Weight Bias in Pre-Professional Health Students

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WEIGHT BIAS IN PRE-PROFESSIONAL HEALTH STUDENTS

A Dissertation Presented
by
HEATHER A. WEMHOENER

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

DOCTOR OF PHILOSOPHY
September 2023
School of Public Health and Health Sciences
Department of Nutrition
WEIGHT BIAS IN PRE-PROFESSIONAL HEALTH STUDENTS

A Dissertation Presented
by
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ABSTRACT

WEIGHT BIAS IN PRE-PROFESSIONAL HEALTH STUDENTS

SEPTEMBER 2023

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Weight bias includes negative attitudes or judgements towards people in larger bodies. It is associated with poor health outcomes.

Weight bias is highly common in the United States, and pre-professional health students are known to exhibit it. Given its impact, finding effective interventions to reduce weight bias is important.

The first paper reviewed literature on existing interventions for weight bias reduction. The search revealed three main intervention types: targeting attributions, increasing empathy, and targeting social consensus. Interventions, regardless of strategy, yielded mixed results for weight bias reduction, and, in some cases, increased bias.

The second paper tested a novel intervention to reduce weight bias using a case study approach to measure bias. We randomly assigned 153 students enrolled in pre-health courses to receive a novel, a conventional, or a control intervention before responding to questions about a case study patient with obesity. Contrary to our hypothesis, we found that the conventional group ($M=3.65$, $SD=0.91$) rated weight as less important on overall health compared to the control condition ($M=4.17$, $SD=0.82$, $p=.025$)) and the control group ($M=3.28$, $SD=1.02$) had significantly lower interest in working with the case study patient than the conventional group ($M=3.74$, $SD=0.97$, $p=.007$).
The third paper was a content analysis of the presentation of case study patients in nutrition counseling textbooks. We used the University of Massachusetts Amherst Libraries Global Online Bibliographic Information (GOBI) database to search for nutrition counseling textbooks published between 2009-2019 in English in the United States. The textbooks (n=3) were then reviewed, and individual case study patient data therein were analyzed.

This study found a lack of diversity in weight status, with 60% of case study patients with overweight or obesity, only 20% described as healthy weight, and no case study patients with underweight. Case study patients were also exclusively described in gender binary, and gender-based stereotypes about occupation were noted in the texts.

Together, the results of these studies show a need for further research into effective ways to reduce weight bias. The results also suggest a need to explore other types of biases that may be reinforced in college textbooks.
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CHAPTER 1 INTRODUCTION

Introduction

Many definitions exist for weight bias and weight stigma; both are related concepts that can lead to discrimination. In this paper, weight bias is defined as negative attitudes or unreasonable judgements towards people based on their body weight and size, while weight stigma is a result of weight bias wherein stereotypes drive social rejection of the targeted person or group.1–3 Weight bias and stigma have deleterious effects on physical and psychological health,4,5 as well as educational and professional opportunities6,7, and may lead to even further weight gain.8–11 Given this, reducing such bias has the potential to impact quality of life, eating patterns, and health outcomes for overweight and obese people.

Weight bias is highly prevalent in the United States.12–14 including among those studying or working in health care15–18 Because these students and practitioners are very likely to work with obese clients in their careers, and given the impact of weight bias on health,2,4,8 finding ways to decrease bias among students before they become practitioners is important for improving patient care and, arguably, health outcomes.

The etiology of weight bias is complex, but is thought to be due, at least in part, to the tendency to view obesity as a consequence of personal choice rather than systemic factors.19 Unfortunately, bias reduction efforts to date show limited success,19,20 and targeting awareness of non-controllable risk factors, especially in short-term interventions, may increase explicit weight bias.21 Thus, a shift towards longer, repeated interventions targeting both increased awareness of stigma and shifting social norms may be more effective.

The Health-at-Every-Size (HAES) model provides an evidenced-based alternative narrative on health and weight status that centers on weight neutral approaches to health,22–24 and thus may address
weight bias via stigma reduction.\textsuperscript{5,25} Despite HAES success in improving the well-being of overweight and obese adults,\textsuperscript{22,24,25} there is limited data on its usefulness for bias and stigma reduction.\textsuperscript{26,27}

**The Language of Body Size**

Overweight and obese are clinical terms used to classify body mass index (BMI) categories for an individual, usually in medical or public health settings. The Centers for Disease Control and Prevention (CDC)\textsuperscript{28} describes BMI as a calculation of body weight (in kilograms) divided by height (in meters\textsuperscript{2}) and classifies adult individuals as either underweight (BMI < 18.5kg/m\textsuperscript{2}), healthy weight (18.5-24.9kg/m\textsuperscript{2}), overweight (25.0-29.9kg/m\textsuperscript{2}) or obese (>30.0kg/m\textsuperscript{2}, with further divisions for class I 30.0-34.9kg/m\textsuperscript{2}, class II 35.0-39.9kg/m\textsuperscript{2}, and class III >40kg/m\textsuperscript{2} obesity). These terms define a weight-to-height ratio, but not a human experience of the body. Weight bias is usually aimed at people with visible adiposity, thus making body fat a phenotypical presentation of otherness in a society that favors thinness.\textsuperscript{6,13} To this end, public figures and online forums focusing on size acceptance,\textsuperscript{29–31} as well as those writing in academic literature focused on social justice,\textsuperscript{5,6,32} use the term “fat” to describe this group of people. This use of the term fat is in contrast to the disparagement associated with the term as a slur. It is also of note that some argue against the use of the words overweight or obesity and reject defining obesity as a disease.\textsuperscript{33} or respond negatively to the term obese.\textsuperscript{34} In this paper, I will use the terms “overweight” and “obese” in reference to measured BMI or when citing medical literature, and the term “fat” in the context of literature on social justice and prejudice using this language.

**Obesity: Prevalence and Impact**

Prevalence of obesity based on a BMI \textgreater 30kg/m\textsuperscript{2} among adults in the United States from 2017-2020 was 41.9\%.\textsuperscript{28} Obesity is an important public health target as it is associated with a number of other chronic diseases, including cardiovascular disease, type 2 diabetes, and certain types of cancer.\textsuperscript{28,35–37} In
addition to the health consequences people with obesity are often targets of weight bias,\textsuperscript{3} which also has significant effects on health and well-being.\textsuperscript{2,4,8,9}

It is important to note that BMI does not directly measure health, nor is a consistently accurate predictor of risk.\textsuperscript{38} The equation fails to account for age, race, and gender, and was developed using non-Hispanic white populations.\textsuperscript{39} Although BMI is significantly correlated with adiposity in the general United States population, it does not work as well to predict body fat of individuals.\textsuperscript{40} Responding to these limitations, in June 2023 The American Medical Association (AMA) adopted a new policy clarifying the use of BMI in medical practice encouraging physicians to use the metric in conjunction with other measures of adiposity.\textsuperscript{40}

**Weight Bias**

Weight bias is important from both social justice and public health standpoints, as the experience of such bias is associated with poor eating behaviors and psychological disturbances,\textsuperscript{8,9} as well as inequities in work, legal,\textsuperscript{42,43} and educational settings.\textsuperscript{44,45}

As with other types of bias weight bias is an intersectional issue, meaning that weight bias should be viewed through multiple social categories into which a person can fall.\textsuperscript{39,46} For example, a person can identify as fat and also a woman. These social categories, including body size, gender, sexual orientation, socioeconomic status, race, etc., interact with one another to shape the experience of each individual. Despite the more well-documented effects of weight and gender,\textsuperscript{6,41,42,44} there is relatively little known about how other social categories interact with weight status.\textsuperscript{39}

Himmlestein et al.\textsuperscript{39} examined the relationship between body size, race, gender, and coping with weight stigma among 2,378 adults in the United States using a cross-sectional study. Participants were surveyed about their weight, height (weight and height were used to calculate BMI), race, gender, income, and experience of weight stigma. For those who reported weight stigma (40.7%), the
researchers also asked about internalization of weight bias using the Modified Weight Bias Internalization Scale\textsuperscript{47} and coping responses to that stigma. Coping mechanisms were divided into four categories: 1.) disordered eating, 2.) negative emotions, 3.) eating (overeating in response to weight stigma or eating more food), and 4.) avoidance behaviors (avoiding physical activity or eating in front of others).

The researchers found no differences in weight stigma as a function of race or gender; however, women reported higher weight bias internalization ($p=0.004$). Black men and women reported less weight bias internalization than white men and women ($p=0.009$). Also, compared with white women, Black women were less likely to cope with stigma using disordered eating ($p=0.001$), while Hispanic women were more likely to cope with stigma using disordered eating ($p=0.020$). The study also found that Black men were more likely than White men to overeat as a consequence of the stigma associated with weight ($p=0.017$).

These results suggest that weight bias is prevalent across the racial groups included in this study. This is in line with findings that weight bias is prevalent in the United States.\textsuperscript{12–14} What does differ is the internalization of weight bias, and how people across races and genders cope with weight stigma.

