8-2008

Disordered Eating Behavior Frequency and Body Mass Index Comparison among Racially Diverse Sorority Women: The Strong Bodies and Strong Minds Unite Sisters! Study

Leah M. Kittle
University of Tennessee, Knoxville

To the Graduate Council:

I am submitting herewith a thesis written by Leah M. Kittle entitled "Disordered Eating Behavior Frequency and Body Mass Index Comparison among Racially Diverse Sorority Women: The Strong Bodies and Strong Minds Unite Sisters! Study." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Lisa Jahns, Major Professor

We have read this thesis and recommend its acceptance:

Leslee Fisher, Jay Whelan

Accepted for the Council:
Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

I am submitting herewith a thesis written by Leah M. Kittle entitled "Disordered Eating Behavior Frequency and Body Mass Index Comparison among Racially Diverse Sorority Women: The Strong Bodies and Strong Minds Unite Sisters! Study." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Lisa Jahns, Ph.D., RD, Major Professor

We have read this thesis
And recommend its acceptance:

Leslee Fisher, Ph.D.

Jay Whelan, Ph.D.

Accepted for the Council:

Carolyn R. Hodges, Vice Provost and Dean
of the Graduate School

(Original signatures on file with official student records.)

Disordered Eating Behavior Frequency and Body Mass Index Comparison among Racially Diverse Sorority Women: The Strong Bodies and Strong Minds Unite Sisters! Study

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee

Leah M. Kittle

August 2008

Acknowledgements

First and foremost is my major professor, Dr. Lisa Jahns. Her unfailing support and encouragement have kept me motivated through the entire thesis process. I have come to appreciate her both as a mentor and friend.

Secondly, to the other PIs of this original study, Karen Wetherall, MS, RD, LDN and Shemyra Johnson, thank you for your tireless efforts in putting together the original survey and IRB submission.

To my other committee members, Dr. Leslee Fisher and Dr. Jay Whelan, your research expertise has been an invaluable asset to me.

And finally, my family and friends, who both graciously and not-so-graciously kept me motivated when I had thoughts of giving up! I love you all! And it's finally done!

Abstract

Objective: The purpose of this study was to describe and compare the frequency of disordered eating behaviors (DEB) among primarily Caucasian and primarily Minority sorority women. A secondary purpose was to describe weight status of sorority women by comparing Body Mass Index (BMI) categories, using guidelines from the Centers of Disease Control and Prevention (CDC), among the two sorority groups.

Method: Sorority women (primarily Caucasian, n=291; primarily Minority, n=44) completed an online survey designed to assess lifestyle habits, body image, and eating attitudes. We focused upon differences in Eating Disorder Examination-Questionnaire (EDE-Q) global and subscale scores and BMI scores, calculated from self-reported height and weight, between primarily Caucasian and primarily Minority sorority women.

Results: The mean global scores for primarily Caucasian sororities was 1.98 ± 1.30; for primarily Minority sororities, 1.72 ± 1.40 ($p \leq 0.23$). The reported mean BMI of the primarily Caucasian sororities was 22.34 ± 2.66 compared to the reported mean BMI of the primarily Minority sororities at 26.99 ± 5.96 ($p \leq 0.001$). The prevalence of overweight, based upon self-report height and weight, among primarily Caucasian sorority women was 12.71% compared to the prevalence of overweight among primarily Minority sorority women at 31.82% ($p \leq 0.001$). The prevalence of obesity among primarily Caucasian sorority women was 1.37%, compared to primarily Minority sorority women at 22.73% ($p \leq 0.001$).

Conclusion: There was no significant difference in either mean EDE-Q global or subscale scores between sorority groups. Both sorority groups reported low EDE-Q global scores, indicating a low frequency of DEB among all participants. This finding contradicts the belief that Caucasian women exhibit more DEB than do Minority women. While there was no difference between the EDE-Q scores between sorority groups, there was a significant difference in mean BMI and percentage of women in the overweight and obese CDC BMI categories. Primarily Minority sorority women reported a higher mean BMI, as well as greater prevalence of overweight and obesity than did primarily Caucasian sorority women. In conclusion, these results highlight the importance of questioning long standing assumptions regarding DEB, such as Caucasian and women being at greater risk than Minority women.

Table of Contents

Background and Significance

Eating Disorder vs Disordered Eating

Eating disorder (ED) diagnostic criteria are established by the American Psychiatric Association (APA) and are published in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (Fourth Edition).[1] There are currently three diagnostic codes in the DSM-IV for EDs: Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Eating Disorder Not Otherwise Specified (EDNOS).[1] According to Striegel-Moore, "The core features of eating disorders include disturbance in body image, over- or under-control of eating, and extreme behaviors to control weight or shape."[2]

AN is the refusal to maintain a minimally healthy body weight, extreme fear of weight gain, and disruption in body shape or size perception.[3] There are two subtypes of AN: restricting and binge-purge. Restricting is characterized by fasting, excessive exercise and lack of binge-purge episodes.[3] The binge-purge subtype of AN retains the characteristics of intake restriction and extreme exercise, but those who suffer from this form of the disorder also experience episodes of binge eating (e.g. consuming large quantities of food in a small time period) and purging (e.g self-induced vomiting and/or abuse of laxatives, enemas, and diuretics) afterwards.[3]

BN is characterized by recurrent episodes of binge eating followed by compensatory behaviors that seek to prevent weight gain. The episodes occur on an average frequency of three times per week over at least three months for a BN diagnosis.[3] As with AN, there are two subtypes of BN: purging and non-purging. The purging type involves self-induced vomiting, abuse of laxatives, enemas, and diuretics as compensatory behaviors. The non-purging type

involves compensatory behaviors such as fasting or excessive exercise to control weight.[3]

Under the EDNOS fall individuals who have strong symptoms of AN and BN but do not completely fulfill all criteria for diagnosis. EDNOS also encompasses what is often referred to as Binge Eating Disorder (BED).[1] BED is defined in the DSM-IV as "recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviors characteristic of Bulimia Nervosa".[1] Mitchell and Peterson state that those report that those who experience recurring episodes of binge eating, but do not engage regularly engage in inappropriate compensatory behaviors are generally regarded as having BED, while given the official diagnosis of EDNOS.[3]

ED diagnosis occurs only when extreme, life-threatening behaviors occur; therefore, it is important to examine potentially unhealthy eating behaviors that fall short of DSM-IV diagnoses.

The term "disordered eating behaviors" (DEB) refers to risky behaviors such as binging, purging, or excessive dietary intake restriction. DEB reveal a tendency to develop an eating disorder, but do not constitute a psychiatric diagnosis. As Striegel-Moore states, "Disordered eating can be conceptualized along a continuum, ranging from unconcern with weight and normal eating to 'normative discontent' with weight and moderately disregulated/restrained eating, to bulimia nervosa."[4] Normative discontent is the almost constant body dissatisfaction that many women have as a result of a Western culture that strongly values feminine beauty and associates that beauty with a thin body.[5] While "normative discontent" is not a psychiatric diagnosis, it can cause distress and be a risk factor for the development of BN.[4] As DEB are

indicative of individuals increased risk of ED, it is important to examine the frequency of occurrence of such behaviors, especially in populations who may be at increased risk of ED.

