The Relationship between Intuitive Eating and Body Mass Index and Diet Quality in College Students

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THE RELATIONSHIP BETWEEN INTUITIVE EATING AND BOTH BODY MASS INDEX AND DIET QUALITY IN COLLEGE STUDENTS

By

Ashley Reynolds

B.S. University of Maine, 2021

A THESIS

Submitted in Partial Fulfillment of the

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THE RELATIONSHIP BETWEEN INTUITIVE EATING AND BODY MASS INDEX AND DIET QUALITY IN COLLEGE STUDENTS

By:

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Thesis Advisor: Dr. Jade McNamara

An Abstract of the Thesis Presented in Partial Fulfillment of the Requirements for the Degree of Master of Science (In Food Science and Human Nutrition) August 2023

Objective
The objective of this research was to explore the influence of intuitive eating (IE) on body mass index (BMI) and diet quality (DQ) among college students.

Methods
A cross-sectional convenience sample of college students completed an online survey consisting of the short-Healthy Eating Index (SHEI) and the Intuitive Eating Scale-2 (23 items). Body mass index was calculated using self-reported height and weight. Descriptive statistics were used to assess group characteristics. A linear regression was used to test if IE scores significantly predicted BMI. An independent t-test was used to compare BMIs of students with IE scores above and below the average. Pearson's correlation coefficients determined significant relationships between dietary components and IE scores. A one-way multivariate analysis of covariance (MANCOVA) was used to identify differences in consumption of dietary components among students with scores above and below average IE scores, while controlling for BMI.
**Results**

Participants (N=734) were an average of 20.9 (± 2.3) years old, mostly White (88.6%), female (71.1%), and heterosexual (72.1%). Participants had an average BMI of 25.3 (±5.9). Intuitive eating scores predicted BMI ($r = 0.068$, $F (1,845) = 61.83$, $p <0.001$), with higher IE scores indicating lower BMI. Micro-level results revealed statistically significant differences between students with IE scores above and below the average in various aspects of DQ including: fruit intake ($2.96 ±1.75$ vs. $3.30 ± 1.70$, $p = 0.041$); vegetable intake ($2.69 ± 0.75$ vs. $2.83 ± 0.68$, $p = 0.031$); sodium consumption ($3.91 ± 2.07$ vs. $3.52 ± 2.08$, $p = 0.023$) and total added sugar intake ($3.56 3.15$ vs. $4.27 3.21$, $p = 0.028$).

**Conclusion**

College students who had above average IE scores had lower BMIs but showed mixed results in relation to DQ. Students with above average IE scores consumed more F/V and less sodium but consumed more added sugar and saturated fat. More research is needed to corroborate DQ findings, but these results do provide some preliminary justification for IE education to be offered to this population to help encourage healthy BMIs and fruit and vegetable intake.
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LIST OF ABBREVIATIONS

Intuitive Eating: IE
Intuitive Eating Scale: IES-2
Diet Quality: DQ
Body Mass Index: BMI
Eating for Physical Rather than Emotional Reasons: EPR
Unconditional Permission to Eat: UPE
Reliance on Hunger and Satiety Cues: RHSC
Body-Food Choice Congruence: B-FCC
Fruit and Vegetable: F/V
United States Department of Agriculture: USDA
Short-Healthy Eating Index: SHEI
One-way multivariate analysis of variance: MANOVA
One-way multivariate analysis of covariance: MANCOVA
Dietary Guidelines for Americans: DGA
Healthy Eating Index: HEI
Self-regulation scores: SRS
CHAPTER ONE: INTRODUCTION

1.1 Problem

Diet culture is the idea that physical, psychological, and overall well-being are less important compared with outward appearance and body shape. College students often participate in unhealthy eating behaviors and can be pulled into diet culture when adapting to the college environment. Behaviors such as frequent consumption of foods high in added sugar and saturated fat, fast food, and reduced fruit and vegetable (F/V) intake are common. College students may suffer from poor eating habits or even eating disorders for reasons such as lack of access to affordable and healthy foods, lack of nutrition knowledge, less time for exercise, a new and different food environment, stress from school, intake of alcohol, and social components. Poor DQ and erratic dieting can result in elevated BMI, obesity, high blood pressure and cholesterol, type 2 diabetes, osteoporosis, heart disease, eating disorders, depression, and various cancers. A healthful diet of all of the various food groups that fulfills the nutritional and calorie needs of each individual should be encouraged in this population to benefit short-term and long-term health. A healthful diet can increase energy levels, support a healthy immune system, enhance stress management skills, improve concentration and academic performance, support muscle and bone strength, lower the risk of chronic diseases like heart disease, type 2 diabetes, and various cancers, and may improve life expectancy.

One alternative to the common diet culture that may help improve college students’ eating behavior is IE. Intuitive eating is a theoretical framework that emphasizes internal recognition of homeostatic signals and physiological hunger and satiety cues, rather than environmental and emotional cues, it is truly an “anti-diet”. This physical connection to one’s needs helps to support a balanced and nourishing diet by being able to listen to one’s hunger cues and physical...
Researchers have found that IE can be a very useful technique to improve healthy eating behaviors with no negative effects on overall health. There is currently limited research focused on the effects of IE on both DQ and BMI in college students in the United States. This current study will provide insight on the potential benefits of IE in a college student population.

1.2 Hypotheses and Objectives

The objective of this study was to explore the impact of IE scores on BMI and DQ in college students. It was hypothesized that those with IE scores above the average score would have (1) lower BMI, and (2) higher short healthy eating index scores (SHEI) representing better DQ.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Young adults enrolled in college often participate in unhealthy eating behaviors such as frequent fast food consumption and inadequate consumption of fruits and vegetables (F/V). This large at-risk group, of almost 20 million individuals, is likely to experience poor DQ and elevated BMI, contributing to an increased risk for diet-related chronic diseases. Students gain an average of 1.5–6.8 pounds over the first 3–4 months of college, with rates of overweight and obesity doubling by the end of the first semester. Additionally, most young adults, ages 20–29 years, consume only one serving of fruit and one serving of vegetables per day. Which means they are not meeting the USDA’s Dietary Guidelines for Americans (DGA) recommendations which state adults should consume 2.5 cups of vegetables and two cups of fruit every day for a 2,000 calorie diet. College students have been found to visit fast-food establishments one to three times each week on average, which is associated with adverse health outcomes. This poor DQ can lead to weight gain and potentially dangerous dieting behaviors. Instead of turning towards dieting (calorie restriction or elimination of food groups) to lose weight, incorporating IE practices may be a healthier option. IE is a viable and useful technique to improve healthful eating behavior, with no negative effects on overall health. Currently, there is limited research focused on the impact of IE on DQ indicators and BMI in college students and a review of research on this topic is warranted.

