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PREVALENCE OF WEIGHT BIAS IN HEALTH RELATED MAJORS AT THE
UNIVERSITY OF MEMPHIS

by

Emily E. Beatty

A Thesis

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Masters of Science

Major: Clinical Nutrition

The University of Memphis

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Abstract

Background: Studies have assessed weight bias among pre-health professionals, but no experimental research has tested the difference in weight bias between freshmen and senior pre-health professionals. Such studies are needed to examine if a difference exists that could impact future treatment and health evaluations.

Objective: This study assessed the prevalence of weight bias in freshmen and senior undergraduate students in health care majors.

Methods: Twenty-nine participants were randomized to read one of four patient profiles, which varied in sex and weight characteristics. Participants evaluated their patient's health status, treatment participation, and answered questions from the Fat Phobia Scale, Marlowe Crowne's Social Desirability Scale, EAT26 Scale (a measure of eating attitudes), and General Self-Efficacy Scale.

Results: Participants showed a moderate amount of fat phobia (mean 3.27 ± 0.20). Participants rated obese female patients as having poorer diet quality, health status, and energy intake than non-obese female patients, while obese male patients were rated as having poorer health status, regardless of equivalent health information given across patients.

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CHAPTER I

Introduction

As the obesity epidemic rises in America, those deemed obese are subjected to weight bias and stigma. According to the Center of Disease Control, weight bias can be defined as the inclination to form unreasonable judgments based on a person's weight.¹ The Binge Eating Disorder Association (BEDA) states weight stigma is the judgement of a person's character, work ethic, and personality.² Individuals can be stigmatized by health care providers and peers.² Often times, participants use adjectives like poor self-control, lack endurance, low self-esteem, tendency to overeat, are unattractive, slow, insecure, and inactive to describe obese individuals.³⁻

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Origins of weight stigma stem from the media and societal pressures. The American/Western cultural value to become thin promotes blaming of overweight or obese people for their condition, versus investigating environmental factors, and the general belief that people only fail to lose weight because they lack the will power and discipline.² Weight bias can also stem from internalization of previous experiences being the subject of weight bias as an adolescent and adult spreading the prevalence of weight bias.^{6,7}

One potential source contributing to the increasing amount of weight bias and weight stigma may be future and current health care providers, including dietetic students, exercise science students, medical students, dietitians, doctors, nurses, and nutritionists.⁸⁻¹³ Such susceptibility of weight bias, from research, indicates an increases in the likelihood of poorer physical health and mental health.^{6,14}

To assess weight bias and weight stigma, the Fat Phobia Scale has been used to indicate weight bias among future and current health care professionals.^{3,4,11,15-18} Even though weight bias

comes from all different BMI ranges, there has been reason to believe that individuals of lower BMI status have more weight bias and weight stigma toward overweight/obese individuals compared to those with a higher BMI status.^{4,5} Gender differences have also been suggested with women exhibiting more fat phobic signs than men.⁴ Some studies suggest that women are subjected to more weight bias leading to an increase in negative health and coping strategies than men.^{19,20}

Weight bias has been seen from professionals who specialize in eating disorders, which has shown to be associated with their treatment of patients.⁵ Nonetheless, professionals show self-efficacy through confidence and preparedness in the treatment of obese patients.⁵ Given this association with weight bias and self-efficacy, but lack of research regarding one's own eating behaviors towards weight bias and self-efficacy, it is questionable as to if the three correlate.

Due to the fact that weight bias and weight stigma can stem from future and current health care professionals and lead to detrimental effects, it is imperative to assess the prevalence of weight bias in future health care professionals. Assessing the prevalence of weight bias among freshmen and senior level undergraduate students, as well as assessing major, age, gender, BMI, and ethnicity, will contribute to the weight bias literature and the gaps that has been presented. Gaps in the literature include studies examining whether weight bias, not only differs among freshmen level and senior level undergraduate students, but also whether certain health related majors express weight bias more than others and if weight bias increases as curriculum advances. Furthermore, the use of the self-efficacy survey, the eating attitudes survey, and social desirability will give rise to treatment recommendations by future health care professionals. Examining which health major has the highest prevalence of weight bias will also be a contributing factor of study and may help with advances in curriculum by replicating Rebecca

Puhl et al study “Weight Bias among Dietetic Students: Implications for Treatment Practices”.

The aim of the study developed four research questions: Does weight bias differ between senior and freshmen undergraduate students? Do weight bias, patient health status, and treatment participation differ between the four patient profiles due to the patient’s sex and BMI? Is there a correlation between participant’s eating attitudes and social desirability scores? What is the overall general self-efficacy among the future health care undergraduate students?

CHAPTER 2

Methodology

This study was a replication of Puhl et al., “Weight Bias among Dietetics Students: Implications for Treatment Practices”.³ Freshmen and senior Health and Human Performance, Physical Education Teacher Education, Bachelors of Nursing, and Teacher Education Advisor undergraduate students from the University of Memphis in Memphis, Tennessee, were recruited via email, which came from their academic advisors. Recruitment included both female and male participants from stated majors with a goal sample size of over 100 students. Academic advisors from the various departments were asked to send an email invitation to qualifying students. To qualify for the study, participants had to be enrolled in the academic year of 2015-2016 as a freshman or senior undergraduate level student in the departments outlined above and be 18 years of age or older. The email invitation described the study and encompassed a link, which directed participants to the informed consent form on Qualtrics.²¹ The survey was accessible to the student for four months and emails were sent out twice as a reminder. The survey was analyzed anonymously and submission of names and emails was not required.

The main purpose of the study, to assess weight bias in future health care professionals, was not disclosed to participants given the potentials that knowing the study purpose would undermine the validity of the experiment and lead participants to give socially desirable responses.³ The study was described as a project examining patient health perceptions and treatment decision-making by freshmen and senior undergraduate students.³

Due to low volume of participation, a gift card incentive was devised half way through the data collection process. Participants could provide their name and email address to be entered into a drawing for a \$25 Visa gift card. Thirteen out of the intended goal of 100 participants

submitted their survey anonymously before the incentive was available, in which case there was no way to enter them into the drawing. Therefore, there was an odd of 1 in 87 that the participant could win the \$25.00 Visa gift card. The University of Memphis Institutional Review Board approval was obtained prior to data collection. Participants were allowed to omit any questions, aside from the consent form. If participants wished to withdraw from the research study completely, they could simply close the webpage and data would not be retained. If a participant chose to enter the study anonymously, which could not be traced, participants would not be able to withdraw their data after submission.

After consent, participants were randomly assigned, via Qualtrics, to view one of four patient profiles.³ Each profile described a hypothetical patient, having recently been diagnosed with lactose intolerance, that was referred to a Registered Dietitian for assessment and nutrition counseling.³ Lactose intolerance was chosen because, regardless of weight status, treatment options should be consistent.³ Profiles included demographic information like height, weight, body mass index (BMI), and body fat percentage data; blood pressure, blood cholesterol levels, and fasting blood glucose data, dietary information, including energy intake, fruit/vegetable intake, and fiber intake; and information about physical activity, sleep habits, and perceived stress levels.³ The four patient profiles differed only in sex (male or female) and weight-related data (weight, BMI, and percentage body fat).³ Refer to Table 1 in Appendix A for mock patient health profiles. Participants were assigned to Condition 1 (overweight female patient profile), Condition 2 (non-obese female patient profile), Condition 3 (overweight male patient profile), or Condition 4 (non-obese male patient profile).

Data in the profiles were crafted to reflect generally healthy adults, such that no particular blood or dietary measure on its own might indicate a poor lifestyle habit.³ Blood pressure and

cholesterol data, fasting blood glucose data, perceived stress level, hours of sleep, and physical activity in the patient profiles were at or near general recommendations for a healthy adult.¹⁵ Dietary data, including energy intake per day, percentage of energy from fat, fruit/vegetable intake, and fiber intake, were chosen to indicate an overall healthful dietary patterns whereby patients consumed appropriate amounts based on their age and sex, and consumed close to the recommended amount of fiber from fruit and vegetable recommendations.³ All four patient profiles are depicted in Table 1 in Appendix A.