**Measuring Weight Bias**

Being able to identify and measure bias is necessary to understand who has weight bias and to what extent, and for measuring the success of campaigns aimed at decreasing bias. Before discussing the existing tools used to measure bias, it is important to understand the ways in which bias manifests. Weight bias may present explicitly or implicitly.\textsuperscript{2} Explicit bias is conscious, purposeful prejudice based on weight, while implicit bias is defined as bias that is activated automatically or unconsciously.\textsuperscript{48}

Explicit bias is typically measured by asking people directly about their beliefs or attitudes about obesity.\textsuperscript{48} Researchers commonly use the Fat-Phobia Scale (FPS) short form\textsuperscript{49} to measure explicit bias.\textsuperscript{50–}
Validation and reliability of the FPS has been demonstrated by Bacon et al.\textsuperscript{49} against their previously longer-form survey (50 questions). Cronbach’s alpha 0.87 and 0.91 for the long and short-form surveys, respectively. The short-form FPS is a 14-item questionnaire that presents respondents with a scale that corresponds to how strongly they feel a word describes fat people. Each item has a pair of words (ex: lazy, industrious), with one word each end of the scale (see Appendix B). Respondents are asked to mark where on the scale they feel best describes fat people. In the lazy/industrious example, one would mark closer to the “lazy” end of the scale if one believed that word best described fat people, or mark closer to the “industrious” end of the scale if that word best describes fat people. Each spot on the scale has a corresponding number, 1-5. At the end of the test, numbers are scored by the researcher to yield a measure of how much a respondent likes or dislikes obese people, based on their responses to the survey.\textsuperscript{49} FPS is scored by totaling the numbers that correspond to each item response, with response for questions 3, 4, 5, 6, 7, 10 and 12 reverse scored and questions 1, 2, 8, 9, 11, 13, and 14 scored as recorded. The total score is then divided by 14. Possible scores range from 1 (lowest explicit weight bias) to 5 (highest explicit weight bias).\textsuperscript{49}

Other validated measures of explicit bias include the Antifat Attitudes Test (AFAT)\textsuperscript{54} and the Beliefs about Obese Persons (BAOP) scale.\textsuperscript{55} These tools are similar to the FPS\textsuperscript{49} in that they ask participants how strongly they agree with provided statements about obese people. The measures gauge the bias that people self-report. (See Appendix B for copies of these scales).

The AFAT\textsuperscript{54} presents a Likert scale from “strongly disagree” to “strongly agree” and asks participants to mark which statement best describes their own circumstance or attitude for 47 total questions. This questionnaire is subdivided into three subscales: 1.) social/character disparagement, 2.) physical/romantic unattractiveness, and 3.) weight control/blame, allowing for analysis observing differences in one or more of the subscales.\textsuperscript{54} Responses are coded numerically, reverse-coded where necessary, and tallied, with higher scores indicating higher anti-fat attitudes.
The BAOP\textsuperscript{55} is a survey that presents a scale from \(-3\) (strongly disagree) to \(+3\) (strongly agree) at the top of the page, and then directs participants to assign a number along the scale to a series of eight statements. The statements are all related to beliefs about the diet, lifestyle, and personality characteristics of obese people. Researchers use the numeric data to tally a score for the survey, with higher scores indicating stronger beliefs that obesity is under one’s personal control.

Researchers have also developed their own questionnaires to measure explicit weight bias, or present case study\textsuperscript{53} or vignette scenarios\textsuperscript{56} to assess responses to a theoretical obese patient. Case studies or vignettes provide an important measure of how a study participant would actually act in their capacity as a health professional. This information goes beyond beliefs to measuring behavioral intent. Although case study scenarios may be useful in capturing behaviors, they do not necessarily capture more subtle aspects of patient-provider interactions, particularly non-verbal communication which may be important to how patients experience bias.

Implicit weight bias is an unconscious response to obese people, so it is measured differently than simply asking participants for their attitudes or opinions. Implicit bias has been measured using the Implicit Associations Test (IAT)\textsuperscript{\textsuperscript{57}} (see Appendix C),\textsuperscript{57} developed and validated\textsuperscript{58} to test response time to images associating some characteristic of a person (race, weight, etc.) with good or bad words flashed on a computer screen. Stronger associations between representations of fat people with negative words is shown through quicker response times linking the picture of an obese person with the negative descriptor.\textsuperscript{57} It is important to note that while the IAT measures implicit bias, this does not necessarily correlate with bias that is expressed explicitly (\(r=0.25\)).\textsuperscript{58} This may mean that what people feel unconsciously differs from what they will report when asked explicit questions about a subject, particularly if it is socially unacceptable to hold certain explicit views (as is the case with racism).\textsuperscript{48,59}
IATs are set up with seven rounds, designed to vary the order of the attributes and targets presented. Generally, the participant is asked to place both hands on a keyboard with a standard QWERTY order, holding their index or middle fingers on the “e” and “l” keys, where hands would typically be placed for typing. Participants are asked to push “e” and “l” as a test of keyboard function and ability to read test instructions. Following the initial instructions, the screen flashes pictures or words and the participant is asked to click either “e” or “l” to match the picture or word to the appropriate attribute. Although IATs can be set up in different ways, a common IAT for weight bias is a “good/bad” IAT, wherein associations with goodness or badness and some attribute (in this case, body weight) are measured. Faster associations, as measured by faster clicking of the “e” or “l” key indicate a stronger implicit association between goodness/badness and the attribute of interest.

**Consequences of Weight Bias**

Weight bias affects quality of life, especially for people classified as obese who face discrimination from employers, coworkers, teachers, and others. This discrimination appears to have a gender component, as women with obesity are affected more by weight bias and earn less money than men with similar BMI or normal weight individuals.

Weight bias has financial effects through job salary and hiring practices that may be affected by prejudice. Mason conducted a review of salary differences between obese and normal weight people using data from the National Longitudinal Survey of Youth 1997-2008 (n = 2427, with 1,196 women and 1,231 men). Results from this review suggest that obese women earned an average of $15,220/year compared to $18,948/year earned by non-obese women. Women who were in the obese class II or III categories earned an average annual income of $14,592 compared to $18,659 earned by women in lower BMI categories. For men, being in the obese class II or III categories was also associated with
lower income. Men in the obese class II and II BMI categories earned an average of just $16,166/year compared to thinner men who earned an average salary of $25,406/year.6

While the Mason review shows differences in pay scale,6 other data indicate differences in hiring.41 Flint et al.41 sampled 181 participants working in jobs requiring various levels of physical activity and strength. Jobs included were divided into “sedentary”, “standing”, “manual”, and “heavy manual” categories, with “heavy manual” being the most physically demanding jobs. The participants were presented with curriculum vitae and, in one experiment, a photo of a potential job candidate and asked to rate the candidate’s suitability for being employed alongside the participant at their job. Candidate photos included men and women who were normal weight and men and women who were obese. When candidate photos were shown, obese candidates were rated less suitable than normal weight candidates. Additionally, obese female candidates were rated less suitable than men of any weight.41

Weight bias also has effects in educational settings and may impact student success and the way teachers view students. Queally et al.44 used data from the first wave of the Growing Up in Ireland Survey to assess whether teachers’ assessments of nine year old students were affected by the child’s weight or the weight of the child’s mother. Teachers’ perceptions of students’ reading ability (n= 6,463 children) and math ability (n=6,518 children) were measured. While BMI in the children themselves did not impact teachers’ assessments of their abilities, children with obese mothers were more likely to be rated as below average in reading (p<0.001) and math (p<0.001) compared to children with thinner mothers. This association included adjusting for measured reading and mathematical ability in the children, indicating that the teachers’ assessments were not based on actual intellectual capability.44 This study provides another example of the impacts of gender on weight bias.

While Queally et al.44 did not find an effect of children’s weight status on teachers’ perceptions, Kenney et al.45 did find that increase in BMI z-score was associated with poorer teacher perceptions of
students (male and female) regardless of objectively measured ability using standardized test scores. The authors in this study used a longitudinal analysis, measuring both change in BMI z-score and change in teacher perceptions on 3,362 children participating in the Early Childhood Longitudinal Study from their fifth to eighth grade years in the United States. When adjusted for standardized test scores, an increase in BMI z-score was associated with significantly lower perceptions of girls’ reading abilities (p=0.03) and boys’ math abilities (p<0.001).

Although the studies noted above focus on children’s experience of weight bias, the findings are relevant to adults. These findings demonstrate how early the experience of weight bias begins. If eating behaviors are negatively impacted by weight bias⁸,¹¹, then children in the Kenney study would likely be subject to poorer eating behaviors and self-esteem, and these effects would begin early in their lives. This increases the risk for overweight or obesity in adulthood through overeating, which in turn, makes them more likely to experience weight bias. The experience of bias and being judged as less capable by teachers could also impact opportunities for children, possibly including college admissions, career prospects, and long-term success.