2.2 Intuitive Eating

The concept of IE was created in 1995 by two registered dietitian nutritionists: Evelyn Tribole and Elyse Resch. Intuitive eating was created in response to traditional dieting, such as extreme caloric deficits and restriction of entire macronutrient categories, which have been
associated with increased risk of eating disorders, binge eating, weight gain, body dissatisfaction, poor mental health, and many other physical and psychological issues.\textsuperscript{18} The evidence-based paradigm of IE is a dynamic incorporation of mind and body that is built on ten principles that promote one’s interoceptive awareness and interoceptive responsiveness.\textsuperscript{18} Interoceptive awareness is the capacity to recognize physical sensations that originate from within the body and is directly mediated by the right brain.\textsuperscript{18} Interoceptive responsiveness refers to how someone evaluates and responds to certain bodily sensations.\textsuperscript{18} Therefore, it is not only important to be able to feel the physical changes and sensations, but it is important to be able to value and respond to these sensations to ensure individual needs are met.\textsuperscript{18} The ten principles of IE are to (1) reject the diet mentality, (2) honor your hunger, (3) make peace with food, (4) challenge the food police, (5) discover the satisfaction factor, (6) feel your fullness, (7) cope with your emotions with kindness, (8) respect your body, (9) movement- feel the difference, and (10) honor your health- gentle nutrition.\textsuperscript{19} There have been multiple studies to show that intuitive eaters tend to have a higher interoceptive awareness when compared to non-IE.\textsuperscript{18,20}

Intuitive eating can be measured using the Tylka’s 23-item Intuitive Eating Scale (IES-2).\textsuperscript{21,22} The IES-2 measures agreement towards statements surrounding eating behaviors using a Likert scale. The survey contains 23 questions, and each can be scored 1-5. To determine the overall score, all the items must be added together and then divided by 23 to create an average score. There are seven survey items that are scored in reverse due to the wording of the question. Higher IE scores are associated with increased capability to practice IE.\textsuperscript{21} The scale contains four subscales based on the 10 principles of IE, reflecting the key characteristics of intuitive eaters. These subscales are: (1) eating for physical rather than emotional reasons (EPR), which depicts eating as a physical hunger reaction rather than a coping response to emotions; (2) presence of
unconditional permission to eat (UPE), which denotes a willingness to eat when hungry and a refusal to refrain from eating specific foods; (3) reliance on hunger and satiety cues (RHSC), which assesses how much people trust and rely on hunger and satiety cues to control their behavior; and (4) body-food choice congruence (B-FCC), which advocates food choices that respect taste preferences, health, and functionality.21

2.2.1 Intuitive Eating in College Students

Tylka et al21 evaluated the connection between IE and BMI in college students. It was hypothesized that IES-2 scores would be negatively connected to women’s BMI. Participants (N=199) had a mean age of 18.9, and were mostly Caucasian American (75.4%), and considered themselves to be middle class (43.7%) or upper middle class (33.2%). The average BMI was 23.5, which is within the normal recommended BMI range for women.23 The revised 21-item IES-2 was used. Out of a possible score ranging from 1 to 5, the IES-2 average total score was 3.09, 3.08 for UPE, 2.65 for EPR, and 3.56 for RHSC. The total IES-2 scores and BMI had a significant negative correlation of –0.28 (p< 0.001). The IES-2 was also significantly negatively correlated with UPE (–0.21, p<0.01), EPR (–0.17, p<0.05), and RHSC subscale (–0.20, p<0.01). These findings provide evidence for construct validity because they align with the principles of IE.21

Tylka et al22 also examined differences in IE between male and female college students using the IES-2. College students (N=878) were recruited via introductory psychology classes. The sample was mostly female, (55.5%), White (77.3%) and had a mean age of 20.4 years. The researchers discovered that women and men varied substantially on 22 items, with males reporting higher levels of IE (p=0.001).22 In another study, Anderson et al24 found that in college students, increased IE scores have been linked with both decreased BMI and disordered eating.24
Although these studies deeply examined IE, they only briefly included the impact IE may have on BMI among college students.

### 2.3 Body Mass Index Trends in College Students

Up to 35% of college students may be overweight or obese, according to the National College Health Risk Behavior Survey.\(^\text{25,26}\) Obesity prevalence in 18-25 year-olds has continually increased from the 1970s.\(^\text{26,27}\) Webb and Hardin\(^\text{28}\) investigated whether a person's BMI at the start of college influenced changes in body composition and eating habits after the first year of college.\(^\text{28}\) The participants were 134 female undergraduate students (40% Black/African American and 60% White/European American) with the mean age of 18.1 years. This study was a longitudinal examination of biophysical predictors of body composition fluctuations happening during the adjustment period of early college. Self-reported measurements of IE, eating throughout the night, and binge eating were assessed.

Regardless of time, the overweight/obese subjects (n= 28) had higher mean values for body composition (weight) for each parameter (p< 0.001).\(^\text{23}\) In comparison to the underweight/normal weight group (n=55), the overweight/obese college students gained more weight, had an increased BMI, and greater increases in waist circumference (p< 0.001).\(^\text{28}\) Across the first college semester, frequency of eating throughout the night increased (p < 0.05). The average levels of IE declined among all participants (p < 0.05). In comparison to underweight/normal weight participants, overweight/obese participants endorsed higher mean binge eating scores (F(1,70) = 13.8 p < 0.001) and lower IE scores (F(1,70) = 10.99 p < 0.01) at baseline and after the first semester. Both major effects were sustained when corrected for parental wealth [Group: F(3,64) = 3.99, p < 0.05; Time: F(3,64) = 3.09, p < 0.05]. Compared to students with lower BMIs, students who were overweight or obese were more likely to
experience weight gain and an increase in waist circumference (p < 0.05, p < 0.06). The addition of parental income reduced the significance of these effects, indicating that the proxy for socioeconomic status may represent cultural and behavioral aspects that influence body composition changes that relate to BMI status. Among all study participants, regardless of admission BMI, researchers noticed a large decrease in IE and an increase in night eating. Furthermore, female students with higher BMI at the start of the college semester had lower IE scores and more severe binge eating at both evaluation points. These studies provide insight on BMI trends in college students, but do not investigate the impact of IE on BMI in college students.

2.3.1 Body Mass Index and Intuitive Eating

According to numerous studies, IE and BMI are related, usually with individuals who eat more intuitively having lower BMIs. In a longitudinal, cross-sectional study, Christoph et al. used surveys and anthropometric measures to examine how eating intuitively as a young adult relates to weight status, dieting, both healthy and harmful weight control practices, and binge eating among participants (N=1,660). During one wave of the survey, the average age of participants was 25.3 and during the next wave of the survey, the average age was 31.1. Results at the 5-year follow-up of the study found that women, considered to be intuitive eaters, were less likely to have a BMI $\geq 25 \text{ kg/m}^2$ (53.0% for IE vs. 67.9% for non-IE, p < 0.001) or a BMI $\geq 30 \text{ kg/m}^2$ (22.9% vs. 36.7% for non-IE, p < 0.001) than non-IE. Compared to non-IE women, IE women reported decreased dieting participation (63.2% vs. 72.4%, p<0.009), harmful weight control behaviors (49.5% vs. 61.7%, p < 0.001), and binge eating (11.4% vs. 21.1%, p < 0.001) at the 5-year follow up. Additionally, men who ate intuitively had a reduced prevalence of BMIs $\geq 25 \text{ kg/m}^2$ (63.3% vs. 73.9%, p=0.002) and BMI $\geq 30 \text{ kg/m}^2$ (22.6% vs. 31.1%,
p=0.008) compared to men who were non-IE. Intuitive eating men were less likely to participate in dieting (41.1% vs. 51.1%, p < 0.006), unhealthy weight control behaviors (31.6% vs. 45.6%, p < 0.001), and binge eating (0.9% vs. 1.9%, p < 0.005). In both women and men, IE during young adulthood was linked to a lower prevalence of obesity, dieting, harmful weight control practices, and binge eating at the five-year follow-up. This study investigated IE and BMI but lacked in assessing how poor self-regulation is related to both.

Poor self-regulation is associated with increased BMI and risk of obesity. Self-regulation is the ability to control one's attention and emotions to achieve a specific goal. Self-regulation and IE are both associated with lower BMI. In a study done by Ruzanska and Warschburger, the researchers found that the self-regulation scores (SRS) showed medium positive correlations with the IES-2 total score among their sample (N=530). As a result, the SRS and BMI association was mediated by the IES-2, highlighting the potential for using IE strategies to achieve reduced BMI.