After assessing the patient profiles, participants were asked to rate the patient's dietary quality, overall health status, and energy intake on a Likert-type scale (ranging from 1=poor to 5=excellent).³ Participants were also asked a series of questions on their perceptions of their patient and general attitudes about obese individuals.³ To assess perceptions, participants were asked to rate how receptive they believed the patient would be to their treatment recommendations, how well the patient would understand their recommendations, how compliant the patient would be with treatment, how motivated the patient would be to change his/her diet, and the patient's potential to be successful in making dietary changes and maintaining dietary changes over time.³ The participants were also asked how much they might enjoy working with the patient.³ All questions were asked using a Likert-type scale (ranging from 1=very little to 5= very much).³

Next, participants were asked a series of demographic questions, including age, sex, height, weight, ethnicity, major, and level of degree. Then, in order to assess weight bias, participants were asked to complete the Fat Phobia Scale, a 14 question survey developed to assess endorsement of negative stereotypes about individuals who are "fat".²² The format of the Fat Phobia scale is scored on a five point semantic differential scale with each of the 14 items

containing two adjectives, one positive and one negative, which are weighted on opposing sides of the scale. Adjective pairs included: lazy/industrious, no will power/ has will power, attractive/unattractive, good self-control/poor self-control, fast/slow, having endurance/having no endurance, active/inactive, weak/strong, self-indulgent/self-sacrificing, dislikes food/likes food, shapeless/shapely, undereats/overeats, insecure/secure, and low self-esteem/high self-esteem.²² Scores over an average of 2.5 indicated a high level of fat phobia.²²

The Marlowe-Crowne Social Desirability survey also was administered in this study. This survey was comprised of 33 statements concerning personal attitudes and traits, which participants selected as true or false.²³ Two items in this survey include; “before voting I thoroughly investigate the qualifications of all candidates” and “I never hesitate to go out of my way to help someone in trouble”. The social desirability survey was chosen to assess whether participants were at risk of providing socially desirable responses. Scores are categorized into ranges signifying groups including; a socially undesirable direction with a score of 0-8, an average degree of concern for social desirability with a score of 9-19, and a high concern about social desirability with a score of 20-33, which may distort true beliefs on other surveys and testing methods.²³

The EAT-26, an abbreviated measure from the 40-item EAT survey was used to identify participants at an increased risk for an eating disorder.²⁴ Creators of the survey recommend individuals who score a 20 or more should be screened by a qualified professional for an eating disorder.²⁴ The EAT-26 began with three subscales; dieting, bulimia and food preoccupation, and oral control.²⁴ The subscale scores were computed by summing all items assigned to that particular scale. Dieting scale items included questions 1, 6, 7, 10, 11, 12, 14, 16, 17, 22, 23, 24, and 26 which regarded questions like “I am terrified about being overweight” and “aware of the

calorie content of the foods I eat”.²⁴ Bulimia and food preoccupation scale items included questions 3, 4, 9, 18, 21, and 25 regarding questions like “I find myself preoccupied with food” and “have gone on eating binges where I feel that I may not be able to stop” .²⁴ Lastly, the oral control subscale items included questions 2, 5, 8,13, 15, 19, and 20 regarding questions like “I avoid eating when I am hungry” and “cut my food into smaller pieces”.²⁴ Numbers 1-25 were scored such that always= 3, usually= 2, often= 1, sometimes, rarely, and never= 0. Question number 26, “I enjoy trying new rich foods”, was reverse coded such that: always, usually, and often= 0, while sometimes= 1, rarely= 2, and never= 3. The last part of the EAT26 included behavioral questions pertaining to eating disorder behavior were addressed and signified if the following behaviors were checked: gone on eating binges where they feel they may not be able to stop more than 2-3 times a month, once a week, 2-6 times a week and once a day or more; if the participant ever made themselves sick to control their weight or shape or ever used laxatives, diet pills or diuretics to control their weight or shape more than once a month, 2-3 times a month, once a week, 2-6 times a week, and once a day or more; and if the participant has exercised more than 60 minutes a day to lose or to control their weight for once a day or more and if they have lost 20 pounds or more in the past 6 months.²⁴

The General Self-Efficacy survey, a 10 question survey, was used to assess if the participant believed that he or she *has* the capacity and ability to succeed in a specific situation or task. Furthermore, the survey was to assess if participants had the ability to produce a certain performance attainment in their patients.²⁵ The survey was scored on a Likert-scale with 1= not at all true and 4= exactly true. The sum of all 10 items yielded the final composite score with a range from 10 to 40. Though there were no cut points for this survey, higher scores indicated higher levels of self-efficacy.²⁵

Data Analysis

All of the data was analyzed using the R Programming Language (R) and Qualtrics.²¹ Data analysis included descriptive statistics as well as a regression analysis. A power analysis revealed that the total sample size was sufficient to detect a difference at the 0.05 significance level. The prevalence of weight bias as a whole and between freshmen and senior undergraduate students was assessed with mean scores. A t-test was used to test for differences in participant's weight bias, health evaluations, and perceptions of patients across the four experimental conditions. A regression model was used to test if fat phobia scores arose from participant's year in school, major, age, sex, BMI, and ethnicity. With the regression analysis, the EAT-26 scores were assessed if a correlation arose between weight bias scores or social desirability scores. The Social Desirability Scale was assessed through mean scores to see if participants gave socially desirable answers. Self-efficacy was assessed by looking at mean scores as to whether the participant believes he/she has the capacity and ability to succeed in a specific situation or task. Furthermore, the survey was to assess if participants had the ability to produce a certain performance attainment in their patients.²⁵

CHAPTER 3

Results

Sample Characteristics

A total of 3,173 freshmen and senior undergraduate students were emailed and notified of the research study. Of the total recruitment sample, 29 participants with a mean age of 23.1 ± 5.8 enrolled. Participants were primarily female (83%), white (69%), seniors (62%), and Nursing (or pre-nursing) majors (62%), while 38% were Health and Human Performance majors. Mean BMI was 26.2 ± 6.9 . Due to the small percentage of participants who were obese, the moderately obese group (BMI 30-35) and the severely obese group (BMI >35) were combined. The BMI of participants was stratified into categories of underweight (BMI <18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25-39), and obese (BMI 30-39).^{3,26} Fifty-eight percent of the sample had a normal BMI. Refer to Table 2 in Appendix A for characteristics of the sample.

Nine participants were assigned to Condition 1 (overweight female patient profile), 4 participants in Condition 2 (non-obese female patient profile), 7 participants in Condition 3 (overweight male patient profile), and 9 participants in Condition 4 (non-obese male patient profile).

Descriptive Findings

Table 3 in Appendix C depicts the percentage of participants, as a whole, who agreed or strongly agreed with the negative adjectives used in the Fat Phobia Scale. Majority stated obese individuals like food (86%), overeat (75%), are inactive (65%), slow (62%), have no endurance (62%), are shapeless (48%), and have poor self-control (44%). Majority of participants also reported that obese individuals are also shapeless. Few participants stated that obese persons

were unattractive, have no willpower, are weak, lazy, self-indulgent, have low self-esteem, and are insecure.

The mean score of the Fat Phobia Scale was 3.27 ± 0.20 which represents moderate amount of weight bias. Results from the t-test showed there were no significant differences in weight bias across the four condition groups. However, when correlations between the Fat Phobia Scale and other variables were examined, the perceptions of diet quality for the obese female patient profile only showed significance, indicating that participants with higher levels of fat phobia rated the obese female patient's diet quality as being poorer ($P=0.003$), results were similar with the previous study showing $P<0.05$.³ Furthermore, scores of the Fat Phobia Scale were significantly correlated with participant's perceptions of health status for the obese female patient profile only, indicating that participants with higher levels of weight bias rated obese female patients as having poorer health ($P=0.001$). Scores of the Fat Phobia Scale were also significantly correlated with participants perceptions of energy intake for the non-obese male patient profile only, indicating that participants with higher weight bias rated these non-obese male patient's energy intake as being poorer ($P=0.04$). Table 3 in Appendix C depicts the percentage of participants, as a whole, who agreed or strongly agreed with the negative adjectives used in the Fat Phobia Scale.