Populations At Risk for Developing Eating Disorders

The DSM-IV asserts that EDs are most prevalent among women living in industrialized societies where an abundance of food exists and a slender body shape is associated with beauty, particularly in females.[1] Research suggests that a certain population appear to be more at-risk for EDs and DEB. This group is Caucasian women, particularly those between the ages 15-24 years.[6-12] Anecdotally, it has been assumed that EDs do not affect males, African-American women, and older individuals, although this assumption is being challenged in more recent literature.[2, 4, 13]

Caucasian Women

Historically, Caucasian women have been considered the most at-risk for the development of ED, although the origins of this conclusion are not clear.[1] There is, however, some evidence that Caucasian women experience more ED and exhibit more DEB than do women of ethnic minority status. Aruguete and colleagues examined African-American (n = 225) and Caucasian (n= 199) college students (37% male and 63% female) attending a small, historically Black college/university and report that Caucasian students were three times as likely to experience body image dissatisfaction and somewhat more likely to experience self-loathing and to diet than African-American students.[14]

Striegel-Moore and colleagues (2003) looked at a sample of female participants from the National Heart, Lung, and Blood Institute (NHBLI) Growth and Health Study. The NHLBI

study was a 10-year longitudinal study to examine cardiovascular disease risk factors. Nine hundred and eighty-five Caucasian women and 1,061 African-American women, aged 19-24 years, were pulled from the large sample pool of the NHLBI Growth and Health Study. They reported that 57 (5.6%) Caucasian and 19 (1.8%) African-American women met lifetime criteria for at least one of three (AN, BN, BED) eating disorders.[15] Fifteen women, all Caucasian, met criteria for AN, and the odds for detecting BN was sixfold greater for Caucasian women than for African-American women.[15]

Abrams and colleagues (1993) examined 100 Caucasian and 100 African-American women at a middle Atlantic state university and reported that Caucasian women were more likely to exhibit disordered eating behaviors such as dietary restraint, binge eating, fear of becoming fat, drive for thinness, and body dissatisfaction.[16]

To our knowledge, no studies have found that Caucasian women are at lower risk than African-American women for the development of EDs.

Age

According to the DSM-IV, EDs are extremely rare in women over the age of forty.[1] In a thorough literature review, Hoek and van Hoeken (2003) report that "incidence rates for anorexia nervosa are the highest for females in the 15-19 age group."[17] According to this review, 40% of all identified cases of AN were in females between 15-19 years old.[17] When Rodriquez and colleagues conducted a case-control study with ED patients in Spain, 36.7% of the total sample were between the ages of 15 and 20 years and 32.5% of the patients were age 20.1 - 25 years.[18] The same study found that AN cases ranged in age from 19.7 - 22.1 years, while BN cases were between 20.9 and 28.0 years.[18]

The majority of published empirical research on EDs and DEB focuses on young women which may be considered a limitation. However, research finding continue to suggest that the onset of an ED is almost always during adolescence.[2]

Sorority Membership

In anecdotal reports, sorority women are considered to be more concerned with physical appearance and body image than the general population.[12] A small body of literature has also reported a positive association between sorority membership and disordered eating. Allison and Park compared DEB among 57 sorority women and 63 non-sorority women using the Eating Disorder Inventory-2 during the women's first three years at a Midwestern University.[19] They reported that all participants had a similar baseline level of reported disordered eating during the first year of college. However, by the third year, the women who joined sororities maintained more rigorous attitudes and behaviors regarding dieting.[19] However, the researchers of the study did not examine how these attitudes translated into the development of EDs, as the aim of the study was clearly to examine how sorority membership changed attitudes towards dieting, satisfaction with body image, disordered eating behaviors, and body weight.[19] What is not known is the race and/or ethnicity of the participants.[19]

Hoerr, et al, reported that sorority women did not have a significantly greater incidence of disordered eating than non-sorority women in a convenience sample survey (sorority, n=333; non-sorority, n=865).[8] Thus the conflicting nature of the literature indicates the strong need for further investigation regarding DEB in sorority women.

Minority Women and ED and DEB

There is a long standing historical assumption that women from ethnic minority groups are immunized to ED and DEB because of a culture that associates feminine beauty with voluptuous curves.[6] While there is some research to support this strong assertion[7, 10, 11] newer research suggests that Minority women may be less likely to suffer from ED or exhibit DEB, as discussed in the previous section on Caucasian women, but they are not immune.[14-16] In fact, Aruguete et al reported that a statistically significant difference did not exist between Caucasian and African-American college students on the drive for thinness subscale of the Eating Disorder Inventory.[14] The assumption that Minority women do not suffer from ED or exhibit DEB may have led to a research bias towards Caucasian women.[4, 6] This highlights the need for research that examines both Caucasian and Minority women.

Therefore, a main purpose of the current study was to describe and compare the frequency of DEB among primarily Caucasian and primarily Minority sorority women. A secondary purpose was to describe weight status of sorority women, using data from the Strong Bodies and Strong Minds Unite Sisters! Study.

Methodology

Participants

Participants consisted of 1,949 sorority women who were at least 18 years of age and enrolled at a large, Southeastern public university in Spring, 2007. The goal of the Strong Bodies and Strong Minds Unite Sisters! Study was to gather descriptive statistics on frequency of disordered eating behaviors as it related to ethnic identity and sorority involvement. The study used an internet based survey as the data collection tool, using the MrInterview Program[20] which allowed data to be collected and stored electronically. The survey was comprised of several validated questionnaires (Eating Disorder Examination-Questionnaire, Perceived Stress Scale, Multigroup Ethnic Identity Measure, and SCOFF), as well as demographic and lifestyle questions.

Formal Organization of Sororities on Campus

Primarily Caucasian Sororities

There are 17 sororities, all of which are under the direction of the Panhellenic Council (PC), the campus level governing body comprised of sorority representatives.

Thirteen of these sororities are governed on a national level by the National Panhellenic Conference (NPC) and are composed of mainly Caucasian women.[21] The NPC is the governing body for twenty-six United States sororities; however, only 13 of these national sororities were represented on this campus. The NPC is comprised mostly of alumni of the twenty-six national sororities.

Primarily Minority Sororities

The remaining four sororities, composed of mainly Minority women, are under the direction of both the PC and The Office of Minority Student Affairs (OMSA), a campus organization that "supports minority students by administering programs and services that holistically address the cultural, educational, and civic growth, thus contributing to their academic success."[22] Three sororities are primarily African-American and are governed on a national level by the National Pan-Hellenic Council (NPHC).[23] The NPHC is the governing body for what is known as the Divine Nine, the nine national African-American fraternities and sororities. The remaining sorority, primarily Latina, is governed nationally by The National Association of Latino Fraternal Organizations (NALFO).[24]

The sororities are not forcibly segregated by race/ethnicity. Women choose which sorority to join. The 13 primarily Caucasian sororities have an open orientation at the same time as the campus-wide freshman orientation at the beginning of the academic school year. The primarily Minority sororities require that a potential member have one to two semesters of grades before being eligible to join. The joining process is known as "rushing" in the primarily Caucasian sororities and as "intake" among the primarily Minority sororities. The primarily Minority sororities do not recruit new women at campus-wide orientation. Most of the women who choose to join primarily Minority sororities are recruited by friends or via family connections. Therefore, primarily Minority sorority women join later and may be slightly older than primarily Caucasian sorority members.

Recruitment

The primary investigator held meetings with the PC director and the director of OMSA to seek advice on recruitment. The purpose was to design study incentives in a manner that would be most enticing to the sororities. Primarily Caucasian sororities compete with one another to raise money for various charities based upon yearly philanthropy goals. Primarily Minority sororities compete to hold the "largest" or "best" event on campus. According to the director of OMSA, many times these events revolve around bringing a speaker on Minority women's issues or a similar event to campus. Because of these key informant interviews, monetary incentives to sororities based upon participation rates was chosen. Each sorority that had a participation rate of ≥ 90% received $250; sororities with 75-89% participation received $100 to be used for the philanthropy or service project of the sorority's choice. Sororities with less than 75% participation did not receive compensation.

Survey Tool

Eating Disorder Examination Interview Instrument

The Eating Disorder Examination (EDE) interview instrument[25] was created to be a standardized instrument for the assessment of specific psychopathology of eating disorders. It was designed to be a face-to-face interview for clinical diagnostic use. It assesses a wide range of the specific psychopathology of bulimia nervosa, anorexia nervosa, and their variants. It was validated in 1994 using 243 women aged 16-35 from a community sample and a patient sample of 36 women and was deemed appropriate for use in both clinical and community populations.[26] The EDE assesses the frequency of daily DEB over the preceding 28-day period using a 7-point scale. The

EDE considers severity based upon the frequency of DEB; however, severity ratings were not appropriate for use in this study as explained below.