Multiple studies demonstrated that IES-2 scores and BMI were negatively correlated, with a higher tendency to practice IE relating to a lower BMI. Researchers have also found that IE is associated with improved overall life satisfaction, positive affect, self-esteem, and self-efficacy, as well as being inversely related with unhealthy and disordered eating behaviors like binge eating. These studies were not all done on the college population and they do not address the impact of DQ on the relationship between IE and BMI.

2.4 Diet Quality

Diet quality can be defined as a well-balanced, nutritious diet that offers energy and all required elements for growth and a long, healthy life. Diet quality can refer to the variety of food in one’s diet or the amount of nutrients in foods someone is consuming, that allows for
adequate body maintenance, growth, physiological condition, physical activity, and infection protection. The Dietary Guidelines for Americans 2020-2025 are a set of recommendations for both the public and nutrition and health experts to assist people in eating a nutritious and healthy diet in order to prevent chronic disease. The Healthy Eating Index (HEI) is a dietary quality metric that evaluates how closely an individual’s diet adheres to the Dietary Guidelines for Americans’ 2020-2025 recommendations. The HEI evaluates a set of foods using a scoring system ranging from 0 to 100. A perfect total HEI score of 100 indicates that an individual’s diet complies with the DGA 2020-2025. HEI scores above 80 indicate a “good” diet, HEI scores in the range of 51 to 80 show a diet that “needs improvement,” and HEI scores that are below 51 show a “poor” diet. Americans average a total HEI-2015 score of 58 out of 100, indicating that most Americans’ diet needs improvement. Adherence to the DGA 2020-2025 can help reduce the risk of acquiring diet-related chronic diseases like heart disease, type 2 diabetes, and some types of cancers.

2.4.1 Diet Quality in College Students

College students suffer from poor eating habits. Yun et al conducted a cross-sectional study that utilized self-designed questionnaires for college students (n=303). They found that only 23.4% (71 out of 303) and 9.2% (28 out of 303) of students consumed F/V every day, respectively. In this same study, 28.8% of the sample was overweight or obese. Most of the participants indicated that their reported diet did not vary from their usual intake, indicating the data was representative of usual DQ. More than half of participants regularly skipped breakfast (57.4%). Most of the students ate more when dealing with stress (70.6%). A majority of respondents reported multiple instances of snacking throughout the day (82.2%). More than half of the participants reported eating fried food at least three times per week (60.7%).
with overweight and obesity, the frequency of trips to fast food outlets was significantly higher (17.2%, p=0.016); this group also significantly preferred cheaper foods over nutritious foods (67.8%, p=0.042).  

Multiple studies have found that more than 90% of college students don’t meet the recommended minimum requirements for servings of F/V per day. Alkazemi and Salmean used a cross-sectional study to examine F/V consumption in college students (n=300) by using a fruit and vegetable screener. They found that the median overall F/V consumption was 1.76 servings without French fry consumption, which is lower than the DGA recommendations (2.5 cups of vegetables each day and 2 cups of fruit each day for a 2000 calorie diet). Intakes of fruit juice differed significantly by gender, with males reporting more servings per day than females (p=0.007). Male students relied more on fried potatoes for vegetable intake (p=0.011) and female students consumed more vegetables excluding fries (p=0.04). Increased F/V consumption improves DQ while providing a way to balance the consumption of energy- and fat-dense meals, leading to a reduction in overall body weight. Fruit- and vegetable-rich diets can also protect against lifestyle-related chronic health issues including heart disease and cancer. Regardless of the benefits, young individuals are unlikely to consume the recommended quantity of F/V because of reasons like taste, inconvenience, and a lack of understanding about F/V consumption recommendations and preparation methods. These are important concepts to study due to the benefits provided by the regular consumption of F/V. Students are more likely to seek out quick food options such as fast food and calorie-dense meals. These poor dietary patterns can result in elevated BMI and obesity-related comorbidities.  

Two previous studies have examined the impact of college related stress on DQ in students. Fabián et al used a retrospective epidemiological study to investigate DQ of college
students (n= 275). Most students (60.7%) reported their stress levels as moderate, and consumed diets that fell short of the dietary recommendations for whole grains, fruits, vegetables, dairy products, and protein; fat consumption was adequate.\textsuperscript{7} In general, most participants’ diets were insufficient for all dietary recommendations (62%).\textsuperscript{7} Age was found to be a significant factor in DQ (p < 0.05); with older college students exhibiting better DQ than younger students.\textsuperscript{7} The majority of the participants’ diets fell short of the dietary recommendations for whole grains, fruits, vegetables, dairy products, and protein; fat consumption was adequate. Age was found to be a significant factor in DQ (p < 0.05) with older students having higher DQ score than younger ones.\textsuperscript{7}

Choi\textsuperscript{36} used data from self-reported questionnaires given to students at a college campus in Korea and looked at the impact that perceived stress levels had on DQ in this population (n=393). Students who reported higher levels of stress exhibited more unhealthy eating practices, such as consumption of ready-made meals (p < 0.001).\textsuperscript{36} These findings indicate that stress management techniques at the beginning of college may be a potential strategy to improve overall DQ.\textsuperscript{36} Additional common barriers to healthy eating among college students included: time restrictions, stress, high pricing of healthy food, and convenience and easy access to junk food.\textsuperscript{36} In contrast, improved food knowledge and education, meal planning, involvement in food preparation, and physical activity were all enablers of healthy behavior.\textsuperscript{36} Intuitive eating interventions have been shown to enable healthy behaviors as well as to improve DQ in some cases.

\textbf{2.4.2 Diet Quality and Intuitive Eating}

There have been mixed results in research regarding DQ and IE. Christoph et al\textsuperscript{37} used a longitudinal cohort study to examine the relationship between IE and DQ. The sample included
1,830 individuals, where 49% were women and had an average age of 31 years old (± 1.6).

Women, that were categorized as being the highest IE, consumed 0.4 servings more vegetables (p= 0.04) and 0.6 servings more fruit (p= 0.001) each day than women in the bottom quartile.

Men, that were categorized as being the highest IE, ate 0.3 servings more fruit (p= 0.03) and 0.6 servings more of vegetables (p= 0.01), but 0.6 servings less of whole grains (p= 0.001) than their lower IE counterparts.

In another study, Jackson et al38 explored how the subscales of the IES-2 were linked to DQ in a sample of adults (n=305) with the average age of 47.28 (±15.75). Results showed that unconditional permission to eat was linked to increased consumption of added sugar, whereas body-food choice congruence was linked to reduced added sugar and calcium intake, as well as a higher intake of vegetables and whole grains.38 Higher intakes of calcium and vegetables were linked to eating for physical rather than emotional reasons. More than 28% of this sample experienced food insecurity. Sex and food security status affected overall IE scores in which both men and food secure people had significantly higher IE scores as well as increased EPR compared to women and food insecure subsample.

Similarly, there were mixed results in another study done by Barad et al,39 who explored the association between IE habits and F/V intake in the college student population (n=293). The total IES-2 score had no relation to F/V consumption. However, F/V intake was positively associated with the B-FCC and EPR subscales (r = 0.462, p < 0.001 and r = 0.177, p= 0.002, respectively), but negatively associated with the UPE subscale (r = −.308, p <.001). Another study found that both men and women’s total IES-2 scores had moderate negative correlations with BMI, but the four IES-2 subscales all had different distinct relationships with consumption of different food groups and total calories.40 Unconditional permission to eat moderately
corresponded with poorer DQ, and consistently exhibited links with a more negative self-evaluation of eating behavior, compared to the other subscales. The other three IES-2 subscales revealed a few modest positive and negative connections with food intake, including small positive associations of DQ scores in women, but not men. Finally, a study by Tabatabai et al looked at the relationship between IE and DQ in college students (n=307) with an average age of 23.5 (± 6.6). Researchers found that both fast food and potato chip consumption were negatively connected with IES-2 total score. It also found that IES-2 total scores were positively correlated with improved overall DQ. Subscales of the IES-2, B-FCC and EPR, were also positively correlated with DQ, whereas the UPE subscale was negatively correlated.