Twenty-one percent of participants scored at or above a score of 20 on the EAT-26, indicating that they show a high level of concern about dieting, body weight, and problematic eating behaviors. Specifically, 24% responded always, 31% responded usually, and 17% responded often in regards to being terrified about being overweight. Moreover, 34% responded always, 13% responded usually, and 20% responded often regarding being occupied about being

thinner. Although, 24% responded always, 20% responded usually, and 17% responded often in regarding to trying new rich foods.

The mean score of the Marlowe Crown Social Desirability Survey was 19.75 ± 5.28 . No participants answered in a socially undesirably direction (score 0-8). Forty-five percent showed an average degree of social desirability (score 9-19), while 55% showed high concern about social approval (score 20-33). These scores indicate that responses were possibly distorted regarding true beliefs on other surveys throughout the study. Refer to Table 2 in Appendix B for information regarding the responses towards the surveys.

The mean self-efficacy score was 33.24 ± 3.80 . Seventy-six percent of participants showed very high levels of self- efficacy with scores ranging from 31-40 out of 40, while 24% showed moderate levels of self-efficacy, indicating the majority of participants believed they could succeed in a specific situation or accomplish a task to the best of their ability.

Significance Tests and Regression Modeling

A T-Test was used to determine whether the BMIs in each of the four profiles had an effect on how participant's evaluated the patient's health and participant's perceptions of the patient. There were three significant findings. First, participants who viewed the obese female profile evaluated them as having poorer diet quality than participants who viewed the non-obese female profile ($P=0.01$). Second, between the obese female and male profiles, participants who viewed the obese female profile were more likely to state that the obese female profile had a poorer diet quality than participants who viewed the obese male profile ($P=0.02$). Third, participants who viewed obese female profiles evaluated the as having poorer perceived health status than the non-obese female profile ($P=0.01$). Lastly, participants who viewed the non-obese male profile they would be less motivated to make dietary changes than those who viewed the

obese male profile ($P=0.02$). There were findings that approached statistical significance.

Participants who viewed the obese female profile indicated that they would be less motivated to make dietary changes than those who viewed the obese male profile ($P=0.06$). Also, participants who viewed the obese female profile stated they would have lower confidence to maintain their dietary changes than those who viewed the non-obese female ($P=0.06$). Table 4 in Appendix D shows the mean scores on these outcome variables and their significant differences.

A regression model was computed to determine if participants with high weight bias (score of 2.5 or above on the Fat Phobia Scale) differed demographically or by self-efficacy, eating attitudes, or social desirability. There were no significant differences in those with high weight bias compared to those with low weight bias on the variables BMI, year in school, major, age, sex, ethnicity, self-efficacy scores, eating attitudes, or social desirability. Among white participants, associations between self-efficacy and weight bias as well as social desirability and weight bias approached significance. Furthermore, there was no relationship between the general self-efficacy scores and the eating attitudes scores, indicating that their own eating behaviors and self-efficacy did not correlate positively or negatively (0.0). There was a negative correlation between the eating attitudes scores and social desirability scores, indicating those with low eating attitudes had higher social desirability scores (-0.11).

There were no differences across conditions regarding student's perceptions about how receptive obese and non-obese patients would be to treatment recommendations, how well they would understand their treatment recommendations, how compliant they would be with their treatment recommendations, the likelihood of success they would have in changing their diet, how much confidence the participant's had in the patient's ability to maintain dietary changes, or how much participant's would enjoy counseling their patient. It is noteworthy that obese male

patients had higher scores in every health perception than the non-obese male, while the non-obese female had higher scores in every health perception than the obese female patient. Table 4 in Appendix D depicts the mean scores regarding these perceptions and treatment evaluations.

CHAPTER 4

Discussion and Conclusion

The present study found moderate levels of weight bias among Nursing and Human and Health Performance majors at the University of Memphis, much like the previous study of dietetic students.³ None of the participants in this study showed high levels of weight bias (a score of 4.4 or more) compared to the eight percent in the previous study.³ However, the majority of participants in the present study agreed that obese individuals have no endurance, tend to overeat, slow, inactive, and like food, which is similar to the previous study's findings.³ Contrary to the previous study, the majority of participants in the present study did not agree with statements that obese individuals were more likely to be insecure, have low self-esteem, and poor self-control compared to non-obese individuals.

There were no significant differences regarding weight bias between freshman and senior undergraduate students. This gives reason to believe that students who enter into college do not necessarily become more weight bias through their curriculum over the course of their degree. There is no research to suggest that seniors are more weight bias than freshmen, although Tomiyama et al showed that as time progressed, so too did explicit bias among researchers and health professionals in the obesity field.⁹

Regression analyses computed associations between weight bias and ethnicity, self-efficacy, and eating attitudes. Ethnicity (white) and self-efficacy approached positive significance when their association with weight bias was examined, indicating that as scores went up, so too did weight bias. Although, eating attitude scores showed a negative correlation toward weight bias, indicating those with high levels of serious eating problems had less weight bias. There was also a negative correlation between the eating attitudes and social desirability,

which brings to question the responses of those who scored at or above a 20 on the survey and if those with a potential eating disorder were more weight bias than actually reported. Those who believe weight-based stereotypes to be true have reported more frequent binge eating and refusal to diet in response to stigma experiences.⁷ There are questions regarding participant's responses to the Marlow Crowne Social Desirability Survey. The majority (55%) responded in a manner that suggested high levels of social desirability. Moreover, Adams et al. and Narges et al concluded that women give more socially desirable answers than men.^{27,28} Further research on weight bias with men and the relationship between eating attitudes and social desirability needs to be conducted with a larger sized population.

The majority of participants had high levels of self-efficacy scores, ranging from 31-40. This suggests participants may feel capable to succeed in a specific situation or accomplish a task. Perhaps, even meeting specific performance goals with their patients. This is especially interesting considering participants also had moderate levels of weight bias toward obese individuals. These findings are similar to Puhl et al. study of weight bias among professionals treating eating disorders, whereby professionals felt confident to provide treatment to obese patients, though attributed obesity to behavioral causes, expressed more negative attitudes and frustrations about treating obese patients, and perceived poorer treatment outcomes for these patients.⁵

The present study has several limitations. The sample size was rather small and comprised on primarily normal weight, white women. Also, the low response level, as well as the timing of when the recruitment email was sent out was a major limitation due to the email being sent out during Spring vacation and the beginning of Summer vacation. Participants who were Nursing majors, due to the number of hours accumulated, could have technically been a

freshman or senior and in their first semester of nursing school, affecting our categorizations of participants as freshmen or seniors. Also, due to the narrow BMI range of participants, it is hard to specify how their own BMI may affect their attitudes and perceptions toward obese individuals. Furthermore, the self-efficacy survey was a general survey used to depict general attitudes about oneself, not entirely about one's job towards treating the hypothetical patient. Use of a self-efficacy survey designed to assess self-efficacy toward ones job and performance attainment in their patients would be better suitable. Lastly, high scores on the social desirability scale by approximately half of the participants brings into questions whether all individual surveys were answered truthfully.

There is minimal research regarding the implementation of weight bias education and prevention among future health care professionals. Research has shown, though, benefits of weight acceptance brought upon less stigmatization and were perceived as having better self-esteem and fewer psychological problems.¹⁶ Furthermore, research shows consequences of weight bias with a significantly positive association between body weight dissatisfaction and depression independent of BMI.²⁹ Weight bias, also, indicates an increase in the likelihood of poorer physical health and mental health.^{6,14} This suggests that weight bias education and prevention could help future health care professionals.

Due to the presence of weight bias among Nursing and Health and Human Performance undergraduate students, weight bias education in the curriculum may be needed to assure that treatment recommendations from future health care professionals positively influence their clientele. More research regarding weight bias reduction and interventions is needed. Perhaps research focusing on specific majors separately on into their professional practice could provide more information regarding the success of weight bias interventions.

