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# A Study to Explore Mindfulness among Vegetarian and Non-Vegetarian Students on a College Campus

Miho Hatanaka  
*Syracuse University*

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# **A Study to Explore Mindfulness among Vegetarian and Non-Vegetarian Students on a College Campus**

A Capstone Project Submitted in Partial Fulfillment of the  
Requirements of the Renée Crown University Honors Program at  
Syracuse University

Miho Hatanaka  
Candidate for B.S Degree  
and Renée Crown University Honors  
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Honors Capstone Project in Nutrition/Dietetics

Capstone Project Advisor: \_\_\_\_\_  
Sudha Raj, Associate Professor

Capstone Project Reader: \_\_\_\_\_  
Katherine McDonald, Associate Professor

Honors Director: \_\_\_\_\_  
Stephen Kuusisto, Director

Date: May 4<sup>th</sup>, 2015

## Abstract

Mindful eating is characterized by being fully present in the moment and using all the senses in the body to taste and savor food. There is a growing interest in the practice of mindful eating as it is shown to be effective for weight management and improving diet. Also in general, studies have shown that vegetarians tend to be more conscious about their food choices. This project, a cross sectional study, examines whether vegetarians exhibit a higher index of mindful eating than non-vegetarians. To conduct this study, 564 self-administered online surveys were collected and evaluated. The survey included both questions regarding students' dietary choices (vegetarian, non-vegetarian, or vegan) and a validated 28 item Mindful Eating Questionnaire (MEQ). The MEQ had 5 different domains, and each domain had a score range of 1 to 4 where a higher score indicate a higher level of mindful eating. The data was analyzed using a 2-tailed independent sample T-test and ANOVA to evaluate associations between the MEQ score and dietary choices, gender, major, and whether students eat organic food. The mean total MEQ score was  $2.78 \pm 0.306$ , with high internal consistency (Cronbach's  $\alpha = 0.743$ ) of the questionnaire. There was no statistical significance found between mindful eating and vegetarian diet, gender, or major. However, the study found that people who choose to eat organic foods had higher mean MEQ score ( $2.81 \pm 0.28$ ). The ANOVA results suggest that a small population of vegetarians who choose to eat organic foods ( $n = 86$ ) may also be more mindful. Taken together, these results indicate a possible correlation between vegetarian diet and mindful eating. Further research is needed to determine whether an association between mindful eating and different motivations for vegetarianism (health, ethical, or environmental) exists.

## **Executive Summary**

Mindfulness is defined as one's physical and emotional state of being aware and accepting him or herself without judgement, it is a way to cultivate "habits of mind." Mindful eating, as a part of mindfulness, emphasizes awareness of physical and emotional senses that are associated with hunger and satiety. Mindful eating practice provides skills for individuals to determine appropriate portion sizes, to monitor how much food was eaten, and to resist impulsive cravings or emotional eating. Several studies have shown the effectiveness of mindful eating for weight control, emotional or impulsive eating, and certain eating disorders. In addition, mindful eating is found to bring a positive influence on one's cognitive functions which improves one's diet. Also it is found that people who eat mindfully choose to eat healthier. The recent scientific research studies in mindfulness have been presenting evidence based health benefits. However there is a paucity of research studies focusing on the relationship between mindfulness and the dietary practices such as vegetarianism. This present study explored to see whether vegetarians eat more mindfully compared to non-vegetarians on a college campus.

In general, vegetarians are considered to be more mindful as they need to pay careful attention to their choice of food. The most common reasons why people adopt a vegetarian diet in the U.S. are for health and concerns about animal cruelty. Other reasons people follow vegetarian diet includes: religion, environmental concerns, and fashion/trends.

This capstone project examined the mindfulness among vegetarian and non-vegetarian students at Syracuse University and SUNY Environmental Science and Forestry. Surveys were distributed electronically through the university e-mail listserv. Through an online survey (Qualtrics) the students were asked to identify as vegetarian, non-vegetarian, or vegan with some questions about demographic information (gender, major, and class standing). A validated 28 item

Mindful Eating Questionnaire (MEQ) (Framson et al. 2009) was then used to measure the scale of mindful eating. The MEQ consists of 5 domains including disinhibition, external cues, emotional response, awareness, and distraction. The domain *disinhibition* measures the individual's inability to stop eating after feeling full (eg. I stop eating when I'm full even when eating something I love); *external cues* measure one's response to their surrounding environment while eating (eg. I recognize when food advertisements make me want to eat); and *emotional response* measures how one's eating pattern is affected by emotion (eg. When I'm feeling stressed at work, I'll go find something to eat). For mindfulness measures, *awareness* was measured to find how individuals appreciate the senses that are stimulated while eating and listening to one's own internal bodily cues (eg. I notice when there are subtle flavors in the foods I eat). Also, *distraction* measures the adherence to the intimate eating experience without being interfered by thoughts or other activities (eg. I think about things I need to do while eating). The total MEQ score and each domains have a score range of 1 to 4 where a higher score indicates a higher level of mindful eating.

The survey data were analyzed to see whether vegetarians are more mindful than non-vegetarians. College students were chosen as a sample population because the number of college students adopting vegetarianism is increasing, and they are the fastest growing vegetarian population in the United States (Derricone et al, 1997). Additionally, this campus's diverse population provides a great sample to collect data from.

SPSS statistical analysis software was used to evaluate the data collected from the MEQs. The total of 564 survey responses were collected, then the association with the MEQ and the independent variables (gender, major, and whether students choose to eat organic foods) were analyzed. Study participants were predominantly non-vegetarian (77%), largely women (64%), and more than half of the students chose to eat organic foods (52%). Major was considered to be

an independent variable because nutrition majors may be more accustomed to mindful eating concepts and are more mindful when eating compared to students in other majors.

The relationship between vegetarian diet and the total MEQ score was not statistically significant ( $p > 0.05$ ) which indicates that vegetarians are no more mindful compared to non-vegetarians. Alternatively, there is a statistically significant relationship between mindful eating and organic food choice, with total MEQ score of  $p < 0.05$ . This may correlate with the growing trend in organic food consumption and the increased number of conscientious omnivores who tend to be more aware of what they consume and continuously evaluate the source of food (Rothgerber, 2014). Since majority of the study population chose to eat organic food, it was predicted that vegetarians who eat organic foods would be more mindful compared to vegetarians who do not. The Analysis of Variance was run to see the association between vegetarians who eat organic foods and the MEQ. The result suggests with some degree of confidence that vegetarians who choose to eat organic foods are more mindful compared to any other population evaluated in the study.