2.5 Gaps in the Research

There is a current gap in the research regarding fully understanding the influence of IE on health behaviors and BMI in college students. Additionally, results regarding how IE influences DQ have yielded mixed results thus far. Although there are studies that have investigated the connections between IE and BMI and IE and DQ separately, there are very few that have assessed the impact of IE on both BMI and DQ. Also, many studies have assessed IE as a mediating factor rather than a primary outcome. It is important to consider individuals’ ability to assess their own dietary habits using the IES-2.

2.6 Conclusion

The transition to the college life style with a combination of increased stress and self-reliance for food can lead to poor dietary habits such as increased fast food intake and decreased F/V intake. These maladaptive behaviors have contributed to rising rates of overweight/obesity. Intuitive eating has been shown as a possible eating strategy to improve both DQ and BMI in college students. Research concerning health outcomes and IE
should continue to be explored among various diverse populations. Understanding IE and its associated benefits can further provide evidence for effective college-aimed interventions. Interventions that reduce the risk of developing chronic diseases related to high BMIs and poor DQ. The purpose of the present study is to examine the impact of IE scores on both BMI and DQ in college students.
CHAPTER THREE: METHODOLOGY

3.1 Study Design

The purpose of this cross-sectional study was to understand the influence of being an IE on BMI and DQ in college students. Data was collected using an online questionnaire that collected sociodemographic information, IES-2 scores, and DQ.

3.2 Setting, Recruitment, and Participants

Data collection began on March 29, 2021, when the electronic survey was distributed via email to students and was kept open for two weeks. (Appendix A) Approval was obtained from the University of Maine’s Institutional Review Board on March 11, 2021. Informed consent (Appendix B) was included at the beginning of the survey and the completion of the survey implied the participants’ consent. College students were invited to participate in data collection via their school email, which was obtained from the university’s listserv. Participants were given the option separately to provide their email upon completion of this survey to be entered into a raffle to win a $25 gift card.

All responses were generated using Qualtrics Software, Copyright © 2021 Qualtrics. Qualtrics and all other Qualtrics product or service names are registered trademarks or trademarks of Qualtrics, Provo, UT, USA. All responses were then downloaded to Excel™ to manage participant data. Data was then analyzed using Statistical Package for the Social Sciences (SPSS) Version 28.0 (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp).

Participants included in analyses attended college full-time (at least 12 credit hours), had complete data sets, and were between 18-27 years old. Students with BMIs of less than 16
and over 40 were excluded from analysis to remove outliers. A final sample of 827 students was obtained.

3.3 Survey Instruments

Demographic questions, such as age, gender identity, ethnicity, year in college, and living arrangements, were included in the online survey. Diet quality was measured using the USDA Short Healthy Eating Index (SHEI). The HEI measures overall DQ by comparing food groups that are consumed with the 2015 DGA recommendations. All food components are weighted equally. HEI scores range from 0 to 100 with 100 being a perfect score. The higher the HEI score, the closer the adherence to dietary guidelines. This scale has been used and validated within the college population to adequately assess DQ. Total fruits and whole fruits were used in the analysis. Total fruits include both whole fruits and 100% fruit juices while whole fruits do not include 100% fruit juices. Body mass index was calculated using self-reported height and weight from demographic questions, weight (kg) / [height (m)]^2. Intuitive eating was measured using the IES-2 (23 items). The IES-2 uses a Likert scale to determine how much each individual agrees or disagrees with the 23 questions. Figure 3.1 describes the scoring procedure for the IES-2. Students were categorized as above average intuitive eaters if they had a score above the mean score of 3.3 and students were categorized average or below average intuitive eaters if they had a score at or below the mean score of 3.3.
Figure 3.1: Scoring Procedure for Intuitive Eating Scale-2

Scoring Procedure:

1. Reverse score Items 1, 2, 3, 7, 8, 9, and 10

2. Total IES-2 Scale Score: Add together all items and divide by 23 to create an average score.

3. Unconditional Permission to Eat subscale: Add together Items 1, 2, 3, 4, 5, and 6; divide by 6 to create an average score.

4. Eating for Physical Rather than Emotional Reasons subscale: Add together Items 7, 8, 9, 10, 11, 12, 13, and 14; divide by 8 to create an average score.

5. Reliance on Hunger and Satiety Cues subscale: Add together Items 15, 16, 17, 18, 19, and 20; divide by 6 to create an average score.

6. Body-Food Choice Congruence subscale: Add together Items 21, 22, and 23; divide by 3 to create an average score.

Obtained from the Intuitive Eating Scale-2 (23 items)\textsuperscript{44}

3.4 Statistical Analysis

All statistical analyses were conducted using SPSS version 28. Descriptive analysis was completed to identify the sample’s characteristics. Significance levels were set at p<0.05. A Pearson’s correlation was used to identify any significant relationships between variables of dietary components (total fruit, whole fruit, total vegetable, added sugar, saturated fat, and sodium), BMI, and IE. An independent t-test assessed the differences in BMI values in above average intuitive eaters compared with below average intuitive eaters. Linear regressions were conducted to analyze how IE scores (independent variable) predicted BMI and DQ (dependent variable) in college students. A one-way multivariate analysis of variance (MANOVA) was used to determine differences in dietary component variables between students that had an IE score above the average and students that had an IE score below the average and then a one-
way multivariate analysis of covariance (MANCOVA) was used to determine the same data as the MANOVA test while additionally controlling for BMI.
CHAPTER FOUR: RESULTS

4.1 Demographics

All participants were college students. Participants were primarily White (88.6%), female (71.1%), and heterosexual (72.1%). The mean age of participants was 20.9 years old (±2.3) with a mean BMI of 25.3 (±5.9). The distribution of grade level was relatively equal, with freshman participants representing 20.7%, sophomore participants representing 22.5%, junior students representing 21.1%, senior students representing 19.0%, and graduate students representing 16.8% of total participation. Table 4.1 contains further demographic details.
Table 4.1: Demographic Variables of College Students Completing an Online survey assessing Intuitive eating

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean (±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, year</td>
<td>20.9 (±2.3)</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>25.3 (±5.9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>88.6 (746)</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>3.3 (28)</td>
</tr>
<tr>
<td>Black</td>
<td>1.1 (9)</td>
</tr>
<tr>
<td>Native American or Asian/Pacific Islander</td>
<td>4.0 (34)</td>
</tr>
<tr>
<td>Other</td>
<td>3.0 (25)</td>
</tr>
<tr>
<td>Male</td>
<td>25.6 (218)</td>
</tr>
<tr>
<td>Female</td>
<td>71.1 (606)</td>
</tr>
<tr>
<td>Other</td>
<td>3.3 (28)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sexual Orientation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight</td>
<td>72.1 (619)</td>
</tr>
<tr>
<td>Gay or Lesbian</td>
<td>3.8 (33)</td>
</tr>
<tr>
<td>Bisexual</td>
<td>14.5 (124)</td>
</tr>
<tr>
<td>Queer</td>
<td>4.4 (38)</td>
</tr>
<tr>
<td>Questioning/Unsure</td>
<td>2.2 (19)</td>
</tr>
<tr>
<td>Something Else</td>
<td>2.9 (25)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year in College</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>20.7 (178)</td>
</tr>
<tr>
<td>Sophomore</td>
<td>22.5 (193)</td>
</tr>
<tr>
<td>Junior</td>
<td>21.1 (181)</td>
</tr>
<tr>
<td>Senior</td>
<td>19.0 (163)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>16.8 (144)</td>
</tr>
</tbody>
</table>

