight change, and focused on calories and fat components compared to non-label users. Davy, et al., determined similarly that females focus on fat and perform more label reading than male counterparts (2006). More females (59%) than males (41%) completed this survey.

The study indicated 81 students utilized nutrition labels sometimes, very often, or always, compared to 56 students who utilize labels rarely or never. Students who had claimed "no" to nutrition label reading before food purchasing had indicated nutrition label utilization in a separate survey question, which indicated either a misunderstanding of the questions or that they no longer read labels because they already know and use that information to influence their food purchases. Students who indicated no change since freshman year, but indicated weight fluctuation in pounds may be referring to amount of weight variation since their freshman year.

Eighty-one students said they currently read labels, but approximately 122-130 students identified topics focused on using nutrition labels utilization including calories, fat, sugar, protein, fiber, sodium, and carbohydrates, even though some of these students said they were not currently utilizing labels. Students may have been purchasing the same grocery items each visit and may have utilized nutrition label upon initial purchase, but not thereafter, and indicated in the question that they "currently" do not utilize nutrition labels.

Nurliyana et al. reported that college students focus on taste, price, and ingredients when making food purchasing decisions. This study indicates college students primarily focus on benefits of taste and price. College students, according to Nurliyana et al. reported using nutrition labels "often" compared to this study that found "sometimes" was the most common response.

Temple, Johnson, Recupero, & Suders, discovered students focus on calories and fat on nutrition labels, the current study had the same findings (2010). In addition, students in this study also focused on sugar, protein, fiber, sodium, and carbohydrates in that order. The current study found that more males exercise than females. Most students (57%) were not trying to lose weight, 63% were satisfied with individual body weight, and 69% perceived their current body weight as healthy. Students that indicated no weight change also answered questions on amount of weight

change, which contradicts their identification of no weight change. Students may have misunderstood the questions or may be referring to overall weight (in pounds) change since freshman year, but may currently be at the same weight as freshman year after gaining then losing weight.

Of students trying to lose weight, healthy eating was the top weight loss method. Students identified physical activity as a significant influence upon weight change. Approximately 7% of students were affected by a chronic condition influencing individual diet quality. Lowry, et al., determined 46% of students were trying to lose weight (2000). Those students who engaged in physical activity were significantly more prone to engage in nutrition label reading. More frequent physical activity was frequently linked to weight loss compared to students who gained or maintained weight with less exercise.

Gender differences influenced the results of the study. First of all, more women completed the online survey. Women grocery shop and utilize nutrition facts labels more frequently than male counterparts. Men exercise more frequently than female colleagues. Within all listed focuses on nutrition labels more males focused on carbohydrates and protein compared to females. Equivalent amounts of both males and females gained weight from freshman to junior or senior year, whereas more females lost weight.

In conclusion, students who engage in nutrition label reading tend to exercise more frequently and experience less weight change over college years. Label reading does influence purchasing habits, with students focusing primarily on calories and fat. Most students at UW-Stout are not trying to lose weight, but are cognizant of nutrition labels. Physical activity was identified by students as the largest impact on weight status and nutrition label reading.

Recommendations for Future Research

Although this research study identified various factors affecting college students' weight change and health habits, the population of 137 juniors and seniors was a small sample size. A larger population of the entire junior and senior class might provide representative conclusions of UW-Stout undergraduate students' habits. The 21-question online survey was a useful tool to determine overall habits of this sample, whereas a more in-depth survey of 50 questions may better assess college students' habits, eating patterns, exercise types, and provide a better summary of habits.

More valuable data could have been obtained if the questions were phrased differently to extract the exact information needed without leaving room for interpretation. For example, instead of asking students if nutrition labels "currently" influenced their purchasing decisions, the researcher would simply ask if labels affect purchasing habits and how frequently students utilize labels in a typical week.

The study identified students with chronic diseases, but further research may be beneficial to health professionals to identify students' dietary habits in relationship to chronic diseases. This study focused lightly on dieting methods and weight change, but further identification of diet methods, dieting frequency, or dieting environment would provide further information towards weight change in college students. Further research needs to assess psychological and environmental factors of weight change among students. Future questionnaires may need to address utilization of a 3-day recall that may also include alcohol consumption and types of physical activity. Ultimately, there are factors beyond the reach of this study that leave room for future research studies to address.

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Appendix A

Institutional Review Board Approval

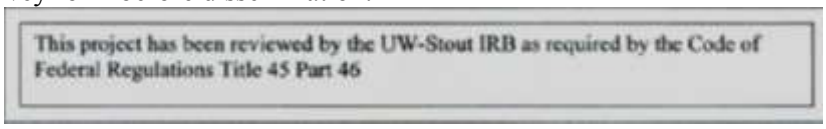
March 28, 2013

Meredith Johnson
Food & Nutritional Sciences
UW-Stout
RE: Nutrition Facts Label Use and Weight Status

Dear Meredith,

The IRB has determined your project, "*Nutrition Facts Label Use and Weight Status"* is **Exempt** from review by the Institutional Review Board for the Protection of Human Subjects. The project is exempt under **Category #** of the Federal Exempt Guidelines and holds for 5 years. Your project is approved from **3/26/2013**, through **3/25/2018**. Should you need to make modifications to your protocol or informed consent forms that do not fall within the exemption categories, you will need to reapply to the IRB for review of your modified study.

