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INTUITIVE EATING, ATTITUDES TO FOOD, AND BODY SIZE: A COMPARISON
BETWEEN NUTRITION MAJORS AND NON-MAJORS

A Thesis Presented

by

KATELYN A. RUSSELL

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE

September 2014

Department of Nutrition

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DEDICATION

“There is no ‘supposed to be’ in bodies. The question is not size or shape or years of age, or even having two of everything, for some do not. But the wild issue is, does this body feel, does it have the right connection to pleasure, to heart, to soul, to the wild? Does it have happiness, joy? Can it in its own way move, dance, jiggle, sway, thrust? Nothing else matters.”

Clarissa Pinkola Estes, Ph.D., *Women Who Run with the Wolves*

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Most importantly, I'd like to thank my family. I am grateful for my aunt, Ria Leonard, who is my kindred spirit and who always offers me strength and insight. So much gratitude goes to my brothers, Chris Russell and Matt Russell, who enrich my life and the lives of all those around them with their presence. Finally, thank you to my mom and dad, Kathy and Jim Russell, for making all of this possible. I am forever grateful for your unconditional love, wisdom, and support. You gave me every opportunity to succeed in life and this thesis is a testament to the work ethic and attitude you instilled in me.

ABSTRACT

INTUITIVE EATING, ATTITUDES TO FOOD, AND BODY SIZE: A COMPARISON BETWEEN NUTRITION MAJORS AND NON-MAJORS

SEPTEMBER 2014

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Directed by: Professor Alayne Ronnenberg

Dietitians are expected to deliver sound and scientifically objective advice to the general public, yet their personal beliefs and behaviors could influence delivery of nutrition care. Increased understanding of the personal attitudes and behaviors of dietitians concerning eating behavior and body image could help improve dietetic practice. Traditional nutrition education emphasizes cognitive eating, i.e., monitoring energy intake and comparing macronutrient intakes to the current acceptable ranges. Intuitive eating, however, promotes the release of cognitive eating in favor of greater attention to physiologic cues, or “body wisdom”. We hypothesized that nutrition students in a traditional curriculum would report eating less intuitively than non-nutrition majors.

We surveyed 258 female undergraduate students (96 nutrition majors and 162 non-majors) at the University of Massachusetts Amherst. Using Mann-Whitney U tests, we assessed the differences between nutrition majors and non-majors in terms of: intuitive eating, as measured by the Intuitive Eating Scale-2 (IES-2); body mass index (BMI, kg/m^2); magnitude of body dissatisfaction (actual weight – ideal weight); and dieting behavior. We also used non-parametric

Spearman's rho correlations and Chi-squared statistics to examine relationships between variables. A two-way between-groups analysis of variance was used to calculate statistical differences in intuitive eating scores between diet behavior and major.

Contrary to our working hypothesis, we found that IES-2 scores were significantly higher in majors versus non-majors ($p= 0.01$) and significantly lower ($p<0.05$) in those trying to lose weight. We also found that the magnitude of body dissatisfaction was significantly correlated to IES-2 scores ($r=-0.44$, $p=0.01$). Lastly, we found that 2 out of 3 women (65.1%) in our study group who reported that they "wanted to lose weight" had, in fact, *normal* or *underweight* BMI.

These observations provide novel information indicating that nutrition undergraduate students, who have the intention of becoming registered dietitians, report that they eat more intuitively and have a lower degree of body dissatisfaction than do undergraduate students not majoring in nutrition. Additional research is needed to address issues related to body dissatisfaction and body weight.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	v
ABSTRACT.....	vi
LIST OF TABLES.....	x
CHAPTER	
1. INTRODUCTION	1
2. DEFINITION OF OBESITY/HEALTH IMPACTS/PREVALENCE.....	3
Definition of Obesity.....	3
Weight and Morbidity	4
Weight and Mortality	5
Overweight/Obesity Prevalence.....	7
Energy Restriction and Weight Loss.....	7
Prevalence of Dieting Behavior	8
3. PUBLIC HEALTH RESPONSE	10
Weight Management	10
Energy Restriction.....	10
Physical Consequences of Energy Restriction	12
Psychological Consequences of Energy Restriction	13

4. DISORDERED EATING	16
Introduction	16
Prevalence of Disordered Eating in Nutrition Students and Professionals	16
5. HEALTH AT EVERY SIZE AND INTUITIVE EATING	19
Introduction	19
Intuitive Eating.....	20
Intuitive Eating Interventions.....	20
Cross-sectional studies of intuitive eating.....	21
6. PURPOSE OF THE STUDY	25
Overview	25
7. METHODS	29
Study Sample	29
Human Subjects Approval	29
Study Design	29
Survey Instruments and Variables.....	30
Intuitive Eating Scale - 2.....	30
Health Consciousness and Pleasure Questionnaire	31
Youth Risk Behavior Surveillance Survey (YRBSS)	33

Demographic Questions	33
Height, Weight and BMI Questions	33
Decoy Questions and Deception	34
Statistical Analyses	34
8. RESULTS	37
Study Subjects	37
Demographic Variables.....	37
Body Size and Personal Weight Goals.....	38
Diet Behavior	38
Mean comparison of Intuitive Eating and Health Consciousness and Pleasure by Nutrition Major or Non-Major.....	39
Correlations	39
9. DISCUSSION	42
Intuitive Eating.....	42
Body Dissatisfaction	47
Health Consciousness and Pleasure	49
Strengths.....	49
Limitations	50
Future Directions.....	50

Summary of Findings.....	51
Implications for Research and Practice.....	52
Conclusions	52
TABLES	54
APPENDICES	
A. TWO-WAY BETWEEN-GROUP ANALYSIS OF VARIANCE WITH MULTIPLE COMPARISONS, IES-2 SCORES BY DIET BEHAVIOR AND MAJOR. MEAN IES-2 SCORES OF THE LHSSG.	
	63
B. LHSSG SURVEY	64
C. RECRUITMENT EMAIL	98
D. IRB APPROVAL LETTER	100
BIBLIOGRAPHY	102

LIST OF TABLES

Table	Page
1. Characteristics of the LHSSG stratified by Nutrition Major or Non-Major	54
2. Cross tabulation of BMI categories and diet behavior, layered by nutrition major and non-major in the LHSSG.....	56
3. Cross tabulation of BMI categories and weight perception, layered by nutrition major and non-major in the LHSSG.....	57
4. Comparison of IES scale by Nutrition Major or Non-Major in the LHSSG	58
5. Comparison of Health Consciousness and Pleasure Questionnaire Subscales by Nutrition Major or Non-Major in the LHSSG.....	59
6. Correlation Coefficients Between Variables in the LHSSG	60
7. Correlation Coefficients Between Variables in the LHSSG, Split by Major and Non-Major ...	61
8. Two-Way Between-Group Analysis of Variance with Multiple Comparisons, IES-2 Scores by Diet Behavior and Major, Tukey	62

CHAPTER 1

INTRODUCTION

Nutrition majors are at high risk for disordered eating and body dissatisfaction.¹⁻⁴ This is damaging personally and could have professional ramifications as well, since dietitians are responsible for disseminating nutrition information to the public.⁵ An alternative to restrictive eating and weight loss dieting is intuitive eating, which suggests that the body knows what, when and how much to eat.⁶ This philosophy is in direct disagreement with the current model of professional nutrition education, which teaches nutrition facts and trains future dietitians to prescribe diets based on energy intake and macronutrient content.⁵ Since nutrition students are taught this type of dietary approach, it is reasonable to assume they eat in a more “cognitive” way as opposed to an “intuitive” way. Given the lack of evidence regarding the long-term efficacy of weight loss diets⁷ and the emergence of the anti-dieting movement⁸, dietitians and nutrition students might benefit personally and professionally from increased knowledge of intuitive eating and its practice. Personally, intuitive eating principles could improve nutritionists’ relationships with food and their body.⁹⁻¹¹ Professionally, offering intuitive eating strategies to patients who are struggling with dieting, disordered eating, and poor body image would give nutritionists another potential therapeutic tool.^{6,12,13}

As noted previously, studies suggest that many nutrition majors exhibit disordered eating patterns²⁻⁴ and are unhappy with their physical appearance.¹ However, no data exist regarding nutrition majors and intuitive eating. It is worth measuring intuitive eating in nutrition majors

versus non-majors for a couple reasons: 1) to see if studying nutrition could perhaps influence intuitive eating behavior, and 2) to gain an understanding of the adaptive eating behavior in nutrition students instead of simply the disordered behavior. If indeed nutrition training is in some way associated with intuitive eating, this could inform dietetics training programs or perhaps nutrition education for the general public (if nutrition majors appear to eat more intuitively than non-majors). Given the call from some in the nutrition community to shift from a weight-loss paradigm to an intuitive eating paradigm,¹⁴ research in this population of aspiring nutrition professionals seems particularly relevant.

CHAPTER 2

DEFINITION OF OBESITY/HEALTH IMPACTS/PREVALENCE

Definition of Obesity

Body mass index (BMI) is the most widely used measure of body fat.¹⁵ Data from the Nurses' Health Study and the Health Professionals Follow-Up Study suggest that the incidence of chronic diseases, such as diabetes, gallstones, hypertension, and heart disease, increases with increasing BMI.¹⁶ BMI is calculated by dividing the weight in kilograms by the height in meters squared (kg/m^2). The table below shows weight classification based on BMI.¹⁵

BMI Classification	BMI (kg/m^2)
Underweight	<18.50
Normal weight	18.50 – 24.99
Overweight	25.00 – 29.99
Obese	≥ 30.00

While BMI is useful in comparing populations, it has serious limitations as a reference value. It does not take into account body composition, and so we assume that someone who is “overweight” according to the reference values has excessive adipose tissue although the weight may in fact be related to extensive lean mass.¹⁵ Furthermore, the World Health Organization (WHO) notes that the cutoff values for BMI are arbitrary.¹⁵ Prior to 1998, the National Center for Health and Statistics classified BMIs of 27 to 28 kg/m^2 as overweight.¹⁷ The WHO also suggests

that BMI might be most appropriate for white men and women in the US and Western Europe, which excludes almost 25% of the United States population.¹⁸

Weight and Morbidity

A 2000 report from the World Health Organization classifies obesity as a risk factor for non-communicable disease, and considers it a disease in its own right.¹⁹ Obesity greatly increases the risk of developing type 2 diabetes, gallbladder disease, dyslipidemia, insulin resistance, breathlessness and sleep apnea.¹⁹ Cardiovascular disease, cancer and hormonal abnormalities have also been linked to obesity.¹⁹ Overall, the negative health consequences associated with carrying excess weight are widely accepted.¹⁹⁻²² In fact, the National Task Force on the Prevention and Treatment of Obesity called the link between overweight and obesity to poor health outcomes well established and incontrovertible.²²

However, the argument that excess weight is incontrovertibly linked to adverse health outcomes may be exaggerated.²³ Campos et al,²⁴ who systematically dismantled the Obesity Task Force's claim, posit that in a system as complex and unique as the human body, it is unlikely that such a black and white relationship exists between body weight and disease. They suggest that underlying metabolic processes could contribute both to the disease state and to obesity. For example, they postulate that insulin resistance could be caused by an underlying metabolic aberration that also predisposes people to gain weight because compensatory insulin secretion promotes fat storage instead of being caused by the weight gain itself.²⁴ They further note that causal links between excess body weight and disease, with the exception of osteoarthritis²⁵ and some cancers²⁶, are hypothetical.

Campos and colleagues also note that people usually point to excess body fat as the culprit for poor health.²⁴ However, a 2004 study that removed subcutaneous fat via liposuction from women who were moderately insulin resistant (n=8) and severely insulin resistant (n=7), found no improvements in health markers over 10-12 weeks.²⁷ If excess body fat was indeed pathogenic, one would suspect that removing 10kg of fat would improve health indicators. Not only did this study suggest that the health effects of fat may differ based on where the fat is located in the body, but it also suggests that positive effects of lifestyle and other interventions that can increase insulin sensitivity may promote health via a mechanism independent of any effect on body fat reduction. In fact, the authors state that the presumed cause and effect relationship between weight and health outcomes can be debunked by considering the role that diet and exercise play:²⁴ diet and exercise can improve insulin sensitivity,^{28,29} blood lipids,²⁸⁻³⁰ and blood pressure,^{31,32} even without weight loss.