The EDE contains four subscales that represent major areas of specific psychopathology. These four subscales consist of *restraint*, *eating concern*, *shape concern*, and *weight concern*.[26] The questions that comprise these subscales are listed in Appendix C.

The EDE is an interviewer-based assessment tool and requires those who administer it be trained in the proper interview techniques. Therefore, it may be burdensome for use in epidemiologic studies. For that reason, the creators of the EDE created a self-administered questionnaire, the Eating Disorder Examination-Questionnaire (EDE-Q), for use in larger studies.

Eating Disorder Examination - Questionnaire

The EDE-Q was developed by the EDE interview instrument creators and eliminates the expense and time associated with trained interviews. The EDE-Q is a 36-item questionnaire that spans the same 28-day time frame of the EDE and is scored on the same 7-point scale of the EDE.[27] Studies on the validity of the EDE-Q have shown excellent agreement between the EDE and the EDE-Q in assessing attitudinal features of eating disorder psychopathology in the general population.[28] The EDE-Q has been found to produce reliable estimates of objective binge episodes in patients with Binge Eating Disorder.[29] In patients with both Bulimia Nervosa and Anorexia Nervosa the EDE-Q has been found to have consistent scores with the EDE.[30, 31]

The frequency ratings of the EDE-Q are identical to the EDE, and are:

0 = Absence of feature

1 = Feature present on 1-5 days

2 = Feature present on 6-12 days

3 = Feature present on 13-15 days

4 = Feature present on 16-22 days

5 = Feature present almost every day (23-27 days)

6 = Feature present every day[25]

There are five scores that can be calculated from the EDE-Q: 1) global score, 2) restraint subscale score, 3) eating concern subscale score, 4) weight concern subscale score, and 5) shape concern subscale score. The questions from the EDE-Q that comprise each subscale are listed in Appendix C.

The global score assesses overall frequency of disordered eating behaviors and is calculated by summing the subscale scores and dividing the resulting number by the number of subscales (4).[26] Each of the four subscales was designed by the EDE-Q creators to assess reported frequency of behaviors associated with each particular eating disorder psychopathology (e.g., restraint, weight concern, eating concern, and shape concern). The restraint subscale is comprised of five questions that ask on how many of the past 28 days food intake was restricted. The eating concern (EC) subscale is composed of five questions that inquire about fear of social eating, fear of losing control over eating, and guilt over eating. The shape concern (SC) subscale of the EDE-Q consists of eight questions that pertain to concern about body image and fear of exposure due to a poor body image perception. The weight concern (WC) subscale consists of five questions that inquire about dissatisfaction with body weight, desire to lose weight, and preoccupation with weight. The subscales are scored by adding the relevant ratings together and dividing by the total number of items in the subscale.[25]

The present study did not, at any point, seek to examine the psychopathology of disordered eating behaviors. The EDE-Q was selected for usage due its ability to assess more than one reported disordered eating behavior[27, 29-31] as well as the frequency of DEB. Many of the standardized questionnaires examined during the study design process focused on one type of disordered eating behavior, e.g. restraint or purging. This study was designed to focus on frequency of DEB and, therefore, we did not compare severity rating scores.

Anthropometrics and Body Mass Index

Body Mass Index (BMI) is a screening tool to determine if individuals may be at risk for weight-associated health problems. It is not a diagnostic assessment; however, it quickly and easily identifies those who should be further examined for inadequate or excessive body fat. It is an ideal tool for population-based research as it only requires height and weight data.[32]

We calculated BMI based upon self-reported height and weight using the following formula: weight (kilograms) / height (meters)^2. For the purpose of this study, we used the Centers for Disease Control and Prevention (CDC) guidelines for interpreting BMI. A BMI below 18.5 is considered underweight, and 18.5-24.9 is considered normal. A BMI of 25.0-29.9 is considered overweight. A BMI of 30.0 or above is considered obese.[32] The CDC does acknowledge that research has found that certain races have more fat free body mass than do others, but as of now the literature does not support separate categories for different races.[32]

Procedure

Approval for the study was granted by the Institutional Review Board. A copy of the approved study information sheet is included in Appendix A and a copy of the complete survey is in Appendix B.

Permission was obtained from the student sorority leadership to briefly attend the weekly chapter meeting to announce the study. Postcards detailing the purpose of the study, incentives, the survey web address, and a random entry code were created and distributed by researchers at these weekly meetings. Five of the sororities requested that instead of attending a weekly meeting, we meet with member(s) of sorority leadership, explain the study and provide the postcards. These young women then served as our spokeswomen to their respective sororities. These sororities included one Caucasian sorority and all of the Minority sororities. This was done because the primarily Minority sororities do not allow non-members to attend meetings, and one primarily Caucasian sorority could not accommodate us in the weekly meeting agenda.

Each participant logged into the web page using an anonymous randomly assigned entry code. This was to prevent "ballot stuffing" (e.g. participants completing the survey multiple times to increase participation rates) due to incentives being based upon sorority participation rates. For compensation purposes, participation was assessed by participant report of her home sorority, compared to total sorority membership.

Statistical Analyses

The global EDE-Q score and each of the four subscale scores were compared between primarily Caucasian and primarily Minority sororities using a paired t-test for independent means. Statistical significance required a P value of 0.05.

The proportion of sorority women in each self-reported weight status category (e.g., underweight, normal, overweight, and obese) were compared by sorority population using χ^2 analysis. As the predominantly Minority sorority women were slightly older than the predominantly Caucasian sorority and contained only one 19-year-old subject, we re-ran all

analyses excluding all 19-year-old women. However, the results were identical. Therefore, we present results based upon the full sample. Data management and analysis was performed using SPSS version 16.0; SPSS Inc. Chicago, IL, and Stata version 9.0; Stata Corp. College Station, TX.

Results

Demographic characteristics

Predominantly Caucasian Sororities

Two hundred ninety-four of 1885 women accessed the survey (15.6%). Three responses were excluded due to missing height and weight data, leaving a final sample of n= 291 (15.4%). The ages ranged from 18-23 years, with the majority of women (52%) $\leq$ 19 years old (Table 1). The mean age was 19.62 years. The mean self-reported height was 65.08 ± 2.48inches. The mean self-reported weight was 134.48 ± 18.92 pounds (Table 1).

Predominantly Minority Sororities

Forty-six of 64 women in the primarily Minority sororities accessed the survey (72%). Two surveys were excluded due to missing or inaccurate self-reported height, leaving a final sample of n = 44 (69%). The mean age was 20.91 ± 0.78 years (Table 1). However, due to sorority requirements that at least one semester of college classes be completed prior to joining, only one woman was 19 years old and there were no 18-year-olds. The self-reported mean height was 65.38 ± 7.25 inches. The self-reported mean weight was 158.64 ±34.54 pounds (Table 1).

EDE-Q

The global score on the EDE-Q is the mean of the four subscales (restraint, eating concern, shape concern, and weight concern). The predominately Caucasian sororities mean global score was 1.97 $\pm$ 1.30, while it was 1.72 $\pm$ 1.41 for the predominately Minority sororities (Table 2). On the EDE-Q a frequency rating of 1 corresponds to a DEB feature being present on 1-5 of the past

Table 1: Demographic and anthropometric characteristics of primarily Caucasian and primarily Minority sorority women (mean ± SD)

	Primarily Caucasian	Primarily Minority	p-value (t-test)
	n= 291	n= 44	N/A
Number of Sororities	13	4	N/A
Mean Age	19.62 ± 1.09	20.91 ± 0.78[1]	<0.001
Mean Height	65.08 ± 2.48	65.38 ± 7.25	=0.60
Mean Weight	134.48 ±18.92	158.64 ± 34.54[1]	<0.001
Mean BMI	22.34 ±2.66	26.99 ±5.96[1]	<0.001

[1]indicates significant difference between sorority groups

28 days. A frequency rating of 2 indicates that the feature was present on 6-12 of the past 28 days.

