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The Differences Between a Sample of Syracuse University Male and Female Students on a Variety of Health Parameters

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

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ABSTRACT

My Honors Capstone Project is entitled "The Differences Between a Sample of Syracuse University Male and Female Students on a Variety of Health Parameters." In the fall of 2007, Dr. Tanya Horacek, as part of a larger project involving several universities, collected extensive nutrition- and health-related data from Syracuse University students. Dr. Horacek allowed me to access and analyze these data to examine if significant differences existed between male and female students.

I chose to work with these data for my Capstone Project because it is a common belief that the college years are a time of accelerated weight gain and because the United States as a whole is currently in the midst of an obesity epidemic. My analysis of these data can help to understand factors that are associated with students' weight status in college.

The health parameters that I looked at include Body Mass Index (BMI), waist circumference, weight dissatisfaction, physical activity, fruit and vegetable consumption, and Eating Competency test scores (a survey that measures an individual's attitudes about eating and food, acceptance of food, internal regulation abilities, and abilities and resources for managing food context). I chose to use these parameters because they are commonly used in nutrition research and are validated tools for nutrition evaluation.

Numerous research studies in the past have used these parameters to examine samples of college students. Overall, these studies have found that students do in fact gain some weight in college. Possible contributing factors that have been identified include low fruit and vegetable consumption and low frequency of physical activity. Reasons for these two behaviors are numerous. Studies have found differences between genders for these and related behaviors.

Because of this, I decided to assess whether any significant differences exist between male and female students for all health parameters examined and to look for correlations between parameters within each gender.

I found significant differences between men and women for waist circumference, weight dissatisfaction, eating competency, and vigorous physical activity. I also found numerous correlations between health parameters. A couple of such connections are: the higher a person's waist circumference, the more likely they were to be dissatisfied with their weight for both genders and the higher a person's BMI, the more likely he or she was to be dissatisfied with their weight for both genders. Some correlations existed within one gender but not the other. For example, Eating Competency Total Score was strongly and negatively correlated to weight dissatisfaction for women but not for men.

Many results were consistent with findings from previous research. This study was limited because it did not consider body composition, it excluded senior students, it may not be representative of demographic statistics of Syracuse University, and it only looked at one northeastern university so its results may not be applicable to other universities. Future research can use these findings to design interventions. The Syracuse University Department of Nutrition Science and Dietetics will be using it to design an obesity prevention program.

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INTRODUCTION

It is well known now that the United States is facing an obesity epidemic that is affecting people of all ages, races, and genders. Obesity rates have been rising over the past few decades. In 2000, 19.8% of U.S. adults were obese (BMI $\geq$ 30 kg/m^2), which included 19.6 million men and 19.2 million women. Furthermore, 2.1% of U.S. adults were classified as extremely obese (BMI $\geq$ 40 kg/m^2) and 65.5% of men and 47.6% of women had a BMI that classified them as overweight (BMI $\geq$ 25 kg/m^2). Forty-nine states had obesity rates of at least 15%, and 22 states had rates of at least 20% (1). The National Health and Nutrition Examination Survey (NHANES) found that in 2001-2002, 65.7% of adults were overweight or obese and 5.1% were extremely obese. In 1999-2000, 30% of adults 20 years and older were obese (2).

Researchers have studied weight gain in an attempt to understand the causes of this epidemic and who is most susceptible. Many people believe that college students are at a higher risk of weight gain than the average American. This may be true. A study by Kasparek et. al. found that the rate of weight gain among freshman students at one university was 6.7 times greater than the rate at which the average U.S. adult gains weight. Fifty-seven percent of students reported gaining 1-35 pounds in their freshman year of college. Average weight gain for this group was 7.1 pounds (3). In a study by Racette et. al., 70% of students gained weight from the beginning of their freshman year to the end of their sophomore year. The average weight gain was nine pounds (4). Nearly 75% of students in a study by Hoffman et. al. gained an average of seven pounds in

their freshman year (5). Twenty-three percent of participants in another study gained ≥5% of their body weight, an average of 9.9 pounds (11.7 pounds for men, 9.2 pounds for women), in their first semester of college (6). Seventy-seven percent of students in yet another study gained weight in their freshman year, and 40% gained 8.8 pounds or more. Eighty-three percent had gained weight by the end of their sophomore year and 46% had gained 8.8 pounds or more. By the end of sophomore year, male students gained 9.5 pounds and female students gained 9.2 pounds (7).