In addition to discrimination in employment and educational settings, people with obesity may also face legal consequences from discrimination. White et al.⁴³ found that participants (n=185 undergraduates at Midwestern University) acting the role of jurors were significantly (p<0.01) more likely to report a plaintiff’s weight entered into their perception of personal responsibility for a traffic accident. Participants were presented with an overweight plaintiff versus a thin one in a vignette scenario of a traffic accident where participants were randomly shown either a normal weight or overweight silhouette representing the plaintiff using an online survey system.⁴³

Schvey et al.⁴² conducted a similarly designed study using an online survey in which 471 adults assuming the role of jurors were asked to rate the culpability of a defendant in a check fraud case.
Participants were randomly shown one of four images of the defendant: 1.) a lean male, 2.) a lean female, 3.) an obese male, or 4.) an obese female. When the defendant was female, male participants were more likely to find her guilty if she was obese than if she was lean (p=0.015). Male participants were also more likely to state that the obese female defendant was likely to repeat her crime (p=0.019). The authors found no differences in responses about guilt for the other defendants in the scenario.\textsuperscript{42}

Both White \textit{et al.}\textsuperscript{43} and Schvey \textit{et al.}\textsuperscript{42} demonstrate the potential ways bias can affect legal outcomes. These findings, though conducted with hypothetical scenarios, suggest that weight bias influences how people treat one another, or judge character based on appearance. The Schvey \textit{et al.}\textsuperscript{42} study results also highlight a gender component to weight bias in which women are judged more harshly than men.

In addition to the effects of weight bias on work, legal scenarios, and education, there are also effects on psychological and physical well-being.\textsuperscript{4,5,10,61} In a model of the relationship between experiencing weight bias and weight gain, Tomiyama hypothesizes that weight bias is a stressful experience, which leads to alterations in normal hormonal response, and makes binge eating more likely. Binge eating leads to weight gain, which then increases the risk for experiencing weight bias.\textsuperscript{11} (See Appendix A for an image of this model). This cyclic model of weight bias and weight gain evidences the need for effective interventions targeting weight bias for improving public health.

In a 2007 survey of 1,013 women enrolled in a non-profit weight loss group, Puhl, Moss-Racusin, and Schwartz\textsuperscript{61} found participants who internalized weight-based stereotypes were more likely to binge eat than those who did not hold such beliefs. These findings are consistent with the arguments made by Tomiyama\textsuperscript{8,11} and others\textsuperscript{10} regarding the impacts of internalization of weight bias and shame around body weight.
Major and colleagues\textsuperscript{10} found similar results in a social psychology study of 93 female students attending a public university in the United States. The researchers compared eating behaviors of women who were randomly assigned to either read an article on weight stigmatization or a control article. Women who read the weight stigmatization article and perceived themselves as overweight or obese consumed more calories and reported feeling less in control of their food intake than those who read the control article or women who perceived themselves to be normal weight. These findings support the idea that exposure to weight shaming is more harmful than beneficial. Interestingly, this research did not examine the personal experience of weight bias but found detrimental effects to fat women’s eating patterns when they were exposed to reading about bias. This suggests that even being aware bias exists, and not necessarily experiencing discrimination itself may be harmful to health. Another possible explanation is that reading the article brought up personal memories of discrimination for the participants; however, since personal experience was not measured, this cannot be known.

Prejudice or assumptions about body size may also affect well-being in less obvious ways. Physical layouts of doctor’s offices, including small chairs in waiting areas and practices of taking patients’ weight in semi-public clinic spaces where other patients may hear the weight being announced are two common examples of things that may make overweight or obese patients feel unwelcome at an office. This can lead to avoidance of doctor’s appointments.\textsuperscript{62} Not seeking routine care may cause people to miss out on important screening procedures. This may, in turn, increase the likelihood for missing early detection periods for some illnesses.\textsuperscript{62}

Similarly, experiencing stigma may lead to avoidance of exercise,\textsuperscript{63,64} which increases risk for poor health outcomes associated with lower rates of physical activity. This avoidance of exercise can occur in gyms or physical education classes, where weight stigma is common.\textsuperscript{64} Fitness centers hiring only those who meet cultural standards for thinness or perceived physical fitness reinforce the notion of fatness as not belonging in spaces such as gyms, and the idea that fat people are exercise novices.\textsuperscript{65}
In addition to gyms and doctor’s offices, much of public space is ill-designed for large bodies. Too small airline seats, restaurant chairs or booths, and desks in classrooms literally leave many without space in public. Some of these problems; namely, airline seat size, mean customers must purchase two tickets in order to fly, significantly increasing cost. As with avoidance of medical offices, some people may choose to avoid social situations where they risk embarrassment over not fitting into a seat.

**Etiology of Weight Bias**

**Note on the Language of Control**

The following paragraphs describing attribution bias frequently reference the idea of “control” as it relates to body weight and size, focusing on risk factors for obesity that are labeled as being in or outside of the control of an individual. For example, genetic factors are described as being “non-controllable” or “uncontrollable” contributors to obesity, while behaviors such as food intake patterns and physical activity are called “controllable”. It is important to note that these terms may not represent the true nature of an individual’s access or their opportunity to perform so called “controllable” behaviors because these descriptions omit systemic factors that impact health and well-being. In this paper, I will reference language used by the cited researchers, but do so with the understanding that the wording is flawed.

**Attribution Bias**

Understanding the development of weight bias is necessary to decreasing bias and its impact on health. Weight bias and discrimination exist among both the general public and health professionals. This bias may in part be a result of the scientific and social emphasis on dieting and the perception that weight loss is easily attainable through sustained caloric restriction and exercise. This is thought to lead to blaming obese persons who do not successfully lose weight. In keeping with the idea that
weight is under one’s personal control, an online survey of 219 medical residents (53.9% female and 46.1% male) found that those residents who had successfully lost weight demonstrated more weight bias toward case study patients than their peers who had not. The belief in total control over body weight makes weight bias more socially acceptable, or even endorses it. This phenomenon is known as attribution bias, because being fat is attributed to factors under personal control.

While many important strides have been made in the areas of obesity treatment, the reality of weight loss is that despite potential for success, many people struggle to lose weight and/or experience weight regain over time. This can be related to compensatory mechanisms such as decreased non-exercise activity, increased appetite, lack of access to important support and resources for weight loss, as well as the food environment in the United States.

Social Consensus

In addition to attribution bias, a second contributor to weight bias is social consensus, the belief that other members of a group hold the same view on a given topic. For example, in nutrition and public health, the dominant discourse around fatness is that it is an unhealthy state. Nutrition students are exposed to the consensus that obesity is not compatible with health, and that experts in their field also hold this belief. While it is well documented that obesity is associated with chronic disease, some data show obesity is compatible with health, when a healthful diet and lifestyle are adopted. Additionally, it is hypothesized that weight bias may contribute to poor health outcomes (and weight gain), which could mean that bias mediates the relationship between weight status and health outcomes.

Media portrayals help shape and reinforce both attribution and social consensus beliefs about obesity. Through media, the public is exposed to ideas about the eating habits, physical activity patterns and lifestyle of various people, and about effective obesity treatment. In a 2011 study, Heuer,
McClure, and Puhl conducted a content analysis to investigate how fat people were represented in pictures in online news stories about obesity. In this study obese people were more likely to be shown eating/drinking than normal weight people. There were also differences in the way obese people were presented in terms of dress. Obese people were more likely than non-obese people to be shown with their bodies not fully dressed and less likely to be pictured wearing professional clothing. Continued exposure to this representation of fat people can reinforce stereotypes about eating habits, professionalism, and laziness among obese people.

These negative portrayals are important, as viewing images of obese people that reinforce stereotypes may increase bias. In another media study, McClure, Puhl, and Heuer found that participants (n=188) had higher fat phobia when shown images of an obese woman eating junk food than when they were shown images of an obese woman exercising or not shown a photo along with a news article on obesity prevalence. These findings suggest that media plays a role in influencing weight bias in the United States culture. It is important to note that in this study the news article itself was neutral in terms of its presentation, and that the picture alone seemed to impact fat phobia.