The restraint subscale is comprised of five questions that ask:"On how many of the past 28 days was food intake restricted?" The mean score on the restraint subscale for the predominately Caucasian sororities was 1.63 $\pm$ 1.49 while it was 1.50 $\pm$ 1.60 for the predominately Minority sororities (Table 2). As with mean global scores, this corresponds with a frequency rating between 1 and 2 on features of dietary restraint being present on 1-12 of the past 28 days.

The eating concern (EC) subscale is five questions that inquire about the fear of social eating, fear of losing control over eating, and the guilt of eating. The mean EC score for the primarily Caucasian sororities was 0.86 ± 1.06 while it was 0.75 ± 1.09 for the primarily Minority sororities. This number corresponds to a frequency score that falls between 0 and 1. A frequency rating of 0 indicates that the feature was completely absent during the past 28 days, and as already defined, a frequency rating of 1 indicates presence of the feature on 1-5 days. The shape concern (SC) subscale of the EDE-Q is eight questions that pertain to concern about body image and fear of exposure due to a poor body image perception. The mean SC score for the Caucasian sororities was 2.63 ± 1.62 while it was 2.22 ± 1.77 for the Minority sororities (Table 2). A frequency rating of 2 indicates that behaviors indicative of SC were present 6-12 of the past 28 days. However, the mean Caucasian score approached a frequency score of 3 and that number corresponds to the feature being present on 13-15 days.

The weight concern (WC) subscale is five questions that inquire about dissatisfaction with weight, desire to lose weight, and preoccupation with weight. The mean WC score for the

Table 2: Comparison of the EDE-Q Global and Subscale scores between primarily Caucasian and primarily Minority Sorority Women (mean ± SD)

	Primarily Caucasian (n=291)	Primarily Minority (n=44)	p-value (t-test)
EDE-Q Global	1.97 ± 1.30	1.72 ± 1.41	0.23
EDE-Q Restraint	1.63 ± 1.49	1.50 ± 1.60	0.57
EDE-Q Eating Concern	0.86 ± 1.06	0.75 ± 1.09	0.49
EDE-Q Shape Concern	2.63 ± 1.62	2.22 ± 1.77	0.12
EDE-Q Weight Concern	2.18 ± 1.53	1.90 ± 1.50	0.27

Caucasian sororities was 2.18 ± 1.53 while it was 1.90 ± 1.50 for the Minority sororities (Table 2). Both of the mean frequency scores can be rounded to 2 which correspond to the feature being present on 6-12 of the past 28 days.

Appendix C has a complete listing of the EDE-Q questions that determine each subscale.

Body Mass Index

The BMI as calculated from the self-report data for the primarily Caucasian sororities ranged from 17.4 – 33.7 with a mean of 22.34 ± 2.66 (Table 1). According to the current CDC BMI categories, 11 women were considered underweight (BMI <18.5) (3.78%), 239 were considered normal weight (BMI 18.5-24.9) (82.13%), 37 were considered overweight (BMI 25.0-29.9) (12.71%), and 4 were considered obese (BMI $\geq$ 30) (1.37%) (Table 3).

The BMI as calculated from the self-report data for the primarily Minority sororities ranged from 19.6 – 43.0 and 50% of the women had a BMI > 25. The mean BMI was 26.99 ± 5.96. There were no women that had a BMI considered underweight (BMI <18.5) according to CDC guidelines. Using the same guidelines, 20 women were considered normal weight (BMI 18.5-24.9) (45.45%), 14 were considered overweight (BMI 25.0-29.9) (31.82%), and 10 were considered obese (BMI $\geq$ 30) (22.73%) (Table 3). Therefore, a statistically significant difference between the sororities groups ($p \leq 0.001$) occurred in all CDC BMI categories except for underweight which was due to no women in the primarily Minority sororities having BMI considered underweight (Table 3).

Table 3: Comparison of BMI categories among sorority groups

BMI	Primarily Caucasian	Primarily Minority	p-value (Chi-Square)
Underweight (BMI < 18.5)	3.78%	0.00%	0.190
Normal Weight (BMI 18.5-24.9)	82.13%	45.45%[1]	<0.001
Overweight (BMI 25.0-29.9)	12.71%	31.82%[1]	<0.001
Obese (BMI ≥ 30.0)	1.37%	22.73%[1]	<0.001

[1]indicates significant difference between sorority groups

Discussion

Two important findings emerged from this study. First, there was no difference in self-reported frequency of DEB as measured by mean EDE-Q global and subscale scores between the two sorority groups. Second, there was significantly higher self-reported mean BMI and overweight and obesity prevalence among the primarily Minority sorority women than among the primarily Caucasian sorority women. To our knowledge, this is the first study to examine DEB and BMI categories among primarily Caucasian and primarily Minority sorority women.

Historically, research has suggested that Caucasian women and sorority women are at an increased risk for having DEB.[8, 12, 19] Additional research posits that ethnicity and culture protect Minority women from DEB.[6-12, 19] However, in our study we found no difference in self-reported frequency of DEB between primarily Caucasian and primarily Minority sorority women based upon the EDE-Q global and subscale scores. Our findings of a lack of ethnic differences among sorority women are comparable to findings from a recent study by Delinsky and Wilson, who examined 336 first-year undergraduate women enrolled in a general Psychology class.[33] They found that ethnic differences did not correspond to differences in any EDE-Q subscale scores.[33] Although they did not distinguish between sorority and non-sorority women, these results suggest that the sorority women of our study reported similarly to a general female college population, which is contrary to previous research.[19] However, what is not known is whether this is a result of primarily Minority sorority women reporting a higher frequency of DEB or of primarily Caucasian sorority women reporting a lower frequency. Few studies have examined the frequency of DEB using the EDE-Q in young women, particularly college women.

Our results are similar, however, to two studies of EDE-Q scores of young women and are summarized in Table 4. Luce, et al studied 723 undergraduate women in the United States, mean age 18.7 years, with all participants over the age of 25 being excluded from analysis.[34] Mond et al, examined a large community sample (10,000) of Australian women aged 18-42 years.[28] The results for the young women of this study are also reported in Table 4. A third normative study, with similar results, was conducted in the United Kingdom, but as study participants were adolescent girls aged 12-14 years we chose not to include this study in Table 4 because of the difference in the ages of the participants and the differences in lifestyle independence experienced by college-aged women.[35]

As our study is the first, to our knowledge, to use the EDE-Q in an ethnically diverse group of sorority women, we felt it best to compare to normative data in these previous studies. As can be seen from Table 4, there is not only little difference in the frequency of DEB among the two sorority groups in the current study, but there is little variation between scores in our study and in the other published studies. This indicates that the reported frequency of DEB in our study, among both sorority groups, was similar to that found in other studies of non-sorority women, indicating that the frequency of DEB among sorority women in our sample is not greatly different than the population as a whole. This finding contradicts research suggesting that Caucasian and sorority women exhibit more DEB than do Minority and non-sorority women.[19] Why then, are the frequency of DEB among sorority women of either group so low in the present study? Interestingly, previous research has found differences on college campuses between sorority and non-sorority women, and even differences among sororities on the same campus. Hoerr, et al, reported that women of one sorority, where all residents lived together in the

Table 4: EDE-Q Global and Subscale Scores from Strong Bodies and Strong Minds Unite Sisters! Study (SBSMUS) and Normative Studies