Body Mass Index (BMI) surveys of college students reflect national trends and verify that this population does tend to gain weight. The American College Health Association surveyed 80,121 students from 106 campuses nationwide and found that in 2008, the average BMI for college women was 23.7 and the average BMI for college men was 24.7 (10). A cross-sectional study of one university in 2002 found that, based on BMI, 78% of students were normal weight, 16.8% were overweight, and 4.7% were obese (11). Another survey studying college students' BMI from 2002 to 2004 found that 16.9% of students were overweight and 4.7% were obese at the start of college. At the end of their first year, 28.5% were overweight and 7.5% were obese. At the end of their second year, 25.9% were overweight and 9.2% were obese (7). Although within normal limits, Kasparek et. al. found that BMI in their college student sample increased from an average of 23 to 23.5 over the course of one school year. Male students were twice as likely as female students to be classified as overweight at follow-up based on BMI. The limitation of BMI is that it does not adjust for muscle so a

person with enhanced muscle mass may also fall into the overweight category based on their height and weight. However, this was not the case here since, based on reports of low frequency of strength training activities, most students were not likely to gain muscle mass. Also, overweight students were almost twice as likely as normal weight students to gain weight (3).

Clearly, it is not just a myth that college students have a tendency to gain weight in college. The exact amount of weight and the percent of students that gain weight vary, but the trend is evident. It is difficult to pinpoint specific causes for this trend, but researchers have made associations between college student weight gain and various behavioral and environmental factors that may aid in our understanding of this phenomenon. Barriers to healthy weight management that have been proposed based on this research include lack of exercise and not eating healthy foods. Possible contributing factors to these barriers are numerous: social situations centered around eating, excessive alcohol consumption, eating while intoxicated, time constraints, stress eating, unhealthy foods in dining halls, large portion sizes, lack of access to healthy foods, and lack of funds for healthy foods (8, 9). Students have reported being completely unaware that they were gaining weight, then suddenly realizing it in one shocking moment (such as stepping on the scale for the first time in months) (9). Female students were more likely than males to state stress and difficulty in controlling intake of unhealthy foods as barriers to weight management whereas males were more likely to consider the cost of healthy foods as a barrier (8).

These barriers all affect the two basic behavioral determinants of weight in a healthy individual: diet and physical activity. Researchers frequently review fruit and vegetable consumption as an indicator of the healthfulness of a person's diet. Only 24.4% of adults in the U.S. consume at least five fruits and vegetables per day (1). According to the American College Health Association, 8.5% of college students nationwide consume five or more fruits and vegetables per day (10). Other studies show that anywhere from one third to less than one fourth of college students have diets adequate in fruits and vegetables (4, 12-14). There appears to be no significant difference between male and female students in regards to cups of fruit or servings of vegetables consumed per day (8). Students at one university kept an average of 22,888 calories of food in their dorm rooms, and only 54% of them kept fruits and vegetables. The only foods found in dorm rooms less frequently than fruits and vegetables were dairy products, tea/coffee, and 100% fruit/vegetable juice (15).

The amount of physical activity college students participate in also has a large impact on their weight trends. About 20% of U.S. adults are not physically active at all and 28.2% are not active regularly (1). Among college-aged students, 10.0% to 30.0% are inactive and 32.2% get insufficient physical activity (4, 14). About half get at least the minimum recommended vigorous or moderate activity (4, 10, 14) and 29.9% to 49.2% get sufficient strength training (10, 13). Multiple studies have shown that male students participate in more vigorous activity (13, 16) and in more strength training activity than female students (3, 4). Women were more likely to be involved in low-intensity activities (3). Male students are

more interested in "bulking up" whereas female students are more interested in "getting toned" (8). After the course of one school year, however, men participated in less strength training and women participated in more than at baseline (3). Only one study by Reed and Ainsworth disagreed with other findings and showed that female students participated in more moderate intensity activity than male students (17). Seo et. al. found that students who felt their weight was "just right" were more likely to engage in vigorous and moderate activity than students who saw themselves as overweight (16). Also, overweight and obese men were more likely to be physically active than overweight and obese women (14). However, despite these patterns of physical activity among students in all BMI categories, two studies found that there was no correlation between physical activity and weight change (3, 4).

Weight gain in college may also lead to unhappiness and weight dissatisfaction for students. Students with a BMI $\geq$ 25 are more likely to be unhappy than students with normal range BMIs (6). Overweight and obese women are more likely than overweight and obese men to be trying to lose weight in college (14). Female students are more likely to report wanting to lose weight (8). Sixty percent of all female students and 30% of all male students in one survey reported trying to lose weight (13). These statistics do not necessarily represent the number of students who need to lose weight based on their BMIs. Lowry et. al. found that while 35.0% of students were overweight or obese, 41.6% considered themselves to be overweight and 46.4% wanted to lose weight (13). This may imply that students are either misinformed about what a healthy weight

is or that they are putting too much pressure on themselves to be thin rather than healthy. Men tend to consider their current weight to be slightly less than their desired weight and women tend to consider their current weight much heavier than their desired weight (19). Female students are less likely to be overweight, but more likely to consider themselves overweight and thus more likely to use practices such as diet, exercise, diet pills, and vomiting or laxatives to lose weight (13). This may indicate that female students in particular are pressuring themselves to be thin and have an "ideal" body. Obese students were more likely to report being preoccupied with food, feeling controlled by food, wanting to be thin, dieting, and bingeing (11).