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Appendices

A. Table 1: Mock patient health profiles used as experimental stimuli.

Table 1: Mock patient health profiles used as experimental stimuli (varying by sex and weight-related characteristics)³				
Patient Profiles				
	Obese Female	Normal-weight female	Normal-weight Male	Obese Male
Age	28 years	28 years	28 years	28 years
Sex	Female	Female	Male	Male
Race	White	White	White	White
Weight ^a	193 lb (87.5 kg)	143 lb (64.9 kg)	164 lb (74.4 kg)	221 lb (100.2 kg)
Height	5'6" (1.67 m)	5'6" (1.67 m)	5' 11" (1.80 m)	5' 11" (1.80 m)
Body mass index	31	23	23	31
% Body fat	34	27	21	29
Blood pressure (mm Hg)	118/76	118/76	118/76	118/76
Total cholesterol	148	148	148	148
HDL ^b cholesterol (mg/dL) ^c	48	48	48	48
LDL ^b cholesterol (mg/dL) ^c	82	82	82	82
Fasting blood glucose (mg/dL) ^c	95	95	95	95
Energy intake per day (kcal)	1850	1850	2600	2600
% Energy from fat	28	28	28	28
Fruit/vegetable intake (servings/day)	4	4	4	4
Fiber intake (g/day)	24	24	32	32
Perceived stress level	average	average	average	average
Sleep	6 h/night	6 h/night	6 h/night	6 h/night
Physical activity	30 min moderate activity 4 day/week	30 min moderate activity 4 day/week	30 min moderate activity 4 day/week	30 min moderate activity 4 day/week
^a Weight, body mass index, and % body fat differed between profiles of the same sex				
^b HDL= high density lipoprotein				
^c To convert mg/dL cholesterol to mmol/L, multiply mg/dL by 0.026. To convert mmol/L to mg/dL, multiply mmol/L by 38.7. Cholesterol of 193 mg/dL=5.00 mmol/L.				
^d LDL= low density lipoprotein.				
^e To convert mg/dL glucose to mmol/L, multiply mg/dL by 0.0555. To convert mmol/L glucose to mg/dL, multiply mmol/L by 18.0. Glucose 108 mg/dL=6.0 mmol/L.				

Puhl R, Wharton C, Heuer C. Research: Weight bias among dietetics students: Implications for treatment practices. *J Am Diet Assoc.* 2009;109:438-444.

B. Table 2: Participant Characteristics and Multiple Survey Scores.

Table 2: Participant Characteristics and Multiple Survey Scores. n=29			
Variable	Percentage	Mean	Min, Max
Age		23.1 ± 5.77	
18-24	83%		
25-34	14%		
45-54	3%		
Gender			
Female	83%		
Male	17%		
Ethnicity			
White	69%		
Black	21%		
Asian	3%		
Native Hawaiian	3%		
Major			
Nursing	62%		
Health and Human Performance	38%		
Year in School			
Freshman	38%		
Senior	62%		
BMI		26.28 ± 6.85	18.6, 39.1
Normal	58%		
Overweight	28%		
Obese	14%		
Weight Bias		3.27 ± 0.20	2.9, 3.9
<2.5	0%		
2.5	0%		
>2.5 ^a	100%		
General Self-Efficacy		33.24 ± 3.80	25,40
10.-21	0%		
21-30	24%		
31-40 ^b	76%		
Eat26		14.0 ± 8.83	1,40
Above 20 ^c	21%		
Social Desirability		19.75 ± 5.28	9,29
0-8	0%		
9.- 19	45%		
20-33 ^d	55%		
^a Score >2.5 indicates high levels of weight bias			
^b Higher scores indicate high levels of self-efficacy			
^c Scores above 20 indicate serious eating problems in which help should be sought. Levels below 20 could still indicate serious eating problems.			
^d Higher scores between 20-3 indicate high level of social desirability toward the public. Scores from 9-19 are mildly socially desirable.			

C. Table 3: Percentage of participants who agreed or strongly agreed with negative adjectives in the Fat Phobia Scale.

Table 3. Percentage of participants who agreed or strongly agreed with negative adjectives in the Fat Phobia Scale (n=29)	
Negative adjective on Fat Phobia Scale	% Agreement
Likes food	86
Overeats	75
Inactive	65
Slow	62
Having no endurance	62
Shapeless	48
Poor self-control	44
Unattractive	34
No willpower	27
Weak	27
Lazy	24
Self-indulgent	17
Low self-esteem	17
Insecure	10

D. Table 4: Mean scores on key outcome variables across experimental conditions of mock obese and non-obese patient profiles.

Table 4. Mean scores on key outcome variables across experimental conditions of mock obese and nonobese patient profiles				
	Condition 1 (obese female)	Condition 2 (Normal-weight female)	Condition 3: (Normal-weight male)	Condition 4 (obese male)
Variable	← mean ± standard deviation →			
Fat Phobia Scale ^a	3.3 ± 0.27	3.19 ± 0.14	3.22 ± 0.16	3.29 ± 0.13
Perceived diet quality of patient ^b	2.67 ± 0.47*	3.5 ± 0.5	3 ± 0.53	3.33 ± 0.67**
Perceived health status of patient	2.33 ± 0.67*	3.5 ± 0.5	3.29 ± 0.7	3 ± 1.15
Perceived energy intake of patient	3 ± 1.15	3.5 ± 1.12	2.57 ± 0.73	2.78 ± 0.79
Receptive to treatment recommendations ^c	3.33 ± 0.67	3.5 ± 1.12	3.29 ± 1.16	3.56 ± 0.83
Understand treatment recommendations	3.56 ± 0.50	4.25 ± 0.83	3.29 ± 0.7	3.56 ± 1.17
Comply with treatment recommendations	3.22 ± 0.79	3.75 ± 0.83	3.43 ± 0.49	3.67 ± 0.67
Motivated to make dietary changes	3.11 ± 0.57	3.5 ± 0.5	2.71 ± 0.88	3.89 ± 0.99*
Likelihood of success in changing diet	3.67 ± 0.47	4 ± 0.71	3.43 ± 1.18	4 ± 0.94
Confidence that patient will maintain dietary changes	3.22 ± 0.79	4.25 ± 0.83	3.71 ± 1.03	3.89 ± 0.87
Level of enjoyment in counseling patient	3.33 ± 0.47	4 ± 1	4 ± 0.53	3.89 ± 0.99
^a Scores on Fat Phobia Scale range from 0 (no fat phobia) to 5 (high levels of fat phobia).				
^b Diet quality, health status, and energy intake were rated on a 5-point Likert scale, with 1=poor and 5=excellent.				
^c Items assessing perceptions of patient were rated on a 5-point Likert scale, with higher scores indicating more positive perceptions.				
*P <0.05, indicating that mean scores in obese profile conditions are significantly different than conditions with nonobese profiles				
**P<0.05, indicating that mean scores in male condition are significantly different than conditions with females.				

E. Patient Profiles for Assessment

Below is a patient just referred to a Registered Dietitian for counseling and recommendations needed to treat lactose intolerance. The patient is relatively healthy but please read your patient profiles and answer the following questions regarding your patient.

Table 1: Mock patient health profiles used as experimental stimuli (varying by sex and weight-related characteristics) ¹⁵				
Patient Profiles				
	Obese Female	Normal-weight female	Normal-weight Male	Obese Male
Age	28 years	28 years	28 years	28 years
Sex	Female	Female	Male	Male
Race	White	White	White	White
Weight ^a	193 lb (87.5 kg)	143 lb (64.9 kg)	164 lb (74.4 kg)	221 lb (100.2 kg)
Height	5'6" (1.67 m)	5'6" (1.67 m)	5' 11" (1.80 m)	5' 11" (1.80 m)
Body mass index	31	23	23	31
% Body fat	34	27	21	29
Blood pressure (mm Hg)	118/76	118/76	118/76	118/76
Total cholesterol	148	148	148	148
HDL ^b cholesterol (mg/dL) ^c	48	48	48	48
LDL ^b cholesterol (mg/dL) ^c	82	82	82	82
Fasting blood glucose (mg/dL) ^e	95	95	95	95
Energy intake per day (kcal)	1850	1850	2600	2600
% Energy from fat	28	28	28	28
Fruit/vegetable intake (servings/day)	4	4	4	4
Fiber intake (g/day)	24	24	32	32
Perceived stress level	average	average	average	average
Sleep	6 h/night	6 h/night	6 h/night	6 h/night
Physical activity	30 min moderate activity 4 day/week	30 min moderate activity 4 day/week	30 min moderate activity 4 day/week	30 min moderate activity 4 day/week

^aweight, body mass index, and % body fat differed between profiles of the same sex

^bHDL= high density lipoprotein

^cTo convert mg/dL cholesterol to mmol/L, multiply mg/dL by 0.026. To convert mmol/L to mg/dL, multiply mmol/L by 38.7. Cholesterol of 193 mg/dL=5.00 mmol/L.