	SBSMUS		Luce, et al	Mond, et al	
	Primarily Caucasian	Primarily Minority		18-22 y/o (n=1186)	23-27 y/o (n=908)
EDE-Q Global	1.97±1.30	1.72±1.41	1.74 ± 1.30	1.59 ± 1.32	1.56 ± 1.26
EDE-Q Restraint	1.63±1.49	1.50±1.60	1.62 ± 1.54	1.29 ± 1.41	1.34 ± 1.39
EDE-Q Eating Concern	0.86±1.06	0.75±1.09	1.11 ± 1.11	0.87 ± 1.13	0.81 ± 1.10
EDE-Q Shape Concern	2.63±1.62	2.22±1.77	2.27 ± 1.54	2.29 ± 1.68	2.24 ± 1.61
EDE-Q Weight Concern	2.18±1.53	1.90±1.50	1.97 ± 1.56	1.89 ± 1.60	1.84 ± 1.50

Luce KH, Crowther JH, Pole M. Eating Disorder Examination Questionnaire (EDE-Q): norms for undergraduate women. Int J Eat Disord 2008;41:273-276

Mond JM, Hay PJ, Rodgers B, Owen C. Eating Disorder Examination Questionnaire (EDE-Q): norms for young women. Behav Res Ther 2006;44:53-62.

same house, indicated a 15% higher risk of disordered eating than all other women, both sorority and non-sorority in the study.[8] Another study examined binge eating in sorority women and found that women in the same friendship circles binged in similar patterns indicating the social contagion of DEB.[36] The term "social contagion" refers to a phenomenon wherein a behavior that is considered normal within a social group will be mimicked by all members of the group as well as by those who are trying to become part of the group. Social contagion may also be thought of as "peer pressure."

The low frequency of DEB reported in the present study may be related to the fact that the University does not have separate sorority houses. According to the Panhellenic Director, this is because in the 1950s, the sorority women of the University chose to use money allotted them by the national sororities to build one large Panhellenic building. Each sorority has a room within the building where meetings are held. The residential arrangements at the University may create a sorority environment that is more similar to a non-sorority college experience, accounting for the lack of differences in EDE-Q scores in our study and in previous research. However, since the completion of this study, plans have been announced by the University to build sorority houses within the next few years. Should separate sorority houses be introduced, it would be of great interest to repeat this study two to three years after students have moved into those houses.

While there was no difference found between the EDE-Q scores between the sorority groups, there was, however, a significant difference in reported mean BMI and percentage of women in the CDC overweight and obese BMI categories. The primarily Minority sorority women reported a higher mean BMI as well as much greater percentages in the overweight and

obese BMI weight categories than did the primarily Caucasian sorority women. This fact is of particular interest as it may indicate a greater acceptance of a larger body size among the primarily Minority women. Our results contradict the study by Delinsky and Wilson who found no difference in BMI scores among ethnically diverse college women.[33] Additionally, Rich and Thomas examined 210 undergraduate female psychology students and also found no difference in BMI scores of European American, African-American, or Latina American women.[37] Our results are reflective, though, of the general United States population where Non-Hispanic black and Mexican American women consistently have a higher prevalence of overweight and obesity than Non-Hispanic white women, as measured and reported in the National Health And Nutrition Examination Survey (NHANES) .[38] For instance, among NHANES 2003-2004 women aged 20-39 years old, the prevalence of overweight was 45.6% and 73.7% among Non-Hispanic whites and Non-Hispanic blacks, respectively.[38]

Our results are of concern as 54.5% of the primarily Minority sorority women fell into the overweight or obese CDC BMI category compared to 14.1% of primarily Caucasian sorority women. Overweight and obesity that occur as a result of excessive body fat are a leading public health concern in the United States as it is understood and accepted to be a risk factor for many long-term chronic diseases.[39] It is of interest that although the primarily Minority sorority women in the present study reported a higher prevalence of overweight, they do not appear to exhibit a higher frequency of DEB.

While our study is not without limitations, we feel the findings are still of relevance. The cultural make-up of the University created the small sample size of the primarily Minority sororities, and we did, however, have a good response rate (72%) from this population. We

speculate that this response is related to the fact that, due to small sorority size, it is difficult for the primarily Minority sororities to raise funds, making this study's monetary incentives more enticing than it was to the primarily Caucasian sororities. A second possibility is that primarily Caucasian women with either high BMI or high levels of DEB chose not to participate in the study. Research reports that, among adolescents and college students, females and overweight participants are more likely to under-report weight on self-report questionnaires than individual who are normal weight.[40, 41] The use of self-report height and weight in this study is a limitation. The National Eating Disorders Association acknowledges that individuals who both suffer from EDs and those who exhibit DEB are very secretive about the behaviors.[6] Due to requirements of the IRB, a participant could chose not to complete the survey at any point, and incomplete responses were dropped from analysis. The possibility exists that some survey participants may have chosen to not complete the survey as questions regarding disordered eating behaviors were presented. As the survey was anonymous and the incentives were linked to the sorority and not the individual, we believe that participation rates were more influenced by support by sorority leadership than individual factors.

Another potential limitation of this study was the use of the electronic version of the EDE-Q, as to our knowledge this was the first such usage of this tool. We understand that using a tool in a context in which it was not validated could influence the study results, however, we feel that the increased anonymity of this type of questionnaire administration minimized this bias. The similar results obtained in this study compared to normative data suggest that the instrument performed comparably to paper versions in this age group.

In conclusion, the results of this study highlight the importance of questioning long standing assumptions regarding ED and DEB, such as Caucasian and sorority women being at greater risk than Minority and non-sorority women. It also highlights the need for more research, particularly regarding the effects of communal dwelling (i.e. sorority houses) on the mental health and risks of DEB on sorority women.

References

1. *DSM-IV:* Diagnostic and Statistical Manuel of Mental Disorder, 4th ed. Washington, DC: American Psychiatric Association; 1994.

2. Striegel-Moore RH, Bulik CM. Risk factors for eating disorders. Am Psychol 2007;62:181-198.

3. Mitchell JE, Peterson CB, eds. Assessment of Eating Disorders. New York: The Guilford Press; 2005.

4. Striegel-Moore R, Silberstein LR, Frensch P, Rodin J. A prospective study of disordered eating among college students. Int J Eat Disord 1989;8:499-509.

5. Sonderegger T, ed. Psychology and Gender: Nebraska Symposium on Motivation, *1984*. Lincoln: University of Nebraska Press; 1985.

6. National Eating Disorders Association. www.nationaleatingdisorders.org. Accessed July 6, 2008.

7. Bordo S. Unbearable weight: Feminism, western culture, and the body. Berkley; University of California Press; 1993.

8. Hoerr SL, Bokram R, Lugo B, Bivins T, Keast D. Risk of disordered eating relates to both gender and ethnicity for college students. J of Am Coll of Nutr 2002;21:307-314.

9. Meilman P, von Hippel F, Gaylor M. Self-induced vomiting in college women: Its relation to eating, alcohol use, and Greek life. J of Am Coll Health 1991;40:39-41.

10. Powell AD, Kahn AS. Racial differences in women's desires to be thin. Int J Eat Disord 1995;17:191-195.

11. Rucker C, III, Cash T. Body images, body-size perception, and eating behaviors among African-American and white college women. Int J Eat Disord 1992;12:291-300.

12. Schulken ED, Pinciaro PJ, Sawyer RG, Jensen J, Hoban MT. Sorority women's body size perceptions and their weight-related attitudes and behaviors. J Am Coll Health 1997;46:69-74.

13. Reagan P, Hersch J. Influence of race, gender, and socioeconomic status on binge eating frequency in a population-based sample. Int J Eat Disord 2005;38:252-256.

14. Aruguete MS, DeBord KA, Yates A, Edman J. Ethnic and gender differences in eating attitudes among black and college students. Eat Behav 2005;6:328-336.

15. Striegel-Moore RH, Dohm FA, Kraemer HC, et al. Eating disorders in white and black women. Am J Psychiatry 2003;160:1326-1331.

16. Abrams KK, Allen LR, Gray JJ. Disordered eating attitudes and behaviors, psychological adjustment, and ethnic identity: a comparison of black and white female college students. Int J Eat Disord 1993;14:49-57.