It was predicted that nutrition majors would score higher on the MEQ since they generally have more exposure to mindful eating concepts and are believed to be more conscious about what they consume. However, nutrition majors did not have higher mindful eating scores than non-nutrition majors. With the increasing media coverage and development of mindfulness focused programs, the non-nutrition majors may be becoming more knowledgeable and are actively practicing mindful eating. In addition, there were no statistically significant differences between males and females despite the fact many studies suggests that women are generally more conscious about their food choices and they tend to eat healthier than men.

Some limitations of this study were the uncontrolled sample sizes of vegetarians and non-vegetarians, and the elimination of missing data. Although a large number of data was collected,

survey responses by vegetarians were smaller (22.7%) compared to the non-vegetarians. Many surveys were left incomplete or missing some components, these data were removed automatically via SPSS. In addition, study conducted by Grinnell et al. states that eating habits of college students may be not the ideal because it is reported that average weight gain in the first year college student is higher compared to annual American adult weight gain. Another limitation is that all participants were self-selected through an e-mail listserv recruitment at a single university during one fall semester. The data were collected from the self-reported online survey. Therefore, the data may be affected by individual's interpretation of the questions and external influences such as social desirability, trends, etc.

Even so, this study makes a significant contribution to the field of nutrition. This study examined the vegetarian and non-vegetarian diet's relationship with mindful eating practices among college students. College students are sensitive to changes in trends and are conscious about making better decisions about health. Therefore they are more likely to experiment with vegetarianism and mindful eating practices. Furthermore, this study's findings inform dietitians, healthcare professionals, and university food services to understand the relationship between mindful eating and different dietary choices that college students make, including vegetarianism and eating organic foods. The study will also help implement appropriate nutrition education and improve existing nutrition programs on campus to bring positive behavioral changes in the college student's health.

Further research may be conducted to see the MEQ score among different types of vegetarians (eg. vegan, strict vegetarian, semi vegetarian, lacto-ovo vegetarian, etc). Since each type of the vegetarian diet has different motivations and ideologies, they may be more or less mindful compared to each other. Moreover, different age may influence mindful eating both positively and

negatively, a study found that older adults have higher total MEQ scores compared to young adults. Also, with the increasing interest in sustainable farming and the local food movement, more research on conscientious omnivores and their relationship to mindful eating may be explored. Lastly, extended research on the mindful eating score and relationship between a vegetarian diet and organic food choice may be explored as present research shows a possible association between these two dietary choices and mindful eating.



## Table of Contents

Abstract	I
Executive Summary	II
Introduction	1
Background Information	6
Methods	13
Results	15
Discussion	22
Reference	29



*A Study to Explore Mindfulness among Vegetarian and Non-Vegetarian Students  
on a College Campus*

## **1. Introduction**

Objective: Through an online survey study, the vegetarians and non-vegetarians were assessed for their level of mindful eating practices. It is generally thought that the vegetarians are more mindful of their eating practices because they are more conscious of their food choices. Mindful eating is defined as being fully present in the moment and using all the senses in the body to taste and savor the food one is eating. A cross sectional study to compare mindfulness among vegetarians and non-vegetarian college students was conducted to see if a vegetarian diet would increase mindfulness while eating. A validated Mindful Eating Questionnaire (Framson et al. 2009) was used to measure the characteristics of mindful eating practice among vegetarians and non-vegetarians on a college campus. It was hypothesized that vegetarians would be more likely to have a higher mindful eating score compared to non-vegetarians.

Recently an increasing number of consumers and many healthcare professionals have been showing interest in the mindfulness concept. Mindfulness is defined as an individual's ability to be aware and accept the present moment without any judgment (1). It is a skill that can be learned and practiced by any person. Mindful eating is one of the aspects of mindfulness and it focuses on bodily responses to food and awareness of hunger and satiety cues (1). Originally described in Eastern traditions such as Buddhism and Hinduism, mindfulness is closely associated with spiritual and religious practices through meditation (2). At the same time, these two religions focus on dietary practices and emphasize a vegetarian and/or plant based diet.

More recently, mindfulness focused interventions and programs have become popular in the U.S. A popular approach is the practice of yoga which improves self-awareness and prepares

the mind and body to achieve greater mindful experiences. Yoga practice consists of many ethical principles to live a meaningful and purposeful life (3). Through an online survey, the National Survey for Yoga Practitioners explored the health habits such as dietary patterns, activity levels, general health conditions and other health characteristics among novice and expert yoga practitioners. The researchers found that nearly 10% of the participants reported following a vegetarian diet, which is significantly higher than the national average (3%). Also in the same study, mindfulness was measured using the Freiburg Mindfulness Inventory with a possible score range of 8 to 32, the higher score indicating a higher measure of mindfulness. Among the yoga practitioners, mindfulness scores were in the upper range ( $M= 24 \pm 4.3$ ), which may explain why the yoga practitioners are more mindful than the non-practitioners (4). Although this study did not make direct connections between mindful eating and vegetarianism, it indicates that there may be a positive relationship. The present research was conducted to examine if vegetarians eat more mindfully compared to non-vegetarians on a college campus.

It is widely known that there is a large overweight and obese population in the United States, threatening the health of many Americans. Poor weight management increases the risk of developing diabetes mellitus, cardiovascular disease, and other chronic diseases in an individual (5). Despite the reductionistic view of obesity in medicine, there is growing attention toward the Social Determinant of Health (SDOH) in the U.S. Explained in the article *The Social Determinants of Health: Coming of Age*, SDOH is defined as the social factors with direct or indirect effects on an individual's health. There are many factors that may be influencing the growing obese population such as lack of nutrition education/knowledge, false nutrition information in the media, and lack of access to nutritious foods. These are some of the social factors that cannot be controlled by an individual and, as a result, may cause people to pursue poor lifestyle patterns. It is evidenced

by research that highly educated people have more economic resources such as access to healthier nutrition, and better housing, often living in safe neighborhoods. People who do not have access to such resources may experience increased social pressure, stress, and anxiety, which leads to decreased self-control and less willingness to make healthier decisions (6).

Along with social factors, whether obesity is caused by simply increased caloric intake or other environmental influences is also an issue. One of the possible explanations for the increased obesity epidemic is portion distortion that leads to an increase of caloric intake. To further investigate the motivations of food consumption among people and its relationship to obesity, many research studies have been conducted to explore consumer behaviors. Brian Wansink, Ph.D., a consumer behavior and nutrition science professor at Cornell University, found that food intake increased when individuals ate while watching TV or used the computer, compared to people who were not distracted while eating. Also, participants with distractions had a harder time recalling what they just consumed (5).