Preoccupation with weight can lead to disordered eating. Eating competence would be the opposite of disordered eating. The Satter eating competence model measures an individual's attitudes about eating and food, acceptance of food, internal regulation abilities, and abilities and resources for managing food context. Competent eaters have positive attitudes about and are comfortable with food and eating and are flexible and reliable about getting enough food (20). One study validating this tool found that the most competent eaters (EC score $\geq$ 32) were older, had lower BMIs, were less likely to be overweight, were less dissatisfied with their weight, were more physically active, were less worried about finances in relation to food, practiced better food resource management, prepared foods from scratch more often, were more likely eat sufficient fruits and vegetables, enjoyed a larger variety of food, showed less restraint and hunger, and had less disordered eating traits (21). No studies could

be found at this point examining Satter eating competence in college students or the difference in Satter eating competence scores between men and women.

In response to the obesity epidemic, many studies have been conducted to examine who is at risk and to identify the contributing factors. College students have been identified as a group with increased susceptibility to this phenomenon and who demonstrate accelerated weight gain compared to the general population. The purpose of this study was to analyze the weight status factors of students and how they differ by gender at one university. These factors include BMI, waist circumference, weight dissatisfaction, physical activity, fruit and vegetable intake, and Eating Competency scores. The results of this study will be used to help develop an obesity prevention program at Syracuse University.

METHODS

Participants in this study were college students 18 to 24 years old who attended Syracuse University in the fall semester of 2007. Students who had a BMI $\leq$ 18.5, who were of senior status or higher, who were nutrition or exercise science majors, who had health conditions that could affect diet or physical activity routine, or who were pregnant or lactating were excluded from this study. They were recruited via fliers and presentation tables on campus, online announcements, and classroom announcements. The study was IRB approved and students consented to participate. Each student was given an identification number to fill out an online questionnaire. They also registered for a time to participate in a physical assessment.

Demographic variables (gender, race, etc.) were determined using tools specifically designed for this study.

Fruit and vegetable consumption was measured in cups per day using the19-item National Cancer Institute Fruit and Vegetable Screener (NCI Screener). This measured participants' average consumption over the previous months (22).

Physical activity was determined using the 7-item International Physical Activity Questionnaire (IPAQ). This tool measures walking, moderate-intensity activity, and vigorous-intensity activity in number of minutes per day and number of days per week. This number is translated into Metabolic Equivalent Minutes/Week (MET min·week^{-1}) (23, 24).

Eating competency was determined using the Satter Eating Competency Model. The four subscales of this model are attitude, acceptance, internal regulation, and context of food and eating. A total score of thirty-two or greater indicates that an individual is eating competent (20).

The physical assessment was conducted by trained research aides. Students wore light clothing and were instructed not to consume food or beverages for four hours before the assessment and could not participate in physical activity (beyond their normal routine) for twenty-four hours before the assessment, as there could alter measurements from a person's norm. All scales were calibrated prior to measuring the participants. All measurements were taken twice and the average of the two values was reported. Inter-observer error was calculated to be: 0.04 lb for weight, 0.08 in for height, and 0.6 cm for waist

circumference. Weight in pounds was reported to the nearest 1/4 pound using electronic or balance beam scales. Height in inches was reported to the nearest 1/16 inch using a wall mounted standiometer. Waist circumference was measured to the nearest 1 millimeter at the level of the iliac crest using Gulick fiberglass, non-stretchable tension tape (Gulick Corporation, Tokyo, Japan). BMI was calculated using the formula: 703.1·weight (lb)/height $(in)^2$. A BMI of 18.5 to 24.9 was considered normal; 25 to 29.9 was considered overweight; $\geq$ 30 was considered obese (25, 26). Weight dissatisfaction was determined by subtracting reported current weight from reported desired weight.

ANALYSES

All statistical analyses were completed using SPSS for Windows (version 16.0, SPSS, Inc, Chicago, IL). Frequencies and means were calculated appropriately for all demographic and weight indicator or health variables. Comparisons by gender were completed by independent t-test and chi-squared test analysis. Correlations were conducted between health parameters within gender.

RESULTS

All demographic and selected health variables surveyed can be seen in Table 1. Of the 220 students who participated in this survey there were significantly more women (n = 135; $p \leq 0.01$) (see Table 1). The mean age of the entire sample was 18.84 ± 0.96 years. The distribution of participants by class was significantly different with the most participants being sophomores (42.3%) and

the smallest group had junior status (23.6%). There were significantly more white (non-Hispanic) participants (62.8%), with 10.2% being black (non-Hispanic), and 8.8% being Hispanic/Latino ($p \leq 0.01$). Significantly more students (86.4%) lived on campus ($p \leq 0.001$). The majority of students (73.5%) were taking a full credit load and 21.5% were taking more than a full credit load ($p \leq 0.01$). About half of the students (46.8%) worked one to ten hours per week and 17.7% worked more than ten hours per week.

The majority of students (74.1%) had a body mass index (BMI) that classified them to be within their normal weight range relative to their height (BMI = 18.5-24.9). None of the students were classified as underweight (BMI < 18.5), as this was an exclusion criteria, 19.1% of students were classified as overweight (BMI = 25-29.9), and 6.8% were classified as obese (BMI $\geq$ 30).