Weight and Mortality

Data collected in the early 20th century by life insurance companies pointed to excess weight as a liability for longevity. Companies used these data to construct weight-for-height tables, which physicians used even though they were not intended for that purpose,³³ and the concept of “ideal body weight”, the body weight associated with a minimum morbidity and/or mortality risk—was developed.²⁰ Epidemiologic studies report conflicting results about the association between mortality and weight, with some finding no association at all.^{23,34,35} As noted by Bacon and Aphramor¹⁴, only at statistical extremes (underweight and morbidly obese) does BMI weakly predict longevity. In fact, the National Health and Nutrition Examination Survey

(NHANES) I, II and III all concluded that the most protective weight category was the overweight category.²³

On the other hand, a 2004 Centers for Disease Control (CDC) study calculated that 400,000 deaths per year in the U.S. were attributed to poor diet and physical activity which they classified as overweight.³⁶ However, a subsequent study by Flegal and colleagues calculated only 25,814 deaths per year attributed to overweight and obesity.³⁴ In defending their method, Flegal and colleagues note that previous studies examining the relationship between overweight and mortality, including the 2004 study mentioned above, calculated the deaths attributable to overweight by combining relative risk estimates from epidemiologic cohort studies with estimates of prevalence of overweight and obesity from national surveys and did not adjust the relative risk estimates for confounding factors, such as age and smoking. Furthermore, they only used data from NHANES I and smaller, regional studies, whereas Flegal et al. included data from NHANES II and III in their analysis. These differences in methodologies and data explain the massive reduction in deaths between the 2004 CDC study and the Flegal study.³⁴

Matheson et al.³⁷ analyzed NHANES III data, consisting of approximately 40,000 US civilians, and found that the adoption of healthy habits (smoking cessation, exercise, eating fruits and vegetables, and consuming alcohol in moderation) appears to decrease mortality risk independent of BMI. The authors found that the adoption of each additional healthy habit decreased all-cause mortality between 29% and 85%. To put this in perspective, statins decrease all-cause mortality by 12% in individuals at high risk for cardiovascular disease. Furthermore, when the authors stratified the participants by normal weight, overweight, and obese, they found that all groups benefited from the adoption of healthy habits with the obese group having the

greatest benefit. With the adoption of all four healthy habits, the risk of death in the obese group was equal to the risk of death in the normal weight group. The cross-sectional design of this study does not prove causation, but this study supports the adoption of healthy habits as an important, or perhaps primary, health goal, *instead* of focusing as much as we do on weight loss.

Overweight/Obesity Prevalence

The CDC estimates that 69.2% of adults are overweight or obese, with 35.9% classified as obese.³⁸ According to the National Institutes of Health (NIH), obesity and overweight increase risk for coronary heart disease, high blood pressure, type 2 diabetes, gallstones, breathing problems and certain cancers.²⁰

Energy Restriction and Weight Loss

In order to “combat” the obesity epidemic, people have been urged to lose weight.³⁹ A 1998 report entitled, “Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults”²¹ outlines the association between obesity and poor health outcomes, noting that there is *strong evidence* that weight loss in obese persons decreases their risk of high blood pressure, diabetes, and cardiovascular disease, while improving lipid profiles. Low calorie diets, along with exercise, weight loss drugs and surgical intervention are all described as being evidence-based treatments for weight loss. While this report was published 15 years ago, the basic premise of obesity treatment remains unchanged.^{5,39} The United State’s Department of Agriculture educational website, www.choosemyplate.gov, proclaims the importance of *weight maintenance*, noting that a healthier body weight will help individuals feel and look better, and is good for overall health and well-being.⁴⁰ A variety of tools are provided

on the website in order to educate consumers about how to achieve energy balance, and monitoring and decreasing food intake is discussed as a viable weight loss option.⁴⁰

Prevalence of Dieting Behavior

The high prevalence of overweight in America is mirrored by a high prevalence of dieting.⁴¹ Six in ten Americans diet each year.⁴² A study of 2,287 young adults over 10 years found that half the females and one-fourth of the males reported dieting in the past year, with about 20.6% of the females employing extreme weight loss tactics between middle adolescence and middle adulthood.⁴³ In fact, weight concerns are so ubiquitous among adolescents and young adults that they are now considered normal.⁴⁴ These concerns increase from the age of 10 to 16, and appear to be higher than previously recorded. However, this emphasis on weight can subsequently lead to disordered weight control behaviors.⁴⁵

Despite the commonly held belief that dieting is an effective way to lose weight and alter physical appearance, there is substantial research that suggests otherwise. Only one in six people classified as obese who lose 10% of their body weight are able to keep that weight off for a year.⁴⁶ Additionally, a comprehensive review by Mann and colleagues suggests that one-third to two-thirds of dieters gain back more weight than they lose, and that this number is likely underestimated due to the methodological flaws present in many weight loss studies.⁷ Instead of having its intended effect of creating weight loss and decreasing disease risk, dieting behavior predicts future weight gain, disordered eating, eating disorders, and overweight status.^{45,47} Dieting may also contribute to psychological stress and elevated levels of cortisol,⁴⁸ both of which have been implicated in obesity as well as in adverse health outcomes.

Carrying extra body weight is considered an important health risk and the obese individual is urged to lose weight by behavioral, medical or surgical means. What is disturbing, and somewhat paradoxical, is that, despite a high prevalence of obesity, as a culture, we prize thinness. This translates into pressure to be thin, which Stice and Shaw note can take a variety of forms, from glorification of the ultra-thin fashion models to direct messages that one should lose weight, to indirect pressure to conform to the current thin-ideal espoused for women.⁴⁹ So, individuals receive messages that excess fat is bad for their health from public health organizations, and from mainstream culture they receive messages that in order to be beautiful and to be liked, they must be thin. These messages converge and create psychological distress about carrying excess weight, lest we they be viewed as unhealthy and undesirable.⁴⁹

CHAPTER 3

PUBLIC HEALTH RESPONSE

Weight Management

Public health entities target body weight as the variable that needs to be changed in order to affect health.⁴⁰ The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults suggests that overweight and obese patients should strive to lose 5 to 10% of their body weight to reduce their risk of obesity-related diseases.²¹ People in all BMI categories, except for the underweight category, are urged to prevent weight gain. However, data suggest that is not *weight* that is the problem, it is behaviors. As noted previously, Matheson and colleagues found that the adoption of healthy lifestyle habits ameliorated the mortality risk associated with an obese BMI.³⁷ Among overweight men with type 2 diabetes, those who reported trying to lose weight unsuccessfully experienced the same reduction in mortality rate as those who were successful in weight loss.²⁴ Despite this evidence, weight is still the target of public health interventions and efforts to manage weight are reviewed below.

Energy Restriction

Professionals in nutrition,⁵ public health,^{39,40} and medicine²² encourage weight loss through energy restriction. Furthermore, they present weight loss as reasonable and achievable. But this approach has several shortcomings.

To begin with, the energy-restriction theory of weight loss derives from the theory of energy balance. Simply stated, if we consume more calories than we expend, we will be in

positive calorie balance and we will gain weight. If we consume fewer calories than we expend, we will be in negative energy balance and we will lose weight. If our calorie consumption equals our expenditure, we will be in energy balance and our body weight will remain the same. Yet as noted in a review by Hill et al.,⁵⁰ energy balance is under tight physiological control, which is why we can eat much more on some days relative to others and experience only a small change in weight. This may explain why it is so challenging for some to lose weight and, if they do lose weight, to keep the weight off.

Following the logic of energy restriction, eating fewer calories, regardless of the macronutrient source, should result in a reduction in energy balance and thereby a reduction in the rate of weight gain or a net loss of body weight, depending upon the level of energy output. Therefore, to lose 10% body weight, professionals encourage daily energy restriction of 500-1000 kcals/day,^{21,39,51} which should produce a moderate rate of weight loss of 1-2 pounds per week (negative calorie balance of 3500-7000 kcal/week). This approach to weight loss is supported by the Academy of Nutrition and Dietetics (AND).⁵ The AND characterizes this claim as “Strong, Imperative.” This means, in the balance of benefit versus harm, the AND considers this recommendation to be broadly applicable with its benefits strongly outweighing the risks.

A 2013 review by Fock and Khoo of diet and exercise in the management of obesity reinforced calorie restriction as a way to achieve weight loss.⁵² They note that dietary interventions remain the cornerstone of weight loss therapy, and suggest diets of different macronutrient and energy levels to achieve weight loss. This review does not suggest exercise as an effective agent for weight loss, noting that exercise programs only create weight loss of 0.1kg per week. However, they do note that people who diet and exercise maintain their weight loss

better than those who do not. Given the results of the aforementioned Matheson study, it seems that what is most important is not whether exercise maintains weight loss, but rather that it is a healthy habit that deserves adopting, regardless of the effect on body size.³⁷

Physical Consequences of Energy Restriction

In theory, creating a state of negative energy balance to encourage weight loss makes sense. But, as noted previously, there are physiological mechanisms in place to reduce energy expenditure, such as voluntary and involuntary reductions in activity and a reduced lean body mass, that occur following energy restriction and act to counterbalance the effect of a reduced energy intake, and, thereby, reduce the degree of negative energy balance and reduce the rate of weight loss. Hill et al. reason that food restriction leads to weight loss, but it also leads to decreased energy expenditure and increased hunger.⁵⁰

A 1995 study examined how weight loss and weight gain affected energy expenditure in obese and non-obese subjects.⁵³ The authors found that a 10% loss of body weight resulted in reduced energy expenditure, which corresponded to a positive energy balance of 375 kcals per day, while an increase in weight resulted in increased energy expenditure. In addition, they note that the sense of hunger or dysphoria that may accompany this state of reduced energy expenditure could promote increased food intake, furthering widening the gap between energy intake and output. This finding suggests that a 10% reduction in body weight, the amount recommended by health professionals, causes compensatory changes in metabolism and can contribute to compensatory overeating. Furthermore, it suggests that the ability to lose weight is not only a matter of willpower and that weight regain is not to be viewed as a personal failure –

the body has devised protective mechanisms to resist weight loss and to maintain weight within a certain range.

Indeed, a 2009 study of diets intended to produce a 750-kcal/day deficit reported a 2-year mean weight loss of 3.6 ± 3.5 kg.⁵⁴ Only 14-15% of participants lost 10% of their body weight. Said differently, 85% of the participants did not achieve or maintain a 10% loss of their body weight, which one views as an 85% failure rate. On top of that, weight loss occurred in the first 6 months and weight gain from 6 months to 2 years. Additionally, 7% of participants experienced adverse effects, although the authors did not specify the nature of these effects.

As noted previously, Mann et al report that one-third to two-thirds of dieters gain back more weight than was lost, and they suggest that this number is likely underestimated due to the methodological flaws present in many weight loss studies.⁷

Psychological Consequences of Energy Restriction

Perhaps the most well known study about the effects of energy restriction is the Minnesota Starvation Study.⁵⁵ Directed by Ancel Keys in the mid 1940s, the study evaluated the physiologic effects of starvation and re-feeding to inform post WWII re-feeding protocols. Thirty-six conscientious objectors were fed a semi starvation diet of approximately 1800 kcals a day for 6 months, during which time they were expected to walk 22 miles a week, which would result in loss of >25% of their body weight.

Interestingly, the men reported becoming food obsessed. They collected recipes and cookbooks and performed elaborate rituals during mealtimes. Their sex drives plummeted, as food became their central focus. In a review of the paper, Kalm and Semba note that democracy

and nation building would not be possible in a population that did not have access to sufficient food.⁵⁵ Following the restriction period, the men reported binge eating and feeling as though they were unable to fill themselves with enough food. It is important to point out that these men were average weight before the study started and that they lost double the amount of weight that is recommended by public health officials. Yet their energy consumption of 1800 kcals/day is well above that often recommended for weight loss.⁵²

Not all agree that dieting produces negative psychological outcomes. Wadden et al⁵⁶ randomized 123 obese women to a balanced deficit diet (BDD), a meal replacement (MR) or a non-diet (ND) group. Those in the BDD and MR group restricted their intake to approximately 1000 kcals/day and lost 10-12% of their initial weight by week 40, although they regained weight by week 65. The ND group were told to not restrict their diet and learned about ND principles, such as loving yourself regardless of weight. Dietary restraint increased in the MR and BDD groups and both of these groups reported binge episodes, although the increased prevalence was not statistically different from the ND group. All three groups experienced a decrease in depressive symptoms over the course of the intervention. Therefore, the authors conclude that dieting is “benign” and that the findings of the adverse effects of calorie restriction in individuals of average weight or in those with bulimia nervosa or anorexia nervosa have, in some cases, been inappropriately generalized to overweight and obese persons who attempt to lose weight by caloric restriction.⁵⁶

Despite these authors’ conclusions, strong evidence suggests that energy restriction promotes disordered eating behaviors and body dissatisfaction¹⁴ and predicts extreme weight loss behavior.⁴³ Thus, energy-restricted diets do not produce sustained weight loss and contribute to

adverse psychological outcomes. Considering the failure rate and deleterious effect on psychological health, public health agencies should reconsider their messages concerning energy restriction and weight loss. Dr. Sandra Aamodt echoes this sentiment, stating that diets, at worst, ruin lives and, at best, are a waste of time and energy.⁵⁷

CHAPTER 4

DISORDERED EATING

Introduction

Bacon and Aphramor suggest that the weight-focused paradigm is not only ineffective at producing thinner, healthier bodies, but that it is also damaging, contributing to food and body preoccupation, repeated cycles of weight loss and regain, distraction from other personal health goals and wider health determinants, reduced self esteem and eating disorders, other health decrement, and weight stigmatization and discrimination.¹⁴ Most importantly, they note that health should be emphasized rather than weight.