^dLDL= low density lipoprotein.

^eTo convert mg/dL glucose to mmol/L, multiply mg/dL by 0.0555. To convert mmol/L glucose to mg/dL, multiply mmol/L by 18.0. Glucose 108 mg/dL=6.0 mmol/L.

Puhl R, Wharton C, Heuer C. Research: Weight bias among dietetics students: Implications for treatment practices. *J Am Diet Assoc.* 2009;109:438-444.

Please rate the following

	Poor	Fair	Good	Very Good	Excellent
Dietary Quality					
Overall Health Status					
Energy Intake					

E. Patient Profiles for Assessment

	Very Little	Little	Neutral	Much	Very Much
How receptive the patient will be to treatment recommendations					
How the patient will understand treatment recommendations					
How compliant the patient will be to treatment recommendations					
How motivated the patient will be to change his/her diet					
Patients potential to be successful in making dietary changes					
Patient's potential to maintain dietary changes over time					
Level of enjoyment in counseling the patient					

F. Demographic Survey

Please answer as honestly as possible. Your answers are anonymous.

1. What is your major?
 - Health and Human Performance
 - Physical Education Teacher Education
 - Bachelors of Nursing
 - Teacher Education Advisor

2. What is your level of degree?
 - Freshman
 - Senior

3. What is your age?
 - 18-24
 - 25-34
 - 35-44
 - 45-54
 - 55-64
 - 65 and older

4. What is your gender?
 - Female
 - Male

5. What is your height?

6. What is your weight?

7. What is your ethnicity?
 - American Indian of Alaska Native
 - Asian
 - Black African American
 - Native Hawaiian or Other Pacific Islander
 - White

G. Marlowe-Crowne Social Desirability

Read each item and decide whether the statement is true or false as it pertains to you personally.

STATEMENT	TRUE	FALSE
8. Before voting I thoroughly investigate the qualifications of all the candidates.		
9. I never hesitate to go out of my way to help someone in trouble.		
10. It is sometimes hard for me to go on with my work if I am not encouraged.		
11. I have never intensely disliked anyone.		
12. On occasions I have had doubts about my ability to succeed in life.		
13. I sometimes feel resentful when I don't get my way.		
14. I am always careful about my manner of dress.		
15. My table manners at home are as good as when I eat out in a restaurant.		
16. If I could get into a movie without paying and be sure I was not seen, I would probably do it.		
17. On a few occasions, I have given up something because I thought too little of my ability.		
18. I like to gossip at times.		
19. There have been times when I felt like rebelling against people in authority even though I knew they were right.		
20. No matter who I'm talking to, I'm always a good listener.		
21. I can remember "playing sick" to get out of something.		
22. There have been occasions when I have taken advantage of someone.		
23. I'm always willing to admit it when I make a mistake.		

G. Marlowe-Crowne Social Desirability

24. I always try to practice what I preach.		
25. I don't find it particularly difficult to get along with loudmouthed, obnoxious people.		
26. I sometimes try to get even rather than forgive and forget.		
27. When I don't know something I don't mind at all admitting it.		
28. I am always courteous, even to people who are disagreeable.		
29. At times I have really insisted on having things my own way.		
30. There have been occasions when I felt like smashing things.		
31. I would never think of letting someone else be punished for my wrong-doings.		
32. I never resent being asked to return a favor.		
33. I have never been irked when people expressed ideas very different from my own.		
34. I never make a long trip without checking the safety of my car.		
35. There have been times when I was quite jealous of the good fortune of others.		
36. I have almost never felt the urge to tell someone off.		
37. I am sometimes irritated by people who ask favors of me.		
38. I have never felt that I was punished without cause.		
39. I sometimes think when people have a misfortune they only got what they deserved.		
40. I have never deliberately said something that hurt someone's feelings.		

H. Fat Phobia Scale

For each adjective pair, please place an X on the line closest to the adjective that you feel best describes your feelings and beliefs towards an obese individual.

41. lazy	_____	_____	_____	_____	_____	industrious
	5	4	3	2	1	
42. no will power	_____	_____	_____	_____	_____	has will power
	5	4	3	2	1	
43. attractive	_____	_____	_____	_____	_____	unattractive
	5	4	3	2	1	
44. good self-control	_____	_____	_____	_____	_____	poor self-control
	5	4	3	2	1	
45. fast	_____	_____	_____	_____	_____	slow
	5	4	3	2	1	
46. having endurance	_____	_____	_____	_____	_____	having no endurance
	5	4	3	2	1	
47. active	_____	_____	_____	_____	_____	inactive
	5	4	3	2	1	
48. weak	_____	_____	_____	_____	_____	strong
	5	4	3	2	1	
49. self-indulgent	_____	_____	_____	_____	_____	self-sacrificing
	5	4	3	2	1	
50. dislikes food	_____	_____	_____	_____	_____	likes food
	5	4	3	2	1	
51. shapeless	_____	_____	_____	_____	_____	shapely
	5	4	3	2	1	
52. undereats	_____	_____	_____	_____	_____	overeats
	5	4	3	2	1	
53. insecure	_____	_____	_____	_____	_____	secure
	5	4	3	2	1	
54. low self-esteem	_____	_____	_____	_____	_____	high self-esteem
	5	4	3	2	1	

I. General Self-Efficacy Scale

For each statement, please indicate how true each of the following statements is to you.

	Not at all true	Hardly true	Moderately True	Exactly True
55. I can always manage to solve difficult problems if I try hard enough.				
56. If someone opposes me, I can find the means and ways to get what I want.				
57. It is easy for me to stick to my aims and accomplish my goals.				
58. I am confident that I could deal efficiently with unexpected events.				
59. Thanks to my resourcefulness, I know how to handle unforeseen situations.				
60. I can solve most problems if I invest the necessary effort.				
61. I can remain calm when facing difficulties because I can rely on my coping abilities.				
62. When I am confronted with a problem, I can usually find several solutions.				
63. If I am in trouble, I can usually think of a solution.				
64. I can usually handle whatever comes my way.				

J. Eating Attitudes Scale (EAT-26)

Please check a response for each of the following questions.

	Always	Usually	Often	Sometimes	Rarely	Never
65. Am terrified about being overweight.						
66. Avoid eating when I am hungry.						
67. Find myself preoccupied with food.						
68. Have gone on eating binges where I feel that I may not be able to stop.						
69. Cut my food into smaller pieces.						
70. Aware of the calorie content of foods that I eat.						
71. Particularily avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)						
72. Feel that others would prefer if I ate more.						
73. Vomit after I have eaten.						
74. Feel extremely guilty after eating.						
75. Am preoccupied with a desire to be thinner.						
76. Think about burning up calories when I exercise.						
77. Other people think that I am too thin.						
78. Am preoccupied with the thought of having fat on my body.						
79. Take longer than others to eat my meals.						
80. Avoid foods with sugar in them.						
81. Eat diet foods.						

82. Feel that food controls my life.						
83. Display self-control around food.						
84. Feel that others pressure me to eat.						
85. Give too much time and thought to food.						
86. Feel uncomfortable after eating sweets.						
87. Engage in dieting behavior.						
88. Like my stomach to be empty.						
89. Have the impulse to vomit after meals.						
90. Enjoy trying new rich foods.						