Roughly one-third (35.5%) of students estimated their physical activity level to be less than thirty minutes per day, and 40.9% estimated their level to be thirty to sixty minutes per day, ($p \leq 0.01$). Seventy-two percent of students were not involved in sports.

There was no difference between men and women in their mean age, or their distribution of ethnicity, year, living arrangement, credit load, or sports participation. More of the women worked more hours per week than did the men ($p \leq 0.05$). Of the male students, 43.5% worked less than one hour per week, whereas 47.4% of the females worked one to ten hours and 22.2% worked more than ten hours per week.

A significant difference in BMI distribution was detected by gender ($p \leq 0.05$). Far fewer females (14.1%) than males (27.1%) were overweight, but more women (8.1%) were obese than the men (4.7%). Of the male students, 38.8% were active more than sixty minutes per day, whereas only 14.8% of females estimated that they were physically active for more than one hour per day ($p \leq 0.001$).

The results of the weight and health parameters—BMI, waist circumference, weight dissatisfaction, fruit and vegetable intake (considered individually and totaled), eating competency (and its subsets), and physical activity (IPAQ and its subsets)—for the full sample and for the difference between men and women are presented in Table 2.

No significant differences were found between men and women for BMI, fruit and vegetable intake eating competency acceptance sub-score, eating competency internal sub-score, eating competency context sub-score, IPAQ walking score, IPAQ moderate score, and IPAQ total score.

Waist circumference was found to be significantly different between men and women. Mean waist circumference for men was 82.88 ± 10.11 cm and for women was 80.10 ± 9.01 cm ($p \leq 0.05$). Weight dissatisfaction was significantly different at ($p \leq 0.001$), with women being much more dissatisfied with their weight than men.

Women were found to be significantly less eating competent overall than men ($p \leq 0.01$) and scored significantly lower on the eating competency attitude sub-score than men ($p \leq 0.001$).

IPAQ vigorous METS were also significantly different between men and women, with men scoring higher than women ($P < 0.05$).

CORRELATIONS

For a full report of correlation results for both men and women, refer to Table 3.

For both men and women, weight dissatisfaction was highly negatively correlated with both waist circumference and measured BMI. For both men and women, cups of fruits and vegetables per day was correlated with IPAQ Walking METS and with IPAQ Total METS. Total Eating Competency Score was negatively and moderately correlated with both waist circumference for men and measured BMI for both genders.

Weight dissatisfaction was negatively and moderately correlated with Eating Competency Total Score and Eating Competency Context Subscale Score for women. Also for women, Eating Competency Context Subscale Acceptance Score was slightly negatively associated measured BMI.

For men, cups of fruits and vegetables per day was negatively and moderately correlated with Eating Competency Context Subscale Score. Eating Competency Context Subscale Score was also moderately correlated with IPAQ Vigorous METS and IPAQ Total METS.

Neither waist circumference nor measured BMI were correlated with cups of fruit and vegetables per day or with any of the IPAQ subscales. Total Eating Competency Score was not correlated with any of the IPAQ subscales either.

DISCUSSION

College weight gain is a topic that has been frequently studied by nutrition and health researchers. They have consistently found that it is in fact a trend for college students to gain weight at a faster rate than the average American adult (3-9). The current study was cross-sectional; rather than looking at amount of weight gained by students, it looked at students' current weight status and possible contributing factors.

In 2008, the American College Health Association found that the average BMI was 23.7 for college women and 24.7 for college men (10). The current study found similar, yet slightly lower results, with the average BMI for college women being 23.39$\pm$3.94 and 24.13$\pm$3.37 for men. The current study found that 74.1% of the students had a normal weight, and 6.8% were obese, which is similar to a 2002 study which found that 78% of students had a normal weight, and 4.7% were obese (11). The current study had more students in the overweight and obese categories than the previous study and less in the normal weight category, possibly suggesting that students' weights have been increasing with time. Both in a previous study and in the current study, men were found to be more likely to be overweight than women (3). The current study also found that women were more likely to be obese. Furthermore, men were found to have significantly higher waist circumferences than women. This is likely due to the fact that men are overall bigger in stature than women and so they are expected to have larger body measurements.

Previous studies have found that the average American adult does not consume the recommended five or more fruits and vegetables per day and that

college students may consume even less than this (1, 4, 10, 12-14). In the current study, the average fruit and vegetable consumption among both genders was below the recommendation. The average male student consumed 3.41$\pm$2.06 cups of fruits and vegetables per day and the average female student consumed 3.36$\pm$2.43 cups of fruits and vegetables per day. Neither previous studies nor the current study found a significant difference between men and women for fruit and vegetable consumption (8). Low fruit and vegetable consumption among college students may be associated with time constraints which lead to selection of convenience foods; unhealthy options at dining halls; and lack of access to and funds for healthy foods (8, 9).