*Ethnicity: n = 842, Gender: n = 852, Sexual Orientation: n = 858, Year in College: n = 859
A majority of survey respondents did not have a meal plan at the university (74.3%) and most lived off campus (72.6%). Students had a mean total SHEI of 49.3 (±10.3), a mean SHEI total fruit intake score of 3.2 (±1.7), a mean SHEI whole fruit intake score of 3.4 (±1.9), and a mean SHEI total vegetable intake score of 2.8 (±0.7). Students also had a mean SHEI added sugar intake score of 4.1 (±3.2) and a mean SHEI sodium intake score of 3.6 (±2.1). Table 4.2 shows the participants’ exact environmental and dietary characteristics.
Table 4.2: Environmental & Dietary Characteristics of College Students Completing an Online survey assessing Intuitive eating

<table>
<thead>
<tr>
<th>Variable</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meal Plan</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>25.7 (220)</td>
</tr>
<tr>
<td>No</td>
<td>74.3 (637)</td>
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<tr>
<td><strong>Living Situation</strong></td>
<td></td>
</tr>
<tr>
<td>On Campus</td>
<td>27.4 (235)</td>
</tr>
<tr>
<td>Off Campus</td>
<td>72.6 (622)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHEI Total Score</td>
<td>49.3 (±10.3)</td>
</tr>
<tr>
<td>SHEI Total Fruit Score</td>
<td>3.2 (±1.7)</td>
</tr>
<tr>
<td>SHEI Total Whole Fruit Score</td>
<td>3.4 (±1.9)</td>
</tr>
<tr>
<td>SHEI Total Added Sugars Score</td>
<td>4.1 (±3.2)</td>
</tr>
<tr>
<td>SHEI Total Sodium Score</td>
<td>3.6 (±2.1)</td>
</tr>
<tr>
<td>Total Intuitive Eating Score</td>
<td>3.3 (±0.55)</td>
</tr>
</tbody>
</table>

*Meal Plan: n = 857, Living Situation: n = 857, Short Healthy Eating Index (SHEI) scores: n = 837 (Diet quality was measured using the USDA Short Healthy Eating Index (SHEI)), Total Intuitive Eating (IE) Score: n = 859 (Intuitive eating scores were measured using the Intuitive Eating Scale-2 IES-2 (23 items))
4.2 Intuitive Eating and Body Mass Index

Independent t-tests showed that participants who had above average intuitive eating scores (72%, n=597) had a significantly lower BMI (24.32 ± 5.20) compared to those who had below average intuitive eating scores (n=250) (27.59 ± 6.77), t(377.37) = 6.831, p< 0.001.

A linear regression was used to test if IE scores significantly predicted BMI. Macro-level results showed that the overall regression was statistically significant ($r^2 = 0.07, F (1,845) = 61.83, p <0.001$). Micro-level results revealed that IE scores were a significant negative predictor of BMI ($\beta = -0.26, p < 0.001$). Similarly, a linear regression was used to test if IE scores significantly predicted DQ with macro-level results showing that the overall regression was statistically significant ($r^2 = 0.01, F (1,835) = 8.291, p <0.004$), and micro-level results revealing that IE scores were a significant predictor of total DQ score ($\beta = 0.10, p < 0.004$). Tables 4.3 and 4.4 show summaries of the linear regression analyses.

Table 4.3: Summary of Linear Regression for Intuitive Eating and Body Mass Index of College Students Completing an Online survey assessing Intuitive eating (n=847)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>B</th>
<th>SE (B)</th>
<th>B</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Mass Index</td>
<td>-2.80</td>
<td>0.356</td>
<td>-0.26</td>
<td>-7.86</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

* Represents a significant p-value

Table 4.4: Summary of Linear Regression for Intuitive Eating and Diet Quality in College Students (n=847)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>B</th>
<th>SE (B)</th>
<th>B</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet Quality</td>
<td>1.85</td>
<td>0.644</td>
<td>-0.10</td>
<td>2.88</td>
<td>&lt;0.004*</td>
</tr>
</tbody>
</table>

* Represents a significant p-value
4.3 Intuitive Eating and Diet Quality

Pearson correlation coefficient analysis showed that total IE was positively correlated with total SHEI score ($r=0.10$, $p<0.004$), SHEI total fruits score ($r=0.09$, $p<0.007$), SHEI total vegetable score ($r=0.11$, $p<0.001$), SHEI added sugars score ($r=0.14$, $p<0.001$), and SHEI saturated fat score ($r=0.07$, $p<0.042$). Total IE was negatively correlated with SHEI sodium score ($r=-0.08$, $p<0.03$) and BMI ($r=-0.26$, $p<0.001$).

University students were categorized into two groups based on their IE scores. Students that were above average intuitive eaters (n = 584, 71%) had a score above the mean of 3.3. Students that were average or below IE (n = 243, 29%) had a score at or below the mean score of 3.3. Overall macro-level results of the MANCOVA, while controlling for BMI, yielded a statistically significant difference in DQ components (total fruits, vegetables, sodium, and added sugar) between above average intuitive eaters and below average intuitive eaters, $F(5, 820) = 4.193$, $p < 0.001$. Micro-level results of the MANCOVA revealed a statistically significant difference between those students who were above average intuitive eaters and below average intuitive eaters, in total fruit SHEI (2.96 ± 1.75 vs. 3.30 ± 1.70, $p = 0.041$); total vegetable SHEI (2.69 ± 0.75 vs. 2.83 ± 0.68, $p = 0.031$); total sodium SHEI (3.91 ± 2.07 vs. 3.52 ± 2.08, $p = 0.023$); and total added sugar SHEI (3.56 ± 3.15 vs. 4.27 ± 3.21, $p = 0.028$).
CHAPTER FIVE: DISCUSSION

A cross-sectional study was conducted to examine the influence of IE on the DQ and BMI among college students. The results of the present study were consistent with the hypothesis that students that had a higher IE score, would have both a higher total DQ and a lower BMI. There was a negative relationship between IE scores and BMI, with participants who had higher IE scores having lower BMI values. Furthermore, students who were intuitive eaters had a higher total DQ, higher SHEI total fruits score, higher SHEI total vegetable score, and had significantly lower sodium intake. However, students that had above average intuitive eating scores, also had a higher SHEI added sugars score and SHEI saturated fat score, when compared with average/below average intuitive eaters. These results demonstrated that IE could have a significant impact on both DQ and BMI in a population that is at risk of acquiring chronic diseases. Findings also provided support for IE based education for college students.

The study's findings, that students with higher IE scores also had lower BMIs, were consistent with the findings of numerous other studies, showing that intuitive eaters had lower BMIs than their non-IE counterparts. Above average intuitive eaters may have had lower BMI values due to their overall higher DQ scores when compared with average/below average intuitive eaters. Camilleri et al examined IE and weight status in adults eighteen years and older. Study results mirrored this one in those men and women with higher IE scores had a significantly lower chance of being overweight or obese and having lower BMI values. The researchers also examined the specific subscales of IE and how they related to weight status and BMI in this population. The three subscales EPR, UPE, and RHSC were all inversely related to BMI and weight status. This may be because when eating intuitively and practicing EPR, a person is more likely to choose foods that make them feel physically better and these tend to be
healthier options. An individual practicing RHSC is able to guide when, what, and how much to eat while having the ability to modify their energy intake throughout subsequent meals in order to satisfy their nutritional needs. If a person is practicing UPE, they may not feel the need to binge or overeat because they always allow themselves to eat what they want. The method in which above average IE students choose food may be different than their counterparts due to practicing IE and the subsequent subscales. Findings corroborate conclusions from other studies and provide evidence that IE can be a sustainable way to eat to maintain a healthy BMI.