17. Hoek HW, van Hoeken D. Review of the prevalence and incidence of eating disorders. Int J Eat Disord 2003;34:383-396.

18. Rodriguez Martin A, Novalbos Ruiz JP, Martinez Nieto JM, Escobar Jimenez L, Castro De Haro AL. Epidemiological study of the influence of family and socioeconomic status in disorders of eating behaviour. Euro J of Clin Nutr 2004;58:846-852.

19. Allison KC, Park CL. A prospective study of disordered eating among sorority and nonsorority women. Int J Eat Disord 2004;35:354-358.

20. SPSS for Windows, Rel. 11.0.1. mrInterview. Version 16.0. Chicago: SPSS, Inc.; 2007.

21. National Panhellenic Conference. https://www.npcwomen.org/index.aspx. Accessed March 9, 2008.

22. Office of Minority Student Affairs. http://web.utk.edu/~omsa/. Accessed March 9, 2008.

23. National Pan-Hellenic Council, Inc. http://www.nphchq.org/home.htm. Accessed March 9, 2008.

24. National Association of Latino Fraternal Organizations. http://www.nalfo.org/. Accessed March 9, 2008.

25. Fairburn CG, Beglin SJ. The assessment of Eating Disorders: Interview or self-report questionnaire? Int J of Eat Disord 1994;16:363-370.

26. Fairburn C, Wilson G, eds. Binge Eating: Nature Assessment and Treatment,12th ed. New York: Guilford Press; 1993.

27. Binford RB, Le Grange D, Jellar CC. Eating Disorders Examination versus Eating Disorders Examination-Questionnaire in adolescents with full and bulimia nervosa and anorexia nervosa. Int J Eat Disord 2005;37:44-49.

28. Mond JM, Hay PJ, Rodgers B, Owen C. Eating Disorder Examination Questionnaire (EDE-Q): norms for young women. Behav Res Ther 2006;44:53-62.

29. Reas DL, Grilo CM, Masheb RM. Reliability of the Eating Disorder Examination-Questionnaire in with binge eating disorder. Behav Res Ther 2006;44:43-51.

30. Carter JC, Aime AA, Mills JS. Assessment of bulimia nervosa: a comparison of interview and self-report questionnaire methods. Int J Eat Disord 2001;30:187-192.

31. Wolk SL, Loeb KL, Walsh BT. Assessment of patients with anorexia nervosa: interview versus self-report. Int J Eat Disord 2005;37:92-99.

32. Centers for Disease Control BMI Guidelines. http://www.cdc.gov/nccdphp/dnpa/bmi/adult_BMI/about_adult_BMI.htm#Interpreted. Accessed July 7, 2008.

33. Delinsky SS, Wilson GT. Weight gain, dietary restraint, and disordered eating in the freshman year of college. Eat Behav 2008;9:82-90.

34. Luce KH, Crowther JH, Pole M. Eating Disorder Examination Questionnaire (EDE-Q): norms for undergraduate women. *Int J Eat Disord* 2008;41:273-276.

35. Carter JC, Stewart DA, Fairburn CG. Eating disorder examination questionnaire: norms for young adolescent girls. Behav Res Ther 2001;39:625-632.

36. Crandall CS. Social contagion of binge eating. J Pers Soc Psychol 1988;55:588-598.

37. Rich SS, Thomas CR. Body mass index, disordered eating behavior, and acquisition of health information: examining ethnicity and weight-related issues in a college population. J Am Coll Health 2008;56:623-628.

38. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. JAMA 2006;295:1549-1555.

39. Flegal KM, Graubard BI, Williamson DF, Gail MH. Excess deaths associated with underweight, overweight, and obesity. JAMA 2005;293:1861-1867.

40. Larsen JK, Ouwens M, Engels RC, Eisinga R, van Strien T. Validity of self-reported weight and height and predictors of weight bias in female college students. *Appetite* 2008;50):386-389.

41. Sherry B, Jefferds ME, Grummer-Strawn LM. Accuracy of adolescent self-report of height and weight in assessing overweight status: a literature review. *Arch Pediatr Adolesc Med* 2007;161:1154-1161.

Appendices

Appendix A

Strong Bodies and Strong Minds Unite Sisters!

Study Information Sheet

Study Information Sheet
Strong Bodies and Strong Minds Unite Sisters!

Introduction
You have been invited to participate in a research project. The purpose of this study is to learn your opinions on eating behaviors and ethnic identity. The primary researchers for this study are instructors and graduate students from the University of Tennessee and there are no commercial sponsors.

Information about your involvement in this study
To participate in this study, you must be at least 18 years old, and a member of a University of Tennessee sorority. As a participant in this study, your task is to complete an online survey that asks a series of questions regarding your thoughts on food, eating behaviors, and your ethnic identity.

There will be a database developed and maintained indefinitely for future research purposes. There will be no way to link any individual to your responses.

The first few questions will ask general information about you. The next questions will ask you about eating behaviors and your thoughts on your ethnic identity.

The expected amount of time needed to complete the survey is 10-15 minutes.

Risks
The risks of participating in this study are minimal and no greater than those encountered in daily life. Confidentiality of data will be maintained by the investigators. No identifiers will be used to link you back to the information you have entered into the survey. Although all efforts will be made to maintain confidentiality, researchers cannot fully control confidentiality of research conducted through the internet. The presence of internet hackers poses minimal risk to this study.

Benefits
The results from this study will provide greater knowledge on eating behaviors, thoughts on food, and ethnic identity among sorority women at the University of Tennessee. The long term benefits of such research is to assist students' health behaviors while in college so that you may have better health outcomes later in life. Nevertheless, specific benefits cannot be guaranteed for any individual participant. The guaranteed benefits is that any sorority that has a 75-89% participation rate will receive $100 to be used for a charity or service project of the sorority's choice. Any sorority that has $\geq$90% participation rate will receive $250 to be used for a charity or service project of the sorority's choice.

Confidentiality
As previously stated above, confidentiality of data will be maintained throughout the study and all data will be stored securely. Data will only be available to persons conducting the study

unless you specifically give us permission in writing to do otherwise. No reference will be made in oral or written reports which could link you to the study.

Compensation
As stated above, if you complete the survey, you will be helping your sorority to obtain a monetary reward to be used for a charity or service project of the sorority's choice. Any sorority that has ≥90% participation rate will receive $250. Any sorority that has 75-89% participation rate will receive $100.

Contact
If you have questions at any time about the study or procedure, you may contact the researcher, Karen Wetherall at Jessie Harris Building Room 330 or (865) 974-6256. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466.

Participation
Your participation in this study is voluntary, and you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed, your data will be destroyed. Completion of the online survey (questionnaire) constitutes your consent to participate.

Appendix B

Strong Bodies and Strong Minds Unite Sisters!

Study Survey

Welcome to Strong Bodies and Strong Minds Unite Sisters!
Thank you for helping us out as we seek to understand and empower the women of UT!
The survey will take 10-15 minutes.

First, we would like to ask you some basic questions about yourself.

What is your age? .....

What year are you in school?

- Freshman
- Sophomore
- Junior
- Senior
- Other ……

What is your major?.....

Out of 24 hours, how many hours do you move/are physically active (not sleeping/sitting)?.....

Are you involved in a sports team or intramural team?

- Yes
- No

Which sports/intramural are you involved in?

1) Basketball
2) Baseball
3) Softball
4) Soccer
5) Tennis
6) Volleyball
7) Swimming and Diving
8) Cross Country
9) Track and Field
10) Rowing
11) Golf
12) Flag Football
13) Bowling
14) Dodgeball
15) Kickball
16) Wallyball

17) Whiffleball
18) Other (please specify)…….

How often do you weigh yourself?

1) once a day
2) more than once a day
3) once a week
4) twice a week
5) once a month
6) twice a month
7) other……

Where did you consider home before UT? (city and state) ……

What sorority are you in?