Prevalence of Disordered Eating in Nutrition Students and Professionals

It is well known that college students, particularly females, are at a high risk for disordered eating behavior⁵⁸ and body dissatisfaction.⁵⁹ Nutrition and/or dietetics majors (used interchangeably) might be at increased risk for disordered eating,^{2,3,60,61} although not all agree.⁶² Gonidakis and colleagues³ report that 30% of dietetics students scored between 20-26 on the Eating Attitudes Test, a screening test for eating disorders in which a total score of 20 or greater suggests risk for having an eating disorder, compared to 11% of the control students. While the average BMI for both groups was between 21 and 22 kg/m², 45-46% of the students described themselves as overweight.³ However, this study examined only first year dietetics students and it has been suggested by others that while dietetics students may begin their course of study with disordered eating attitudes, those attitudes may diminish as they obtain more nutrition education.

^{63,64} Regardless, a recent international survey of nutrition faculty found that 77% feel eating disorders are a concern among their students.⁶⁰

Not only may nutrition students be at risk for eating disorders, they also may be at risk for body dissatisfaction. Arroyo and colleagues report that 67% of dietetics majors wanted to weigh less, yet 71% were in the normal range for BMI.¹ Furthermore, Worobey and Schoenfield found that a higher proportion of dietetics majors were, “bothered by the thought of having fat on their bodies,” much of the time or all of the time compared to students in other majors, such as biology, psychology and nursing.⁴

Findings suggest that these disordered eating patterns may persist when the student graduates and enters the workforce as a dietitian. Both Kinzl and Alvarenga report a high frequency of orthorexia in Austrian and Brazilian dietitians, respectively.^{65,66} Orthorexia nervosa (ON), as defined by Alvarenga and colleagues, is: a) a strong preoccupation with healthy eating, b) avoidance of all foods or ingredients considered to be harmful or unhealthy, c) an unusual concern about one’s own health, d) spending a considerable amount of time to plan, purchase, prepare, and consume food considered to be healthy, e) having a rigid definition of what is healthy, according to beliefs.⁶⁶ That ON has not been identified as a true eating disorder by the American Psychiatric Association is worth noting, and the current instrument used to assess behavior is still in its nascent stages and may need refining.⁶⁶

Clearly, disordered eating and body dissatisfaction among professionals who are responsible for disseminating food-related information to the public is a concern. On a professional level, it might impact their ability to do their job effectively.¹ On a personal level, it

might constrict their life and lead to isolation.⁶⁶ Therefore, there must be a way to address disordered eating and body dissatisfaction in dietitians. In doing this, we might be able to help a group of people who have a profound influence on the eating habits of the public.

As noted in this literature review, nutrition majors and dietitians appear to be at high risk for disordered eating behavior and body dissatisfaction. They are also in a profession where cognitive eating is the paradigm, as is the belief that body weight is malleable. Therefore, it seems that nutrition students and professionals would likely eat less intuitively. To our knowledge, no studies have evaluated intuitive eating behavior in nutrition students. This study would be the first step in assessing intuitive eating behavior in this group and inform information sessions and/or interventions.

The exposure to intuitive eating could have professional and personal implications for nutrition majors. Professionally, it would be an asset to them if they counsel people struggling with their weight. Not only would it add to their counseling toolbox, it might give them an understanding of the challenges that people face with their weight and perhaps increase their empathy and compassion. This might ameliorate the existing weight bias in dietetics students.⁶⁷ If nutrition students personally struggle with body image and weight, intuitive eating might help them make peace with their bodies and improve their psychological well-being.

CHAPTER 5

HEALTH AT EVERY SIZE AND INTUITIVE EATING

Introduction

An alternative to the weight-centric paradigm is the Health at Every Size movement (HAES). As described by Robison: “HAES promotes the concept that an appropriate, healthy weight for an individual cannot be determined by numbers on a scale, by a height/weight chart, or by calculating body mass index or body fat percentage.”⁸ HAES proponents view weight as an individual characteristic rather than something that should be manipulated for health reasons. They posture that a ‘healthy’ weight represents what one weighs when living a fulfilling life.

The following list summarizes the HAES philosophy and is taken directly from Robison⁸:

- Self-acceptance: affirmation and reinforcement of human beauty and worth, regardless of differences in weight, physical size, and shape;
- Physical activity: support for increasing social, pleasure-based movement for enjoyment and enhanced quality of life; and
- Normalized eating: support for discarding externally imposed rules and regimens for eating and attaining a more peaceful relationship with food by relearning to eat in response to physiologic hunger and fullness cues.

Intuitive Eating

As summarized above, normalized eating is a component of HAES. Normalized eating is a style of eating focused on hunger and satiety cues and not on rules or guidelines. Intuitive eating is a normative style of eating developed by Tribole and Resch⁶ in response to clients' struggles with weight and based on the premise that we all possess "body wisdom," the belief that the body intrinsically knows the quantity and type of food to eat unless there are specific health issues, such as diabetes or food allergies.⁶⁸

Intuitive eating has emerged as an alternative to dieting and shares similarities with mindful eating, although intuitive eating does not formally involve meditation, while mindful eating does.¹³ Instead, intuitive eating relies upon 10 principles to teach body wisdom. Included in these principles are, "reject the diet mentality," "respect your fullness," and, "honor your feelings without using food." It should be emphasized that the purpose of intuitive eating is not to facilitate weight loss.⁶ Yet, studies comparing intuitive eating to dieting do measure weight in an attempt to quantify differences in the methods.

Intuitive Eating Interventions

A 2005 randomized control trial (RCT) divided 78 obese women into a HAES intervention group and a diet group.¹² A registered dietitian taught the diet group to restrict their energy and fat intake, to exercise at a specific intensity and to keep a food journal. The HAES group was taught the cultural context of weight, as well as how to let go of restrictive eating behaviors, to understand their internal cues, their food preferences and the effect of food on their well-being. The intervention lasted 6 months and there was a 2-year follow-up.

Overall, the HAES group maintained their weight. This is in contrast to the diet group, which initially lost 5.2% of weight but regained the weight back by the end of the study. Members of the HAES group had a significant decrease in cholesterol, lower systolic blood pressure and an increase in physical activity and psychological well being, with the diet group showing no change in these measures. Not only does this study provide evidence for the transient nature of weight loss from energy restriction, it suggests that the benefits of intuitive eating extend to other physical and psychological health indicators.

Additional studies observed weight maintenance in an intuitive eating RCT,⁶⁹ while others report weight loss.⁷⁰⁻⁷² Interestingly, it seems that all studies measuring psychological health indicators report improvements following an intuitive eating intervention.^{14,69-71,73-75} However, a 2012 intuitive eating for weight loss pilot study that measured weight loss and waist circumference observed weight gain in an intuitive eating intervention.⁷² This study allocated 16 women into a calorie restriction (CR) group (n=8) and an intuitive eating (IE) group (n=8). Initially, the IE group lost more weight than the CR group and then gained the weight back while the CR group kept losing weight. Although it appears that IE encourages weight gain while CR results in weight loss, limitations to this study include the short intervention period with lack of a follow-up, the small sample size (n=16), and the lack of other health indicators measured besides weight.

Cross-sectional studies of intuitive eating

Intuitive eating is associated with a lower BMI and positive psychological outcomes, while its relationship to physical activity, quality of dietary intake and other physical health

indicators is less clear.⁶⁸ In a recent review, all 10 cross-sectional studies that evaluated the relationship between BMI and intuitive eating found a significant inverse relationship between the two variables.^{11,76-84} However, one study found no significant association in 18-25 year-old women while finding significance in 26-65 year-old women.⁸⁰ University students and young adults constituted the population in all studies except two.^{79,80}

Eight of the eleven cross-sectional studies examined in this review investigate the connection between psychological health and intuitive eating, and all report that intuitive eating is associated with positive measures of mental health.^{11,76,80,82,84-87} Specifically, intuitive eating is positively correlated with self-esteem, optimism, proactive coping and satisfaction with life^{11,76} and predicts positive body orientation⁸⁰ and positive affect.⁸⁴ Furthermore, it is inversely associated with perfectionism, attachment anxiety,⁸² eating disorder symptomology and body shame.⁷⁶

Iannantuono and colleagues investigated intuitive eating's relationship to positive psychological health indicators and developed an acceptance model based on the outcomes of various studies.⁸² The acceptance model of intuitive eating suggests that general, unconditional body acceptance along with body appreciation predict intuitive eating scores, as measured by the intuitive eating scale (IES).^{76,82,85-87} In other words, it is not simply the absence of an eating disorder that characterizes intuitive eating, but the presence of positive psychological traits. Avalos and colleagues note that when women emphasize the functionality of their bodies more so than their appearance, they are more likely to have positive feelings toward their bodies and eat according to their internal hunger and satiety signals.⁸⁵ Therefore, intuitive eating appears to be an adaptive eating behavior.

Smith and Hawks examined intuitive eating, diet composition, dieting behavior and health consciousness in 343 college students.⁸⁸ The authors used the IES¹¹, the health consciousness and pleasure questionnaire,⁸⁹ the Youth Risk Behavior and Surveillance Survey⁹⁰ and other original diet-related variables. The results indicate 54% of females wanted to lose weight, yet the combined overweight and obesity prevalence was only 15.9%. Furthermore, 10.5% of females overestimated their BMI classification. Intuitive eating was significantly correlated to BMI ($r=0.327$, $p<0.001$) and health consciousness about food ($r=0.209$, $p<0.001$), as well as eating pleasure ($r=0.484$, $p<0.001$). Higher health consciousness correlated to lower pleasure in eating ($r=-0.34$, $p<0.001$). The inverse relationship between health consciousness and intuitive eating makes sense, considering that the premise of intuitive eating is to eat for pleasure and based on what the body needs and wants, not on the nutritional value of food.

This study also found a small but significant association between intuitive eating and diet diversity ($r=.139$, $p<0.019$). Moreover, there was no association between the amount of junk food consumed and intuitive eating. Critics of intuitive eating postulate that people cannot be left to their own devices and to their body's wisdom when it comes to eating. Yet this data suggests otherwise, or at least suggests that intuitive eaters ate no unhealthier than those who do not eat intuitively. Intuitive eaters appear to have more diverse diets, which is a proximate measure of nutritional adequacy. Additionally, they do not differ significantly from non-intuitive eaters in the amount of junk food they consume. One would think cognitive eaters would have more nutritious diets because they are thinking about their food choices. Yet they don't have any difference in terms of junk food consumption and may have even less diverse diets – perhaps as a result of

restrictive eating pattern. Correspondingly, a previous study found that diversity of diet negatively correlated with obsession for thinness in a group of normal weight female students.⁹¹

CHAPTER 6

PURPOSE OF THE STUDY

Overview

According to the Academy of Nutrition and Dietetics, dietitians and nutrition professionals are experts in food and health.⁵ The Academy posits that excess weight is not desirable given the association between overweight/obesity and poor health outcomes, and suggest that dietitians counsel patients on how to achieve weight control through a reduced calorie diet. Specifically, they suggest reducing carbohydrate and fat intake as a way to create a calorie deficit. Therefore, being overweight or obese is characterized as unhealthy, mandating change through diet, and thus dietitians counsel people on how to diet to reduce their weight. Yet dieting appears to be an ineffective method for weight control.⁹² It also appears to have detrimental physiological and psychological side effects.^{43,93,94}

It is unclear how this emphasis on weight affects dietitians and nutrition professionals. The perception that having excess weight is unhealthy and that weight can be controlled by diet might affect the dietitian's relationship with food. Since they are distributing health information, they might feel pressure to conform to the standard of health (ironically, also the current standard of beauty), which is a thin and muscular physique.^{95,96} Studies showing that nutrition students and dietitians exhibit disordered eating behavior and body dissatisfaction confirm this.^{3,63,66} On the other hand, some suggest that students who have issues with eating (i.e. they have preexisting conditions) are more apt to study nutrition, and further postulate that those issues may be resolved as they go through their studies.⁹⁷ While some evidence suggests that freshman nutrition students

may be at a higher risk for disorders than seniors,⁶⁴ this doesn't explain the disordered eating found in practicing dietitians, who have presumably completed school and the dietetic internship, and therefore have received substantial nutrition training. Since disordered eating and body dissatisfaction negatively impact professional and personal satisfaction^{1,66} and since dietitians are expected to deliver nutrition advice to the public and interact with people of varying body sizes, understanding how they view food and the body is critical.

Mindful and intuitive eating^{6,13} have been explored as ways to treat eating disorders. These concepts promote the release of cognitive eating and the embrace of “body wisdom”. This, in many ways, goes against traditional nutrition training, which emphasizes counting calories, fat, carbohydrates and protein. Therefore, it is reasonable to believe that nutrition students eat more cognitively than intuitively.

We based this research on a study by Smith et al that investigated intuitive eating, diet composition and the meaning of food in healthy weight promotion, but substituted the more recent Intuitive Eating Scale-2 IES-2 for the IES.⁸⁸ To our knowledge, this is the first study to investigate intuitive eating and health consciousness and pleasure in nutrition students compared to non-nutrition students.

Specific Aims and Hypotheses

Specific Aim #1:

Identify differences in intuitive eating behavior between female nutrition majors and non-majors at the University of Massachusetts-Amherst.

Hypothesis #1:

There will be a significant difference in intuitive eating scores between nutrition majors and non-majors. Non-majors will have higher intuitive eating scores than majors.