Consistent with earlier studies, the current study found that male students did more vigorous-intensity physical activity than females (13, 16). Previous studies have also found that only about half of college students meet minimum physical activity recommendations (4, 10, 14) and the current study shows that slightly more (64.5%) of these college students estimate that they get at least this recommendation ($\geq$ 30 minutes per day). However, this number is based on students' estimations of their own behaviors and so over-reporting may have occurred. Overall low physical activity levels among college students may be associated with time constraints related to a student's busy academic and social schedule (8, 9).

As was found in previous studies (8, 13), female students in this study were much more dissatisfied with their weight than male students. Other studies also found that the higher the student's BMI, the more likely they were to be

unhappy (6). This is consistent with the current study's findings that strongly and positively correlated weight dissatisfaction with BMI for both men and women. However, the current study is not consistent with one previous study's finding that men wanted to weigh more than their current weight and women wanted to weigh less than their current weight (19). The current study found that both men and women wanted to weigh less than their current weight (weight dissatisfaction was -1.10±14.35 lbs for men and -13.18±13.24 lbs for women). Women were more dissatisfied with their weight, despite the fact that fewer female students were overweight than male students. Female students may be misinformed about what a healthy weight is for them or may pressure themselves to be thin rather than healthy.

Few studies have examined the Satter Eating Competency Model. One study found that a more eating competent individual will have a lower BMI (21). The current study found that women scored significantly lower than men on the total Eating Competency test and scored significantly lower on the Eating Competency Attitude Subscale, indicating that women's attitudes toward food were more negative than men's attitudes.

High BMI and waist circumference are indicators for overweight and obesity. The strong correlation between weight dissatisfaction and both waist circumference and measured BMI for both male and female students may be reflective of this. The correlation between cups of fruits and vegetables consumed per day and IPAQ Walking and IPAQ Total METS may be reflective of the fact that those students who are more health conscious are the ones who are both

eating healthier diets and being more physically active for health and weight maintenance. The negative correlation between weight dissatisfaction and IPAQ Total METS for both men and women may show that increasing physical activity may make students feel better about their bodies, or that feeling better about one's body may lead to increased physical activity; causality cannot be proven here. The negative correlation between Total Eating Competency Score and both waist circumference and measured BMI may be indicative of the fact that a more eating competent person will be more physically active, will consume adequate fruits and vegetables, and will have less disordered eating traits (21).

Weight dissatisfaction was negatively correlated with Eating Competency Total and Eating Competency Context Subscale Scores for women but not for men. This may indicate that women associate these parameters with weight more so than men. Women who are more eating competent are the ones with lower BMIs and thus are the ones who are less dissatisfied with their weight. Weight dissatisfaction for women was strongly correlated with measuring BMI, which further suggests this point is true.

Cups of fruit and vegetables per day and Eating Competency Context Subscale Score were positively correlated with IPAQ Vigorous METS for men but not for women, which may be related to the fact that men participated in significantly more vigorous activity than women. Male students who are more health conscious may be the ones who are both exercising more vigorously and consuming more fruits and vegetables. However, fruit and vegetable consumption was unexpectedly negatively correlated to Eating Competency

Internal Subscale Score but positively correlated to Eating Competency Accept Subscale and Eating Competency Context Subscale Scores. This may indicate that the men who are consuming more fruits and vegetables are not doing so because they are eating intuitively but rather because they are making a conscious effort to eat healthfully. IPAQ Total Score was negatively correlated with waist circumference for men but not for women, suggesting that increased physical activity was related to weight only for men. This may be reflective of the fact that the men participated in more physical activity overall, thus contributing to weight maintenance more so than for women.

Waist circumference had no relation to fruit and vegetable consumption or with IPAQ subscales for either gender; nor did BMI. This may suggest that weight status is the sum of a variety of parameters but not strongly linked to one of these specifically.

CONCLUSIONS

The college years have consistently been shown to be a time of accelerated weight gain for students. This study aimed to examine health parameters that may contribute to this phenomenon and to analyze the difference among them between male and female students. The statistical analyses showed some differences between genders, particularly among health parameter correlations.

The findings from this study can be used to further examine gender differences and explore possible relationships related to these differences. Understanding these correlations can help design interventions specifically aimed

at each gender. The Syracuse University Department of Nutrition Science and Dietetics will be using this information for an obesity prevention program.

The study had a few limitations. First of all, body composition was not assessed so BMI measurements may not be indicative of weight status for all students. Second, senior students were excluded from the study and it is possible that their measurements and scores could have shown different results had they been included. Third, responding to this survey was optional therefore demographic statistics may not be reflective of the demographic statistics of Syracuse University. Finally, this study was conducted on a single northeastern university and may not be applicable to other universities.