Wansink also observed in his study the influence of internal and external cues of meal cessation. He found that the overweight individuals were more likely to rely on external cues such as eating continuously until their plates were clean or when the TV show they were watching was over. In contrast, people with normal BMI used internal cues and stopped eating when they were satiated (7). It seems that people who are susceptible to external cues are easily influenced by the dining environment such as the dining atmosphere, plate size, and types of food contributing to the increase in food intake (8). Often these people who rely on external cues and are not aware of their bodily cues regarding hunger and satiety, are called “mindless eaters”. Also, the increased portion sizes are associated with increased weight among individuals; an inability to regulate the amount consumed would increase the caloric intake and the chance of obesity (9).

In fact, many leading causes of death in the U.S. are related to poor diet and many can be easily reversed by a healthy balanced diet (10). A significant amount of weight loss can reduce blood pressure, reliance on medications, and improve an individual's lipid profile; thereby, improving the quality of life among obese patients (11). As we see the increasing trend in prevalence of chronic diseases, many people have already started to review their lifestyles. It is shown in the research that adopting a vegetarian diet to prevent and recover from these illnesses as well as learning how to meditate to enhance their mindfulness is effective in reducing abdominal fat in obese women (12-13).

The rise in the overweight and obese population has triggered a proliferation of fad diets and the weight loss industry (14). Family, peer, and sociocultural pressure, including the mass media, who advertise the ideal, perfect body image for men and women, is causing many people to restrict their diet to low fat, low caloric foods and to increase physical activity (15). It is shown in many research studies that popular fad diets can result in short term weight loss, however, it is not recommended for long term weight management (more studies are needed to support this claim) (15, 16-18). In addition, many popular weight loss programs fail to provide adequate micronutrients to meet the Reference Daily Intake (19). Often, a persistent dieting history and concern about physical appearance causes development of eating disorders among women and lower satisfaction of health and self-esteem in men (20-21). Gillen and Markey et al., found in their study that women were more likely to engage in healthy and unhealthy dieting compared to men, and that the risk for depression was more prevalent in women who follow unhealthy diets such as skipping meals and calorie restriction (22). Dieting may be inversely associated with mindful eating, because when individuals are on a diet they may restrict types of food they can consume and are more likely to control the time they can eat regardless of their hunger and satiety

cues. A study found that young adolescents who dieted for weight loss scored lower on the intuitive eating factor questionnaire; in addition, they had restricted their eating and were likely to experience emotional/compulsive eating compared to non-dieters (23).

In many of the recent research studies, a well-balanced vegetarian diet has proven to improve overall health, including a lower risk of cardiovascular disease, hypertension, type 2 diabetes, and certain types of cancer (24-26). Similarly, mindfulness based interventions demonstrate a reduction of anxiety, depression, and other mental disorders, as well as weight loss with reduction of chronic stress (27). Not only is mindfulness intervention effective for mental improvement such as coping with distress and an increased perception of quality of life, it seems to alleviate physical impairment and sensory pain to some degree, although it is less frequently reported in research (14). A writer and mindfulness activist, Kate Laurence, has suggested that a vegetarian diet and mindful eating practice can enhance the sensitivity to animal welfare and awareness of the choices we make (29).

Since there is limited research showing the relationship between vegetarianism and mindful eating, the present research explored the relationship between them. Janelle and Barr suggest that compared to non-vegetarians, vegetarians are more concerned about their food choices without overly being critical about their intake. Thus vegetarianism can complement healthy eating attitudes and behaviors (30). The main hypothesis explored in the study was that vegetarians are more likely to eat mindfully compared to non-vegetarians. This study was conducted among college students because this is a group that widely practices vegetarianism and is among the fastest growing vegetarian populations in the United States (24). Dietary patterns such as vegetarianism and mindful eating have many benefits for individuals, particularly by increasing self-efficacy for weight loss/maintenance and overall improvement of health, as well as managing

one's response to the food environment (31-32). As the field of dietetics explores the benefits of a vegetarian diet, it is equally important to look into the practice of mindful eating, as many current scientific studies are showing the effect of mindful eating behaviors (1, 27-28).

## **2. Background Information**

### *Vegetarian Diet*

The increased media focus on the health benefits of vegetarian nutrition and growing consumer awareness about ethical treatment of animals are moving people to adopt a vegetarian diet. A vegetarian diet is defined in general as abstinence from eating animal products; however, the definition of vegetarianism is vague and many vegetarians self-identify themselves in specific categories. Classification of a vegetarian diet includes semi-vegetarian, pescovegetarian, lacto-ovo-vegetarian, lacto-vegetarian, ovo-vegetarian, and vegans. In the U.S. most common reasons why people adopt a vegetarian diet are the concerns about their health and animal cruelty. Other reasons people follow a vegetarian diet include religion, environmental concerns, fashion/trends, and a dislike/disgust for consuming meat. (33).

Abstinence from eating meat and other animal products is an important aspect among many religious practices such as Buddhism, Seventh Day Adventists, and Hinduism, to name a few (34). For example, Seventh Day Adventists believe that following a vegetarian diet will provide good power to their lifestyle; eating meat is thought to stimulate physical and mental being, thus lessening one's spirituality (25). Many people in India follow a vegetarian diet due to their firmly established cultural traditions, social status, and religious doctrine that emphasizes asceticism and maintaining purity of the body by abstaining from eating meat (33). A professor at University of Vermont, Stephanie Kaza states that in Buddhism, consumption of meat is discouraged to nurture compassion and refrain from inflicting pain or harm on animals because it is thought to inflict pain



to oneself in the future. Kaza also states that mindful practice is used to cultivate empathy toward others and animal welfare by following a vegetarian diet (35). Many Buddhists abstain from eating meat because of their religious philosophy and ethics that discourage killing and in order to follow the Noble Eightfold Path to end their suffering and work toward enlightenment.

However, among people in the West, reasons for vegetarianism are not strongly associated with their religious practices compared to the vegetarian population in Eastern countries (36-37). Ruby et al. conducted a study and found most Euro-American vegetarians adopt the diet due to a strong interest in their health and/or animal welfare (38). People adopt a vegetarian diet to become healthier because there is strong scientific evidence that a vegetarian diet prevents many chronic diseases and results in a reduced mortality rate. The Academy of Nutrition and Dietetics Evidence Analysis Library provides strong evidence of the benefit of a vegetarian diet for lowering the risk of ischemic heart disease and, obesity, as well as improving total cholesterol levels (39). In the U.S. some of the reasons people become vegetarians include: personal health, animal cruelty, a distaste for meat, personal beliefs, peer/family influences, environmental/ecological impact, and weight loss (33).

In general, people who become vegetarians for health reasons are identified as “health vegetarians” by consuming meals with low calorie and highly nutrient dense vegetables and fruits to improve their health and weight loss or management. Many view eating meat as unhealthy and associate meat eating with a higher risk of chronic disease (40). Also, health vegetarians tend to adopt their new diet gradually from a trial period to consider if this diet fits their lifestyle; alternatively, they tend to have a shorter period of adherence to a vegetarian diet compared to ethical vegetarians (41-42).