Intuitive eating may also be negatively correlated with BMI due to its positive relationship with self-regulation scores (SRS). Higher BMI and obesity risk are related to poor self-regulation. Ruzanska and Warschburger found that the link between SRS and BMI was mediated by the IES-2 and that the SRS individually had no influence on BMI in a way that was independent of its effect on the IES-2. Self-regulation scores may be mediated by intuitive eating because of intuitive eaters’ ability to rely on hunger and satiety cues. In another study, it was demonstrated that intuitive eaters, not only had a lower BMI, but were also less prone to engaging in binge eating, inappropriate weight-control methods, and dieting. There were significantly fewer cases of obesity, dieting, dangerous weight control methods, and binge eating in both men and women who had engaged in IE as young adults. These findings highlight the numerous physical benefits that IE could have on this population.

When looking at BMI as a good indicator of health, it can be noted that BMI can be a helpful indicator of an individual’s risk for diseases that can develop as a result of having a higher body fat percentage. Higher BMIs have been associated with increased risk of developing chronic diseases including arthritis, diabetes, hepatic disease, cancer, hypertension,
sleep apnea, and elevated cholesterol. However, a person's metabolic health is commonly misclassified by using their BMI alone. Additionally, BMI values may be particularly unreliable for older people, athletes, and pregnant women. Body Mass Index should not be used as a single measure of health. Body Mass Index may be a helpful tool for predicting future health rather than present health. In addition, the majority of white populations served as the basis for the present BMI criteria of overweight and obesity, ignoring racial and ethnic differences in body composition, such as the percentage of body fat or the quantity of muscle mass. Body Mass Index may therefore aid in predicting health status in white people but may be less reliable for those belonging to other racial and ethnic groups. This could result in inadequate counseling and treatment, which would ultimately widen healthcare inequities. Body mass index has many limitations but may still be able to be used as a tool to predict future conditions.

In the current study, students had an overall average total SHEI of 49.3 (49.3 ± 10.3), which is below the average HEI score for adult Americans 19-30 years old (53 out of 100). However, findings demonstrated that higher IE scores were a significant predictor of better DQ. In addition, it was found that students with above average IE scores had higher DQ compared with their average/below average IE counterparts. Above average IE students had a higher overall DQ, consumed more total F/V and consumed less sodium than the average/below average IE students; similar results have been found in other studies.

High intuitive eating scores were found to be a significant predictor of higher DQ scores in students. This may have to do with the way that intuitive eaters view food differently and practice the IE subscales. Tabatabai et al stated that the IES-2 subscales, eating for physical rather than emotional reasons and Body-food choice congruence, both focus on what the body...
physically needs and the consumption of wholesome meals that promote bodily function and wellness.\textsuperscript{41} Both eating for physical rather than emotional reasons and Body-food choice congruence were found to be positively linked with DQ, indicating a higher DQ as subscale scores rose.\textsuperscript{41} Intuitive eating may lead to increased DQ because both are associated with the ability to adhere to the gentle nutrition principle of IE by selecting foods that provide both energy and nourishment.\textsuperscript{41}

Intuitive eating is linked to a lower prevalence of dieting, harmful weight control practices, and binge eating\textsuperscript{18} which are all components that make up diet culture. Intuitive eating may lead to increased DQ because the practice goes against diet culture and environmental or external cues and instead promotes a healthful diet of all essential nutrients. Intuitive eating does this by focusing on internal homeostatic signals and selecting foods that provide both energy and nourishment, which tend to be higher quality healthy foods.\textsuperscript{18} According to researchers, IE is positively correlated with positive body image, self-esteem, positive emotional functioning, proactive coping, health-promoting behaviors, and overall life satisfaction as well as being negatively correlated with eating disorder symptomatology.\textsuperscript{48}

Despite the positive impact that IE had on DQ in the present study, higher IE scores were also positively correlated with SHEI added sugars score and SHEI saturated fat score. Jackson and Sano\textsuperscript{38} found that UPE, a subscale of IE, was associated with an increased intake of added sugar.\textsuperscript{38} Unconditional permission to eat demonstrates a willingness to consume food when hungry as well as a refusal to restrict particular foods or meals and may be associated with less food restriction and traditional dieting. These behaviors (less food restrictions and less dieting behaviors) can lead to an increase in added sugar and saturated fat consumption.\textsuperscript{38} Even though UPE is related to higher intakes of calorie-dense and unhealthy foods, harsh restriction of food
groups can lead to binging of restricted foods, posing health risks. Intuitive eating may be a protective factor over binge eating behaviors.

Of the ten principles that make up the concept of intuitive eating, those that may be related to the higher intake of added sugar and saturated fat in this study’s participants include making peace with food by giving yourself unconditional permission to eat whatever you want, not letting your cravings control you, challenging the food police by not categorizing foods as being good or bad, and finally discovering the satisfaction factor by truly eating foods that you enjoy. All of these principles may add to the increased intake of added sugar and saturated fat in above average IE students. Intuitive eaters do not view foods as being good or bad and give themselves unconditional permission to eat foods that they enjoy eating which is something that non-IE may not be able to do, without that restriction IE may consume foods that contain more added sugar and saturated fats. Researchers have also shown that college students in general have poor diet quality and often consume convenience foods that are higher in added sugar and saturated fat, which also may have impacted students’ DQ. Students may additionally be food insecure and the only foods available may be convenience foods that are higher in added sugars and saturated fats. Although above average IE students in this study did have higher SHEI added sugars scores and SHEI saturated fat scores, they still had healthier BMI values when compared with their average/below average IE counterparts, which may be related to their overall higher total SHEI DQ scores.

There is also a possibility that there was response bias in the survey answers. Above average IE students may be more open about their intakes of certain foods such as ones that contain added sugar or saturated fat because they do not feel shameful about them. Because IE goes against diet culture, above average IE students may not feel embarrassed as they do not
qualify foods as good or bad, whereas students, who are not intuitive eaters and may engage in
dieting behaviors, could view foods that contain added sugars or saturated fat in a negative light.
These individuals may, therefore, not be open about consumption of such foods. Above average
IE students may also be more perceptive about the foods they are eating because they eat
mindfully and may report foods accurately.

5.1 Limitations

One limitation of this study was that the majority of the research sample were White
(88.6%), female (71.1%), and heterosexual (72.1%), making it difficult to generalize results.
Another important consideration for this specific population is access to food or food insecurity.
College students face financial and time constraints due to busy schedules and may turn towards
cheaper convenience foods that are high in added sugars and saturated fat. These demographic
trends were common in other previous research focusing on IE, diet, and BMI in college
students. In order to evaluate IE, DQ, and BMI of college students of various
ethnicities, particularly those confronting racial disparities that have been demonstrated to
significantly influence health outcomes, a more diverse sample is required. Another limitation
may be that the pandemic altered survey responses about BMI and DQ. During the pandemic,
students reported a significant increase in eating frequency and consumption of nearly every
food group. Finally, an additional limitation was that the cross-sectional study had room for
response error because all the data was self-reported.