Specific Aim #2:

Identify differences in health consciousness and pleasure and how they correlate to intuitive eating.

Hypotheses #2:

There will be significant differences in Health Consciousness and Pleasure Questionnaire subscale scores between nutrition majors and non-majors.

Specific Aim #3:

Identify differences in body dissatisfaction and diet behavior, and how they correlate to intuitive eating.

Hypothesis #3:

#3a: There will be a significant difference in magnitude of body dissatisfaction between nutrition majors and non-majors. Nutrition majors will exhibit a greater magnitude of body dissatisfaction than non-majors.

#3b: There will be a significant difference in diet behavior between nutrition majors and non-majors.

#3c: There will be a significant difference in intuitive eating scores between those who are currently dieting and those who are not.

#3d: Body dissatisfaction will correlate significantly with intuitive eating.

Specific Aim #4:

Identify differences in self-reported BMI and how BMI correlates to intuitive eating.

Hypotheses #4:

#4a: BMI will be significantly different between nutrition majors and non-majors.

#4b: Intuitive eating will be correlated to BMI in nutrition majors versus non-majors and the correlation will differ between the two groups.

CHAPTER 7

METHODS

Study Sample

This study targeted female, undergraduate nutrition majors from the UMass Nutrition Department and female non-nutrition majors from the general UMass undergraduate student body. We included only females in this study because 1) the number of male nutrition majors at UMass is limited and 2) males tend to eat more intuitively than females, which would have introduced a gender bias into our sample.

Human Subjects Approval

The University of Massachusetts Institutional Review Board (IRB) approved this study. Participants were required to agree to participate via an online consent form before beginning the survey.

Study Design

This is a cross-sectional study based on survey data collected through the Lifestyle Habits of Female College Students Study during the Spring 2014 semester at the University of Massachusetts Amherst. We recruited participants via email, flyers, and word of mouth. Those interested in participating accessed the consent form and the survey online via Qualtrics, an online survey platform.⁹⁸ Participants had the choice of providing their email address or completing the study anonymously. If a participant chose to give her email address, we entered her in a raffle to win one of eight gift cards to local retailers, valued at \$10 each. The survey

concluded with a debriefing form, which was also automatically sent to their email address if they provided one.

Survey Instruments and Variables

Intuitive Eating Scale - 2

Intuitive eating, as posited by Tribole and Resch (2012), can be assessed with the Intuitive Eating Scale (IES) by clustering 21 items into three subscales: 1) *Unconditional Permission to Eat*, 2) *Eating for Physical Rather than Emotional Reasons* and 3) *Reliance on Hunger and Satiety Cues*.¹¹ The IES is internally consistent ($\alpha=0.89$) and reliable.¹¹ However, the original IES did not assess gentle nutrition. *Gentle nutrition*, as articulated by Tribole and Resch,⁶ is a practice of making food choices that, "...honor your health and your taste buds while making you feel well." The revised Intuitive Eating Scale-2 includes a fourth subscale *Body-Food Choice Congruence* to assess gentle nutrition and maintains the same reliability and validity as the original IES.⁷⁶

The IES-2 contains 23 items and question responses use a Likert scale of strongly disagree, disagree, neutral, agree, and strongly agree to measure the level of agreement with the statements. We used the following guidelines, provided by Tylka, to compute the total IES-2 score along with the scores of all the subscales.⁷⁶

1. Reverse scored items 1, 2, 4, 5, 9, 10 and 11.
2. Total IES-2 score: added together all items and divided by 23 to create an average score.

3. Unconditional Permission to Eat (UPE) subscale: Added together items 1, 3, 4, 9, 16, and 17 and divided by 6 to create an average score.

4. Eating for Physical Rather Than Emotional Reasons (EPR) subscale: Added together items 2, 5, 10, 11, 12, 13, 14, and 15 and divided by 8 to create an average score.

5. Reliance on Hunger and Satiety Cues (RHSC) subscale: Added together items 6, 7, 8, 21, 22, and 23 and divided by 6 to create an average score.

6. Body-Food Choice Congruence (BFCC) subscale: Added together items 18, 19, and 20 and divided by 3 to create an average score.

According to the researchers, the IES-2 scale has good internal consistency, with a Cronbach alpha coefficient of 0.87 reported for women.⁷⁶ In the current study, the Cronbach alpha coefficient was 0.85, which we tested using the method described by Pallant.⁹⁹

Health Consciousness and Pleasure Questionnaire

The Health Consciousness and Pleasure Questionnaire (HCPQ) is a 25-item scale constructed to explore the role of food in life.⁸⁹ The questionnaire contains true/false questions and frequency of behavior questions. Smith and Hawks used this scale to create two variables: 1) a health consciousness variable and 2) a pleasure variable.⁸⁸ However, the analysis used in this study followed the method put forth by Rozin et al. and created seven distinct variables⁸⁹:

1. Fat-Salt Reduced Diet: This factor contains three questions that ask about the consumption of low fat, low cholesterol and low salt foods. Some may consider these foods “healthy” so this question gives insight about how food choice is made based on health concern.

2. Concern: Three items that ask about the effect of food on one's own health and appearance or the health and appearance of others.

3. Worry: Comprised of four questions, three of which ask about feelings towards high fat foods and whether they give rise to pleasure or guilt, and the last assess the occurrence of dieting. Paradoxically, in this scale, a point is given if the participant chooses the answer most associated with pleasure, so that a higher worry score corresponds to less worry about food. To facilitate easy interpretation, this variable was labeled 'Less Worry' in this thesis.

4. Diet-Health Link: This variable consists of four questions asking about the association of diet with health outcomes, such as obesity and heart disease.

5. Pleasure/Importance: Assessed the role of food in life in a positive context using 7 questions. The most quintessential question asks whether participants would be willing to trade eating for a pill that could supply all their nutritional needs.

6. Culinary Associations: measures association of a food term with a culinary term or a nutritional term.

7. Healthy Eater: this measures whether a participant considers herself a healthy eater, and consists of only one true/false question.

According to Smith and Hawks, the HCPQ has acceptable internal consistency, with a Cronbach alpha coefficient of 0.65 reported.⁸⁸ The Cronbach alpha coefficient in the present study was 0.59, which is considered poor.¹⁰⁰

Youth Risk Behavior Surveillance Survey (YRBSS)

Five body weight questions from the YRBSS are used in this survey. They assess what participants are trying to do about their weight and whether or not they have used extreme dieting techniques, such as pills or laxatives, to achieve weight loss (see Appendix). The YRBSS measures risky behavior in youth and this measure has been used to assess dieting and extreme weight loss behavior.⁸⁸

Demographic Questions

We asked each participant for their status in school (freshman, sophomore, etc.), their major (if non-nutrition), their track (if nutrition), their age, and if they lived on campus or off campus.

Height, Weight and BMI Questions

In order to calculate BMI, we ask participants for their self-reported height and weight and computed BMI using the following equation:

$$\text{BMI} = (\text{weight in pounds}/(\text{height in inches} \times \text{height in inches})) \times 703$$

We also created a categorical variable for BMI classification based on the classification criterion established by the WHO.¹⁵ To calculate body dissatisfaction, we asked participants, “Ideally, what would you like to weigh,” and then calculated the difference between their actual weight and ideal weight.¹ We also asked for their status in school (freshman, sophomore, etc.), their major (if non-nutrition), their track (if nutrition), their age, and if they lived on campus or off campus.

The weight and height data were edited one at a time, as some participants had included “pounds” or “inches” in their responses. Furthermore, when answering the “What is your ideal weight” question, some participants responded that they didn’t think about their weight or were fine with their current weight. In that case, we entered their ideal weight to match their actual weight. Additionally, if participants entered a weight range for either actual or ideal, we took the mid-point of that range as their weight.

Decoy Questions and Deception

In order to properly test our hypothesis in a population that is extremely attuned to food and eating (e.g. nutrition majors), we withheld the true hypothesis of the study and added decoy questions that were similar to the food and diet questions but instead related to lifestyle. For example, there is a question on the intuitive eating scale that asks if you turn to food in times of stress. We fabricated a question that asks if you turn to a friend in times of stress to make the study seem more holistic and lifestyle-focused. Furthermore, we called the study a “Lifestyle Habits” study instead of an intuitive eating study. These methods constitute incomplete disclosure or mild deception. As such, we debriefed all participants at the end of the study so that they were aware of our true purpose and also gave them the option to delete their data if they no longer wanted to participate after knowing the true purpose.

Statistical Analyses

We analyzed the data using IBM SPSS Statistics 21. All continuous variables were checked for normality using the Kolmogorov-Smirnov and Shapiro-Wilk tests, and were also evaluated for skewness, kurtosis, and the presence of outliers. The only normally distributed

variable was the total IES-2 score (Kolmogorov-Smirnov $p=0.20$, Shapiro-Wilks $p=0.47$). We deleted one extreme outlier based on the IES-2 score and deleted four extreme outliers based on the height (i.e. recorded their height as being 51 to 56 inches). While it is probable that these participants meant to write 5'6" instead of 56 inches, we could not confirm that. There were approximately 30 outliers based on weight and body dissatisfaction – at the extreme end there were people who weighed over 200 lbs but wanted to weigh in the 100s. We chose not to exclude these cases in analysis.

Frequency distributions and descriptive statistics were used to summarize the data. The non-parametric Mann-Whitney U Test was conducted to determine statistically significant differences in continuous variables between majors and non-majors. Although the Mann-Whitney U is a median-ranking test, both the means and the medians are reported in the results. The Mann-Whitney U test was chosen for the following reasons: 1) All of the variables besides the total IES-2 score were not normally distributed, 2) the majority of the data generated were from measures that used Likert scales and literature suggests that non-parametric tests should be used when analyzing data derived from Likert scales,¹⁰¹ and 3) a power analysis suggested that we did not have sufficient power to detect differences between all of variables in the IES-2 and the HCPQ. Specifically, we lacked power to detect differences between the groups for the EPR, UPE, Fat-Salt Reduced Diet, Worry and Culinary variables.

We used the Chi-Square statistic to investigate the differences in class year for majors and non-majors. In order to explore the differences in BMI classification for majors and non-majors, we collapsed the BMI categories from the usual underweight, normal weight, overweight and obese, to underweight-normal weight, and overweight-obese. In doing this, we increased the

frequency of expected cell counts in our contingency table, and generated a valid Chi-Square statistic. Furthermore, we conducted a parametric two-way between-groups Analysis of Variance (ANOVA) to explore the impact of major (nutrition or non-nutrition) and diet behavior on mean total IES-2 scores. A power analysis revealed sufficient power (0.80) to detect a difference between groups in the ANOVA.

With the exception of IES-2 measurements, we analyzed the degree of association between continuous variables using the non-parametric Spearman's rho correlation. Non-parametric partial correlation was also used to explore the relationship between variables after controlling for potential confounders. We also split the study sample into nutrition majors and non-nutrition majors to explore differences in correlation coefficients between the two groups. We used the method described by Pallant⁹⁹ to determine whether there were any statistical differences in the correlation coefficients between majors and non-majors

CHAPTER 8

RESULTS

Study Subjects

Of the 300 women who took the survey, 15 elected to not have their results included once they were debriefed about the study's real intent. There was no significant difference between the number of majors and non-majors that elected to have their results deleted. Of the 285 remaining participants, 21 were deleted because of incomplete responses (i.e., did not indicate whether she was a nutrition major, did not provide height, weight, ideal weight, etc). Five subjects were not included because they reported their height as less than 56 inches; one other subject was excluded because her extremely low total IES-2 score was found to be an outlier. Our final sample included 96 nutrition majors and 162 non-nutrition majors, for a total of 258 women. However, not all subjects answered the survey completely, so the sample size varies between analyses.

Demographic Variables

Descriptive characters of the Lifestyle Habits Survey Study Group (LHSSG) population are presented in Table 1. The mean age of the study population was 20.2 years ($SD=3.3$); nutrition majors were slightly but significantly older than non-majors (21.2 ± 4.5 for majors and 19.7 ± 1.3 for non-majors, $p=0.01$) and included more upperclassmen than did the non-nutrition majors. Most study women were White/Caucasian (80.2%), with 2.7% African-American, 4.3% Hispanic, 8.1% Asian, 0.8% Native American and 3.9% identifying as "other".

Healthy Eating score, a component of the Health Consciousness and Pleasure Questionnaire, was included in Table 1. A higher proportion of nutrition majors considered themselves healthy eaters than non-majors (95.5% versus 82.6%, respectively).

Body Size and Personal Weight Goals

On average, the participants weighed 137.5 pounds (SD 24.7) with a BMI of 23.1 (SD 3.7), well within the normal BMI classification. There was no significance difference between the weight or height of the nutrition majors and non-majors, but nutrition majors had significantly lower BMIs than non-nutrition majors (22.5 versus 23.5, respectively, $p=0.04$). Both groups reported similar ideal weights (i.e. what they would like to weigh), yet they differed significantly in magnitude of body dissatisfaction with non-nutrition majors showing a higher magnitude of dissatisfaction than majors, and the non-nutrition major group, on average, wanted to lose 13.3 pounds compared to the 8.2-pound weight loss desired by nutrition majors ($p=0.013$).