People who adopt a vegetarian diet for reasons of animal welfare are called “ethical vegetarians”; most advocate for animal rights and consider eating or harming animals to be unethical (43). Ethical vegetarians address concerns about the unethical treatment of livestock in industrial farming where animals are often mutilated and confined in small spaces; furthermore, many ethical vegetarians believe that animals have their own intelligence and practice altruistic behaviors (35). Ethical vegetarians follow certain philosophical, ideological, or spiritual values to address their reasons for abstaining from eating meat and often have more humanistic values for adopting vegetarianism (44). Seen in the recent trends, many ethical vegetarians are adopting the diet with concerns about the large scale environmental impact that livestock and meat industries are making. The Food and Agriculture Organization estimates that more than 18 percent of greenhouse gases are produced by livestock industries around the world (45). Also, a study among Seventh Day Adventists pointed out that the annual greenhouse gas emission was 30% lower among vegetarians compared to non-vegetarians (46).

Despite the fact many benefits of the vegetarian diet are presented, a vegetarian diet must be adopted with proper knowledge and careful planning. Although depending on the type of vegetarian diet adopted and the management of the diet, generally vegetarians are more prone to nutrient deficiencies compared to non-vegetarians. Research shows that vegetarians may be low in omega 3 fatty acids if they omit consumption of eggs, fish, and dairy products (24, 39). Many nutrients such as vitamin B<sub>12</sub>, vitamin D, calcium, iron, and zinc are of concern for strict vegetarians and vegans (47). Therefore, for those people who are following a vegetarian diet, it is recommended to take nutrition supplements or consume products fortified with essential nutrients to prevent nutrient deficiencies (24). Extra precaution is given to adolescents, pregnant women,

and athletes who are following a vegetarian diet because of their increased nutrient needs for growth and athletic performance (24, 48).

Another issue surrounding vegetarianism is that some people adopt a vegetarian diet as a means to lose weight; the prevalence of eating disorders in vegetarian adolescents is frequently reported. Although it may not be a reason why people adopt a vegetarian diet, there seems to be an association between a vegetarian diet and eating disorders. Compared to adult vegetarians, the prevalence of eating disorders is higher among vegetarian adolescents who experience frequent binge eating and caloric restrictions due to their concerns about their physical appearance (49-50).

However, Janelle and Barr found that adult vegetarian women scored lower in dietary restraint compared to non-vegetarians; therefore, the researchers suggest that vegetarian women have more realistic perceptions of their body (30). It is important to understand that people have multiple different reasons for adopting a vegetarian diet and studies show that motivation for being vegetarian can change over time and, at the same time, each motivation can result in different dietary intakes among vegetarians (39). For example, the degree of animal product consumption differs between ethical vegetarians and health vegetarians; also, health vegetarians tend to restrict caloric intake by consuming larger amounts of fruits and vegetables for weight management and to achieve desired physical appearances (50-51).

In general, it seems that many vegetarians are more conscious about what they consume compared to non-vegetarians, largely in order to avoid accidental consumption of animal products (52). The Academy of Nutrition and Dietetics acknowledges the increasing numbers of vegetarians in the U.S and its health benefit. The increasing trend is evidenced by the rising number of courses offered regarding vegetarian nutrition and animal welfare, consumer awareness of ethical food production, and the advertisement of the health benefits of vegetarian diets in various media (24).

Although diet patterns differ by types of vegetarianism practiced, most vegetarians consume larger amounts of vegetables and various types of grains, which contributes to their health advantages (32).

### *Mindfulness and Mindful Eating*

In the past few decades, mindfulness interventions have been widely used to eliminate negative psychological effects and enhance vitality. Mindfulness is described as an individual's non-judgmental awareness and purposeful focus on the present events (53-54). The concept of mindfulness and mindful living is thought to be translated from Eastern traditions, mainly from Buddhist philosophy, which also teaches how to be aware and accept the present moment (54). In Buddhism, mindfulness is one of the 5 spiritual faculties along with faith, vigor, concentration, and wisdom, which are characteristics essential for enlightenment. In their practice, mindfulness is achieved through daily meditation by focusing on breath and other bodily sensations. Buddhist meditation aims for uninvolved and detached observation on the present moment and thoughts (2). Their teaching emphasizes mindfulness on every aspect such as mindfulness of thoughts, feelings, and motions. Therefore, Buddhism incorporates mindful eating by eliminating uncontrolled and distracted movements, and focusing on the taste and texture (55). Mindfulness teaches the way to introspect oneself which is to gain awareness of one's bodily postures, senses, and feelings without the mind's interference (55).

Originating in India and closely associated with Hinduism and Jainism, the practice of yoga allows practitioners to increase their mindfulness and provoke their awareness of self by suppressing the fluctuation of thoughts by controlling sensory activities, while maintaining specific bodily postures and coordinated breathing (56). By practicing yoga, practitioners come to

know how their bodily sensations such as hunger and satiety cues can influence their emotions and behaviors (57). In recent studies, yoga was shown to increase satisfaction and body awareness among people with eating disorders. Also, yoga practice combined with mindful eating strategies were found to be beneficial for treatment of binge eating disorders (58).

Recently, mindfulness interventions became increasingly popular in the United States by the development of the Mindfulness Based Stress Reduction method by Jon Kabat Zinn Ph.D. who is a leading researcher at University of Massachusetts Medical School. The Mindfulness Based Stress Reduction (MSBR) program incorporates various techniques such as meditation, yoga, and group discussions to cultivate mindfulness skills in an individual. The MBSR program is not associated with any religious practice but focuses on reducing anxiety and enhancing overall health by cultivating the individual's mindfulness. When the MBSR program was first introduced, Kabat-Zinn suggested 3 key practices including sitting meditation, body scan, and Hatha yoga to enhance mindfulness in an individual in which all three components provide opportunity for practicing mindfulness (59). Health benefits of mindfulness practice include improved emotional processing and coping with difficulties such as chronic illness and stress; it also increases self-efficacy and self-control. This practice adds more dimensions to the idea of well-being by striving to improve the quality of life while still acknowledging that pain and stress may still exist (28). Mindfulness has been shown to reduce negative effects such as stress and anxiety, prevent impulsivity by increasing self-awareness and self-regulation, and enhance development of self-acceptance (59).

Although the number of research studies regarding mindful eating are small, they are steadily growing. As a part of mindfulness, mindful eating cultivates strategies to control the urge to eat and not to judge oneself. Not only being aware of hunger and satiety, mindful eating considers every movement and changes that happen in the mind and body as food is ingested (60).