5.2 Conclusion

This cross-sectional study provides justification for IE based educational interventions for
college students to help improve DQ and to reach and maintain a healthy BMI. Incorporating an
IE based curriculum can help reduce chronic diseases related to poor DQ and high BMI,
resulting in a lower prevalence of chronic illness in this group. These findings are important in validating the influence that IE has on both DQ and BMI in college students in the United States. Future research should include diverse ethnicities, genders, age groups, occupations, and socioeconomic position, as well as random sampling. There is also a need for more longitudinal studies to examine how IE affects eating behaviors and health indicators over time. Additional future research consideration could include looking at the correlation between IE and food security status especially due to the increased food insecurity for many people as pandemic challenges continue. Intuitive eating may not be possible if a person is facing food insecurity and does not have full control over meal and food availability.
REFERENCES


40. Intuitive eating and food intake in men and women_ Results from the Swiss food panel study | Elsevier Enhanced Reader. doi:10.1016/j.appet.2018.12.036


APPENDICES

APPENDIX A: CONSENT FORM

Informed Consent Form
This survey is anonymous. You are invited to participate in a research project being conducted by Jade McNamara, a faculty member in the Department of Food Science and Human Nutrition at the University of Maine. The purpose of the research is to understand your point of view about health resources and current health behavior. You must be between the ages of 18 and 27 years old to participate.

What Will You Be Asked to Do?
If you decide to participate, you will be asked to complete the online survey which asks questions about your current health behaviors and emotions. It may take approximately 30 minutes to participate.

Risks:
Risk of participating may include responding to sensitive questions on the online survey. Mental and physical health, as well as health behaviors (i.e: sleeping patterns, eating patterns) will be addressed in this survey. Information about how to contact the Counseling Center and Cutler Health for services will be provided for everyone. You may skip questions at any time.

Benefits
While this study will have no direct benefit to you, this research may help us learn more about current health behaviors of college students at the University of Maine.

Compensation:
You will be able to enter a raffle for a $25 Amazon gift card sent to you electronically. Twenty prizes will be given out. You will be contacted through an email you provide through a link at the end of the survey after you answer all questions. Your email will not be connected to your responses. You must reach the end of the survey to be entered into the raffle.

Confidentiality
In the survey, your name will not be on any of the data. All data will be kept on a password protected computer and kept until February 2031.

Voluntary
Participation is voluntary. If you choose to take part in this study, you may stop at any time. If you stop the survey, then you will not be entered into the raffle to receive the incentive of a $25 Amazon gift card. You may skip any questions you do not wish to answer.

Contact Information
If you have any questions about this study, please contact me at 207-581-4895 or jade.mcnamara@maine.edu. If you have any questions about your rights as a research participant, please contact the Office of Research Compliance, University of Maine, 207/581-2657 (or e-mail umric@maine.edu).
Counseling Center Information
If you want to speak with someone please contact the Counseling Center or visit Cutler Health Center.

Here is information for the Counseling Center at the University of Maine.
Hours of Operation: Monday through Friday, 8 AM – Noon and 1-4:30 PM.
Phone Number: 207-581-4975

Cutler Health Center: Provide primary care services to the students and faculty of the University of Maine as well as their dependents.
Location: 5721 Cutler Health Center, Room 125
Hours of Operation: Monday through Friday, 8 AM - 5 PM.
Phone Number: 207-581-4000
Location: 5721 Long Road University of Maine in Orono, Orono ME, 04469
APPENDIX B: SURVEY QUESTIONS

Are you 18 years old or older?

☐ Yes, I am 18 years old or older.
☐ No, I am younger than 18 years old.

How old are you?

<select>
</select>

What is your gender identity?

☐ Male
☐ Female
☐ Trans-male/Trans-man
☐ Trans-female/Trans-woman
☐ Gender non-conforming
☐ Different identity—please state:
<input>
☐ Choose not to answer
What is your ethnicity?
- White
- Hispanic or Latino
- Black or African American
- Native American or American Indian or Asian/Pacific Islander
- Other
- Choose not to answer

What year in college are you?
- Freshman
- Sophomore
- Junior
- Senior
- Graduate Student

Do you have a dining meal plan?
- Yes
- No
- Choose not to answer

Do you live:
- On Campus
- Off Campus
- Choose not to answer

Do you think of yourself as...
- Heterosexual, or straight
- Homosexual, or gay or lesbian
- Bisexual
- Queer
- Questioning/Unsure
### What is your in inches?

<table>
<thead>
<tr>
<th>Height</th>
<th>In</th>
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<tbody>
<tr>
<td>4'8&quot;</td>
<td>60&quot;</td>
</tr>
<tr>
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<td>61&quot;</td>
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Which of the following are you trying to do about your weight?

- Lose Weight
- Gain Weight
- Stay at the Same Weight
- I am not trying to do anything about my weight.

How do you feel about your current weight?

- I am happy with my weight.
- I don’t care about my current weight.
- I am upset about my current weight.
- Choose not to answer

What is your desired weight (in pounds)?

- Pounds
- Choose not to answer

On average, how many servings of fruit (not including juice) do you eat per day?

Example: 1 serving fruit = 1/2 cup cut-up fruit, 1/2 a banana, or one small piece of whole fruit (apple, orange, pear, etc.) One small piece of whole fruit is the size of a baseball. 1/2 cup cut-up fruit is the size of a computer mouse.

- Less than 1
- 1
- 2
- 3
- 4
- 5
- 6 or more
- Choose not to answer
On average, how many servings of 100% fruit juice do you drink per day? Note: Do not include fruit flavored drinks such as Hi-C, Tang, Sunny-D, etc.

Example: 1 serving juice = 1/2 cup 100% fruit juice (apple, grape, orange, etc.), 1 cup of juice = juice box.

☐ Less than 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6 or more
☐ Choose not to answer

Now, think about all the vegetables you eat in a day. On average, how many servings of vegetables do you eat per day? Note: Any vegetable or 100% vegetable juice counts as a member of the vegetable group.

Example: 1 serving = 1 cup of raw vegetables, 1 cup of salad, 1/2 cup cooked vegetables, or 1/2 cup 100% vegetable juice. One cup of raw vegetables is the size of a baseball. 1/2 cup cooked vegetables is the size of a computer mouse.

☐ Less than 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6 or more
☐ Choose not to answer
Now, think about just the green vegetables you eat in a day like spinach, green beans, kale, broccoli, zucchini, or other mostly green vegetables. On average, how many servings of green vegetables do you eat per day? NOTE: Do not include starchy vegetables like green peas.

Example: 1 serving = 1 cup raw vegetables or ½ cup cooked vegetables. 1 cup raw vegetables is the size of a baseball. ½ cup cooked vegetables is the size of a computer mouse.

☐ Less than 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6 or more
☐ Choose not to answer

Now, think about just the starchy vegetables you eat in a day like corn, green peas, or potatoes. On average, how many servings of starchy vegetables do you eat per day?

Examples: 1 serving = 1 cup raw vegetable or ½ cup cook vegetables. 1 cup raw vegetables is the size of a computer mouse.

☐ Less than 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6 or more
☐ Choose not to answer
On average, how many servings of grains do you eat per day?

*Examples: 1 serving = 1 slice of bread; ½ cup grits, 1 cup of ready-to-eat cereal, ½ cup oatmeal, 1 small tortilla, ½ cup cooked rice, or ½ cup pasta. 1 cup ready-to-eat cereal is the size of a baseball.*

- [ ] Less than 1
- [ ] 1
- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 5
- [ ] 6 or more
- [ ] Choose not to answer

On average, how often do you eat grains?

*Examples: 1 serving = 1 slice of bread; ½ cup grits, 1 cup of ready-to-eat cereal, ½ cup oatmeal, 1 small tortilla, ½ cup cooked rice, or ½ cup pasta.*

- [ ] A couple times per week
- [ ] A couple times per month
- [ ] A couple times per year
- [ ] Almost never
- [ ] Never
- [ ] Choose not to answer

Now, just think about whole grains you eat like whole wheat bread, whole grain crackers, brown rice, or oatmeal. On average, how many servings of whole grains do you eat per day?