1) Alpha Chi Omega
2) Alpha Delta Pi
3) Alpha Kappa Alpha
4) Alpha Omicron Pi
5) Chi Omega
6) Delta Delta Delta
7) Delta Gamma
8) Delta Sigma Theta
9) Delta Zeta
10) Kappa Delta
11) Kappa Kappa Gamma
12) Lambda Theta Alpha
13) Phi Mu
14) Pi Beta Phi
15) Sigma Kappa
16) Zeta Phi Beta
17) Zeta Tau Alpha

When did you join the sorority? Please list semester and year……

Why did you choose to join a sorority?.....

Now we would like to ask you a few questions about your eating behaviors. Instructions: The following questions are concerned **with the past four weeks (28 days) only.** Please read each question carefully. Please answer all of the following questions. Thank you

Please click the appropriate circle on the right. Remember the questions only refer to the past four weeks, (28) days.

On how many of the past 28 days…	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	0	0	0	0	0	0
Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	0	0	0	0	0	0	0
Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	0	0	0	0	0	0	0
Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	0	0	0	0	0	0	0
Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?	0	0	0	0	0	0	0
Have you had a definite desire to have a totally flat stomach?	0	0	0	0	0	0	0
Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	0	0	0	0	0	0
Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	0	0	0	0	0	0

Have you had a definite fear of losing control over eating?	0	0	0	0	0	0	0
Have you had a definite fear that you might gain weight?	0	0	0	0	0	0	0
Have you felt fat?	0	0	0	0	0	0	0
Have you had a strong desire to lose weight?	0	0	0	0	0	0	0

Please fill in the appropriate number in the boxes. **Remember that the questions only refer to the past four weeks (28 days).**

Over the past 28 days, how many <u>times</u> have you eaten what other people regard as an <u>unusually large amount of food</u> (given the circumstances)?	.....
On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)?	……
Over the past 28 days, on how many **<u>DAYS</u>** have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food <u>and</u> have had a sense of loss of control at the time)?	……..
Over the past 28 days, how many <u>times</u> have you made yourself sick (vomit) as a means of controlling your shape or weight?	……..
Over the past 28 days, how many <u>times</u> have you taken laxatives as a means of controlling your shape or weight?	……
Over the past 28 days, how many <u>times</u> have you exercised in a “driven” or “compulsive” way as a means of controlling your weight, shape or amount of fat, or to burn off calories?	……

Please click the circle under the appropriate response. **Please note that for these questions the term "binge eating" means eating what others would regard as an unusually large amount of food the for the circumstances, accompanied by a sense of having lost control over eating.**

Over the past 28 days, on how many days have you eating in secret (i.e. furtively)?....Do not count episodes of binge eating	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
	0	0	0	0	0	0	0
On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight?....Do not count episodes of binge eating	None of the times	A few of the times	Less than half	Half of the times	More than half	Most of the time	Every time
	0	0	0	0	0	0	0
Over the past 28 days, how concerned have you been about other people seeing you eat?....Do not count episodes of binge eating	Not at all		Slightly		Moderately		Markedly
	0	0	0	0	0	0	0

Now we are going to ask you some questions about how you feel about your body
Remember that the questions only refer to the past four weeks (28 days).

Over the past 28 days…	**Not at all**		**Slightly**		**Moderately**		**Markedly**
Has your weight influenced how you think about (judge) yourself as a person?	0	0	0	0	0	0	0
Has your shape influenced how you think about (judged) yourself as a person?	0	0	0	0	0	0	0
How much would it have upset you if you had been asked to weight yourself once a week (no more, or less, often) for the next four weeks?	0	0	0	0	0	0	0
How dissatisfied have you been with your weight?	0	0	0	0	0	0	0
How dissatisfied have you been with your shape?	0	0	0	0	0	0	0
How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	0	0	0	0	0	0	0
How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	0	0	0	0	0	0	0

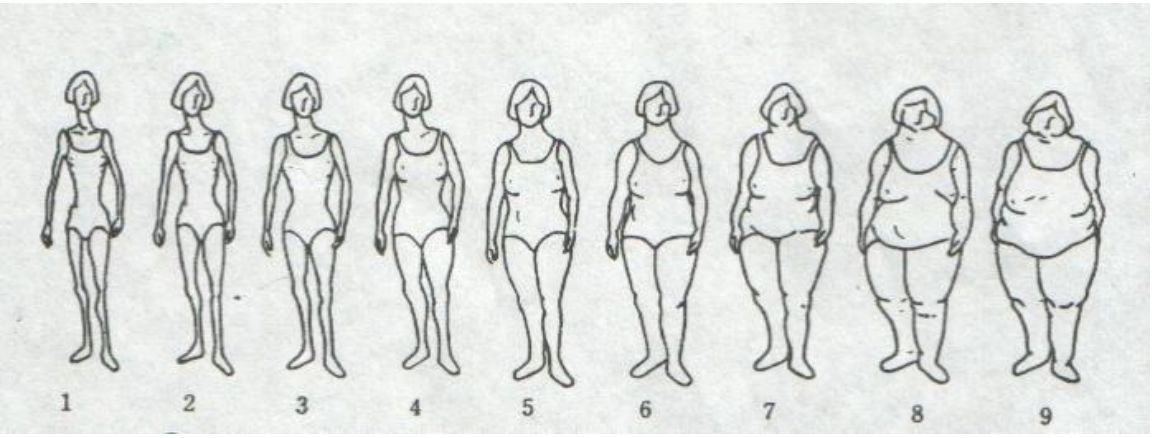
What is your weight at present? (Please give your best estimate in pounds.)…….

What is your height at present? (Please give your best estimate.)
Feet…….
Inches…….

Over the past three to four months, have you missed any menstrual periods?
1) Yes. Please Specify……..
2) No
3) No answer

Have you been taking the pill?
1) Yes
2) No
3) No answer

How Do You See Yourself?



Look at the people above. Then without thinking about it too much, pick the body that you think:
Is closest to what you look like……..

Is closest to how you want to look…….

Is the body type that's most attractive to the opposite sex……

How do you describe your weight?
1 Very underweight
2 Slightly underweight
3 About the right weight
4 Slightly overweight
5 Very overweight

In the past month, how has your weight changed?
1 Stayed the same
2 Decreased a lot
3 Decreased a little
4 Increased a little
5 Increased a lot

In the past month, which of the following were you trying to do about your weight?
1 Lose weight
2 Gain weight
3 Stay the same weight
4 I am not trying to do anything about my weight

SCOFF

Do you make yourself sick because you feel uncomfortably full?
Yes
No

Do you worry you have lost control over how much you eat?
Yes
No

Have you recently lost more than 15 pounds in a three month period?
Yes
No

Do you believe yourself to be fat when others say you are too thin?
Yes
No

Would you say that food dominates your life?
Yes
No

Now we are going to ask you some questions about stress and eating behaviors

How do you tend to eat on days when you feel <u>moderately</u> stressed?
1 Much less than usual
2 Moderately less than usual
3 No change
4 Moderately more than usual
5 Much more than usual

How do you tend to eat on days when you feel <u>extremely</u> stressed?
1 Much less than usual
2 Moderately less than usual
3 No change
4 Moderately more than usual
5 Much more than usual

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate how often you felt or thought a certain way.

In the last month, how often have you been upset because of something that happened unexpectedly?
0 Never
1 Almost never
2 Sometimes
3 Fairly often
4 Very often

In the last month, how often have you felt that you were unable to control the important things in your life?
0 Never
1 Almost never
2 Sometimes
3 Fairly often
4 Very often

In the last month, how often have you felt nervous and "stressed"?
0 Never
1 Almost never
2 Sometimes
3 Fairly often
4 Very often

In the last month, how often have you felt confident about your ability to handle your personal problems?
0 Never

1 Almost never
2 Sometimes
3 Fairly often
4 Very often

In the last month, how often have you felt that things were going your way?
0 Never
1 Almost never
2 Sometimes
3 Fairly often
4 Very often

In the last month, how often have you found that you could not cope with all the things that you had to do?
0 Never
1 Almost never
2 Sometimes
3 Fairly often
4 Very often

In the last month, how often have you been able to control irritations in your life?
0 Never
1 Almost never
2 Sometimes
3 Fairly often
4 Very often

In the last month, how often have you felt that you were on top of things?
0 Never
1 Almost never
2 Sometimes
3 Fairly often
4 Very often

In the last month, how often have you been angered because of things that were outside of your control?
0 Never
1 Almost never
2 Sometimes
3 Fairly often
4 Very often

In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

0 Never
1 Almost never
2 Sometimes
3 Fairly often
4 Very often

The next 2 questions ask about where you and your family "fit" into society.