In ancient Buddhist scripture, there is a lesson to monks that encourages the practice of eating mindfully to cultivate compassion (61). Mindful eating can be achieved by eating slowly, removing the distractions such as the television or computer, being aware of bodily cues to hunger and satiety, noting like/dislike to foods, choosing foods for pleasant eating experiences, acknowledging and reflecting on unmindful eating episodes, and meditation (1).

Because mindfulness intervention has been shown to improve overall health of an individual, this strategy is applicable for weight management and improving eating behaviors. Mindful eating interventions are found to be effective for weight loss, improvement of diet, and the improvement of psychological effects among obese patients (62). Research also shows that mindful eating can be used as a preventative measure for weight gain in healthy young adults without eating disorders (63). Despite the fact that mindful eating may be used for weight reduction and dieting, this concept focuses on the process of eating, and it does not teach about choosing what to eat (53).

Recently, many nutrition researchers are directing their interests toward mindfulness, using mindfulness as a new psychological construct to create innovative strategies to counteract overconsumption of food and possible weight loss (64). In a study, the mindful practice is shown to increase self-awareness and mindfulness among obese participants as well as produce statistically significant weight loss (4). Additionally, the study showed that mindful living practice can increase self-awareness and acceptance which improves the treatment of eating disorders in patients (65). Keaney et al. found in their study that the MBSR program without focusing on diet did not make a significant reduction in emotional eating or uncontrolled eating, thus refuting the general claim about the correlation between mindfulness practice and healthier eating behavior, though more extensive research on mindful eating and its health benefit is needed (66).

There seem to be a paucity of research looking at the relationship between vegetarian diets and mindful eating. Since mindfulness based intervention is a relatively new concept, and there are selective numbers of studies done on mindful eating, it may be limiting the studies exploring the relationship between mindful eating and vegetarian diets. Furthermore, although there are numerous journal articles written on vegetarian/vegan dietary practices and the health benefits of these dietary patterns, however, there is no one studies exploring the correlation between vegetarianism and mindfulness.

### **3. Methods**

#### *Survey Measures*

This study was a cross-sectional study to explore the association between mindful eating and vegetarian diet and other variables. The Qualtrix Online Survey Software was used to create and distribute the survey. The survey contained a total of 40 questions including the Mindful Eating Questionnaire (MEQ) (Framson et al.) and questions regarding vegetarian and non-vegetarian diet using the Likert Scale. Mindful eating was measured by using the Mindful Eating Questionnaire which was developed and validated by Framson et al. (2009). Permission to use this questionnaire was granted by the author before the data collection. The questionnaire included 5 domains and contained a total of 28 questions; within the questionnaire, 12 items required reverse scoring and the analysis was coded accordingly using the analysis software. Each item was rated using a 4 point Likert scale ranging from 1 “never/rarely” to 4 “usually/always”. The maximum total MEQ score participants could get was 4 and the higher score indicates that the person eats mindfully during most meals.

The 5 domains of mindful eating were evaluated in the MEQ including: *disinhibition*, *awareness*, *external cues*, *emotional response*, and *distraction*. Categories such as *disinhibition*

measured the individual's inability to stop eating after feeling full (ex. I stop eating when I'm full even when eating something I love); *external cues* measure one's response to their surrounding environment while eating (eg. I recognize when food advertisements makes me want to eat), and *emotional response* measures how one's eating pattern is affected by emotion (eg. When I'm feeling stressed at work, I'll go find something to eat). For mindfulness measures, awareness was measured to find how individuals appreciate the senses that are stimulated while eating and listening to one's own internal bodily cues (eg. I notice when there are subtle flavors in the foods I eat). Also, *distraction* measures the adherence to the intimate eating experience without being interfered by thoughts or other activities (eg. I think about things I need to do while eating).

The frequency and the mean of each domain was calculated to find the MEQ summary score. Internal consistency of the total MEQ score was measured by the Cronbach's alpha and resulted with the measure of  $\alpha = 0.743$ , indicating the questionnaire to be significantly reliable in this study. In addition to the MEQ, the survey contained questions about personal and demographic information including gender, class standing, and whether or not the students were a nutrition major. Also, the survey included questions asking whether respondents choose to eat organic foods if available.

### *Sample Collection*

The target sample was collected within the Syracuse University and SUNY Environmental Science and Forestry email listserv. The potential participants were invited to complete the survey via e-mail with the online survey link attached. The survey was distributed to mainly undergraduate program e-mail list serves including the Renee Crown Honors Program, the Office of Multicultural Affairs, the David B. Falk College of Sport and Human Dynamics/ Nutrition Department, the Student Buddhist Association, etc. A total of 564 responses were collected over



the course of 15 days during the fall semester of 2014. The distribution of respondents' class standing was freshman (18%), sophomore (24%), junior (23%), senior (25%), and other (10%). From the data collected, 23% of students self-identified as vegetarians (n=129) and 77% were non-vegetarians (n=435). Also, there were a larger number of female (75.5%) respondents compared to male (24.5%, n= 118).

### *Statistical Analysis*

Multiple methods for descriptive analysis were used to evaluate the data collected. The MEQ score was used as a dependent variable and vegetarian/non-vegetarian, gender, organic food choice, and the nutrition major was defined as an independent variable in the analysis. Frequencies and percentages of each independent variable were used to describe the demographic characteristics of the sample groups. Each group was analyzed separately with the MEQ total score to find the association with mindful eating. Two Tailed independent sample t-tests were used to evaluate the model with significance cutoff of  $p < 0.05$ . Analysis of Variance (ANOVA) was run to find the association between the MEQ and awareness score, vegetarian and organic food choice. The statistical analyses were performed using IBM SPSS Statistics software version 21.

## **4. Results**

There were 564 survey responses collected that asked participants to choose one of three categories: vegetarian, non-vegetarian, and vegan. However, the responses for vegans were very limited (n=17) and the sample size was not sufficient to be compared statistically with other variables; therefore, the vegan data was combined with the vegetarian category for the analysis. Of those who completed the survey, 77 did not respond to questions regarding organic food choice and 83 were missing data as to sex/gender. Missing data may be due to incompleting surveys or inappropriate response to the survey questions. These data were assumed to be missing at random

and was removed from the analysis by SPSS software. Sample characteristics are described in Table 1.