Diet Behavior

Despite the finding that the majority of study participants (55.2%) wanted to lose weight regardless of their BMI (Table 2), there was no significant difference in *diet behavior* between nutrition majors and non-majors ($p=0.34$). Of all the participants, 21.7% reported that they wanted to stay the same weight and 20.7% of participants reported that they were not trying to do anything about their weight. Only 5.4% said they were trying to gain weight. Interestingly, of the 106 participants who wanted to lose weight, 69 of them are classified as either normal weight or underweight according to BMI standards. In other words, 65.1% of participants who wanted to lose weight had a normal or underweight BMI. Of those who wanted to stay the same weight or

were not trying to do anything about their weight, 93.2% and 90.5%, respectively, had normal BMIs.

The majority of participants considered themselves to be about the right weight (66.0%) with 23.6% considering themselves slightly overweight. Of those that thought they were slightly overweight, 41.7% had normal or underweight BMIs and 58.3% had overweight or obese BMIs.

Mean comparison of Intuitive Eating and Health Consciousness and Pleasure by Nutrition Major or Non-Major

Total IES-2 scores (Table 4) were significantly higher ($p=0.01$) in majors (mean 3.4, SD, 0.5, median 3.3) compared to non-majors (mean 3.3, SD 0.5, median 3.3). Furthermore, nutrition majors scored higher on the Body-Food Choice Congruence (BFCC) and Reliance on Hunger and Satiety Cues (RHSC) subscale than non-majors ($p=0.00$ and $p=0.02$, respectively). Intuitive eating scores did not differ by class year or whether the students lived on or off campus ($p=0.13$ and $p=0.06$, respectively, results not shown).

In regards to the HCPQ (Table 5), nutrition majors scored significantly higher on the Concern subscale ($p=0.00$) and the Diet-Health Link subscale ($p=0.00$) than non-majors.

Correlations

The association between intuitive eating, body size, and variables from the HCPQ were investigated (Table 6). The strongest correlation was between BMI and body dissatisfaction ($r=0.73$, $p=0.01$). Intuitive eating was also significantly inversely correlated to body dissatisfaction

($r=-0.44$, $p=0.01$) and BMI ($r = -0.271$, $p=0.01$). Intuitive eating was also correlated with Fat-Salt Reduced Diet ($r = -0.022$, $p=0.01$), and Less Worry ($r = 0.38$, $p=0.01$).

We then compared the strength of the correlation coefficients between nutrition majors and non-nutrition majors (Table 7). Body dissatisfaction was significantly associated with total IES-2 scores in both groups. BMI was negatively correlated to IES-2 scores in non-nutrition majors but there was no correlation between BMI and IES-2 in nutrition majors. Interestingly, age was inversely related to body dissatisfaction in non-nutrition majors, but not in nutrition majors ($p=0.05$). There were no significant differences in the strengths of the correlation coefficients between the two groups.

A two-way between-groups analysis of variance (ANOVA) with multiple comparisons was conducted to compare the effect of diet behavior and departmental major (nutrition major or non-major) on total IES-2 score (Table 8.). Participants were divided into four groups based on what they were trying to do about their weight: lose weight, gain weight, stay the same weight or not trying to do anything about their weight. The interaction effect between major and diet behavior was not significant [$F(3, 213) = 0.98$, $p=0.40$]. There was a statistically significant main effect for diet behavior [$F(3, 213) = 13.8$, $p=0.00$] on IES-2 score, and the effect size was large (partial eta squared = 0.16). Post-hoc comparisons using the Tukey HSD indicated that the mean score for the “lose weight” group (mean=3.2, SD=0.5) was significantly different from the “I am not trying to do anything about my weight” group (mean=3.5, SD=0.4), the “stay the same weight” group (mean=3.6, SD=0.4), and the “gain weight” group (3.7, SD=0.4). The “I am not trying to do anything about my weight” group also differed significantly from the “stay the same weight” group and the “gain weight” group. There was no significant difference in IES-2 score

between the “stay the same weight” group and the “gain weight” group. The main effect for departmental major was also statistically significant [$F(3, 213) = 4.5, p = 0.035$] meaning that the average IES-2 score for the nutrition majors was greater than in non-majors, indicating that nutrition students were more intuitive eaters than their non-major counterparts, although the positive effect size associated with being a nutrition major on the IES-2 score was small (partial eta squared = 0.02).

CHAPTER 9

DISCUSSION

Intuitive Eating

The present study evaluated differences in intuitive eating between nutrition majors and non-majors at the University of Massachusetts. Contrary to our hypothesis, nutrition majors reported significantly *higher* intuitive eating behavior than non-majors. This is surprising, both because the current dietetics paradigm is decidedly non-intuitive⁵ and because existing literature suggests that nutrition majors exhibit more disordered eating behavior than non-majors.^{3,60,61,63,102}

The current dietetics-training paradigm is focused on weight management through energy reduction.⁵ In a 2009 position paper on weight management, the Academy of Nutrition and Dietetics (AND) recommended that reduced energy diets be the first line of treatment for overweight and obesity, and suggested that a calorie deficit of 500 to 1,000 kcal per day should be encouraged to achieve gradual and sustained weight loss.⁵ Therefore, students of dietetics are taught how to estimate a person's caloric needs and craft diet plans that will, in theory, result in weight loss. In other words, the core concepts of weight management in dietetics training focus on how to facilitate diet behavior change through meal planning and views changes in body composition and weight loss as achievable based on the laws of thermodynamics.⁵ Because nutrition students are well versed in how to create menus with energy deficits, as well as how to prescribe nutritionally healthful diets, we assumed that the nutrition majors would eat more cognitively, resulting in lower intuitive eating scores on the IES-2. Yet, the reverse seems to be true – nutrition majors had significantly higher intuitive eating scores than non-majors. We do not

know why our findings differ from those of other studies. Overall, our population of women appears similar to others. The mean intuitive eating score for our population as measured by the IES-2 was similar to that reported by Tylka and colleagues in a sample of 238 college women.⁷⁶

Bacon et. al demonstrated that a nutrition education model that provided standard nutrition information along with information on the effect of foods on well-being was significantly more effective in improving health outcomes in chronic female dieters than a nutrition education model focused only on how to achieve weight loss.¹² In a way, our study confirms these results. While I mentioned earlier that the weight management portion of traditional dietetics education focuses on energy restriction to achieve weight loss, this is only a part of nutrition training. Nutrition majors are also immersed in metabolism, organic chemistry, biochemistry, public health, psychology, chronic disease, counseling, etc. Our education is interdisciplinary and holistic, and thus could promote an appreciation of the body and how it functions beyond simply what it weighs. While we are unable to speak to the nutrition fluency of the non-nutrition majors, we could assume that they are receiving the same nutrition messages as the rest of the United States population, which is that there are “good” foods and “bad” foods, and that they should decrease food intake and increase physical activity in order to maintain their weight.⁴⁰ This sort of nutrition education message is similar to the education alone model used by Bacon that focused only on weight loss.¹² It is possible that this emphasis on nutrition education as a means to increase weight loss, rather than as a means to understand the body, could promote non-intuitive eating or, at least, not *promote* intuitive eating. As such, those not studying nutrition as their vocation might benefit from a more holistic-oriented nutrition education approach as a

way to improve their appreciation of the potential health benefits of a more intuitive eating behavior.

Another plausible explanation for why nutrition majors were more intuitive than non-majors could be that the general population is becoming more orthorexic, but that nutrition education is somehow protective against that. Orthorexia nervosa (ON), as defined by Alvarenga and colleagues, is: a) a strong occupation with healthy eating, b) avoidance of all foods or ingredients considered to be harmful or unhealthy, c) an unusual concern about one's own health, d) spending a considerable amount of time to plan, purchase, prepare, and consume food considered to be healthy, e) having a rigid definition of what is healthy, according to beliefs.⁶⁶ There is a dearth of data regarding the number of Americans who are trying to eat "clean"¹⁰³ or who are unnecessarily adopting a gluten-free diet (i.e. they do not have Celiac disease) for perceived health benefits,¹⁰⁴ but anecdotal evidence suggests that as a whole, people are more concerned about the purity of their food (i.e. additives, processing, etc). Indeed, some suggest there is a "moralization of healthy eating" occurring in this country¹⁰⁵ similar to what happened with smoking.¹⁰⁶

While large-scale prevalence data about ON is lacking, a study of the general Italian population found that 57.6% of the 177 participants were diagnosed with ON.¹⁰⁷ In a study of medical doctors in Turkey, 45.5% had "highly sensitive behavior" about eating habits.¹⁰⁸ These findings were confirmed by a study in Turkish medical students.¹⁰⁹ Conversely, Donini and colleagues observed an ON prevalence of 6.9% in a study of 404 Italian subjects.¹¹⁰

Although nutrition majors are experts in nutrition and one would assume that all the knowledge they have about healthy eating might encourage ON-type behavior, it seems that this is not the case. In a 2009 study of German dietetics students, there was no difference in ON prevalence between nutrition students and controls, although ON tendencies decreased as nutrition students advanced through their studies but stayed the same in the control group.⁶³ Therefore, nutrition education appeared to protect against the development of ON tendencies, rather than encourage them. Conversely, a separate study found that Brazilian dietitians exhibited high frequency of ON, however this study lacked a control group and observed a very low reliability score the ORTO-15 scale.⁶⁶

Of course, it is possible that nutrition education played no causative role in the results we observed. For example, motivations for taking the survey may have differed between non-majors and majors. We advertised this study as a Nutrition Department Survey, so the association of the study with the nutrition department was very clear. The women who self-selected to take this survey from the general population may have done so because of a preoccupation with food, which has been associated with disordered eating.¹¹¹ Conversely, it is possible that only nutrition majors who felt comfortable discussing their eating behavior enrolled in the study because of the close association of the study to the department. However, Moss and colleagues found that selection bias might not be as much of an issue in eating disorder research as social desirability bias.¹¹² It is possible that more majors were affected by social desirability bias than non-majors, since the majors were taking a study from their department and the non-majors assumedly had no affiliation with the nutrition department.

As noted previously, our results are surprising because of existing literature regarding nutrition majors and disordered eating.^{3,60,61,63} Nutrition majors exhibit higher dietary restraint⁶³ and scored higher on the EAT-26 test, a diagnostic tool for eating disorders² than non-majors. Additionally, Fredenberg and colleagues found that 17.7% of Didactic Program in Dietetics (DPD) students had EAT-26 scores symptomatic of an eating disorder as opposed to 3.3% of Coordinated Program in Dietetics (CPD) students and 2.9% of home economics students.⁶¹ Gonidakis and colleagues, who reported 30% of dietetics students symptomatic of an eating disorder as opposed to 11% of students in other majors, support these findings.³ According to Tylka and colleagues, overall intuitive eating scores are significantly associated with decreased eating disorder symptomology.⁷⁶ If we accept that intuitive eating is the antithesis to disordered eating, these findings suggest that non-nutrition majors tend to be more disordered eaters than nutrition majors. This would partially support the findings of two authors^{62,113} who observed no significant differences between disordered eating behavior in nutrition majors and non-majors. However, our inference about disordered eating in this population is limited, as we did not measure it directly.

Although we did not measure disordered eating in this study, we did measure diet behavior. Dieting is a precursor to disordered eating,⁴⁹ and some suggest that dieting is pathological regardless of whether it progresses to a clinically significant eating disorder.^{57,105,114,115} As expected, there were significantly lower mean intuitive eating scores between those trying to lose weight and all other categories of diet behavior (trying to gain weight, stay the same weight, or not do anything about their weight), which is in agreement with other studies.^{116,117} No

significant interaction was observed between dieting and intuitive eating scores in the two-way ANOVA model.

Body Dissatisfaction

Stice and Shaw review predictors of eating pathology and body dissatisfaction.⁴⁹ Body dissatisfaction is one of the most prominent risk factors in the onset and maintenance of eating pathology, along with dieting and negative affect.⁴⁹ Factors that might promote body dissatisfaction include thin-ideal internalization, perceived pressure to be thin, and body mass.⁴⁹ In our study, the average BMI for both groups was below 22, with 77% of the non-nutrition majors and 84.9% of the nutrition majors classified as normal based on BMI. Yet in both groups, almost half of all normal-weight participants wanted to lose weight. Perhaps body mass is not a strong predictor of body dissatisfaction in this population and another construct, such as thin-ideal internalization or perceived pressure to be thin, contributes to body dissatisfaction instead.

Arroyo and colleagues found that 67% of nutrition students wanted to lose weight even though 71% were in the normal range for BMI.¹ Our study reported a lower proportion of nutrition majors with a normal BMI that wanted to lose weight (46.2%). However, this still suggest that half of all nutrition majors with a normal BMI are unsatisfied with their body size. The percentage was similar for non-majors (41.3%). However, non-nutrition majors exhibited greater magnitude of body dissatisfaction than nutrition majors. This could be because non-majors had a higher average BMI and BMI has been strongly linked to body dissatisfaction.¹¹⁸ Or, it could be that nutrition education fosters an appreciation and reverence for the body. Our findings are in disagreement with Worobey and colleagues, who found that a higher proportion of

nutrition majors exhibited body dissatisfaction compared to students from other majors.