*Examples: 1 serving = 1 slice whole wheat bread, 5-6 whole grain crackers, 3 cups popcorn, ½ cup cooked brown rice, or ½ cup oatmeal.*

- [ ] Less than 1
- [ ] 1
- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 5
- [ ] 6 or more
- [ ] Choose not to answer
On average, how often do you eat whole grains?

Examples: 1 serving = 1 slice whole wheat bread, 5-6 whole grain crackers, 3 cups popcorn, 1/8 cup cooked brown rice, or 1/8 cup oatmeal.

☐ A couple times per week
☐ A couple times per month
☐ A couple times per year
☐ Almost never
☐ Never
☐ Choose not to answer

On average, how many servings of milk do you eat or drink per day?

Examples: 1 serving = 1 cup of milk, 1 cup of yogurt, 1.5 ounces of natural cheese, or 2 ounces of processed cheese. 1 cup of milk is the size of a carton of milk. 1 serving of cheese is the size of your index finger.

☐ Less than 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6 or more
☐ Choose not to answer

On average, how often do you drink or eat milk products?

Examples: 1 serving = 1 cup of milk, 1 cup of yogurt, 1.5 ounces of natural cheese, or 2 ounces of processed cheese.

☐ A couple times per week
☐ A couple times per month
☐ A couple times per year
☐ Almost never
☐ Never
☐ Choose not to answer
Now, just think about the milk products you eat per day. On average, how many servings of low-fat milk products do you eat per day?

Examples: 1 serving = 1 cup of skim milk, 1 cup of low-fat yogurt, or 1.5 ounces of low-fat cheese. 1 cup of milk is the size of a milk carton. 1 serving of cheese is the size of your index finger.

☐ Less than 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6 or more
☐ Choose not to answer

On average, how often do you drink or eat low-fat milk products?

Examples: 1 serving = 1 cup of skim milk, 1 cup of low-fat yogurt, or 1.5 ounces of low-fat cheese.

☐ A couple times per week
☐ A couple times per month
☐ A couple times per year
☐ Almost never
☐ Never
☐ Choose not to answer
On average, how many servings of beans (legumes) do you eat per day? Note: All foods made from dry beans, canned beans, peas, and lentils are considered part of this group.

Examples: 1 serving = ½ cup cooked beans. ½ cup cooked beans is the size of a computer mouse.

☐ Less than 1  ☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5  ☐ 6 or more  ☐ Choose not to answer

On average, how many servings of nuts or seeds do you eat per day?

Examples: 1 serving = 1 tablespoon of peanut butter; ½ ounces of nuts or seeds. 1 tablespoons of peanut butter is the size of the tip of your thumb.

☐ Less than 1  ☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5  ☐ 6 or more  ☐ Choose not to answer
On average, how many servings of seafood do you eat per day? Note: All foods made of fish, shrimp, crab, and shellfish are considered part of this group.

Examples: 1 serving = 3 ounces of fish. 3 ounces of fish is the size of a deck of cards.

☐ Less than 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6 or more
☐ Choose not to answer

On average, how often do you eat seafood? Note: All foods made of fish, shrimp, crab, and shellfish are considered part of this group.

Examples: 1 serving = 3 ounces of fish.

☐ A couple times per week
☐ A couple times per month
☐ A couple times per year
☐ Almost never
☐ Never
☐ Choose not to answer

On average, how many sugar-sweetened beverages do you drink per day?

Examples: 12 ounces of soft drinks/soda, fruit flavored drinks, sweetened coffee, and sweet tea. Do not include milk or 100% fruit juice. 12 ounces of soda is the size of one can.

☐ Less than 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6 or more
☐ Choose not to answer
On average, how often do you drink sugar-sweetened beverages?

*Examples: 12 ounces of soft drinks/soda, fruit flavored drinks, sweetened coffee, and sweet tea. Do not include milk or 100% fruit juice.*

- A couple times per week
- A couple times per month
- A couple times per year
- Almost never
- Never
- Choose not to answer

On average, how much added sugars do you consume per day? Note: Added sugars are often in foods such as breads, cakes, candy, sweet tea, jam, ice cream, or sugar added to food at the table. Do not include naturally occurring sugars such as lactose in milk or fructose in fruits.

*Examples: white sugar, brown sugar, raw sugar, corn syrup, corn-syrup solids, high-fructose corn syrup, malt syrup, maple syrup, pancake syrup, fructose sweetener, liquid fructose, honey, molasses, and dextrose.*

- None/almost none
- Some
- A lot
- Choose not to answer

How many servings of saturated fat do you consume on average per day? Note: Saturated fats for these purposes should be considered to be solid fats. Solid fats are fats that are solid at room temperature.

*Examples: butter, cakes, cookies, Crisco, coconut oil, beef fat (tallow, suet), chicken fat (lard), stick margarine, and shortening.*

- None/almost none
- Some
- A lot
- Choose not to answer

On average, how much water do you drink per day?

- None/almost none
- Some
- A lot
- Choose not to answer
I try to avoid certain foods high in fat, carbohydrates, or calories.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I have forbidden foods that I don't allow myself to eat.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I get mad at myself for eating something unhealthy.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I find myself eating when I'm feeling emotional (e.g., anxious, depressed, sad), even when I'm not physically hungry.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I find myself eating when I am lonely, even when I’m not physically hungry.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I use food to help me soothe my negative emotions.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree
I find myself eating when I am stressed out, even when I’m not physically hungry.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I am able to cope with my negative emotions (e.g., anxiety, sadness) without turning to food for comfort.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

When I am bored, I do NOT eat just for something to do.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

If I am craving a certain food, I allow myself to have it.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I allow myself to eat what food I desire at the moment.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I do NOT follow eating rules or dieting plans that dictate what, when, and/or how much to eat.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree
When I am lonely, I do NOT turn to food for comfort.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I find other ways to cope with stress and anxiety than by eating.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I trust my body to tell me when to eat.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I trust my body to tell me what to eat.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I trust my body to tell me how much to eat.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I rely on my hunger signals to tell me when to eat.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree
I rely on my fullness (satiety) signals to tell me when to stop eating.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I trust my body to tell me when to stop eating.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Most of the time, I desire to eat nutritious foods.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I mostly eat foods that make my body perform efficiently (well).

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I mostly eat foods that give my body energy and stamina.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree
BIOGRAPHY OF THE AUTHOR

Ashley Reynolds was born in Dover-Foxcroft, Maine and was raised in Dexter, Maine. She graduated as salutatorian from Dexter Regional high school in 2017. Ashley received a Bachelor of Science degree from the University of Maine in food science and human nutrition with a concentration in human nutrition and dietetics in 2021 Summa Cum Laude. Ashley was an undergraduate research assistant for Dr. Jade McNamara in her Nutrition Education and Eating Decisions lab on campus from 2019-2021. She also volunteered as an undergraduate researcher with Angela Myracle. During her undergraduate years, she also served as the vice president of the nutrition club and was inducted into Kappa Omicron Nu Honor Society.

As a graduate student, she continued her membership in the Kappa Omicron Nu Honor Society and worked as a teaching assistant for Eileen Molloy and Natalie VandenAkker for multiple food science classes: FSN 305, FSN 412, FSN 103, and FSN 104. She is currently in pursuit of a Master of Science in Food Science and Human Nutrition and will be completing a dietetic internship in central Maine from January to August of 2023. Ashley is a student member of the Academy of Nutrition and Dietetics and the Maine Academy of Nutrition and Dietetics. Ashley’s plan is to complete the Registered Dietitian Examination and become a Registered Dietitian Nutritionist (RDN) upon completion of her master’s degree. After that, her long-term goal is to pursue a doctorate in Nutrition with a focus on public health nutrition, specifically investigating intuitive eating and related programs. Her recent publications include:


Ashley is a candidate for the Master of Science degree in Food Science and Human Nutrition in August 2023.