<b>Table 1. Sample Characteristics</b>		
	n	%
<i>Diet</i>		
Vegetarian	129	22.9
Non-vegetarian	435	77.1
<i>Choose to eat Organic foods</i>		
Yes	297	52.7
No	190	33.7
<i>Sex/gender</i>		
Male	118	20.9
Female	363	75.5
<i>Major</i>		
Nutrition	42	7.4
Other	438	77.7
n = number of sample		
*Numbers vary due to missing data		

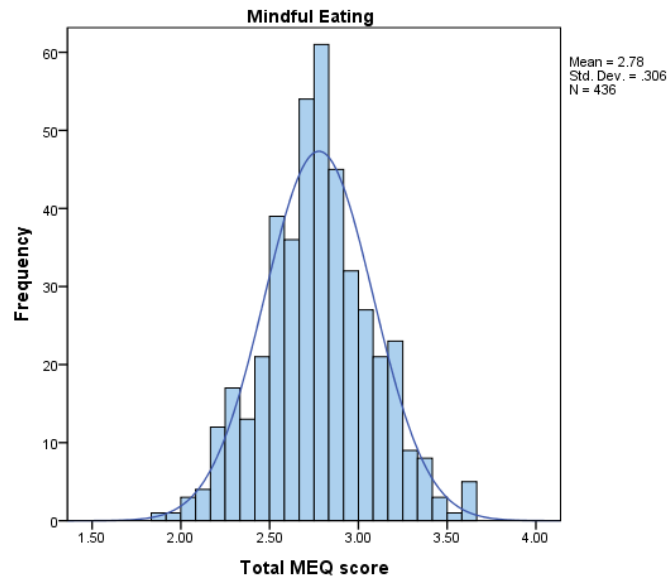
Study participants were predominantly non-vegetarian (77%) and largely women (75.5%). More than 52% of participants chose to eat organic foods when possible. Nutrition major students (N = 42) were considered as one of the independent variables as they may be more accustomed to the mindful eating concept through nutrition courses and increased individual interests compared to non-nutrition majors.

The total MEQ score and awareness domain were analyzed for its frequency and reliability to find association with vegetarian/non-vegetarian, organic food choices, gender, and major. The Independent sample t-tests were used to determine the statistical significance of differences between total MEQ score and awareness domain with each independent groups (vegetarian, organic food choice, gender, and major).

### Total MEQ score

The survey responses yielded a normal distribution for total MEQ score ( $n = 436$ ) with a mean = 2.78 and standard deviation =  $\pm 0.306$  as drawn in Figure 1.

Figure 1.



An Independent sample t-test was used to determine whether there were differences in the total MEQ score between vegetarians ( $n=129$ ) and non-vegetarians ( $n=435$ ). The mean and the standard deviation were calculated and the vegetarians scored slightly higher on the mindful eating score ( $M= 2.79 \pm 0.321$ ) than non-vegetarians ( $M = 2.77 \pm 0.302$ ). Shown in Table 2, the vegetarian's mean total MEQ score was  $0.02 \pm 0.04$ , higher than non-vegetarians. Thus the total MEQ score between vegetarians and non-vegetarians was found to have no statistical significance ( $p = 0.583$ ).

Table 2. Total MEQ score and Diet (Vegetarian/ non-vegetarian)  
Independent Samples T-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Total MEQ Score	Equal variances assumed	.188	.665	.549	434	.583	.01945	.03542	-.05017	.08906
	Equal variances not assumed			.530	145.669	.597	.01945	.03669	-.05307	.09196

The difference between male (n=118) and female (n=363) students on total MEQ score was also analyzed using the independent sample t-test. However, there was no statistical significance established for gender groups evidenced by the mean difference of 0.06 (95% CI, -0.01 ± 0.13),  $t(424) = 0.817$ ,  $p = 0.414$ .

Alternatively, the independent sample t-test was also used to find relationships between people who choose to eat organic foods (n=297) and people who do not (n=190). Data for Mean ± Standard Deviation were as follows: choose to eat organic foods had a higher mean MEQ score (M = 2.81 ± 0.28) compared to people who did not choose to eat organic foods (M= 2.70 ± 0.30). A statistically significant difference of 0.107 (95% CI, 0.05 to 0.16),  $t(430) = 3.74$ ,  $p < 0.005$ , as described in Table. 3.

Table 3. Total MEQ score and Organic food choice  
Independent Sample T-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Total MEQ Score	Equal variances assumed	.859	.355	3.739	430	.000*	.10725	.02868	.05087	.16363
	Equal variances not assumed			3.691	356.575	.000	.10725	.02906	.05010	.16440

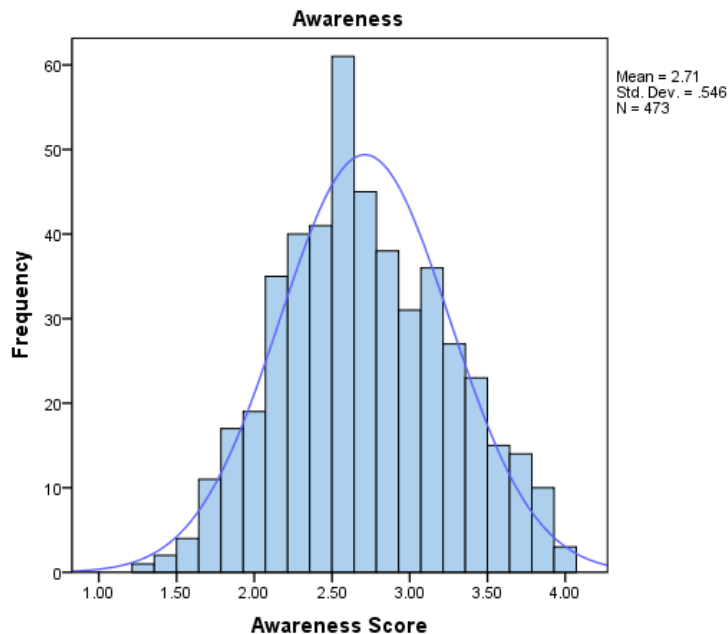
\*p < 0.05

Interestingly, there was no statistical significance found for total MEQ score between nutrition majors (n=42) ( $2.78 \pm 0.23$ ) and other majors (n=348) ( $2.79 \pm 0.31$ ), as evidenced by a mean difference of 0.01 (95% CI -0.09 to 0.11),  $p = 0.86$ .

#### *Awareness Domain*

Awareness domain (n= 473) was chosen to be evaluated because of its major role in mindful eating practice (being in tune with the hunger and satiety cues) and it was determined to be the most direct measure of mindfulness within the Mindful Eating Questionnaire. The internal consistency of the Awareness domain was found to be reliable ( $\alpha = 0.731$ ). This domain contained 7 out of 28 questions in the MEQ which is the second largest domain evaluated in the questionnaire. The survey responses yielded a normal distribution for awareness domain with a mean score = 2.71 and standard deviation  $\pm 0.546$  as drawn in Figure 2.

Figure 2.