Media images that frame body weight as a consequence of personal choices may make shaming people about their weight status acceptable. A content analysis of 417 YouTube clips related to obesity by Yoo and Kim revealed that 43.6% of video clips analyzed cited personal behaviors as the cause of obesity and 42.4% cited behaviors as the solution. Interestingly, about 20% of clips also contained some weight-based teasing as a theme, for example, via verbal jokes about obese people. Viewers who are repeatedly exposed to these clips may get the impression that personal responsibility alone is the cause of and solution to the increasing prevalence of obesity. This can manifest in blaming obese people for their body weight.
Television programs such as *The Biggest Loser* increase the likelihood of viewing body weight as being under one’s personal control\(^85\) and can increase weight bias after as little as one viewing.\(^86\) Yoo\(^85\) found that viewing *The Biggest Loser* show led to an increased belief that body weight is under personal control among 684 undergraduate students at a Midwestern university. Although this study did not directly measure weight bias among participants, believing that obesity is a problem stemming from lack of personal control or weight loss efforts is one way that weight bias forms and is reinforced.\(^87\)

There is evidence that viewing *The Biggest Loser* directly increases weight bias.\(^86\) In a 2012 paper, Domoff et al.\(^86\) measured weight bias in a randomized control trial after exposing 59 participants to an episode of either *The Biggest Loser* or *Meerkat Manor* (a weight-neutral program about meerkats). The authors found that those participants who had viewed 40 minutes of *The Biggest Loser* had significantly higher levels of dislike for overweight and obese individuals \((P = 0.04)\). Interestingly, this effect was noted to be stronger among participants with relatively lower BMIs.

This chapter has provided an overview of weight bias, including its impact on health and how it is measured. This chapter also introduced the etiologies of weight bias that may be targeted in literature on bias reduction. The next chapter presents a literature review of the prevalence of weight bias among health care providers and pre-professional health students, as well as research on interventions to reduce weight bias in these populations.
CHAPTER 2 LITERATURE REVIEW

**Weight Bias among Healthcare Professionals**

Health care practitioners are not immune to weight bias. The presence of this bias can influence the quality of care overweight and obese patients receive, which ultimately influences health outcomes. Gaining insight into which practitioners are prone to bias and how it can affect clients is therefore critical to improving patient outcomes.

Weight bias is prevalent in the general population, as well as among current and future health care practitioners. Phelan et al. measured implicit and explicit bias in a national sample of 4732 male (50%) and female (50%) first year medical students in the United States. Implicit bias was assessed with the IAT, and explicit measures were taken with the AFAT and a feeling thermometer. A feeling thermometer is a validated scale that asks participants to identify where on a continuum of feeling “very cold or unfavorable” to “very warm and favorable” they would rate their feelings toward a given group of people. The scale is labeled numerically as well as by descriptors for coldness/warmth, from 0-100, by increments of 10, with 0 being on the “very cold or unfavorable” extreme and 100 being assigned to the “very warm and favorable” end. Scores below 50 are generally considered cold feelings and those greater than 50 are considered warmer.

The study found 74% of participants exhibited implicit bias with mild, moderate, or strong preference for thinness. The authors note that 32% of participants had a strong preference for thinness on the IAT. Sixty-seven percent of participants reported explicit bias with the AFAT and feeling thermometer measures. Explicit weight bias was associated with being male and younger age. Younger age was also associated with dislike, blame, and fear of fat. Men tended to endorse more dislike and blame, and women experienced more fear of fat. These findings suggest that weight bias in both explicit and implicit forms is common among first year medical students and that gender may impact weight...
bias. The results showing high prevalence of weight bias among current and future health care practitioners are consistent with findings presented in the 2012 Rudd Policy Center Report on weight bias, which stated that 69% of overweight and obese patients surveyed reported being stigmatized by their doctors about their weight.  

Schwartz et al. surveyed 389 clinicians who worked in obesity treatment attending a conference on obesity. The researchers used a paper version of the Implicit Associations Test (IAT) to measure implicit weight bias and also surveyed participants on explicit attitudes toward and experiences with obesity. Participants demonstrated a significant pro-thin, anti-fat implicit bias assessed with the IAT, and implicitly endorsed stereotypes about fat people being lazy, stupid, and worthless with the same test (p<0.0001).

Explicit bias was measured in this study with a seven-point semantic differential scale developed by the researchers to evaluate beliefs about motivation, intelligence, and value of fat people versus thin people. Compared with thin people, fat people were considered lazier (p < 0.0001), less intelligent, (p< 0.0001), and more worthless (p < 0.05) by participants in the study.

Interestingly, those participants who stated they knew someone personally who was obese or reported understanding the experience of obesity had lower levels of implicit bias on the IAT subscale for intelligence (p<0.05). These findings suggest that practitioners who have closer relationships with obese people may have less implicit weight bias than those who do not, at least with regard to stereotypes about intellect. While the findings of this study are important, it should be noted that the population of study was a convenience sample from clinicians attending a conference, which could limit the generalizability of these results to all practitioners working with obese clients.

In another study of 84 practitioners working in obesity treatment, Teachman and Brownell used a paper version IAT and asked about explicit attitudes toward obese people. Though IAT results
showed a strong anti-fat implicit bias, it was lower than the bias measured in the general population with this test \((p<0.05)\). This could be attributed to the fact that these clinicians are people who have chosen to work with obese patients, and therefore may have more empathy than the general population does for the experience of obese people. Other studies have correlated increased understanding of the experience of obesity with lower bias. Additionally, explicit bias among this group was low. Although this information appears promising, it may simply indicate that explicit bias measurement alone is not sufficient to demonstrate attitudes towards obese persons, especially given the implicit bias found in this population.

As with other health professionals, dietitians also demonstrate implicit weight bias. Edelstein, Silva, and Mancini used the IAT to measure implicit weight bias among 128 Registered Dietitians enrolled in the American Dietetic Association (now The Academy of Nutrition and Dietetics) via an online survey. The researchers found 76% of dietitians surveyed showed a strong to moderate preference for thinness \((p = 0.05)\). This is similar to the prevalence found by Phelan et al. (74%) among a national sample of 4,732 first year medical students using the same measure for implicit weight bias.

Explicit bias is also present among dietitians. Hellbardt, Riedel-Heller, and Sikorski surveyed 49 dietitians participating in a meeting on nutrition in the United Kingdom using the FPS with vignette scenarios. The vignettes described two 42-year-old women, identical except for weight status. One woman was presented as being normal weight, and the other overweight. Participants were randomly presented with one of the two scenarios and asked to rate their assigned woman using the FPS’s descriptor terms. For example, the participants would mark a circle along a continuum of lazy to industrious how they would describe their assigned patient, based on what they knew of her. The participants’ mean score was a 3.35, with the normal weight vignette receiving an average rating of 2.61, a significantly more positive score \((p<0.001)\). This study is interesting, as it shows that an explicit favoring of normal weight people among dietitians.
Diversi, Hughes, and Burke\textsuperscript{56} surveyed 201 dietitians practicing in Australia to measure explicit weight bias and response to case study patients identical in every way except weight status with one obese and one normal weight female patient. Participants were randomized into two groups and explicit bias was measured with the FPS short-form scale\textsuperscript{49}. Mean fat phobia scores indicated mild fat phobia in this study population. Despite only mild self-reported weight bias, when the dietitians were given a case study, unrelated to weight, the participants rated the obese case study patient as having poorer health and less receptive, less motivated, and having a lower ability to understand and maintain nutrition recommendations. Of these, it is noteworthy that only the rating of poorer health (p<0.001) was statistically significant. Obese case study patients were also more likely to be given unsolicited weight loss information from the dietitians in the study, despite the case being created to be unrelated to weight status.\textsuperscript{56}

Dietetics students are prone to weight bias as well.\textsuperscript{50,51,53} Swift et al.\textsuperscript{51} used a modified FPS\textsuperscript{51} and the BAOP\textsuperscript{55} survey to measure explicit weight bias among 1,130 nutrition, nursing, and medical science students in the United Kingdom in 2013. The researchers found fat phobia, as measured by the FPS, among all participants (FPS score 3.8). Nursing students were more likely to view obesity as less under personal control compared to other students. Nursing students also generally had higher BMI than the dietetics or medical students, leading the researchers to hypothesize that being overweight may increase empathy for weight status, and decrease feelings of weight being totally under personal control.

Puhl et al.\textsuperscript{53} surveyed 182 dietetics students, assessing fat phobia using the FPS\textsuperscript{49} and response to the case study patients presented at different weights. Results showed moderate fat phobia among dietetics students, similar to what other research has found among dietetic students and comparing dietetic students to non-dietetic students.\textsuperscript{83} Despite demonstrating no more fat phobia than average, the dietetic students presented with an obese versus normal weight case study patient were more likely
to describe overweight/obese patients as non-compliant compared to normal weight patients. These students were also more likely to assess the diet quality of overweight/obese patients as poorer than normal weight patients. These findings are important because they indicate that in practice, dietetics students may treat patients differently based on weight. The results are also consistent with the Hellbardt study of dietitians and vignette scenarios, suggesting that students' bias likely continues into practice as dietitians. This study is in line with the findings from practicing dietitians presented with vignettes in the research by Hellbardt, Riedel-Heller, and Sikorski and the Australian study by Diversi, Hughes, and Burke.

The prevalence and extent of weight bias among health care professionals is well-documented in research. Given the impact that weight bias can have on physical and psychological well-being, reducing weight bias remains an important target for improving patient care and outcomes.