Imagine that this ladder pictures how American Society is set up.

- At the top of the ladder are the people who are the best off – they have the most money, the highest levels of education, and the jobs that bring the most respect.

- At the bottom of the scale are the people who are the worst off - they have the least money, little or no education, no job or jobs that no one wants or respects.

Now think about your family. Please tell us where you think your family would be on this ladder. **Fill in the circle that best represents where your family would be on this ladder.**

Imagine that this ladder is a way of picturing your school.

- At the top of the ladder are the students in your school with the most respect, the highest grades, and the highest standing.

- At the bottom of the scale are the students who no one respects, no one wants to hang out with, and have the worst grades.

Where would you place yourself on this ladder? **Fill in the circle that best represents where you would be on this ladder.**

In this country, people come from many different countries and cultures, and there are many different words to describe the different backgrounds or ethnic groups that people come from. Some examples of the names of ethnic groups are Hispanic or Latino, Black or African American, Asian American, Chinese, Filipino, American Indian, Mexican American, Caucasian or White, Italian American, and many others. These questions are about your ethnicity or your ethnic group and how you feel about it or react to it.

Please fill in: In terms of ethnic group, I consider myself to be…….

Please indicate how much you agree or disagree with each statement.

	Strongly Agree	**Somewhat Agree**	**Somewhat Disagree**	**Strongly Disagree**
I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs.	0	0	0	0
I am active in organizations or social groups that include mostly members of my own ethnic group.	0	0	0	0
I have a clear sense of my ethnic background and what it means for me.	0	0	0	0
I like meeting and getting to know people from ethnic groups other than my own.	0	0	0	0
I think a lot about how my life will be affected by my ethnic group membership.	0	0	0	0
I am happy that I am a member of the group I belong to.	0	0	0	0
I sometimes feel it would be better if different ethnic groups didn't try to mix together.	0	0	0	0
I am not very clear about the role of my ethnicity in my life.	0	0	0	0
I often spend time with people from ethnic groups other than my own.	0	0	0	0
I really have not spent much time trying to learn more about the culture and history of my ethic group.	0	0	0	0
I have a strong sense of belonging to my own ethnic group.	0	0	0	0
I understand pretty well what my ethnic group membership means to me.	0	0	0	0
In order to learn more about my ethnic background, I have often talked to other people about my ethnic group.	0	0	0	0

I have a lot of pride in my ethnic group and its accomplishments.	0	0	0	0
I don't try to become friends with people from other ethnic groups.	0	0	0	0
I participate in cultural practices of my own group, such as special food, music, or customs.	0	0	0	0
I am involved in activities with people from other ethnic groups.	0	0	0	0
I feel a strong attachment towards my own ethnic group.	0	0	0	0
I enjoy being around people from ethnic groups other than my own.	0	0	0	0
I feel good about my cultural or ethnic background.	0	0	0	0

My ethnicity is

1. Asian or Asian American, including Chinese, Japanese, and others
2. Black or African American
3. Hispanic or Latino, including Mexican American, Central American, and Others
4. White, Caucasian, Anglo, European American; not Hispanic
5. American Indian/Native American
6. Mixed; Parents are from two different groups
7. Other (please specify):…….

My father's ethnicity is

1. Asian or Asian American, including Chinese, Japanese, and others
2. Black or African American
3. Hispanic or Latino, including Mexican American, Central American, and Others
4. White, Caucasian, Anglo, European American; not Hispanic
5. American Indian/Native American
6. Mixed; Parents are from two different groups
7. Other (please specify):…….

My mother's ethnicity is

1. Asian or Asian American, including Chinese, Japanese, and others
2. Black or African American
3. Hispanic or Latino, including Mexican American, Central American, and Others
4. White, Caucasian, Anglo, European American; not Hispanic
5. American Indian/Native American
6. Mixed; Parents are from two different groups
7. Other (please specify):…….

Listed below are a number of statements concerning personal feelings or attitudes that you might have. Please indicate the most appropriate answer.

	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
I get especially nervous going into a room full of people if I am going to be the only one of my racial group.	0	0	0	0	0
I get nervous when several people from a different racial group approach me.	0	0	0	0	0
I feel pretty uneasy in classes or meetings when there's no one form my own racial group nearby.	0	0	0	0	0
People from other racial groups seem to talk and act strangely and often don't know how to behave properly toward me	0	0	0	0	0
It is difficult to really trust someone if they're from a different racial background	0	0	0	0	0
Students from other racial backgrounds often act as if they don't want to get to know me just because I'm of a different race.	0	0	0	0	0
In this school, I am often treated more like a member of my racial group than as an individual person.	0	0	0	0	0

Students from certain racial backgrounds generally get treated better than others in this school.	0	0	0	0	0
Many kids at school put people down just because they're from racial groups other than their own.	0	0	0	0	0

Additional Comments (optional)…….

Appendix C

EDE-Q Subscale Questions

Each subscale of the EDE-Q is calculated by summing the answers to specific questions from the survey. List below are those questions.

Fairburn CG, Beglin SJ. The assessment of Eating Disorders: Interview or self-report questionnaire? *Int J of Eat Disord.* 1994;16:363-370.

- Restraint
  - 1. Restraint over eating
    Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?
  - 2. Avoidance of eating
    Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?
  - 3. Food avoidance
    Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?
  - 4. Dietary rules
    Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?
  - 5. Empty stomach
    Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?
- Eating Concern
  - 7. Preoccupation with food, eating or calories
    Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?
  - 9. Fear of losing control over eating
    Have you had a definite fear of losing control over eating?
  - 19. Eating in secret
    Over the past 28 days, on how many days have you eating in secret (i.e. furtively)?....Do not count episodes of binge eating
  - 21. Social eating
    Over the past 28 days, how concerned have you been about other people seeing you eat?....Do not count episodes of binge eating
  - 20. Guilt about eating
    On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight?....Do not count episodes of binge eating

- Shape Concern
  - 6. Flat stomach

Have you had a definite desire to have a totally flat stomach?

- 8. Preoccupation with shape or weight
  Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?
- 23. Importance of shape
  Has your shape influenced how you think about (judged) yourself as a person?
- 10. Fear of weight gain
  Have you had a definite fear that you might gain weight?
- 26. Dissatisfaction with shape
  How dissatisfied have you been with your shape?
- 27. Discomfort seeing body
  How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?
- 28. Avoidance of exposure
  How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?
- 11. Feelings of fatness
  Have you felt fat?

- Weight Concern
  - 22. Importance of weight
    Has your weight influenced how you think about (judge) yourself as a person?
  - 24. Reaction to prescribed weighing
    How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?
  - 8. Preoccupation with shape or weight
    Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?
  - 25. Dissatisfaction with weight
    How dissatisfied have you been with your weight?
  - 12. Desire to lose weight
    Have you had a strong desire to lose weight?

Vita

Leah M. Kittle completed her Bachelor's degree in Food and Nutrition with an emphasis in Dietetics at Carson-Newman College. She moved to Knoxville to pursue her Master's of Science in Public Health Nutrition at the University of Tennessee the following year. After she graduated from the Dietetic Internship at UTK, she secured a position as a Clinical Dietitian at the University of Tennessee Medical Center, Knoxville. She currently remains employed at UTMCK.