An Independent sample T test was run to determine if there were differences in awareness domain of MEQ between vegetarians and non-vegetarians. It was found that vegetarians ( $2.82 \pm 0.59$ ) are more aware of their hunger and satiety cues compared to non-vegetarians ( $2.68 \pm 0.53$ ). A statistical significance was established between vegetarians and awareness domain (95% CI, 0.02 to 0.25),  $t(471) = 2.32$ ,  $p = 0.02$ .

Table 4. Awareness and Diet (Vegetarian/non-vegetarian)  
Independent sample T test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Awareness Domain Score	Equal variances assumed	3.858	.050	2.319	471	.021*	.13801	.05952	.02106	.25496
	Equal variances not assumed			2.174	160.210	.031	.13801	.06347	.01265	.26336

\* $p < 0.05$

The awareness domain score between people who eat organic food and people who do not eat organic food was statistically significant and consistent with the total MEQ score. People who choose to eat organic foods ( $2.81 \pm 0.52$ ) had a higher mean awareness score compared to people who do not choose to eat organic food ( $2.54 \pm 0.52$ ), a statistically significant difference of 0.27 (95% CI, 0.17 to 0.37),  $p < 0.005$ .

Table 5. Awareness and Organic  
Independent Sample T test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Awareness Domain Score	Equal variances assumed	.237	.627	5.490	466	.000	.27099	.04936	.17399	.36799
	Equal variances not assumed			5.487	392.687	.000	.27099	.04939	.17389	.36810

\* $p < 0.05$

The awareness score was not statistically significant for gender or major. Although male students had slightly higher awareness scores ( $2.76 \pm 0.54$ ) than female students ( $2.69 \pm 0.54$ ), there was no statistical significance established ( $p = 0.26$ ). Similarly among nutrition majors, they scored lower ( $2.66 \pm 0.55$ ) in awareness domain compared to the non-nutrition majors ( $2.72 \pm 0.55$ ), but there were no statistical significance between majors ( $p = 0.50$ ).

#### *Vegetarian and Organic Food Choice*

Since all students who choose to eat organic foods were more mindful compared to students who do not, vegetarians who choose to eat organic foods ( $n = 86$ ) were predicted to eat more mindfully compared to vegetarians who do not choose to eat organic foods. The summary

of mean score and standard deviation were calculated, shown in Table 6. The vegetarians who eat organic foods had the highest score of  $2.87 \pm .580$  in awareness domain, and students who do not eat organic foods had the lower score in both total MEQ ( $2.59 \pm .298$ ) and awareness domain ( $2.54 \pm .523$ ).

Table 6. Summary of Means for Diet choice, Organic food choice, and vegetarians who eat organic foods

	n	Full Data set	Diet Choice		Organic food choice		Vegetarian and Organic food choice	
			Vegetarian	Non-Vegetarian	Choose to eat organic food	Does not choose to eat organic food	Vegetarian who eat organic food	Other*
		-	129	435	297	190	86	387
Total MEQ	436	2.67±.302	2.70±.325	2.66±.295	2.71±.284	2.59±.298	2.73±.314	2.66±.298
Awareness	473	2.71±.546	2.82±.594	2.68±.527	2.80±.521	2.54±.523	2.87±.580	2.68±.533

\*includes data: non-vegetarian, does not choose to eat organic food, and vegetarians who do not eat organic foods

Total MEQ scale and the awareness domain were used to compare difference across 3 variables including diet choice, organic food choice, and vegetarians who eat organic foods. Significant difference in the variance was found between 3 variables in both total MEQ scale and the awareness domain. The ANOVA results are shown in the Table 7 and 8.

Table 7. ANOVA with Total MEQ Score

		Sum of Squares	df	Mean Square	F	Sig.
Diet Choice	Between Groups	10.732	42	.256	1.558	.018
	Within Groups	64.786	395	.164		
	Total	75.518	437			
Vegetarian who eat organic	Between Groups	8.423	42	.201	1.474	.033
	Within Groups	53.735	395	.136		
	Total	62.158	437			
Organic food choice	Between Groups	13.964	41	.341	1.473	.035
	Within Groups	90.662	392	.231		
	Total	104.627	433			

\*p <0.05



Table 8. ANOVA with Awareness Domain

		Sum of Squares	df	Mean Square	F	Sig.
Diet Choice	Between Groups	5.458	19	.287	1.671	.038
	Within Groups	77.883	453	.172		
	Total	83.340	472			
Vegetarian who eat organic	Between Groups	4.753	19	.250	1.727	.029
	Within Groups	65.611	453	.145		
	Total	70.364	472			
Organic food choice	Between Groups	11.515	19	.606	2.705	.000
	Within Groups	100.355	448	.224		
	Total	111.870	467			

\*p &lt;0.05

## 5. Discussion

The present study result did not show a direct association between a vegetarian diet and mindful eating as evidenced by no significance in total MEQ score ( $p < 0.05$ ). However, this study found a statistical significance for the awareness MEQ subscale among vegetarians ( $p = 0.108$ ). Perhaps the vegetarian diet only improves awareness and it is predicted that vegetarians may score lower in other domains such as *distraction*, *disinhibition*, *external cues*, and *emotional response*, leading to no significant difference within the total MEQ score. Furthermore, because the prevalence of eating disorders is very high in the vegetarian population, domains such as *emotional response* and *disinhibition* may likely be affected if there were significant number of vegetarians having some degree of eating disorders. Another study shows that people who experience uncontrolled eating or are unable to regulate the amount of food consumed tend to have lower mindfulness (65). For clearer results, vegetarians who are experiencing eating disorders should be screened and removed from the data. With the unbiased data, there may be a stronger relationship between vegetarians without eating disorders and a mindful eating score.

Interestingly, the students in the nutrition major did not have a significant association with mindful eating. It was predicted that nutrition majors will score higher on the mindful eating questionnaire since they generally have more frequent exposure to the concept of mindful eating and are more conscious about what they consume. It is possible that the students in the nutrition majors may tend to restrict their diet according to the nutrient content of the food; therefore, they did not score significantly higher than the students in non-nutrition majors. Alternatively, with increasing media coverage and development of mindful eating programs, it may be predicted that the non-nutrition major students are becoming more knowledgeable and are actively practicing mindful eating.

This study found that students who chose to eat organic food tend to eat more mindfully. There was a statistically significant relationship between mindful eating and organic food choice. The results were consistent in both awareness domain ( $p < 0.005$ ) and total MEQ score ( $p < 0.005$ ). This finding may be related to the growing trend in organic food consumption and the increased number of conscientious omnivores who tend to be more aware of what they consume and continuously evaluate the source of food (44).