**Interventions Targeting Weight Bias**

There is no consensus on effective strategies for weight bias reduction. Reviews of weight bias reduction strategies identified no clear best practice for weight bias reduction. These reviews also noted that existing research may be limited by lack of control groups, randomization, and/or follow-up data collection for determining effectiveness of weight bias interventions. The Moore *et al.* review also calls for measurement of impact on clinical behaviors/outcomes.

Another review of weight bias in diabetes management by Puhl *et al.* concluded that changing medical culture around obesity, through a combination of strategies, including targeting attributions, change of language used around obesity, and challenging weight stereotypes would lead to reduced weight bias. A call to target stigma was noted in the Alberga review, indicating that weight bias interventions should focus on the experience of the oppressed, versus the mindset and beliefs of the biased.
Bias reduction interventions take many forms. Common strategies include increasing knowledge about the etiologies of obesity (targeting attributions), increasing empathy for obese people, using cognitive dissonance, and/or targeting social consensus. Each type of intervention is summarized and evaluated below.

**Attribution Theory**

If beliefs about the causes of obesity shape attitudes toward obese people, it stands to reason that increasing knowledge around how obesity develops will affect bias. Attribution theory posits that bias can be reduced or exacerbated depending on what drivers of a condition (in this case, obesity) are emphasized.

Diedrichs and Barlow conducted a non-equivalent group comparison trial with 85 undergraduate psychology students in Australia (85.7% female, 14.3% male). Students received one of three treatments. 1.) an intervention lecture on obesity, weight bias, and the multiple determinants of body weight (intervention group), 2.) a comparison lecture on obesity and behavioral determinants of weight (comparison group), or 3.) a control of no lecture (control group). The two experimental lectures each lasted two hours. Weight bias was measured with the AFAT before and after the intervention period and at three weeks follow-up.

Participants in the intervention group were less likely to hold anti-fat attitudes after the intervention (p=0.002) and maintained that reduced likelihood at follow-up compared to the other groups (p<0.002). The intervention group was also less likely to believe that weight is totally controllable following intervention (p=0.002), maintained that attitude at follow-up, and were less likely to rate overweight people as unattractive (p<0.001). Interestingly, there was no difference in disparagement of overweight people over time for either the intervention or comparison group. The control group
exhibited increased disparagement of overweight people at follow-up compared to pre- or post-intervention.¹

Finding no difference in disparagement of overweight people among the intervention and comparison is not consistent with attribution theory. If the extent to which people view obesity as being under their personal control is the driver of attitudes about body weight, we would expect to see increased disparagement of overweight people in the comparison group, which focused on weight as controllable. Decreased disparagement would be expected among intervention participants. This finding is especially interesting given that there was a reduced likelihood of believing that weight is entirely under personal control in the intervention group; however, this did not occur with a change in disparagement, suggesting that perhaps some factor beyond attribution influences weight bias. The authors acknowledge this possibility, but also argue that disparagement was low among all groups at baseline and suggest a floor effect may explain the lack the improvement.¹ An alternative explanation may be that knowledge of biological or other non-modifiable risk factors for obesity may actually not change weight bias, as was observed in the Azevedo fMRI study.²¹

In another study on attributions, Persky and Eccleston⁶⁷ randomly assigned 110 third and fourth year medical students (50.1% female) to read an article on 1.) the genetic mechanisms of obesity, 2.) the behavioral determinants of obesity, or 3.) a control article about headaches not related to obesity. After the readings, students interacted with a virtual patient, presented as an obese female. All participants were surveyed on beliefs about etiologies of obesity, perceptions of personal responsibility of the patient for her own weight status, stereotyping about obesity, anticipated adherence of the patient, and health screening/consultation recommendations appropriate for the patient.

Students in the genetic article condition reported higher belief that genetics influence weight status than did those in the control group (p<0.0001), while students in the controllable factors group
indicated genetics were less responsible for contributing to obesity cases (p<0.0001). Students in the genetics condition were also less likely to attribute the simulated patient’s weight to her personal lack of control (p<0.0001) compared to those in the controllable factors group. The students in the genetics condition stereotyped the patient less than did the controllable factors group (p=0.028); however, they were not more likely to believe that the patient would be adherent to advice (p=0.077). Perhaps not surprisingly, given beliefs about adherence, the genetics group was less likely to recommend consults for weight loss, diet counseling, or exercise compared to the controllable factors group (p=0.022).

These findings are important, as they demonstrate attributions may affect certain aspects of bias, such as identifying multiple etiologies of weight status, and not assuming that weight is entirely under personal control. Interestingly, the researchers found no difference in beliefs about adherence to diet among the genetic and controllable conditions. It may be argued that believing obesity is entirely genetically predetermined could lead to a fatalism with respect to dietary adherence (it won’t make a difference anyway) and need for referrals for nutrition and physical activity. Another possibility is that while targeting attributions changes some aspects of bias, it does not alter others, including the belief about the health behaviors of obese people. This may affect patient care if providers fail to refer patients to appropriate nutrition services based on weight.

O’Brien et al. examined the effects of tutorials on the controllable and uncontrollable risk factors of obesity on weight bias among 159 undergraduate public health majors (mean age 20.3 years). Students completed baseline assessments with the AFAT, IAT, BAOP, and Dieting Beliefs Scale. The Dieting Beliefs Scale assesses views about willpower and body weight status (explicit weight bias). Students were randomized into one of three groups: 1.) alcohol and youth, 2.) diet and physical activity, or 3.) genetics and the food environment. The alcohol and youth group served as the control, while the diet and physical activity group represents controllable risk factors for obesity, and the genetics/food environment group presents uncontrollable obesity risk factors. Students attended weekly hour-long
tutorials on their assigned topic and completed written and oral homework assignments on the subject. At week seven, students again took the AFAT, IAT, BAOP, and Dieting Beliefs Scale. This time point was labeled post-intervention.

At post-intervention the genetics group showed a 27% decrease in implicit beliefs related to good/bad anti-fat prejudice and a 12% decrease in implicit beliefs related to beliefs about laziness compared to baseline. The diet group showed a 27% increase in implicit beliefs about laziness compared to baseline, which is consistent with the idea that beliefs about the etiologies of obesity can impact weight bias.

For explicit weight bias, the researchers found no significant group differences. Post hoc t-tests showed an increase in anti-fat willpower scores for the control and genetics condition. This was surprising, as the hypothesis was that anti-fat willpower scores should decrease in the latter group, given the focus on uncontrollable factors contributing to obesity. This study again suggests that targeting attributions may not be as successful as would be anticipated.

Teachman et al. found that exposure to scientific information emphasizing the controllable aspects of obesity (energy intake and physical activity) increased anti-fat bias, while teaching about the uncontrollable risk factors for obesity had no effect on weight bias. This research reveals that while attributions may increase bias, the use of attributions to decrease bias does not appear effective. These findings are consistent with the results of the above intervention studies in that targeting attributions and emphasizing the uncontrollable risk factors for obesity does not predictably improve weight bias outcomes.

A study by Azevedo et al. used functional MRI measurements in 12 normal weight female volunteers aged 18-25 to assess differences in brain response when participants believe that a person’s obesity is related to a medical condition. Participants viewed video clips of normal weight and obese
women experiencing either pain (injection) or a neutral touch (cotton swab on the skin). The video clips showed the action performed (injection or swab) and the models’ facial expression of either pain (injection) or a neutral expression (swab). For the obese models in the clips, half were labeled as being obese related to Cushing’s Syndrome, a condition in which prolonged exposure to high levels of the hormone cortisol (from medications or endogenously produced), leads to increased body fat, while the other half were obese patients presented without additional information.21

The researchers measured activity in the right inferior frontal gyrus, an area of the brain associated with emotional resonance.21 Having more emotional resonance with another person indicates a greater feeling of connection to the person. When comparing video clips of obese models in pain, when participants were told that the obese person experiencing pain was obese because they had a medical condition, lower activity in the right inferior frontal gyrus was noted, meaning participants felt lower emotional resonance with the models with obesity secondary to Cushing’s. The findings suggest that knowing the biological etiology for obesity was associated with less connection was surprising, given the attribution theory posits that understanding biological drivers of weight gain would decrease prejudice. In light of the difficulty in identifying effective strategies for decreasing weight bias, these results give insight into why attribution theory may be a flawed approach. It is important to recognize, however, that this is a single study with a small sample size made up entirely of young, female, normal weight participants.