Unsurprisingly, 84.1% of those women classified as overweight or obese in this study wanted to lose weight.

As expected, body dissatisfaction was strongly correlated with IES-2 scores. Controlling for BMI did not weaken the relationship between body dissatisfaction and intuitive eating. The strong inverse correlation between body dissatisfaction and intuitive eating is in agreement with the findings of Tylka, who reported a correlation of -0.53, significant at the $p < 0.001$ level. We did not find as strong of an association between body dissatisfaction and intuitive eating as Tylka, which could be because we assessed body dissatisfaction as the difference between actual weight and ideal weight, whereas Tylka assessed body dissatisfaction through administration of the Body Dissatisfaction subscale of the Eating Disorder Inventory-2 (EDI-2). It is likely that the Body Dissatisfaction subscale captures additional dimensions of not being satisfied with one's physical appearance¹¹⁹ that we are unable to capture using only the difference between actual weight and ideal weight.

Once we controlled for body dissatisfaction, the correlation between BMI and IES-2 scores became non-significant. This is somewhat in agreement with Tylka and Kroon Van Diest, who observed that BMI had a mild negative correlation or was not significantly related to the IES-2.⁷⁶ The positive correlation between BMI and IES-2 we observed in nutrition majors is hard to explain and goes against existing literature.⁷⁶ Further research and exploration is warranted to better explain these results.

Health Consciousness and Pleasure

As expected, nutrition majors scored significantly higher on the Diet-Health Link and the Concern subscales of the HCPQ. This is not surprising, given the emphasis nutrition and dietetics training places on the impact of diet on health. However, a recent study observed that food concerns, weight concerns, and concerns about the health consequences of diet are associated with dietary restraint.¹⁰⁵ As such, it is unclear whether higher scores on these subscales indicate underlying pathologic eating behavior. Furthermore, significantly more majors than non-majors classified themselves as healthy eaters (95.5% versus 74.6%, respectively), suggesting that regardless of what is motivating their food and diet choices, they view their behavior in a positive light.

Strengths

To our knowledge, this is the first study to investigate the differences in intuitive eating, as measured by the IES-2, between nutrition majors and non-majors. Given the attention being paid to the eating habits of nutrition students and professionals, this sheds important light on the adaptive eating behavior of this population. The fact that this study utilized the newly updated IES-2 is also a strength. The IES-2 contains a measurement of body-food choice congruence, which was not measured with the first iteration of the IES. There is a dearth of literature measuring intuitive eating using the IES-2 and our study will add to the literature using this measure.

Limitations

The major limitation of this study is its cross sectional design, which prevents inference about causality. Furthermore, our study population was relatively homogenous, which also prevents generalization of study results.

Another limitation of the study is the poor Cronbach alpha coefficient observed for the HCPQ. Because of the low internal consistency of the scale, results should be interpreted with caution. Similarly, all of our variables except for the total IES-2 score were not normally distributed. This, combined with the fact that our scales were all derived from Likert data, limited us to non-parametric analyses, which is not as powerful as parametric analyses.⁹⁹ Furthermore, we had insufficient power to detect differences between groups for some of our variables because of the relatively small number of nutrition majors that participated in the study (n=96).

A major limitation of this study is the self-reported heights and weights. Data suggests that people tend to overestimate their height and underestimate their weight.¹²⁰ This limits our interpretation of body mass and its relationship to intuitive eating and body dissatisfaction.

Lastly, because this study measured eating behavior in a population very attuned to eating, it is possible that nutrition majors' responses were influenced by social desirability bias.

Future Directions

This study should be repeated with a larger sample size and should measure height and weight instead of relying on self-reported data. Furthermore, body dissatisfaction should be measured using the EDI-2 or EDI-3 or another scale that captures more of nuances of body

dissatisfaction. While difference between ideal weight and actual weight does measure a component of body dissatisfaction, it would be interesting to investigate other facets of the construct.

Additionally, future studies should measure intuitive eating, and adaptive eating behavior, as well as pathological eating habits, such as disordered eating or dietary restraint, in nutrition majors. We were limited in our ability to compare our results to those of other studies using nutrition majors because we did not measure disordered eating directly.

Lastly, future studies should measure diet quality and dietary intake along with intuitive eating in nutrition majors. It would be interesting to see how intuitive eating corresponds to actual food choices in this population. Considering a majority of both majors and non-majors indicated that they wanted to lose weight, it would also be interesting to see what these students are actually eating and whether they are limiting or constricting their diet in order to achieve weight loss.

Summary of Findings

In this study of nutrition majors and non-majors, we found that nutrition majors had significantly higher intuitive eating scores than non-majors, exhibited a lower magnitude of body dissatisfaction, and considered themselves healthier eaters. Nutrition majors also had significantly lower BMIs than non-majors. However, we also found that about half of both normal weight nutrition majors and non-majors reported that they were trying to lose weight. Intuitive eating scores were significantly lower in women who indicated that they were trying to lose weight than those who were trying to gain weight, stay the same weight, or do nothing about their weight.

Implications for Research and Practice

Our results are surprising given the body of research that suggest that nutrition majors may actually exhibit more disordered eating behaviors than non-majors. As such, it is important to assess both adaptive and a pathological eating behaviors in the same group of nutrition majors to see if these behaviors might coexist. We were limited in our ability to compare our results to those of other studies using nutrition majors because we did not measure disordered eating directly. Furthermore, given the high percentage of normal-weight nutrition majors that indicated they were trying to lose weight, it is important to further investigate issues surrounding weight in this population.

If indeed non-nutrition majors are struggling with intuitive eating and body dissatisfaction and if nutrition education encourages intuitive eating, serious steps should be taken to increase the breadth nutrition education for the general population.

Conclusions

Our study found significant differences in measure of intuitive eating and body dissatisfaction between nutrition majors and non-majors. Contrary to our hypothesis, nutrition majors had significantly higher intuitive eating scores than non-majors and significantly lower magnitude of body dissatisfaction. Furthermore, significantly more nutrition majors considered themselves healthy eaters than non-majors. Intuitive eating scores were significantly lower in women that were trying to lose weight as opposed to those that were not. We also found that intuitive eating scores were correlated to body dissatisfaction but not to BMI in our population.

Our study raises new questions about whether nutrition education prevents against or encourages disordered eating. Previous research suggests that those studying and practicing nutrition may be at higher risk for eating disorders, yet our results suggest that perhaps nutrition education promotes intuitive eating, which is an adaptive eating behavior. Further research is warranted to determine what role nutrition training plays in intuitive eating behavior.

TABLES

Table 1: Characteristics of the LHSSG stratified by Nutrition Major or Non-Major

Variable (N)	Total N=258		Nutrition Major N=96		Nutrition Non-Major N=162		p-value
	Mean \pm SD	Median	Mean \pm SD	Median	Mean \pm SD	Median	
Age, years (236)	20.2 \pm 3.2	20.0	21.2 \pm 4.5	20.0	19.7 \pm 1.3	19.0	0.01*
Weight, pounds (258)	137.5 \pm 24.7	133.0	133.8 \pm 19.1	130.0	139.7 \pm 27.3	134.0	0.20
Ideal Weight, pounds (258)	126.1 \pm 15.0	125.0	125.6 \pm 13.5	125.0	126.4 \pm 15.8	125.0	0.80
Body Dissatisfaction, pounds (258)	11.4 \pm 16.2	8.0	8.2 \pm 10.0	7.0	13.3 \pm 18.7	10.0	0.01*
Height, inches (258)	64.6 \pm 2.6	65.0	64.7 \pm 2.6	65.0	64.5 \pm 2.6	64.8	0.56
BMI (kg/m ²) (258)	23.1 \pm 3.7	22.3	22.4 \pm 2.8	22.0	23.5 \pm 4.1	22.7	0.04*
	Total	Nutrition Major		Nutrition Non-Major		p-value	
N (%)							
Year							
Freshman	66 (25.6)	19 (19.8)		47 (29.0)		0.02*	
Sophomore	82 (31.8)	58 (25.0)		24 (35.8)			
Junior	62 (24.0)	32 (31.2)		30 (19.8)			
Senior	48 (18.6)	25 (24.0)		23 (15.4)			

Total	258	96	162	
BMI				
Underweight and Normal Weight	174 (77.0)	73 (84.9)	101 (72.1)	.03*
Overweight and Obese	52 (23.0)	13 (15.1)	39 (27.9)	
Total	226	86	140	
Healthy Eater				
True	190 (82.6)	84 (95.5)	106 (74.6)	.00*
False	40 (17.4)	4 (4.5)	36 (25.4)	
Total	230	88	142	

*p-value is significant at the $p < 0.05$ level.

Table 2: Cross tabulation of BMI categories and diet behavior, layered by nutrition major and non-major in the LHSSG*

	Lose Weight	Gain Weight	Stay Same Weight	Do Nothing	Total
Underweight or normal weight					
	N (%)				
Major	31 (46.3)	3 (4.5)	21 (31.3)	12 (17.9)	67 (100)
Non-major	38 (41.3)	8 (8.7)	20 (21.7)	26 (28.3)	92 (100)
Overweight or obese					
Major	9 (75)	0	1 (8.3)	2 (16.7)	12 (100)
Non-major	28 (87.5)	0	2 (6.3)	2 (6.3)	32 (100)
Total	106 (52.2)	11 (5.4)	44 (21.7)	42 (20.7)	203 (100)

*p-value not calculated. Chi-Square statistic not valid and UMass SPSS does not have ability to calculate Fischer's Exact for tables greater than 2x2.

Table 3: Cross tabulation of BMI categories and weight perception, layered by nutrition major and non-major in the LHSSG*

	Very underweight	Slightly Underweight	Right Weight	Slightly Overweight	Very Overweight	Total
	N (%)					
Underweight or normal weight						
Major	0	1 (1.5)	58 (86.6)	8 (11.9)	0	67 (100)
Non-major	2 (2.2)	9 (9.8)	69 (75.0)	12 (13.0)	0	92 (100)
Overweight or obese						
Major	0	0	1 (8.3)	10 (83.3)	1 (8.3)	12 (100)
Non-major	0	0	6 (18.8)	18 (56.3)	8 (25.0)	32 (100)
Total	2 (1.0)	10 (4.9)	134 (66.0)	48 (23.6)	9 (4.4)	203 (100)

*p-value not calculated. Chi-Square statistic not valid and UMass SPSS does not have ability to calculate Fischer's Exact for tables greater than 2x2.

Table 4: Comparison of IES scale by Nutrition Major or Non-Major in the LHSSG

Variable (N)	All Participants		Major		Non-Major		p-value
	Mean	Median	Mean	Median	Mean	Median	
Total IES ¹ (222)	3.3 ± 0.5	3.3	3.4 ± 0.5	3.4	3.3 ± 0.5	3.3	.01*
UPE ² (230)	3.2 ± 0.7	3.2	3.3 ± 0.7	3.3	3.2 ± 0.7	3.2	.33 ^a
EPR ³ (233)	3.2 ± 0.8	3.1	3.3 ± 0.8	3.3	3.1 ± 0.8	3.1	.18 ^a
RHSC ⁴ (230)	3.4 ± 0.7	3.5	3.5 ± 0.7	3.7	3.3 ± 0.7	3.3	.02*
BFCC ⁵ (232)	3.9 ± 0.8	4.0	4.1 ± 0.7	4.0	3.7 ± 0.8	4.0	.00*

*Statistically significant

^a insufficient power to detect statistical significance

¹ Total Intuitive Eating Scale-2 score

² Unconditional Permission to Eat subscale

³ Eating for Physical Rather Than Emotional Reasons subscale

⁴ Reliance on Hunger and Satiety Cues subscale

⁵ Body-Food Choice Congruence subscale

Table 5: Comparison of Health Consciousness and Pleasure Questionnaire Subscales by Nutrition Major or Non-Major in the LHSSG

	Sample		Major		Non-Major		P-value
	Mean±SD	Median	Mean±SD	Median	Mean±SD	Median	
Concern	0.9 ± 0.2	1.0	0.9 ± 0.2	1.00	0.80±0.25	1.00	0.00*
Fat-Salt Reduced Diet	0.5 ± 0.3	0.5	0.5 ± 0.3	0.50	0.53±0.29	0.58	0.07 ^a
Worry	0.5 ± 0.2	0.5	0.6 ± 0.2	0.50	0.53±0.20	0.50	0.17 ^a
Diet-Health Link	0.9 ± 0.2	0.9	1.0 ± 0.1	1.0	0.9 ± 0.2	0.9	0.00*
Pleasure	0.7 ± 0.2	0.7	0.7 ± 0.2	0.7	0.7 ± 0.2	0.7	0.4
Culinary	0.3 ± 0.2	0.3	0.3 ± 0.2	0.3	0.3 ± 0.2	0.3	0.4 ^a

*Statistically significant

^a insufficient power to detect statistical significance

Table 6: Correlation Coefficients Between Variables in the LHSSG

	1	2	3	4	5	6
1. Age						
2. BMI	-0.11					
3. Body Dissatisfaction	-0.19**	0.73**				
4. Total IES-2	0.14	-0.27**	-0.44**			
5. Diet Health	0.34	0.02	0.03	0.02		
6. Fat Salt Diet	-0.23**	0.02	0.08	-0.22**	0.01	
7. Worry	0.09	-0.13*	-0.22**	0.38**	-0.07	-0.23**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 7: Correlation Coefficients Between Variables in the LHSSG, Split by Major and Non-Major

Nutrition Major		1	2	3	4	5	6
No	1. Age						
	2. BMI	-0.11					
	3. Body Dissatisfaction	-0.16*	0.744**				
	4. Total IES-2	0.13	-0.36**	-0.44**			
	5. Diet Health	-0.12	0.07	0.11	-0.01		
	6. Fat Salt Diet	-0.21*	0.05	0.05	-0.14	0.01	
	7. Worry	-0.02	-0.22*	-0.16	-0.38*	-0.11	-0.27*
Yes	1. Age						
	2. BMI	0.00					
	3. Body Dissatisfaction	-0.17	0.68**				
	4. Total IES-2	0.06	0.091	-0.38**			
	5. Diet Health	0.11	0.02	0.03	-0.16		
	6. Fat Salt Diet	-0.20	-0.08	0.12	-0.30**	0.12	
	7. Worry	0.23*	0.01	-0.21	0.39**	-0.13	-0.16

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 8: Two-Way Between-Group Analysis of Variance with Multiple Comparisons, IES-2 Scores by Diet Behavior and Major, Tukey HSD

The table below illustrates where there are differences in the mean IES-2 scores between diet behavior groups. Mean IES-2 scores that are listed in column 1 are significantly different ($p \leq 0.05$) from the scores listed in column 2 for different groups. For example, the mean IES-2 score of those who answered that are not trying to do anything about their weight (column 1) is significantly different from the scores of other answers listed in column 2.