If your project involved administration of a survey, please copy and paste the following message to the top of your survey form before dissemination:



If you are conducting an **online** survey/interview, please copy and paste the following message to the top of the form:
"This research has been reviewed by the UW-Stout IRB as required by the Code of Federal Regulations Title 45 Part 46."

Informed Consent: All UW-Stout faculty, staff, and students conducting human subjects research under an approved "exempt" category are still ethically bound to follow the basic ethical principles of the Belmont Report: 1) respect for persons; 2) beneficence; and 3) justice. These three principles are best reflected in the practice of obtaining informed consent from participants.

If you have questions, please contact Research Services at 715-232-1126, or foxwells@uwstout.edu, and your question will be directed to the appropriate person. I wish you well in completing your study.

Sincerely,

Susan Foxwell

Susan Foxwell
Research Administrator and Human Protections Administrator,
UW-Stout Institutional Review Board for the Protection of Human Subjects in Research (IRB)

Appendix B

Consent Form

Consent to Participate in UW-Stout Approved Research
Title: Nutrition Facts Label Use and Weight Status

Description: This research seeks to determine if reading the nutrition facts label has any association with weight change among college students at UW-Stout. You will be asked to answer a short survey about your weight and label reading habits.

Risks and Benefits: There is little risk from completing the survey but you might feel uncomfortable about answering weight status questions, but the survey is anonymous. There is no direct benefit to you, but you will be contributing to the knowledge of college student habits and label reading which will help professionals provide nutrition education.

Time Commitment: The survey will take approximately 5-8 minutes to complete; there is no direct compensation.

Confidentiality: Your name will not be included on any documents. We do not believe that you can be identified from any of this information.

Right to Withdraw: Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. You have the right to stop the survey at any time. However, should you choose to participate and later wish to withdraw from the study, there is no way to identify your anonymous document after it has been submitted. Once you submit your response, the data cannot be linked to you and cannot be withdrawn.

IRB Approval: This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

Investigator: Meredith Johnson
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Statement of Consent:
By completing the survey at the link, you agree to participate in the project entitled, Nutrition Facts Label Use and Weight Status.

Appendix C

Qualtrics Survey

This research has been approved by the UW-Stout IRB as required by the Code of Federal Regulations Title 45 Part 46.

In a typical week, how often do you grocery shop?

- ❍ 5 or more days a week (1)
- ❍ 3-4 days a week (2)
- ❍ 1-2 days a week (3)
- ❍ 0 days a week (4)

Do you currently read nutrition facts labels before purchasing food items?

- ❍ Yes (1)
- ❍ No (2)

How often does the information from nutrition facts labels influence your food purchase?

- ❍ Always (1)
- ❍ Very often (2)
- ❍ Sometimes (3)
- ❍ Rarely (4)
- ❍ Never (5)

On a nutrition facts label, what items do you focus most on?

Calories (1)	❑	❑
Fat (2)	❑	❑
Sodium (3)	❑	❑
Carbohydrates (4)	❑	❑
Fiber (5)	❑	❑

Sugar (6)	❑	❑
Protein (7)	❑	❑

What other factors influences your food purchasing decisions?

Price (1)	❍	❍
Convenience (2)	❍	❍
Nutritional Value (3)	❍	❍
Taste (4)	❍	❍
Availability (5)	❍	❍

In a typical week, how often do you exercise 30 or more minutes a day?

❍ 5 or more days a week (1)
❍ 3-4 days a week (2)
❍ 1-2 days a week (3)
❍ 0 days a week (4)

Do you feel that you are at a healthy body weight right now?

❍ Yes (1)
❍ No (2)

From the beginning of freshman year to now, have you gained or lost weight?

❍ Gained (1)
❍ Lost (2)
❍ No Change (3)

Since freshman year, how many pounds have you gained or lost?

❍ 21 or more pounds (1)
❍ 16-20 pounds (2)
❍ 11-15 pounds (3)
❍ 6-10 pounds (4)

- ❍ 1-5 pounds (5)
- ❍ 0 pounds (6)

Are you currently trying to lose weight?

- ❍ Yes (1)
- ❍ No (2)

How are you trying to lose weight?

Diet Plan (1)	❍	❍
Exercise (2)	❍	❍
Decreased calorie intake (3)	❍	❍
Reading nutrition labels (4)	❍	❍

What diet are you currently on?

What factors have influenced your weight change during college?

Social environment (1)	❍	❍
Physical activity (2)	❍	❍
Change in eating patterns (3)	❍	❍
Eating cafeteria food on campus (4)	❍	❍
Eating fast food (5)	❍	❍
Having to prepare own food (6)	❍	❍

Limited budget (7)	❍	❍

Are you satisfied with your current body weight?

- ❍ Yes (1)
- ❍ No (2)

Do you have a health condition or chronic illness that affects your diet?

- ❍ Yes (1)
- ❍ No (2)

If yes, please indicate your illness or condition.

Please select your age range.

- ❍ 18-20 (1)
- ❍ 21-23 (2)
- ❍ 24-26 (3)
- ❍ 27 or more (4)

What is your gender?

- ❍ Male (1)
- ❍ Female (2)

What year in school are you?

- ❍ Junior (1)
- ❍ Senior (2)