Existing studies using attribution theory show varying success, but often fail to elicit important attitude change about body weight and disparagement of obese people. In fact, the study by O’Brien et al.97 found that anti-fat attitudes about willpower were actually worsened in the group receiving lectures on uncontrollable risk factors of obesity.
Increasing Empathy

Poustchi et al.\textsuperscript{99} used the Yale Rudd Policy Center (now UConn Rudd Policy Center) video\textsuperscript{62} in a cross-sectional study of weight bias among physicians (accessed at: http://www.uconnruddcenter.org/weight-bias-stigma-videos-exposing-weight-bias) to reduce prejudice in a group of 64 second and third year medical students. The video describes how the physical layout, staff behavior, and weighing procedures in medical offices can be shaming to fat patients. The film walks through a suboptimal and then more positive experience of a patient, with detailed examples of what is harmful and helpful to patients of all sizes. Students viewed the video and then discussed their experiences with obese patients among themselves. The BAOP,\textsuperscript{55} FPS,\textsuperscript{49} and the Attitudes Towards Obese People (ATOP)\textsuperscript{55} scales were administered to participants before and after the video and discussion intervention period. The ATOP is a 20-item survey which measures attitudes about obese people on a Likert scale (score range 0-120) with higher scores indicating more positive attitudes.\textsuperscript{55}

Following the intervention, beliefs that genetic and environmental factors play an important role in the cause of obesity (as opposed to lack of personal control) increased among participants (mean BAOP = 16.53 at baseline, versus 19.27 post-intervention). Participants also decreased negative stereotypes about obese patients (mean FPS =3.65 at baseline, versus 3.45 post-intervention). Interestingly, with the ATOP\textsuperscript{55} scores, there were independent associations with change towards more positive associations with obese patients among white, younger, and male participants, but not overall.

Swift et al.\textsuperscript{100} also utilized the Rudd physician video,\textsuperscript{62} along with a second video from the same group and website featuring the experience of an obese teenager and how prejudice about why she is overweight has shaped her social and academic life.\textsuperscript{103} Forty-one nutrition students enrolled in either Master’s dietetics studies or premed undergraduate programs (83.7% female) served as participants and
were randomized into an intervention (viewing the Rudd Center videos) or control group (viewing a video on a history topic with the same time length as the two Rudd Center videos).

This study used measures of both explicit and implicit bias. Explicit bias was measured with FPS and the BAOP and by the “dislike” and “willpower” subscales of the Anti-Fat Attitudes Questionnaire. Implicit bias was measured with a paper version of the IAT in which participants had 20 seconds to classify words into categories. Measures of bias were taken at baseline, post-intervention, and at a six-week follow-up time. The researchers found significant improvements in explicit bias measures, (BAOP and F-scale scores difference p<0.001) some of which were maintained at follow-up among the intervention group participants (AFA willpower subscale p<0.01). As would be expected, control group participants showed no significant changes over time. These results are limited; however, because of small group size. No change in implicit bias was observed. This lack of change is an important finding, as implicit bias may affect patient interaction and care.

Cotugna and Malick investigated whether the experience of dieting would lead to an attitude change toward fat people. The researchers assigned 40 undergraduate students (90% female, 10% male) enrolled in an elective nutrition course to follow a calorie-restricted diet for one week. Males and females were assigned to consume 1,500 and 1,200 kcals per day, respectively, and keep a journal of their experiences. All participants took the FPS before and after the diet intervention period. Changes in FPS scores were significant after the one-week intervention (p<0.05). Participants had difficulty adhering to the dietary restrictions, with only 65% of students completing the full seven days of dieting. The strongest drivers of diet non-adherence were 1.) hunger and 2.) social events such as parties that increased pressure to break calorie restrictions. This study is the only known research using dieting (a common experience for overweight and obese patients) as a method of increasing empathy. The method appears to be effective; however, the study is limited by a small sample size, short duration, and lack of a control group. The researchers in this study only measured explicit weight bias (FPS). It is
unknown whether dieting for this short time period would also change implicit bias, or if participants maintained their decreased explicit bias after the study ended.

In another study related to empathy, Kushner et al. measured stereotyping, empathy, and self-confidence in counseling overweight and obese patients among 127 medical students (47% female) enrolled in a communications course. Participants read two articles on communication and stigma prior to doing a role play in which they counseled an overweight “patient” actor about their weight, diet, and physical activity. The researchers used a self-designed questionnaire to measure stereotyping, empathy, and confidence at baseline, following the patient role play, and at one-year follow-up.

Immediately following the role play, participants showed significant improvement in all three categories: stereotyping (p = .002), empathy (p < .0001) and confidence (p < .0001). It is interesting to note, that while 53% of participants showed less obesity stereotyping after the intervention, a sizeable portion (32.8%) indicated more stereotyping. Likewise, while 48.4% increased empathy for overweight or obese patients, 23.4% had less empathy following intervention. At one-year follow-up, negative stereotyping regressed to baseline levels. The only measure that maintained improvement was for self-confidence in working with overweight and obese patients. This is unsettling, as the medical students studied felt more confident in their abilities, but were not actually more capable or sensitive to the needs of patients.

Targeting empathy appears to have positive effects on explicit bias measures. The observed effects are limited by small sample sizes and lack of long-term follow-ups, with the exception of the Kushner et al. study, which did measure long-term effects, but found a reversal of improved stereotyping at a one-year follow-up, and found iatrogenic effects on stereotyping and empathy along with more positive ones. Additionally, the Cotugna and Malik and Kushner et al. studies are limited by the absence of a control group. Only the Swift et al. article measured implicit bias, and the
researchers in that study found no change in that type of bias. Given that implicit attitudes can shape behavior toward patients, or decisions about care\textsuperscript{48} it is important to identify intervention strategies that can decrease implicit bias.

**Social Consensus**

Some research on weight bias has targeted social consensus, the belief that others share similar views to your own.\textsuperscript{102} Ciao and Latner\textsuperscript{102} compared groups receiving feedback designed to induce social consensus effects or cognitive dissonance among 64 undergraduate students (mean age 21.22 years). Participants each took the AFAT\textsuperscript{54} and were randomized into groups that were either told that their scores on the test were very different from their self-reported values on kindness and equality (cognitive dissonance group) or that their scores were much more biased than the average score of their peers on the test. A third group (control) was told that their scores were consistent with both their peers’ scores and their own values. None of these reflected true scores for either the participant or the group at large. Participants were then asked to repeat the AFAT. For participants in the cognitive dissonance group AFAT\textsuperscript{54} scores were significantly lower than control group scores overall (P<0.05), and for subscales of social/character disparagement and physical/romantic unattractiveness (both P<0.05). There were no differences between the social consensus and control groups in terms of AFAT scores.

These results suggest that social consensus may not have as much of an impact on weight bias as previously thought. This is surprising, given the influence of social norms on prejudices, as shown in the research on media portrayals of fat bodies.\textsuperscript{82–86} It is noteworthy that the results suggest that cognitive dissonance affected weight bias. That is, when people identify that weight bias is inconsistent with their moral or ethical values, they report less explicit bias. Whether and to what extent this may change implicit bias is not known from this research.
Health-At-Every Size (HAES)

In response to the growing preoccupation with weight, the HAES, a trademark of the Association for Size Diversity and Health, model offers a new way of viewing health that does not use BMI as a predictor of health. Instead, HAES focuses on intuitive eating and physical activity as part of everyday activities (described below). HAES shows success in some research with improving health behaviors and eating patterns, particularly among overweight and obese women. Given Tomiyama’s model of how internalized weight bias affects eating and health, it is perhaps unsurprising that a program such as HAES, which helps to reduce self-hatred about body size, also decreases the poor outcomes associated with experiencing weight bias. Although there is evidence to support the use of HAES as a model for improved self-acceptance, there is a paucity of data exploring whether this model is effective as a weight bias reduction intervention.

Intuitive Eating

HAES presents a weight-neutral approach to health centered in intuitive eating and physical activity. Intuitive eating describes eating in response to physiologic cues (internal cues) of hunger and fullness. This contrasts the restrictive nature of dieting by allowing people to follow natural eating patterns and not be influenced by time of day, caloric content of foods, and other factors. Put most simply, intuitive eating is eating when hungry and stopping when full.

Evidence of HAES Effectiveness

The HAES model or “non-diet” approaches have been studied for effectiveness at improving eating behaviors and some health outcomes, including blood pressure and lipid profile, with promising results. Although not directly measured by these studies, the Tomiyama model suggests that some improvements may be due to reduced internalized weight bias via a new narrative on weight and health.
Bacon et al.\textsuperscript{105} conducted a six-month randomized control trial with a two-year follow-up using 78 white women ages 30 to 45 years with a BMI $>30\text{kg/m}^2$ and history of chronic dieting. Participants were randomized into one of two groups: 1) a HAES group focused on size acceptance and intuitive eating, or 2) a traditional diet group focused on caloric restriction and physical activity. Cognitive restraint (dieting) decreased in the health at every size group and increased in the diet group, as expected ($p=0.007$). Attrition at 6 months was high in the diet group (41%), compared with 8% in the HAES group. Fifty percent of both groups returned for a two-year evaluation. While diet group participants lost weight and showed initial improvement in many variables at one year, weight was regained such that the weight loss observed was no longer significantly different from baseline ($p = 0.068$) and no significant changes for total cholesterol, LDL cholesterol, or systolic blood pressure were maintained at the two-year follow-up. The diet group did show significant improvement in HDL cholesterol at the two-year follow-up time ($p=0.009$). On the other hand, HAES group members maintained their weight and significantly improved in outcome variables including systolic blood pressure ($p=0.043$), total cholesterol ($p=0.026$), LDL cholesterol ($p=0.038$), and HDL cholesterol ($p<0.001$) at the two-year timepoint. The HAES group also showed improvements in eating behaviors for disinhibition (the loss of control that follows breaking a self-imposed rule i.e., breaking one’s diet) ($p<0.001$), and reported hunger ($p=0.014$) and for psychological outcomes including depression ($p=0.001$), body image($p=0.03$), and self-esteem ($p=0.001$) at the two-year follow-up where the diet group had no significant changes. Neither group had significant changes in diastolic blood pressure at follow-up.