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REFERENCES

1. Mokdad AH, et al. "The Continuing Epidemics of Obesity and Diabetes in the United States." JAMA : the Journal of the American Medical Association. 286.10 (2001): 1195-200.
2. Hedley AA, et al. "Prevalence of Overweight and Obesity Among US Children, Adolescents, and Adults, 1999-2002." JAMA : the Journal of the American Medical Association. 291.23 (2004): 2847-50.
3. Kasparek DG, et al. "Selected Health Behaviors That Influence College Freshman Weight Change." Journal of American College Health : J of ACH. 56.4 (2008): 437-44.
4. Racette SB, et al. "Weight Changes, Exercise, and Dietary Patterns During Freshman and Sophomore Years of College." Journal of American College Health : J of ACH. 53.6 (2005): 245-51.
5. Hoffman DJ, et al. "Changes in Body Weight and Fat Mass of Men and Women in the First Year of College: A Study of the "freshman 15&quot." Journal of American College Health : J of ACH. 55.1 (2006): 41-5.
6. Wengreen HJ, and C Moncur. "Change in Diet, Physical Activity, and Body Weight Among Young-Adults During the Transition from High School to College." Nutrition Journal. 8 (2009): 32.
7. Lloyd-Richardson EE, et al. "A Prospective Study of Weight Gain During the College Freshman and Sophomore Years." Preventive Medicine. 48.3 (2009): 256-61.
8. Greaney ML, et al. "College Students' Barriers and Enablers for Healthful Weight Management: a Qualitative Study." Journal of Nutrition Education and Behavior. 41.4 (2009): 281-6.
9. Nelson MC, et al. "Understanding the Perceived Determinants of Weight-Related Behaviors in Late Adolescence: a Qualitative Analysis Among College Youth." Journal of Nutrition Education and Behavior. 41.4 (2009): 287-92.
10. American College Health Association. "American College Health Association-National College Health Assessment Spring 2008 Reference Group Data Report (Abridged): the American College Health Association." Journal of American College Health : J of ACH. 57.5 (2009): 477-88.
11. Desai MN, et al. "Risk Factors Associated with Overweight and Obesity in College Students." Journal of American College Health : J of ACH. 57.1 (2008): 109-14.
12. Schuette LK, WO Song, and SL Hoerr. "Quantitative Use of the Food Guide Pyramid to Evaluate Dietary Intake of College Students." Journal of the American Dietetic Association. 96.5 (1996): 453-7.
13. Lowry R, et al. "Physical Activity, Food Choice, and Weight Management Goals and Practices Among US College Students." American Journal of Preventive Medicine. 18.1 (2000): 18-27.

14. McCracken M, Jiles R, Blanck HM. Health behaviors of the young adult U.S. population: Behavioral Risk Factor Surveillance System, 2003. Prev Chronic Dis [serial online] 2007 Apr [date cited]. Available from: http://www.cdc.gov/pcd/issues/2007/apr/06_0090.htm.
15. Nelson MC, and M Story. "Food Environments in University Dorms: 20,000 Calories Per Dorm Room and Counting." American Journal of Preventive Medicine. 36.6 (2009): 523-6.
16. Seo DC, et al. "Relations between Physical Activity and Behavioral and Perceptual Correlates Among Midwestern College Students." Journal of American College Health : J of ACH. 56.2 (2007): 187-97.
17. Reed J, and B Ainsworth. "Perceptions of Environmental Supports on the Physical Activity Behaviors of University Men and Women: a Preliminary Investigation." Journal of American College Health : J of ACH. 56.2 (2007): 199-204.
18. Buckworth J, and C Nigg. "Physical Activity, Exercise, and Sedentary Behavior in College Students." Journal of American College Health : J of ACH. 53.1 (2004): 28-34.
19. Rozin P, S Trachtenberg, and AB Cohen. "Stability of Body Image and Body Image Dissatisfaction in American College Students Over About the Last 15 Years." Appetite. 37.3 (2001): 245-8.
20. Satter E. "Eating Competence: Definition and Evidence for the Satter Eating Competence Model." Journal of Nutrition Education and Behavior. 39.5 (2007): S142-53.
21. Lohse B, et al. "Measuring Eating Competence: Psychometric Properties and Validity of the EcSatter Inventory." Journal of Nutrition Education and Behavior. 39.5 (2007): S154-66.
22. Thompson FE, et al. "Fruit and Vegetable Assessment: Performance of 2 New Short Instruments and a Food Frequency Questionnaire." Journal of the American Dietetic Association. 102.12 (2002): 1764-72.
23. Craig CL, et al. "International Physical Activity Questionnaire: 12-Country Reliability and Validity." Medicine and Science in Sports and Exercise. 35.8 (2003): 1381-95.
24. International Physical Activity Questionnaire – Short Form. August 2002; http://www.ipaq.ki.se/dloads/IPAQ_SHORT_LAST_7_SELF_ADM-revised_8-23-02.pdf. Accessed December 2006.
25. Greene GW, et al. “College Students Differ in Weight Related Behaviors and Cognitive Variables by Gender and Relative Weight Status.” Journal of the American Dietetic Association. Unpublished.
26. "Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults--The Evidence Report. National Institutes of Health." Obesity Research. 6 (1998): 51S-209S.