In the past 6 months have you:

	Never	Once a month or less	2-3 times a month	Once a week	2-6 times a week	Once a day or more
91. Gone on eating binges where you feel that you may not be able to stop?						
92. Ever made yourself sick (vomited) to control your weight or shape?						
93. Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?						
94. Exercised more than 60 minutes a day to lose or to control your weight?						
95. Lost 20 pounds or more in the past 6 months						

K. Submission Consent

You are about to finish this survey. Before you do so, it is my duty to share the true purpose of the study and let you decide whether you wish to withdraw or complete the survey. The true purpose of this study is to assess weight bias in freshman and senior undergraduate students enrolled in a health care major at the University of Memphis. Weight bias is the inclination to form unreasonable judgements about someone based on their weight. You have the right to either refrain from completing the survey, simply closing the webpage and none of the data will be retained, or to submit the survey. If you choose to submit the survey, your answers are anonymous, if desired. If you choose to submit the survey, you have the option of entering your name and email into a drawing to possibly win a \$25.00 gift card. Those who choose to remain anonymous and cannot be traced, participants will not be able to withdraw their data after submitting the survey. Thank you for your participation.

Yes, Submit.

If not, simply exit the browser.

Name: _____

Email: _____

L. Recruitment Email

Students, please see below if interested in participating in the available research study.

My name is Emily Beatty and I am a Clinical Nutrition Masters student at the University of Memphis. I would like to invite freshman and senior undergraduate students (those with either below 30 credit hours or more than 90 credit hours), like you, to participate in my research study. The main purpose of the study is to examine patient health perceptions and treatment decision-making by future health care professionals. Participation in this study is voluntary, reward-/penalty free, and anonymous. There are minimal risks to this study, which include a possibility of internalizing weight bias and the time it takes to complete the survey, which is about 15 minutes. There is also a risk of identification if you choose to enter your name and email at completion of the survey, to enter a drawing to possibly win a \$25.00 Visa gift card. The potential benefits are contributing to the literature of weight bias and body image in future health care professionals, while also the possibility of winning the \$25.00 Visa gift card drawing. Below is a link that will direct you to a consent page and, from there, the 95 question survey. The survey is anonymous, if desired, and the instructor nor myself will have any names tied to the participants, unless given voluntarily. Thank you for your time.

Sincerely,

Emily Beatty

Yes I wish to participate in the study [Click here to take a survey.](#)

No, I do not wish to participate in the study. Please delete the email.

Submit this completed form via email to irb@memphis.edu

M. Institutional Review Board Approval

Hello,

The University of Memphis Institutional Review Board, FWA00006815, has reviewed and approved your submission in accordance with all applicable statuses and regulations as well as ethical principles.

PI NAME: Emily Beatty

CO-PI:

PROJECT TITLE: Prevalence of Weight Bias in Health Related Majors at the University of Memphis

FACULTY ADVISOR NAME (if applicable): Ruth Williams-Hooker

IRB ID: #3998

APPROVAL DATE: 4/29/2016

EXPIRATION DATE: 2/12/2017

LEVEL OF REVIEW: Expedited Modification

Please Note: Modifications do not extend the expiration of the original approval

Approval of this project is given with the following obligations:

- 1. If this IRB approval has an expiration date, an approved renewal must be in effect to continue the project prior to that date. If approval is not obtained, the human consent form(s) and recruiting material(s) are no longer valid and any research activities involving human subjects must stop.**
- 2. When the project is finished or terminated, a completion form must be completed and sent to the board.**

3. No change may be made in the approved protocol without prior board approval, whether the approved protocol was reviewed at the Exempt, Exedited or Full Board level.

4. Exempt approval are considered to have no expiration date and no further review is necessary unless the protocol needs modification.

Approval of this project is given with the following special obligations:

Thank you,

Institutional Review Board Chair

The University of Memphis.

Note: Review outcomes will be communicated to the email address on file. This email should be considered an official communication from the UM IRB.

N. REVIEW OF THE LITERATURE

Weight bias has been researched in different populations, one being future and current health care professionals. Weight bias has been studied across sex, age, BMI, major in school, and professional attainment. Frederick et al. examined the effect of attitudes about weight and obesity policies in response to exposure of anti-fat media.¹⁹ Two-thousand, one-hundred and eighty-seven participants read news articles stressing fatness as negative (unhealthy, controllable, acceptable to stigmatize) or positive (healthy, controllable, unacceptable to stigmatize). Of these participants, those who read fat-negative frames expressed more: belief in the health risks of being fat, the belief that weight is controllable, the support for charging obese people more for health insurance, anti-fat prejudice, willingness to discriminate against fat people, and less willingness to celebrate body size diversity compared to those participants exposed to positive news articles.¹⁹ Those exposed to negative news articles were also less willing to say that women at the lower end of an obese range could be healthy at their weights, meaning that women were more likely to have higher weight discrimination than men.¹⁹ This study shows that exposure to different frames of fat can shift beliefs about weight-related health risks and weight based stigma.¹⁹

In another study, Puhl et al. aimed at assessing explicit weight bias and sociodemographic predictors of weight bias, such as sex, age, race/ethnicity, and educational attainment of weight biased attitudes and the extent to which weight related variables, including participant's own body weight, personal experiences with weight bias and casual attributions of obesity, play a role in expressions of weight bias in different countries.¹⁵ Puhl et al. surveyed 2866 participants using an identical, online, anonymous survey, by the survey company Qualtrics, from the United States, Canada, Iceland, and Australia, due to the prevalence of

overweight and obesity in those countries.¹⁵ The Fat Phobia Scale, the UMB-FAT Scale, and beliefs about the causes of obesity scale, were used in this study. The UMB-FAT Scale indicated that women had lower score of weight bias than men of the United States, Canada, and Iceland and also indicated lower scores of weight bias among obese individuals in Canada and Iceland.¹⁵ The Fat Phobia Scale, showed only Iceland to express significantly lower scores of weight bias among obese individuals.¹⁵ This showed Iceland to be less weight biased toward obese individuals than the United States and Canada. Behavioral causes of obesity were positively associated with Fat Phobia and UMB-FAT scores in all countries while physiological causes of obesity were negatively associated with both Fat Phobia and UMB-FAT scores in the United States and Iceland.¹⁵ Beliefs about the causes of obesity were divided into subscales including physiological causes, behavioral causes, psychological causes, and environmental causes.¹⁵ The original survey described 11 factors that could contribute to obesity, for example genetic factors, overeating, poor nutritional knowledge, and physical inactivity, in which participants were asked to assess the importance of each factor in causing obesity on a 5 point Likert scale.¹⁵ Beliefs in behavioral causes of obesity were positively associated with Fat Phobia and UMB-FAT scores in all countries while physiological causes of obesity were negatively associated with both Fat Phobia and UMB-FAT scores in the United States and Iceland.¹⁵ Beliefs in environmental causes were negatively associated with both the Fat Phobia and UMB-FAT scales in Australia.¹⁵ In all three countries, levels of weight bias were higher among participants with stronger beliefs that obesity is a result of lack of willpower.¹⁵

The effects of weight bias are numerous and have been shown in various populations.^{14,16,17,20,30,31} A self-reported study of 394 weight victimized adolescents, those singled out for their weight, in Connecticut aimed to see how they respond and cope with weight

based victimization in schools. Puhl et al. signified BMI, how often weight based teasing arose, the location most prevalent for weight victimization, the emotional reactions to weight based victimization, the coping strategies, and the affect weight victimization has on school performance.²⁰ Forty to fifty percent of all students reported that weight victimization made them feel sad, depressed, worse about themselves, bad about their body and angry.²⁰ Of the participants, females reported significantly more negative affect in response to weight victimization than males.²⁰ Furthermore, the study found adolescents who stated that weight victimization influenced them to skip school and also lowered their grades.²⁰ Coping strategies were measured on a 5-point scale with variables including avoidance strategies, health behavior strategies, and coping responses involving increased eating.²⁰ There were many gender differences in the reactions to experiences of weight based victimization. Weight based teasing and the number of teasing incidents was strongly related to avoidance coping strategies among girls, but not boys, however both male and female students with lower grades reported more avoidance coping strategies in response to weight based teasing. Furthermore, in regard to coping strategies like increased food consumption or binge eating, none of the independent observed variables in the model emerged as significant predictors among girls, though a moderate effect was observed in boys.²⁰ Girls however, reported considerable negative emotional responses with increasing incidents of weight based victimization, which was associated with increased use of coping strategies.²⁰