Although it had a limited sample size, the results of this study suggest that HAES is more useful in achieving long-term health behavior changes than traditional dieting. This is especially interesting given the high attrition rate of dieters. Dieters returning for follow-up were those who had continued to adhere to the diet plan, indicating that even strong adherence to a weight-loss regimen does not provide the long-term benefits of a HAES intervention.
Carroll, Borkoles, and Polman\textsuperscript{107} found short-term effects of a “non-dieting” lifestyle intervention program on weight management, fitness, metabolic risk, and psychological wellbeing in obese premenopausal females diagnosed with metabolic syndrome. The researchers conducted a secondary analysis of a randomized control trial with 17 participants in a “non-diet lifestyle” group and 14 participants in “waiting list” control group for a 12-week intervention. Participants were women ages 24-55 (pre-menopausal) with a BMI $\geq 30$kg/m$^2$ and metabolic syndrome. The intervention group received structured exercise classes and education sessions on healthy eating and the potentially adverse effects of dietary restriction. Social support was also included as a component, and participants completed initial interviews about their dieting histories and received phone calls for missed sessions. The control group had a delayed intervention after a three-month waiting period. Interestingly, both groups improved diastolic blood pressure and HDL cholesterol, despite the control group receiving no treatment at the time of study other than being on a wait list for intervention. The non-diet group improved VO$_2$ (p=0.003) and improved general psychological wellbeing level on the General Well-Being schedule (GWB) compared to those in the control group (p=0.0005).\textsuperscript{107}

In this study, using a non-diet approach was effective at improving some cardiorespiratory outcomes among, obese women with a history of metabolic syndrome. The study results are limited by the small sample size and short study period. Although the intervention is described as being “similar” to a HAES group, the intervention protocol used may be different than other HAES or non-diet interventions, making direct comparison difficult across interventions.

Gagnon-Giroud \textit{et al.}\textsuperscript{25} conducted a randomized control trial with 107 premenopausal women who were overweight or obese and preoccupied with their weight. Participants were randomly assigned to one of three groups: 1.) HAES, 2.) Social Support (SS), or 3.) Waiting List (WL) group. The HAES group received a 14-week intervention titled “Choisir de Maigrir?” (What about losing weight?) with weekly
sessions led by a Registered Dietitian and clinical psychologist and kept food diaries. The sessions focused on learning to use intuitive eating, nutrition education, how to find enjoyment through physical activity, and self-acceptance about body size. The SS group also participated in weekly sessions with a Registered Dietitian and clinical psychologist, but the dietitian and psychologist acted only as moderators of an otherwise participant-led discussion about the same topics as the HAES group, but with no input from the moderators. The WL group served as the control and were told that they would be enrolled in an intervention group at a later time. WL participants received the HAES intervention after the one-year follow-up period.

All participants (including controls) presented significant psychological outcome improvement for body satisfaction, depressive symptoms, self-esteem, quality of life, and binge eating. This is similar to the findings from Carroll, Borkoles, and Polman who also found improvement in all study groups. As with the previously mentioned study, though at one-year follow-up, the HAES group continued to improve while the other groups did not.

Analyzing the food diary data kept by participants in the Gagnon-Giroud et al. study, and building on previous research on eating behaviors with this participant group, Leblanc et al. assessed the impact of HAES versus SS and a WL group for changes in dietary intakes and eating patterns in the cohort of 140 overweight and obese women (mean age 42.4±5.6 years) living in the Québec City Metropolitan area who reported preoccupation with their body weight. No differences were found in calorie intake or snack frequency among three groups using three-day food records; however, the HAES was associated with a decrease in reported hunger. This finding is important, as lower hunger may be an effect of more intuitive eating. Conversely, having consistently higher hunger (a possible effect of restrained eating) can lead to binge eating behaviors.
Charbonneau et al.\textsuperscript{108} also assessed diet quality and intuitive eating in a 2017 study of the Choisir de Magrir program in Canada. Participants included 326 women whose BMIs were normal, overweight, or obese. Participants were either currently enrolled in a HAES group (intervention, \textit{n} = 216) or on a wait list (control group, \textit{n} = 110). HAES participants received weekly, three-hour meetings and one intensive six-hour day over the course of four months. Data on intuitive eating and diet quality were assessed at baseline, post-intervention (four months), and one year post-intervention (16 months). Intuitive eating was assessed with The Intuitive Eating Scale, a validated measure for intuitive eating.\textsuperscript{109} Diet quality was measured with a Food Frequency Questionnaire and assessed for 1.) energy and macronutrient intakes, 2.) high-fat and high-sugar foods intake frequency, and 3.) a Canadian adaptation of the Kennedy’s Healthy Eating Index.\textsuperscript{110} Women in the HAES group significantly improved their intuitive eating score at post-intervention and follow-up (\textit{p}=0.0002) and their diet quality (group by time interaction, \textit{p}=0.0139) compared to the those in the control group.

In a study focused on the intuitive eating (a central component of HAES), a 2012 pilot study by Anglin\textsuperscript{111} assessed the usefulness intuitive eating (for weight loss. Participants (\textit{n}= 16) were randomized into either an intuitive eating group or a calorie restriction group. All participants were obese women, aged 20-48 years. Both groups were assigned 30 minutes of daily physical activity three times per week, using a stationary bicycle. The intuitive eating group was instructed on how to use intuitive eating techniques (honoring hunger by eating, rejecting calorie counting or other restrictions, respecting fullness, etc.), while the caloric restriction group was assigned a1200-1800 kcal/day restriction, based on an estimation of energy needs using the Harris-Benedict equation\textsuperscript{112} and implementing a 500 calorie deficit, and provided guidelines for following this limit. Food diaries were used to monitor self-reported caloric intake in both groups.

At six weeks, the caloric restriction group had significantly greater weight loss (\textit{p} = 0.03) compared to the intuitive eating group.\textsuperscript{111} These results are not surprising, given the general success found with
many diet plans in the short term. This study is limited by its small sample size and relatively short duration. Given that other studies show positive outcomes for long-term health with HAES, which includes an intuitive eating component, it is arguable that the caloric restriction group may not fare as well in the long run. Additionally, although some data indicate that intuitive eating may lead to weight loss, HAES and intuitive eating are not designed as weight loss programs.

Teaching HAES

While several studies have evaluated the usefulness of HAES for improving eating behaviors and other health outcomes, only one known study has examined its potential for use as a teaching tool about weight bias. A 2009 study by Brown sampled 129 undergraduate students in an introductory nutrition course. Students viewed a PowerPoint presentation developed by the Weight Realities Division of the Society for Nutrition Education on HAES. Students took pre- and post-lecture test, developed for use with the PowerPoint presentation, also made by the Weight Realities Division of the Society for Nutrition Education. Post-test ratings improved significantly from pretest for seven out of the eight statements on the test rating whether students believed that the HAES approach is useful and evidenced-based (p<0.01 to p<0.001). Additionally, 83% of students reported improved understanding of the HAES approach (p<0.001), with 77% of students reporting improved attitudes towards the approach and 76% reporting increased recognition for the approach as being evidenced-based. Forty seven percent of students also reported a decrease in the belief that calorie restriction and exercise as ways to combat the obesity epidemic.

This study had a relatively large or similar sample size compared to some other interventions seeking to target weight bias but lacked a control group. The results from post-test show improvements in attitudes but did not measure weight bias directly. Arguably, the study did measure attributions through measuring belief in calorie restriction and exercise, but it failed to capture attitudes or stereotypes about fat people.
Summary of Findings on Interventions Targeting Weight Bias

Weight bias is a highly prevalent\textsuperscript{12–14} and damaging\textsuperscript{6,8} form of prejudice that exists among health care students and professionals.\textsuperscript{15,18} Given this, research targeting weight bias is important for improving patient care and health outcomes.