Diet Behavior	N	Subset	
		1	2
Lose weight	123	3.16	
Not doing anything	43	3.48	3.48
Stay the same weight	45		3.58
Gain weight	10		3.71

APPENDIX A

TWO-WAY BETWEEN-GROUP ANALYSIS OF VARIANCE WITH MULTIPLE
COMPARISONS, IES-2 SCORES BY DIET BEHAVIOR AND MAJOR. MEAN IES-2
SCORES OF THE LHSSG.

Nutrition Major	Diet Behavior	Mean IES-2		
		Scores	Std. Deviation	N
No	Lose weight	3.09	0.44	77
	Gain weight	3.64	0.43	8
	Stay the same weight	3.58	0.49	23
	Not Doing Anything	3.39	0.40	30
	Total	3.27	0.49	138
Yes	Lose weight	3.28	0.52	46
	Gain weight	4.02	0.15	2
	Stay the same weight	3.58	0.37	22
	Not Doing Anything	3.71	0.46	13
	Total	3.44	0.50	83
Total	Lose weight	3.16	0.48	123
	Gain weight	3.71	0.42	10
	Stay the same weight	3.58	0.43	45
	Not Doing Anything	3.48	0.44	43
	Total	3.33	0.50	221

APPENDIX B

LHSSG SURVEY

Q38 Consent Form You are invited to participate in a research study titled, “Lifestyle Habits of Female College Students.” Katelyn Russell, Kelsey Baumgarten and Alayne Ronnenberg, Sc.D., from the University of Massachusetts Amherst, are doing this study. You were selected to participate in this study because you are a female undergraduate at UMass. The purpose of this research study is to find out more about the lifestyle habits of female undergraduates. We will ask you questions about your general mood, physical activity and eating habits. We will also ask you for some basic demographic information, such as your height, weight and age. If you agree to take part in this study, you will continue on to the survey. This survey will take approximately 15-20 minutes to complete. You may not directly benefit from this research; however, we hope that your participation in the study may provide more information about lifestyle habits in female undergraduates. Your answers will be anonymous - that is, we will not be able to link your answers to you. Survey responses will be kept in a password-protected file and only research staff will have access to the results. If you choose to participate in this survey, we will ask you to provide your email address. This is so we can 1) send you a debriefing form once you complete the survey and 2) enter you in a raffle to win one of 8 gift cards from local retailers valued at approximately \$7-10. Atkins Farm and Cushman Market have both donated gift cards for goods. Atkins Farm donated 2 gift cards each good for a Fresh Baked Pie and Cushman Market donated 1 pack of coffee coins good for 3 free coffees. Bueno y Sano donated 5, \$10 gift cards. If you do not enter your email, you will not be eligible for compensation. Your email will be stored separately from your results and we will have no way of linking it to your results. We do not anticipate there being any risks to participation, although it is possible that some people may feel uncomfortable answering questions about their lifestyle habits and their mood. Your participation in this study is completely voluntary and you can withdraw at any time. You are free to skip any question you choose. As researchers we are not qualified to provide counseling services and we will not be following up with you after this study. If you feel upset after completing the study, or find that some questions or aspects of the study trigger distress, talking with a qualified clinician may help. If you feel you would like assistance please contact Mental Health Services at University Health Services 413-545-2337 (Monday-Friday 8am-5pm) or 413-577-5000 (ask for the on-call mental health clinician) or the Psychological Services Center at 413-545-0041(Monday-Friday 8am-5pm) or psc@psych.umass.edu. In the case of an emergency please call 911. If you have questions about this project or if you have a research-related problem, you may contact the researcher(s), Katelyn Russell (978-895-0480 or krussell@nutrition.umass.edu) or Dr. Alayne Ronnenberg (413-545-1076 or alayne.ronnenberg@gmail.com). If you have any questions concerning your rights as a research subject, you may contact the University of

Massachusetts Amherst Human Research Protection Office (HRPO) at (413) 545-3428 or humansubjects@ora.umass.edu. By clicking the I AGREE button below, you are indicating that you are at least 18 years old, have read and understood this consent form and agree to participate in this research study.

- I AGREE (1)
- I DO NOT AGREE (2)

If I do not agree to participa... Is Selected, Then Skip To End of Survey

Q40 Thank you for agreeing to take part in this study. As we noted in the consent form, we ask that you provide your email address. This is so we can 1) send you a debriefing form once you complete the survey and 2) enter you to win one of eight gift cards for goods from Atkins Farm, Bueno y Sano and Cushman Market, valued at \$7-10. This is the compensation for participating in the study. If you do not enter your email, you will not be eligible for the gift basket. If you do enter your email, it will be stored separately from your results. Please enter your email address in the space below.

If Thank you for agreeing to t... Is Empty, Then Skip To Please be aware that once you leave a...

Q41 Thank you for providing your email address. You will receive an email with a debriefing form and will be entered in the gift card raffle. We may be conducting a follow-up study. If you are interested in hearing more about this study, please check "I am interested" below. Please note if we decide to do a follow-up study you will only receive one email before December 2014 if you indicate you are interested.

- I AM INTERESTED (1)
- I AM NOT INTERESTED (2)

Q64 Please be aware that once you leave a page you will not be able to go back to it. Your answers will not be linked to your email address so your responses to these questions will remain completely anonymous. There are no right or wrong answers to these questions. Please answer each question honestly. Some questions may seem very similar - we think that having these detailed questions will help us identify lifestyle habits more accurately. You are free to skip any question you choose.

Q1 What is your race?

- White/Caucasian (1)
- African American (2)
- Hispanic (3)
- Asian (4)
- Native American (5)
- Pacific Islander (6)
- Other (7)

Q2 What is your class status?

- Freshman (1)
- Sophomore (2)
- Junior (3)
- Senior (4)

Q66 How old are you? Please just give a number (for example, 19).

Q9 What choice best describes where you currently live?

- Residence hall (1)
- Off-campus housing (2)
- Sorority (3)
- At home/with family (4)

Q42 Are you a nutrition major?

- Yes (1)
- No (2)

If Yes Is Selected, Then Skip To If you are a nutrition major, which t...If No Is Selected, Then Skip To What is your major?

Q6 What is your major?

Q7 If you are undeclared, what major might you declare?

Q8 If you are a nutrition major, which track are you on?

- Health sciences (1)
- Global nutrition (2)
- Dietetics (R.D.) (3)

Q12 What do you currently weigh? Please answer in pounds.

Q14 Ideally, what would you like to weigh? Please answer in pounds.

Q13 How tall are you? Please answer in inches. For example, if you are 5 feet tall, you are 60 inches.

Q61 Please indicate how often, on average, you have eaten the following foods in the past 12 months.

	Never (9)	Less than Once a Month (10)	Once a Month (11)	2-3 Times a Month (12)	Once a Week (13)	2-3 Times a Week (14)	Daily (15)
Meat (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poultry (chicken, turkey, duck, etc) (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fish (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dairy products (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eggs (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Honey (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q55 Are you a vegetarian now?

- Yes (1)
- No (2)

If No Is Selected, Then Skip To Have you ever been a vegetarian?

Q17 If currently a vegetarian, I've been a vegetarian for:

- Less than 1 year (1)
- 1-2 years (2)
- 3-5 years (3)
- 6-10 years (4)
- 11-15 years (5)
- 16-19 years (6)
- 20-25 years (7)
- More than 25 years (8)
- I am not a vegetarian (9)

Q18 The main reason I am a vegetarian is because (check up to three):

- Health (1)
- Ethics (2)
- Animal rights (3)
- Weight loss (4)
- The environment (5)
- My religion (6)
- My spiritual beliefs (7)
- Family or friends (8)
- Saving money (9)
- Politics (10)
- World hunger (11)
- Taste (12)
- Other (13)
- I am not a vegetarian (14)

Q60 Have you ever been a vegetarian?

- No (5)
- Yes, but less than 1 month (6)
- Yes, for longer than 1 month (7)

Q50 A number of statements which people have used to describe themselves are given below. Read each statement then circle the appropriate number to the right of the statement to indicate

how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer that best describes you generally feel.

	Almost never (1)	Sometimes (2)	Often (3)	Almost always (4)
I feel pleasant (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel nervous and restless (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel satisfied with myself (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wish I could be as happy as others seem to be (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like a failure (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel rested (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am calm, cool and collected (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that difficulties are piling up so that I cannot overcome them (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I worry too much over something that really doesn't matter (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am happy (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I have disturbing thoughts (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I lack self-confidence (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel secure (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I make decisions easily (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel inadequate (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am content (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some unimportant thought runs through my mind and it bothers me (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take disappointments so keenly that I can't put them out of my mind (18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a steady person (19)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get in a state of tension or turmoil as I think over my recent concerns and interests (20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q42 During the past month, what was your average time per week spent at each of the following activities?

	Zero (1)	1-4 minutes (2)	5-19 minutes (3)	20-59 minutes (4)	One hour (5)	1- 1.5 hrs (6)	2-3 hrs (7)	4-6 hrs (8)	7- 10 hrs (9)	11+ hrs (10)
Walking or hiking outdoors or on a treadmill (includes walking to work or school) (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jogging outdoors or on a treadmill (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running outdoors or on a treadmill (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bicycling/using a stationary bike (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aerobics, dance/rowing machine (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tennis, squash or racket sports (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lap swimming (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other aerobic activity, such as martial arts or lawn mowing (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yoga or pilates (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weight training or resistance exercise (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q43 What is your usual walking pace outdoors?

- Easy, casual (less than 2 miles an hour) (1)
- Normal (2-2.9 miles an hour) (2)
- Brisk pace (3-3.9 miles an hour) (3)
- Very brisk, striding (4 miles an hour or faster) (4)
- Unable to walk (5)

Q44 During the past month, what was your average time per week spent at each of the following recreational activities?

	ZERO hours (1)	One hour (2)	2-5 hrs (3)	6-10 hrs (4)	11-20 hrs (5)	21-40 hrs (6)	41-60 hrs (7)	60-90 hrs (8)	over 90 hrs (9)
Standing or walking around school or work (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Standing or walking around at home (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sitting while at the computer, in class, work or driving (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sitting while reading, talking or eating (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sitting watching TV (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q34 These next few questions ask about your participation in sports at UMass:

	Yes (1)	No (2)
Do you play a varsity sport at UMass? (1)	<input type="radio"/>	<input type="radio"/>
Do you play a club sport at UMass? (2)	<input type="radio"/>	<input type="radio"/>
Do you play an intramural sport at UMass? (3)	<input type="radio"/>	<input type="radio"/>

Q29 Ice cream belongs best with:

- Delicious (1)
- Fattening (2)

Q38 For each item below, please check the best answer.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Spinach and artichoke dip is healthy. (30)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like eating foods that are high in fat, carbohydrates or calories. (26)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sweet potato fries are healthy. (31)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
White rice is healthy. (32)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to avoid certain foods high in fat, carbohydrates or calories. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself watching TV when I'm feeling emotional (e.g., anxious, depressed, sad), even when I have other things to do. (25)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I find myself eating when I'm feeling emotional (e.g., anxious, depressed, sad), even when I'm not physically hungry. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Q35 Pick the word you think is most different from the other two:

- Bread (1)
- Pasta (2)
- Sauce (3)

Q50 For each item below, please check the best answer.

	Strongly Disagree (28)	Disagree (29)	Neither Agree nor Disagree (30)	Agree (31)	Strongly Agree (32)
When I crave a food, it is usually something sweet. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I crave a food, it is usually something crunchy. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I crave a food, it is usually something salty. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I'm craving a certain food, I allow myself to have it. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get mad at myself for eating something unhealthy. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I trust my body to tell me when to stop eating. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q52 For each item below, please check the best answer.