Table 1: Demographic and Selected Health Variables

Variable		Total		Men (n=85)		Women (n=135)	
Age		18.84±0.96		19.08±1.12		18.85±0.84	
	18	84	38.2%	30	35.3%	54	38.2%
Age	19	81	36.8%	29	34.1%	52	38.5%
	20	44	20.0%	20	23.5%	24	17.8%
	21	8	3.6%	3	3.5%	5	3.7%
	22	2	0.9%	2	2.4%	0	0.0%
	23	0	0.0%	0	0.0%	0	0.0%
	24	1	0.5%	1	1.2%	0	0.0%
BMI Category	Underweight	0	0.0%	0	0.0%	0	0.0%
	Normal Weight	163	74.1%	58	68.2%	105	77.8%
	Overweight	42	19.1%	23	27.1%	19	14.1%
	Obese	15	6.8%	4	4.7%	11	8.1%
Race	White (non-Hispanic)	135	62.8%	50	61.0%	85	63.9%
	Black (non-Hispanic)	22	10.2%	6	7.3%	16	12.0%
	Hispanic/Latino	19	8.8%	6	7.3%	13	9.8%
	Amerian Indian/Alaskan Native	2	0.9%	1	1.2%	1	0.8%
	Asian/Pacific Islander	27	12.6%	15	18.3%	12	9.0%
	Other	10	4.7%	4	4.9%	6	4.5%
Estimated Physical Activity Level	<30 min	77	35.0%	24	28.3%	53	39.3%
	30-60 min	90	40.9%	28	32.9%	62	45.9%
	> 60 min	53	24.1%	33	38.8%	20	14.8%
Live	On Campus	190	86.4%	74	87.1%	116	85.9%
	Off Campus	30	13.6%	11	12.9%	19	14.1%
Year	First/Freshman	75	34.1%	30	35.3%	45	33.3%
	Sophomore	93	42.3%	35	41.2%	58	42.9%
	Junior	52	23.6%	20	23.5%	32	23.7%
Sports	Yes	61	28.0%	25	30.1%	36	26.7%
	No	157	72.0%	58	69.9%	99	73.3%
Work Hours	< 1 hr/week	78	35.5%	37	43.5%	41	30.4%
	1-10 hrs/week	103	46.8%	39	45.9%	64	47.4%
	>10 hrs/week	39	17.7%	9	10.6%	30	22.2%
Credits	< full credit load	11	5.0%	6	7.1%	5	3.7%
	full credit load	161	73.5%	62	72.9%	99	73.9%
	> full credit load	47	21.5%	17	20.0%	30	22.4%

Table 2: Health Parameter Results for Men and Women

	Men	Women
Weight Dissatisfaction	-1.10±14.35	-13.18±13.24
Waist Circumference	82.88±10.11	80.10±9.01
Measured BMI	24.13±3.37	23.39±3.94
NCI screener cups F & V per day	3.41±2.06	3.36±2.43
IPAQ Walking METS	1118.66±973.67	976.43±778.85
IPAQ Moderate METS	456.54±562.55	420.32±593.92
IPAQ Vigorous METS	1551.53±1587.06	1092.73±1296.48
IPAQ Total METS	3046.53±2158.44	2490.30±1950.14
EC Total Score	32.86±7.26	29.34±8.17
EC Attitude Subscale	11.87±2.72	9.19±3.64
EC Accept Subscale	5.65±2.56	5.08±2.36
EC Internal Subscale	6.87±1.88	6.39±1.91
EC Context Subscale	8.54±3.30	8.67±3.34

Table 3: Correlations Between Health Parameters for Men and Women

Blue = Men; Red = Women

*** = p ≤ 0.05**

**** = p ≤ 0.01**

***** = p ≤ 0.001**

	Waist Circumference		Measured BMI		NCI Screener Cups F & V Per Day		IPAQ Walking METS		IPAQ Moderate METS		IPAQ Vigorous METS	
Weight Dissatisfaction	0.65***	0.82***	0.72***	0.87***	-0.08	-0.16	-0.21	-0.19*	-0.16	-0.19*	-0.21	-0.14
Waist Circumference			0.90***	0.87***	0.08	-0.12	-0.06	-0.18	-0.12	-0.10	-0.20	-0.03
Measured BMI					0.05	-0.13	-0.07	-0.16	-0.18	-0.14	-0.11	-0.12
NCI screener cups F & V per day							0.38**	0.26**	0.11	0.20*	0.25*	0.11
IPAQ Walking METS									0.17	0.23*	0.06	0.21*
IPAQ Moderate METS											0.25*	0.31**
IPAQ Vigorous METS												
IPAQ Total METS												
EC Total Score												
EC Attitude Subscale												
EC Accept Subscale												
EC Internal Subscale												