Murakami et al. presented an online survey using Survey Monkey with 394 adults that analyzed attitudes of different groups of people.¹⁶ The participants were randomized to read vignettes describing an accepting or non-accepting target, a 21 year old female, who was either obese or normal weight in a 2 X 2 between-subjects design.¹⁶ All vignettes were made precisely

the same in details other than weight status or body satisfaction.¹⁶ Participants were evaluated using the Fat Phobia Scale, the Anti-fat Attitudes Scale, the Rosenberg Self-Esteem Scale, and Perceived Psychopathology items. ANOVA revealed no differences between randomized experimental groups for BMI, age, ethnicity, or gender. The Fat Phobia Scale showed that obese targets had elicited greater stigma than normal weight targets.¹⁶ Weight emerged as a main effect on the Anti-fat Attitudes Willpower Subscale, such that obese targets were rated as having lower willpower than normal weight targets.¹⁶ Additionally, acceptance emerged as a main effect on the Anti-fat Attitudes subscale such that non-accepting targets were rated as having lower willpower than accepting targets. non-accepting targets. Weight accepting targets were less stigmatized, mentally healthier and had higher self-esteem than non-accepting targets in terms of the Rosenberg Self Esteem Scale and perceived psychopathology items.¹⁶

Schvey et al. looked at hormonal effects on women to see if salivary cortisol altered in response to exposure to weight stigmatizing stimuli.³⁰ One hundred and twenty-three women from a university in the northeastern United States were randomized to either a stigmatizing or neutral video condition.³⁰ The stigmatizing video consisted of a 10 minute compilation of 24 clips where overweight and obese women are depicted in stereotypical ways, while the neutral video depicted 20 emotional neutral scenes about the invention of the radio, commercials for household products, car insurance and etc. A one-way ANOVA revealed no group differences between the stigmatizing condition and the neutral condition in age, race, BMI, antifat attitudes, or baseline positive affect.³⁰ Participants who watch stigmatizing video had higher baseline depression, perceived stress, and pretest negative affect when compared with those viewing the neutral condition, though baseline cortisol levels did not differ between groups.³⁰ Stress was the only psychological variable that was significantly associated with baseline cortisol level.³⁰ The

study anticipated some decreases in salivary cortisol levels for all participants regardless of condition, thus results focused on degree of change in cortisol level from prevideo to postvideo.³⁰ Results concluded that those viewing the stigmatizing video experienced a significantly smaller decline in cortisol level from pre to post-video compared to those viewing the neutral video, regardless of body weight.³⁰ Those who viewed the stigmatizing video were significantly more upset, anxious, angry, and sad after the video compared to those who viewed the in neutral video.³⁰ Thus, those in the stigmatizing condition experienced sustained cortisol elevation, whereas those in the neutral condition experienced a greater decline from prevideo to post video.³⁰

Pearl et al. aimed to evaluate impact of a weight stigmatizing media on exercise intentions, motivation, and behavior, as well as to examine the interaction between this exposure and past experience with weight stigma.¹⁴ Seventy-two women were randomly assigned to a stigmatizing video or a neutral video.¹⁴ The participants were asked whether they preferred taking the stairs or elevator before they completed the measures of exercise intentions, motivation, and behavior questions.¹⁴ A follow-up survey was sent to participants 1 week later to assess exercise behavior and intentions.¹⁴ Results showed that frequency of past weight stigma correlated with worse psychological well-being and more controlled exercise motivation.¹⁴ There were also significant interactions between past weight stigmatizing experiences and exposure to the weight stigmatizing video for outcomes of exercise intentions, behavior, and drive for thinness.¹⁴ This could very much mean that past experiences of weight stigma interact with exposure to weight stigmatizing media to increase exercise intentions and behavior, although it is accompanied by a heightened drive for thinness that may increase risk for long-term negative health consequences.¹⁴

Swift et al. designed a study to see the effects of educational films designed to reduce weight stigmatization toward obese patients' on trainee dietitians' and doctors' attitudes.¹⁷ The study was a pre-post experimental design with a 6 week follow up consisting of an intervention group of 22 participants and a control group of 21 participants. The goal was to assess the efficacy of brief anti-stigma films in reducing weight bias and to test whether future studies are feasible.¹⁷ Results showed that participants at baseline demonstrated above average levels of weight bias, using the Fat Phobia Scale, on both implicit and explicit attitude measures and that obesity is a person's control.¹⁷ Post-hoc paired samples t-tests revealed that weight bias significantly decreased between baseline and post-intervention in the intervention group, indicating less weight bias, but there were no differences in weight bias scores between baseline and the 6-week follow up.¹⁷ The intervention films significantly improved explicit attitudes and beliefs toward obese people, but not implicit anti-fat bias based off the Fat Phobia Scale. At baseline, participants achieved a mean Anti-Fat Attitudes 'willpower' subscale score of 5.6, indicating explicit weight bias.¹⁷ There was no significant difference in scores at baseline but the intervention had lower scores than the control at both post intervention and the 6 week follow up indicating a lower level of explicit weight bias.¹⁷

Weight bias is seen in terms of explicit and implicit bias. Explicit biases are intentional and conscious and are assessed using self-reported measures, while implicit biases are automatically activated, may occur unconsciously.³¹ In health care professionals specifically, there has been evidence that there is explicit negative attitudes toward overweight and obese individuals and these attitudes often lead overweight or obese individuals to internalize the bias.³¹

There may be speculation to whether weight bias could promote weight loss toward patients. Carels et al. explored the relationship between weight bias and weight loss treatment outcomes and hypothesized that greater implicit and explicit weight bias would be associated with a greater program attrition, lower weight loss, poorer self-monitoring adherence, lower daily exercise levels and overall caloric expenditure, greater daily caloric intake, and a smaller daily caloric deficit among overweight/ obese treatment-seeking adults.³² Forty-six overweight/obese adults were recruited from a newspaper and email list at Midwestern University and were to electronically report daily energy intake, exercise, and energy expenditure. All participants began a 18 week self-help behavioral weight loss program, BWLP, with an energy expenditure tracker, a LEARN weight loss manual, and written verbal instructions on how to self-monitor and report diet and physical activity.³² They were instructed to read a chapter of the LEARN manual each week, self-monitor and report diet and physical activity, create a 500 calorie per day deficit through diet and physical activity and given a 2.5% weight loss goal for the first 6 weeks of the program.³² Of the participants who lost the 2.5%, they further completed the remaining 12 weeks of the program and were given a maintenance intervention manual to be used after completion of the LEARN program. Results indicated IAT survey completers had significantly lower average BMI than non-completers and that completers were more likely to be Caucasian and female.³² Greater negative personality traits, like lazy or bad, among obese people was associated with higher attrition and was only the attribution of fewer positive traits to obese people that predicted poorer weight loss during the self-help phase.³² Among those that proceeded through the entire 18 weeks, greater implicit bias was associated with poorer weight loss between week 7 and 18. During the first 6 weeks, more positive traits, like good or motivated, toward obese persons was associated with more frequent

participant self-monitoring, lower daily caloric intake, and greater daily exercise and directly the opposite for those with more negative traits. Greater weight bias was associated with inconsistent self-monitoring, greater caloric intake, lower energy expenditure and exercise, creation of a smaller caloric deficit, higher program attrition, and less weight loss during the self-help phase of the stepped-care treatment.³² These results conclude that relationships among weight bias, self-monitoring, and energy intake and expenditure are related.³²

The effects of weight bias are too numerous to count, due in part to groupings of different diet related, psychological related and hormonal related outcomes. Though some effects of externalized weight bias include depression, anger, low self-esteem, binge eating, loneliness, the drive to be thin, and use of alcohol or drugs to cope with stress.^{14,16,20,30,33}

Apart from external bias, there have been multiple studies on the effect of internalized weight bias.^{6,7} Latner et al. compared the Weight Bias Internalization Scale (WBIS) on 120 participants, who were overweight or normal weight, to the short form SF-12, a measure for the health related quality of life (HRQoL). The WBIS scale assesses the degree to which respondents believe that negative stereotypes and negative self-statements about being overweight are believed to themselves.⁶ The WBIS scores were significantly correlated with both the physical health (PCS) and mental health (MCS) subscales of the SF-12.⁶ The higher the WBIS score, the lower the PCS score, revealing greater physical health difficulty and lower MCS scores revealing greater mental health difficulties.⁶ In further recognition of internalizing weight bias, persons who believed weight based stereotypes to be true reported more frequent binge eating and refusal to diet, in response to stigma experiences compared to those who reported stereotypes to be false.⁷ The given results were not related to the amount of stigma experienced, self-esteem, depression, or attitudes toward obese persons.⁷