	Strongly Disagree (4)	Disagree (5)	Neither Agree nor Disagree (6)	Agree (7)	Strongly Agree (8)
I like eating kale, spinach, collards, and/or other green leafy vegetables. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Red meat is nutritious. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sitting more than three hours a day is unhealthy. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q43 For each item below, please check the best answer.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
I find myself staying awake even when I am physically tired. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself eating when I am lonely, even when I'm not physically hungry (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I trust my body to tell me when to sleep. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I trust my body to tell me when to eat. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I trust my body to tell me when to stop sleeping. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I trust my body to tell me when to stop eating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(5)					
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Q53 For each item below, please check the best answer.

	Strongly Disagree (4)	Disagree (5)	Neither Agree nor Disagree (6)	Agree (7)	Strongly Agree (8)
I trust my body to tell me what to eat. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I trust my body to tell me how much to sleep. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I trust my body to tell me how much to eat. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q53 For each item below, please check the best answer.

	Strongly Disagree (4)	Disagree (5)	Neither Agree nor Disagree (6)	Agree (7)	Strongly Agree (8)
I like watching a lot of TV shows at one time. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like watching my favorite TV show when it airs on TV. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like snacking when I am watching TV. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q44 For each item below, please check the best answer.

	Strongly Disagree (9)	Disagree (10)	Neither Agree nor Disagree (11)	Agree (12)	Strongly Agree (13)
My favorite food is chocolate. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have forbidden foods that I don't allow myself to eat. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use music to help sooth negative emotions. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use food to help me soothe my negative emotions. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself watching T.V. when I am stressed out, even when I have other things to do. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself eating when I am stressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>out, even when I'm not physically hungry (3)</p> <p>I am able to cope with my negative emotions (e.g., anxiety, sadness) without turning to food for comfort. (4)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Q37 Fried egg belongs best with:

- Breakfast (1)
- Cholesterol (2)

Q27 Please answer true or false for the following 4 questions:

	True (1)	False (2)
I am concerned with the health of friends/family who eat poorly. (1)	<input type="radio"/>	<input type="radio"/>
I rarely think about the long-term effects of diet on my health. (2)	<input type="radio"/>	<input type="radio"/>
I am concerned about what I eat and how it will affect my appearance. (3)	<input type="radio"/>	<input type="radio"/>
I am usually dieting. (4)	<input type="radio"/>	<input type="radio"/>

Q34 If you were vacationing and had to choose between the following hotels including meals, which one would you pick? Assume that you must eat at the hotel and there is no price difference.

- Luxury hotel with average food (1)
- Average hotel with excellent food (2)

Q45 For each item below, please check the best answer.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
When I am bored, I do NOT eat just for something to do. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am bored, I do NOT watch TV just for something to do. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am lonely, I do NOT turn to food for comfort. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am lonely, I find myself going for a walk, to the gym or to an exercise class. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find other ways to cope with stress and anxiety than by eating. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am lonely, I call a	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

friend. (7)					
I allow myself to eat what food I desire at the moment. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q30 Chocolate cake belongs best with:

- Guilt (1)
- Celebration (2)

Q46 For each item below, please check the answer that best characterizes your attitudes or behaviors.

	Strongly Disagree (4)	Disagree (5)	Neither Agree nor Disagree (6)	Agree (7)	Strongly Agree (8)
I like following eating rules or dieting plans that dictate what, when, and/or how much to eat. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do NOT follow eating rules or dieting plans that dictate what, when, and/or how much to eat. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Brown rice is a nutritious food. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most of the time, I desire to eat nutritious foods. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I mostly eat foods that make my body perform efficiently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(well). (3) I mostly eat foods that give my body energy and stamina. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Q47 For each item below, please check the answer that best characterizes your attitudes or behaviors.

	Strongly Disagree (4)	Disagree (5)	Neither Agree nor Disagree (6)	Agree (7)	Strongly Agree (8)
I rely on my hunger signals to tell me when to eat. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I rely on my fullness (satiety) signals to tell me when to stop eating. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q36 Pick the word you think is most different from the other two:

- Carbohydrate (1)
- Bread (2)
- Butter (3)

Q33 Please answer the following questions either true or false:

	True (1)	False (2)
Enjoying food is one of the most important pleasures in my life (1)	<input type="radio"/>	<input type="radio"/>
I would rather eat my favorite meal than watch my favorite TV show (2)	<input type="radio"/>	<input type="radio"/>
I think about food in a positive anticipatory way (3)	<input type="radio"/>	<input type="radio"/>
Money spent on food is money well spent (4)	<input type="radio"/>	<input type="radio"/>
I have fond memories of family food occasions (5)	<input type="radio"/>	<input type="radio"/>
If I could satisfy my nutritional needs safely, cheaply and without hunger by taking a daily pill, I would do this. (6)	<input type="radio"/>	<input type="radio"/>
I am a healthy eater (7)	<input type="radio"/>	<input type="radio"/>

Q31 Heavy cream belongs best with:

- Whipped (1)
- Unhealthy (2)

Q26 For each item below, please indicate how often you eat the following foods:

	Every day (1)	A few times a week (2)	Once a week (3)	Once or twice a month (4)	Rarely/never (5)
I eat low cholesterol foods (foods from which cholesterol has been removed) (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I eat reduced salt portions (in which salt is removed) (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I eat low-fat foods (foods in which some of the fat has been removed, or substitutes for high-fat foods) (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q32 On a scale of 1 to 4, how much of an effect do you believe diet has on the following?

	No effect (1)	Little effect (2)	Some effect (3)	A lot of effect (4)
Heart disease (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Obesity (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good health (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cancer (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q19 How do you describe your weight?

- Very underweight (1)
- Slightly underweight (2)
- About the right weight (3)
- Slightly overweight (4)
- Very overweight (5)

Q20 Which of the following are you trying to do about your weight?

- Lose weight (1)
- Gain weight (2)
- Stay the same weight (3)
- I am not trying to do anything about my weight (4)

Q46 Please answer yes or no to the following questions:

	Yes (1)	No (2)
<p>During the past 30 days, did you take any diet pills, herbs, powders, or liquids without a doctor's advice to lose weight or keep from gaining weight? (Do not count meal replacements such as Slim Fast). (1)</p>	<input type="radio"/>	<input type="radio"/>
<p>During the past 30 days, did you vomit or take laxatives to lose weight or keep from gaining weight? (2)</p>	<input type="radio"/>	<input type="radio"/>

Q52 PLEASE NOTE - THIS IS THE LAST QUESTION OF THE STUDY. YOU HAVE TO ANSWER THIS QUESTION AT THE BOTTOM OF THE PAGE IN ORDER FOR YOUR STUDY RESULTS TO BE RECORDED. Purpose of the Study: Earlier in our consent form we informed you that the purpose of the study was to evaluate lifestyle habits in college students. In actuality, our study is about intuitive eating in nutrition majors versus non-nutrition majors. Intuitive eating is a way of eating that honors body cues, such as hunger and satiety, and seeks to nourish the body rather than control its size. We are also evaluating diet behavior, mood, health consciousness and physical activity to see if there is any relationship between intuitive eating behaviors and these other behaviors. Unfortunately, in order to properly test our hypothesis, we could not provide you with all of these details prior to your participation. This ensures that your reactions in this study were spontaneous and not influenced by prior knowledge about the purpose of the study. If we had told you the actual purposes of our study, your ability to answer the questionnaires in an unbiased way could have been affected. We regret the deception but we hope you understand the reason for it. Now that you know the purpose of the study, if you would like your data deleted please check **DELETE MY DATA** below. Otherwise, please check **KEEP MY DATA**. If you would like your data deleted but provided your email address earlier, you will still be entered to win a gift card. Confidentiality: Please note that although the purpose of this study has changed from the originally stated purpose, everything else on the consent form is correct. This includes the ways in which we will keep your data confidential. All data will still be kept in a password protected computer file and only the researchers will have access to the data.

If you provided your email address, it will be stored separately from your data. We will have no way of linking your data to you. Please do not disclose research procedures and/or hypotheses to anyone who might participate in this study in the future as this could affect the results of the study. Final Report: If you would like to receive a copy of the final report of this study (or a summary of the findings) when it is completed, please feel free to contact us. Useful Contact Information: If you have any questions or concerns regarding this study, its purpose or procedures, or if you have a research-related problem, please feel free to contact the researcher(s), Katelyn Russell, 978-895-0480 or krussell@nutrition.umass.edu, or Dr. Alayne Ronnenberg, 413-545-1076 or alayneronnenberg@gmail.com. If you have any questions concerning your rights as a research subject, you may contact the University of Massachusetts Amherst Human Research Protection Office (HRPO) at (413) 545-3428 or humansubjects@ora.umass.edu. If you feel upset after having completed the study or find that some questions or aspects of the study triggered distress, talking with a qualified clinician may help. If you feel you would like assistance please contact Mental Health Services at University Health Services 413-545-2337 (Monday-Friday 8am-5pm) or 413-577-5000 (ask for the on-call mental health clinician) or the Psychological Services Center at 413-545-0041(Monday-Friday 8am-5pm) or psc@psych.umass.edu. In the case of an emergency please call 911. Further Reading(s): If you would like to learn more about intuitive eating please see the following references: Mathieu, J. What should you know about mindful and intuitive eating? J Am Diet Assoc, 2009, 109, 12, 1982-1987 Smith, TS.; Hawks, SR. Intuitive Eating, Diet Composition, and the Meaning of Food in Healthy Weight Promotion. Am J of Health Ed., 2006, 37, 3, 130-136 Tylka, TL.; Kroon Van Diest, AM. The Intuitive Eating Scale-2: Item Refinement and Psychometric Evaluation in College Women and Men. Journal of Counseling Psychology, 2013, 60, 1, 137-153. Van Dyke, N.; Drinkwater, EJ. Relationships between intuitive eating and health indicators: literature review. Public Health Nutrition, 2013 ***Please keep a copy of this form for your future reference. Once again, thank you for your participation in this study!***

- KEEP MY DATA (4)
- DELETE MY DATA (5)

APPENDIX C

RECRUITMENT EMAIL

Dear [insert name of department, class, organization, etc] students:

We are seeking female college students for a study about lifestyle habits. The study involves completing an online survey, which will take approximately 15-20 minutes.

Your responses to this survey will be completely anonymous – we will have no way of linking your results to you. If you choose to provide your email, it will be stored separately from your results.

If you participate in this survey and provide your email address, we will enter you to win one of eight gift cards for goods from Cushman Market, Bueno y Sano and Atkins Farm, valued from \$7-10. Participation in this study is completely voluntary and will in no way influence your standing in the [insert name of department, class or organization].

To participate in this study please insert this link into your browser:

https://qtrial.qualtrics.com/SE/?SID=SV_9Hvf5xpdK51sALz

If you are interested in hearing more about this study, please contact Katelyn Russell at krussell@nutrition.umass.edu or 978-895-0480.

Thank you,

Katelyn Russell

krussell@nutrition.umass.edu

978-895-0480

APPENDIX D

IRB APPROVAL LETTER



University of Massachusetts Amherst
108 Research Administration Bldg.
70 Butterfield Terrace
Amherst, MA 01003-9242

Research Compliance
Human Research Protection Office
Telephone: (413) 545-3428
FAX: (413) 577-1728

Certification of Human Subjects Approval

Date: December 20, 2013
To: Katelyn Russell, Nutrition
Other Investigator: Alayne Ronnenberg, Nutrition
From: Lynnette Leidy Sievert, Chair, UMASS IRB

Protocol Title: Intuitive Eating in Nutrition Majors and Non-Majors: An Exploratory Study
Protocol ID: 2013-1830
Review Type: EXPEDITED-NEW
Paragraph ID: 7
Approval Date: 12/20/2013
Expiration Date: 12/19/2014
OGCA #:

This study has been reviewed and approved by the University of Massachusetts Amherst IRB, Federal Wide Assurance # 00003909. Approval is granted with the understanding that investigator(s) are responsible for:

Modifications - All changes to the study (e.g. protocol, recruitment materials, consent form, additional key personnel), must be submitted for approval in e-protocol before instituting the changes. New personnel must have completed CITI training.

Consent forms - A copy of the approved, validated, consent form (with the IRB stamp) must be used to consent each subject. Investigators must retain copies of signed consent documents for six (6) years after close of the grant, or three (3) years if unfunded.

Adverse Event Reporting - Adverse events occurring in the course of the protocol must be reported in e-protocol as soon as possible, but no later than five (5) working days.

Continuing Review - Studies that received Full Board or Expedited approval must be reviewed three weeks prior to expiration, or six weeks for Full Board. Renewal Reports are submitted through e-protocol.

Completion Reports - Notify the IRB when your study is complete by submitting a Final Report Form in e-protocol.

Consent form (when applicable) will be stamped and sent in a separate e-mail. Use only IRB approved copies of the consent forms, questionnaires, letters, advertisements etc. in your research.

Please contact the Human Research Protection Office if you have any further questions. Best wishes for a successful project.

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