IPAQ Total METS		EC Total Score		EC Attitude Subscale		EC Accept Subscale		EC Internal Subscale		EC Context Subscale	
-0.28*	-0.22*	-0.22	-0.30**	-0.19	-0.23**	-0.09	-0.21*	0.14	0.03	-0.28*	-0.34***
-0.24*	-0.11	-0.33**	-0.19*	-0.28*	-0.09	-0.21	-0.17	-0.13	0.09	-0.18	-0.27**
-0.19	-0.18	-0.30**	-0.26**	-0.34**	-0.13	-0.21	-0.18*	-0.08	0.03	-0.13	-0.35***
0.39**	0.20*	0.11	0.06	-0.15	-0.01	0.26*	0.06	-0.23*	-0.10	0.38**	0.10
0.54***	0.57***	-0.19	0.01	-0.28*	0.06	0.04	-0.07	-0.37**	-0.09	0.15	0.06
0.50***	0.61***	-0.07	0.13	-0.12	0.00	-0.12	0.06	-0.17	0.16	0.09	0.17
0.84***	0.85***	0.18	-0.01	-0.12	-0.13	0.04	0.08	0.17	-0.06	0.40***	0.12
		0.02	0.01	-0.24*	-0.04	-0.01	0.01	-0.13	-0.04	0.41***	0.11
				0.72***	0.79***	0.73***	0.68***	0.70***	0.64***	0.69***	0.71***
						0.38***	0.37***	0.51***	0.49***	0.16	0.30**
								0.41***	0.30***	0.39***	0.37***
										0.27*	0.24**

SUMMARY

My Capstone project, "The Differences Between a Sample of Syracuse University Male and Female Students on a Variety of Health Parameters," analyzes factors that contribute to an individual's weight status and how these factors might be different for men and for women.

The U.S. is currently facing an obesity epidemic. Americans have been gaining weight and obesity rates have increased alarmingly over the past three decades. College students in particular appear to gain weight at a faster rate than the general population. Numerous research studies have been conducted in the past in an attempt to understand why this is so. Poor eating habits and low physical activity due to time constraints, unhealthy cafeteria options, lack of funds, and social situations centered around food are just a few of the contributing factors that may explain this phenomenon. I chose this topic for my Capstone project to see how Syracuse University students compare to findings from previous research. The results will be used to design an obesity prevention program on campus.

The data I used to complete my analyses were collected by Dr. Tanya Horacek in the fall semester of 2007 as part of a larger study that involved several universities across the country. Students were recruited for the study via fliers, presentation tables on campus, online announcements, and classroom announcements. They filled out a questionnaire online which assessed their fruit and vegetable consumption, physical activity level, weight dissatisfaction, eating competence. Fruit and vegetable consumption was determined using a 19-

question survey that estimated consumption in cups per day. Physical activity level was determined using a 7-question survey that estimated physical activity in number of minutes per day and number of days per week. Weight dissatisfaction was determined by subtracting what the student reported their current weight was from what the student reported their desired weight was. Eating competence was determined using a 4-part questionnaire that evaluates a person's attitudes toward food, acceptance of food, ability to listen to their body's hunger and fullness cues, and food context. Students also answered questions regarding their age, gender, race, etc.

Students participated in a physical assessment that was conducted by trained research aides. Their heights were determined to the nearest 1/16 inch using a wall-mounted measuring tool. Weight was measured to the nearest ¼ pound using either an electric scale or a balance beam scale. Waist circumference was determined to the nearest 1 millimeter using professional measuring tape. Body Mass Index (BMI), which is a ratio of a person's weight compared to their height, was calculated for each student. A BMI of 18.5 to 24.9 was considered normal; 25 to 29.9 was considered overweight; $\geq$ 30 was considered obese**.**

I analyzed these data using a program called SPSS for Windows. I used SPSS to determine the average scores for each gender for each of the variables measured (cups of fruits and vegetables per day, weight dissatisfaction, eating competence, etc.) and to see the differences between men and women. I also used this program to see if any of the variables were related to one another for either

gender (If a person got a certain score for one variable, did that make them more likely to get a certain score for a different variable?).

I found some differences between men and women for the variables analyzed. More men than women were classified as overweight, but more women than men were classified as obese. Men participated in physical activity per day than did women. Women were more dissatisfied with their weight than men and were less eating competent than men.

I found that the higher a student's waist circumference and the higher a student's BMI, the more likely he or she was to be dissatisfied with their weight. High fruit and vegetable consumption was related to high total physical activity level.

Weight dissatisfaction was related to Eating Competence for women but not for men. Eating Competence was related to physical activity for men but not for women. Numerous other correlations between variables were found for each gender.

Overall, my findings were fairly similar to previous findings. However, I did find that a higher percentage of students were obese than previous studies found, which may suggest that college students have higher weights now than in the past. This is consistent with the overall trend of increased rates of obesity in the past three decades.

My study had a few limitations. It did not consider body composition (fat versus muscle), so BMI results for some students may not be reflective of their overall health. The study excluded students of senior status and had their

information been included, some results may have been different. Participation was voluntary so the demographic distribution of students may not be representative of demographic statistics of Syracuse University as a whole. Finally, it only looked at one northeastern university, so its results may not be applicable to other universities.

The results of my study may be used to guide further research in this area. It may also be used to help design obesity prevention programs and interventions.