Certain questionnaires and scales are used to measure internalized weight bias. The Anti-Fat Attitudes Questionnaire has shown internalized weight bias in overweight and obese individuals using its' three subscales; dislike, willpower, and fear of fat. The Fat-Thin IAT is used to measure automatic self-stigma and compares the length of time that respondents use to categorize images of fat and thin people with positive and negative words. Phelan et al. used both the Anti-Fat Attitudes Questionnaire and the Fat-Thin IAT to assess the internalization of weight bias in overweight individuals.³³ Among explicit self-stigma measures in overweight individuals, explicit dislike of fat people was associated with anxiety, depression, loneliness, and use of alcohol.³³

Weight bias toward overweight and obese individuals continues to be depicted by future/current health care providers. A study to assess weight bias in students, took 297 undergraduate dietetic students in a randomized, experimental, between subjects design with four experimental conditions.³ The four experimental conditions depicted a hypothetical patient, being either an overweight/normal weight male and overweight/normal weight female, only differing in sex, weight, BMI, percentage body fat. All four condition group's patients had the same blood pressure, blood cholesterol, fasting blood glucose, energy intake, fiber intake, physical activity, sleep habits, and perceived stress levels.³ Dietetic students were asked to rate the patient's dietary quality, overall health status, energy intake and also complete the Fat Phobia Scale. There were no significant differences across conditions in dietetic students in terms of weight bias from the Fat Phobia Scale.³ Though, the mean score of all students showed to be 3.7+/- 0.51 representing weight bias as a whole, which means there are instances of weight stigma in dietetic students. The majority of students agreed that obese individuals have poor self-control, lack endurance, have low self-esteem, tend to overeat, are unattractive, slow, insecure, and inactive.¹⁵

Dietetic students also rated obese patients as being less likely than non-obese patients to comply with treatment recommendations.^{3,5}

Weight bias is prevalent among health and non-health studies majors.^{3,18} Berryman et al. examined weight bias differences between 38 dietetic students and 38 non-health major students from Ohio University.¹⁸ These participants completed the Fat-Phobia Scale and the Block 98 Food Frequency Questionnaire and height, weight, BMI, and percentage body fat were measured. This was to assess if BMI was correlated with the Fat Phobia Scale. Both groups had mean BMI values within the healthful range and mean percentage body fat classified as moderately lean.¹⁸ The two groups were not significantly different when comparing overall scores on the Fat Phobia Scale. The mean score for dietetic majors was 3.66 and 3.69 mean score for nondietetic majors.¹⁶ This means both dietetic majors and non-health majors express weight stigma toward obese individuals. Assessing individual scores showed that 13% dietetic majors and 3% of non-dietetic majors scored a 2.5 or less, indicating lower weight stigma.¹⁸ An equal number of students from both groups (16%) had a score of 4.4 or more, indicating a very high level of weight stigma.¹⁸ Another study compared students' weight bias of health and non-health majors and showed non-health students were more likely to report obese persons as lacking willpower, possibly having to do with lack of obesity education.³⁴

In another study, Hayran et al. examined the attitudes about obesity among a sample of University students from both the departments of Health Sciences and Fine Arts.⁴ Three-hundred and five first and second year college students answered sociodemographic, height, weight, and a short form of the Fat Phobia Scale. T-tests were analyzed and the mean fat phobia scale depicted a value of 3.57 +/- 0.69 which indicated a weight bias towards obese individuals due to the fact that a score above 2.5 is considered to be weight bias. In this study, they concluded that the mean

score of fat phobia was higher in underweight students than obese students.⁴ Negative adjectives used in the Fat Phobia Scale that showed the most amount of phobia from ascending to descending order are as followed; likes food, overeats, slow, inactive, no will power, and shapeless.⁴ This means that students related overweight/obese individuals as being more likely to like food more than being shapeless. This also showed that fat phobia is common among university students and that women were to be more fat phobic than men.⁴

Tomiyama et al. measured anti-fat bias in obesity specialists examining both explicit bias and implicit bias.⁹ This study was a continuation of Schwartz's et al. study that concluded obesity specialists were against fat but pro-thin in both implicit and explicit biases using the IAT.⁸ The obese specialists explicitly endorsed obesity related stereotyping on traits of lazy, stupid, and worthless.⁸ Tomiyama et al. and Chambliss et al. both investigated the pairing words such as good and bad with lazy/motivated, stupid/smart, and worthless/valuable towards obese individuals.^{9,11} Results showed higher levels of explicit anti-fat bias and lowered levels of implicit anti-fat bias, though still significant amount of implicit anti-fat bias due to a belief in greater personal responsibility for obesity being associated with stronger lazy bias.^{9,11} Using the Anti-fat Attitudes Test, the belief in less personal responsibility for obesity, positive history of obesity, and having an obese friend were associated with lower anti-fat scores.¹¹

Weight stigma can impact binge eating disorder and obese persons experience high levels of dieting, eating, and body image concerns.^{20,35} Puhl et al. demonstrated weight bias among professionals who treat eating disorders.⁵ The study analyzed 371 mental health professionals through an anonymous online survey which incorporated the Fat Phobia Scale and the UMB-FAT scale. In terms of explicit measures of weight bias, the presence of negative stereotypes toward obese persons was present in terms of having poor self-control, having no willpower,

being self-indulgent, unattractive, inactive, insecure, and tend to overeat.⁵The UMB-FAT scale assessed the attitudes about treating obese patients and perceived treatment outcomes revealing that high percentages of professionals agreed it is important to treat obese patients with compassion and respect, meaning there is a lower percentage of negative attitudes toward treating obese patients.⁵ Using the Fat Phobia Scale, weight bias was positively associated with beliefs that obesity is caused by behavioral traits and increasing weight bias was positively associated with an increase in scores both for negative attitudes about treating obese patients and perceived frustrations in treating obese patients.⁵ In terms of predictors of weight bias, participants with a higher BMI had lower weight bias scores and those trying to lose weight had higher levels of weight bias than those not trying to lose weight.⁵

In terms of honesty toward weight bias, it is uncertain whether a participant is telling researchers their actual viewpoint or whether they are telling researchers what they want to hear. The Social Desirability Survey and Social Approval Survey have been used to test personality traits related to participants honesty and self-reported physical activity.²⁷ Eighty-one participants were separated into one of two types of 7-day physical activity recalls (PARs). Results showed that there was an increase social desirability score along with an overestimation of physical activity for the PAR 2 women in the 75th percentile compared to the 25th percentile of the social desirability test. There was also an association with increased social desirability and overestimation of duration of light activity (PAR 2) and moderate activity (PAR 1 and PAR 2).²⁷ Though, hypothesized that women would have higher social approval scores with the reporting of high levels of activity, this was not the case and was suggested to be seen on women with a BMI of 27 or higher.²⁷ The social desirability survey can be used to compare self-reported error, bias, or honesty to other tests.

While the prevalence of weight bias and its effects have been documented thoroughly across many different populations, minimal information is known comparing weight bias between freshman and senior undergraduate level students who strive to become future health care professionals. Replicating Rebecca Puhl et al. “Weight bias in dietetic students: Implications for treatment practices” will allow us to see if weight bias exists at different levels between different majors and levels of educations. The addition of the social desirability scale, EAT-26, and the self-efficacy will also give rise to honesty about ones feelings, if one’s own eating behaviors influence treatment recommendations, and if one believes in their capacity to execute behaviors necessary to produce specific performance attainments on their patients. One can conclude that a large sample size would be most favorable and that using the Fat Phobia Scale will contribute to literature on weight bias. The purpose of this study is to assess the prevalence of weight bias in freshman and senior level undergraduate students at The University of Memphis that will become future health care professionals. There may also be a correlation of weight bias with type of major, age, sex, year in school, BMI, and ethnicity.