Organic food proponents emphasize environmental health and sustainable farming, advocating for societal change, the better treatment of animals, and food safety. The organic food industry had a \$20 billion sales in 2002 and there is a 12% yearly increase in organic farming in the United States (68). Although many people's food intake gets influenced largely by the food environment they're surrounded by, regular organic food consumers may be less susceptible and more critical of the marketing strategies of more conventional food industries. Hughner et al. summarizes in their article that people perceive that there is a larger value added to organic food because of more conscious farming practice due to its higher price (68). The article states that

organic food consumption is thought to be derived from an ideology of sustainability and supporting local agriculture causing individuals to change eating practices for environmental reasons. The ideologies and philosophies which organic food consumers believe are similar to how vegetarianism has been adopted by many individuals for reasons of animal cruelty and health. Furthermore, common values held by many organic food consumers include altruism, sustainability, universalism, benevolence, spirituality, and self-direction (68). Generally consumers are increasingly concerned about food safety and quality. Organic consumers may be more conscious about nature and have greater concerns for how the food is produced and processed.

Results from the ANOVA suggests the presence of significant difference between 3 variables including dietary choice, organic food choice, and vegetarians who choose to eat organic foods. For the analysis, these 3 variable were chosen because vegetarians did not have high MEQ scores, but people who eat organic foods had significantly higher MEQ scores; therefore, it was predicted that vegetarians who also choose to eat organic foods are mindful compared to vegetarians who do not choose to eat organic foods. Thus, the analysis suggests vegetarians who choose to eat organic foods are more mindful and aware while eating compared to other populations. The vegetarians who choose to eat organic foods scored much higher in the MEQ scale ( $2.73 \pm .314$ ). This may suggest that choosing organic foods has significant influence on the individual's ability to eat more mindfully and simply being a vegetarian is not a strong factor in mindful eating. It can be concluded with some degree of confidence that vegetarians who choose to eat organic foods are more mindful than non-vegetarian who choose to eat organic foods.

Certainly food choice has become more personalized and is often used as a way to present individual food ideologies which shapes the individual's lifestyle related to food (69).

Interestingly, a study conducted by Cicia et al. found that 58% of regular consumers of organic foods are following the vegetarian diet (70). In general, increased mindfulness is thought to be associated with healthy food choices because mindful individuals will have a greater ability to regulate internal cues to withstand the impulses to eat unhealthy foods (32). Subsequently, a vegetarian diet and organic foods are considered to be healthy by the general public; therefore, it may be predicted that vegetarians who choose organic foods may score significantly higher in the MEQ scores.

Consistent with the study conducted by Framson et al. gender did not affect the mindful eating score in the present study. This contradicts the fact that women are generally more conscious about their food choices and they tend to eat healthier than men because women are more likely to be involved in food purchasing and preparation (67). Also, in general women tend to adopt a vegetarian diet more than men. It is likely that in many cultures, consumption of meat is associated with strength and masculinity (33). A study conducted by Bellows et al. shows that men and women view food to have high social meaning and values. Women consider food as an integral part of their family traditions, pleasure in life, and expression of love. However, the study found that females expressed higher importance of food in their life compared to men (69).

College students were recruited to participate in this study because they are most racially and ethnically diverse than in any other generations (71). Syracuse University provides a diverse community of students as evidenced by total student population representing all 50 U.S. states, also the campus consists of 55% female and 45% male full time undergraduate students. More specifically, this campus holds 25.6% minority population including 7.7% African Americans, 6.4% Asian Americans, 8.6% Hispanics, 0.6% Native Americans, and 2.3% multiple races. The World Health Organization recommends in the Handbook for Good Clinical Research Practice to

include vulnerable subjects including minority populations and those who are economically disadvantaged. Moreover, Forbes magazine reports that the younger generation is increasing their interest in healthy diet and willing to explore different diets, they are increasingly conscious about sustainability and safety in food production. According to the web poll collected by the Vegetarian Resource Group, the number of vegetarians are most prevalent in young adults and college students (5%).

Present research had a total MEQ score of 2.78 among college student participants. In fact, a study found that younger participants (age  $\leq 30$  years) had lower total MEQ score compared to older participants (MEQ score 2.79 vs 2.99) (67). However, further research is needed to understand the correlation between lower MEQ score and age.

Some of the limitations of this study were the lower mean score of MEQ among the college students compared to other studies (65, 67), uncontrolled sample sizes of the vegetarians and non-vegetarians, and elimination of missing data. Although large number of data was collected, survey responses by the vegetarians were smaller (22.7%) compared to the non-vegetarians and the mean difference (0.019) represent small effect size. Additionally, large number of incomplete survey and missing data which were removed by the SPSS software may have shifted the values in analysis. Another limitation is that all participants were self-selected through e-mail recruitment at a single university during one fall semester. It is not clear whether baseline dietary beliefs and eating practices are representative of all college students. Also the data were from the self-reported online survey; therefore, the data may be affected by an individual's item interpretation and external influences such as social desirability, trend, etc.

Grinnell et al. state that eating habits of college students may be not the ideal because it is reported that average weight gain in first year college student is higher compared to the annual

American adult weight gain. The researchers suggest it is due to the increased caloric intake and the undesirable food environment for health such as buffet style dining facilities, unhealthy food selection at campus cafeterias, and the use of large utensils/plates (72). Also, college students need to balance their time and resources between class, friends, and other opportunities which may contribute to the poor dietary habits.

Even so, this study makes a significant contribution to the nutrition field that it explored the vegetarian and non-vegetarian diet's relationship with mindful eating among college students. This population is sensitive to changes in dietary trends and are conscious about making better decisions for health; therefore, they are more likely to experiment with vegetarianism and mindful eating. Certainly, mindful eating practice can be used to work with overweight or obese students and students with eating disorders on campus. Furthermore, this study's findings informs dietitians, healthcare professionals, and university food services to understand the relationship between mindful eating and different dietary choices including vegetarianism and choosing to eat organic foods. The study will also help implement appropriate nutrition education and improve existing nutrition programs on campus to bring positive behavior changes among college student's health.

Further research may be warranted to see the MEQ score among different types of vegetarians (eg. vegan, strict vegetarian, semi vegetarian, lacto-ovo vegetarian, etc). Since each type of vegetarian diet has different motivations and beliefs, they may be more or less mindful compared to each other. Because it is found in another study that older adults have higher total MEQ score, vegetarians or organic food consumers in the older age may have higher mindful eating scores. Also with the increasing interest in sustainable farming and local food movement, more research on conscientious omnivores and their relationship to mindful eating may be explored. More

extended research on the mindful eating score and relationship between a vegetarian diet and organic food choice may be explored as present research showed a possible association between these two dietary choices and mindful eating.

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