Research to date shows no clear best practice for reducing weight bias.\textsuperscript{19,68} Attribution theory posits that targeting beliefs around the etiology of obesity can reduce prejudice by exposing the idea that weight is not entirely under personal control;\textsuperscript{87} however, interventions using this method are generally unsuccessful, and may even worsen weight bias.\textsuperscript{67,98} Increasing empathy appears more useful in reducing weight bias,\textsuperscript{52,99,100} but studies are often limited by small sample sizes,\textsuperscript{52,99,100} no control group,\textsuperscript{52,101} and lack of long-term follow-up data.\textsuperscript{52,99,100}

The HAES approach appears to be effective at ameliorating some negative psychological and physiological consequences of weight bias among those most at risk for experience this type of prejudice.\textsuperscript{22,25,104,106} This effect may be a result of a reduction in internalized bias. If this is true, then the HAES approach may also be useful as a tool to reduce weight bias.

A call to action by Alberga \textit{et al.}\textsuperscript{115} presses for more upstream interventions to reduce weight bias, including compulsory curricula for weight-related issues for pre-service health care and public health professionals. The HAES approach is an evidenced-based model that could be used for such teaching purposes; however, there is limited data on its effectiveness at targeting weight bias in this population.\textsuperscript{27} HAES targets social norms around body weight and size by moving away from a weight-centered paradigm and encouraging acceptance of all body sizes. Social norms then influence prejudice about body weight. Additionally, the intervention in place may increase empathy, a strategy shown effective at reducing weight bias in other research,\textsuperscript{52,98,101} by encouraging future practitioners to take the
perspective of patients of all sizes. A proposed model for using HAES to target weight bias is found in Appendix D of this paper.

The following chapter presents a study designed to test the HAES approach for its usefulness in weight bias reduction among those undergraduate students most likely to work with overweight and obese people in clinical practice or public health settings.
CHAPTER 3: USE OF A CASE STUDY APPROACH FOLLOWING A NOVEL WEIGHT BIAS INTERVENTION AMONG STUDENTS IN UNDERGRADUATE HEALTH-RELATED COURSES

Background

Approximately 73.6% of adults in the United States are classified as overweight (having a body mass index, or BMI >25.0 to <30.0kg/m²) or obese (BMI ≥30.0kg/m²).\(^{28}\) Obesity is associated with an increased risk for cardiovascular disease, type 2 diabetes, and certain cancers.\(^{28,35–37}\) In addition to the physical health risks, people with obesity are also at risk for being the target of weight bias\(^{1,3,9}\). Although definitions vary, weight bias is a term used to describe when a person experiences unreasonable judgements about them related to body weight and appearance\(^2\). Despite the prevalence of overweight and obesity, and the classification of obesity as a disease caused by multiple factors, weight bias is one of the most common forms of bias, and largely remains a socially acceptable form of discrimination.\(^3,12\)

Weight bias is known to negatively affect psychological and physical well-being.\(^4,5,8,10,61\) People experiencing weight bias may be more likely to binge eat\(^8,11,61\) or experience psychological distress\(^4\) compared to people who are not experiencing such judgements. Weight bias can also have educational,\(^7,44,45\) economic,\(^6,41\) or even legal\(^42,43\) ramifications.

Weight bias is common among healthcare professionals, including dietitians, nurses, physicians, and physical therapists, as well as those studying to work health-related fields.\(^15–18,53\) Weight bias among health care students and practitioners can affect patient care through avoidance of health care visits, poor communication between patient and provider, and distrust in the health care system.\(^116\) This makes finding strategies to reduce weight bias an important target.

Research to date shows no clear best practice for reducing weight bias.\(^19,68\) Attribution theory holds that targeting beliefs around the causes of obesity can decrease prejudice through teaching that weight is not entirely under personal control;\(^87\) however, interventions using this method are not consistently
successful, and may even worsen weight bias. Increasing empathy may be more useful in reducing weight bias, but studies are often limited by small sample sizes, no control group, and/or lack of long-term follow-up data.

The Health at Every Size (HAES) model is a weight-neutral alternative approach that focuses on size acceptance and health-promoting behaviors rather than weight change. HAES appears to be effective at reducing some negative psychological and physiological consequences of weight bias among those most at risk for being targets of weight-based prejudice, possibly due to decreased internalized bias. Therefore, the HAES approach may also be useful as a tool to reduce weight bias.

Case studies are integral teaching tools for future health care professionals. These cases can help students learn about treating patients with various conditions, but are also an opportunity to gauge attitudes about the case patient, including measuring weight bias. Several published articles have explored the use of case study patients or vignette scenarios to assess weight bias among both health care students and practitioners.

Puhl et al. assessed 182 dietetic students’ response to case study patients presented at different weight statuses and found that students presented with an obese (versus normal weight) case study patient were more likely to describe overweight/obese patients as non-compliant. Students were also more likely to assess the diet quality of overweight/obese patients as poorer than normal weight patients.

Hellbardt, Riedel-Heller, and Sikorski surveyed 49 dietitians using vignette scenarios featuring two 42-year-old women, identical except for weight status. Participants were randomly presented with either an overweight or normal weight case patient and asked to describe the patient, based on what details they knew of her, using the Fat Phobia Short-Form Scale described in the previous chapter.
this study, participants showed a significantly more positive view of the normal weight patient compared to the overweight scenario.

Diversi, Hughes, and Burke surveyed 201 dietitians’ response to case study patients identical in every way except weight status with one obese and one normal weight female patient. Participants rated the obese case study patient as having poorer health, being less receptive, being less motivated, and having a lower ability to understand and maintain nutrition recommendations compared to the normal weight scenario. Obese case study patients were also more likely to be given unsolicited weight loss information from the dietitians in the study, despite the case being created to be unrelated to weight status.

These studies are consistent with data showing prejudice about body weight and size is prevalent among health care students and professionals and highlight how case studies can be used assess such bias. Interestingly, no known studies measured response to case study patient following an intervention to reduce weight bias.

This study sought to expand upon previous research by investigating whether student response to an obese case study patient with a non-weight-related complaint varies after receiving a novel intervention aimed at reducing weight bias compared to a conventional approach to weight bias reduction and a control group.

Specific Aims and Hypotheses
Aim 1
To determine the effect of a bias reduction intervention centered on the HAES approach on the assessment of an obese case study patient among nutrition, nursing, public health, kinesiology, and premedical students compared to current approaches to weight bias reduction and a control group.
Hypothesis 1
The HAES group participants will assess an obese case study patient more favorably when compared to participants exposed to interventions targeting attributions for obesity and a control group.

Research Question:
1. What is the effect of a novel weight bias reduction lecture on assessment of and obese case patient among nutrition, nursing, public health, kinesiology, and premedical students compared to current approaches to weight bias and a control group?

Methods
Recruitment

Undergraduate courses offered in the fall 2017 semester included in the curriculum of nursing, nutrition, kinesiology, public health, and pre-medical students were identified via Spire, the online course catalog system at the University of Massachusetts Amherst. Enrollment totaled 1,327 students in all courses combined. Courses were selected from a variety of levels to ensure a mix of graduation years and experience in a major. A list of these courses is provided in Appendix XX of this document. Instructors of each identified course were contacted via email using the University of Massachusetts Amherst email directory in summer 2017. This email (Appendix XX) outlined the basic study procedures potential learning benefits to participants, asked course instructors to share study recruitment materials to their class, and suggested offering extra credit to students as an incentive for their participation. One instructor invited the researcher to also advertise in-class during the fall 2017. This was done in addition to the email recruitment strategy for this course.

Interested students were instructed to arrive at a computer laboratory on the university campus at one of the available dates and times provided. There was no pre-registration required and inclusion criteria for study participation was only to be currently enrolled in one of the targeted courses.
Given the limited effectiveness of existing interventions described in the literature review chapter, sample sizes were estimated by determining what effect sizes would be detectable at different given sample sizes, based on the overall sample population from which data would be collected. This study randomized participants into one of three groups, described in more detail below, which also factored into calculations. Effect sizes were calculated at 50, 100, and 200 participants per group with a two-tailed t-test using G-power software.\textsuperscript{119} Assuming $\alpha=0.05$ and power = 0.8, an effect size of 0.565 would be detectable with 50 participants per group. With the same assumptions, an effect size of 0.398 and 0.280 would be detectable in 100 and 200 participants per group, respectively. Effect sizes of 0.2 are considered small, while an effect size of 0.5 is considered medium and 0.8 large. The aim was to recruit at least 100 participants per group, for a total of 300 participants.

A more traditional approach to sample size calculation was also conducted using the Cohen tables.\textsuperscript{120} With this approach, 53 participants per group, totaling 159 participants is estimated to be required to detect any statistically significant between-group differences.

**Ethical Considerations and Human Subjects Protection**

All study protocols were reviewed and approved by the University of Massachusetts Institutional Review Board prior to recruitment and data collection (Appendix E). Informed consent was obtained from all participants, and debriefing on the study was provided after data collection.

**Measures**

**Demographic Data**

Demographic data including self-reported body weight and height, gender (asked by open-response question wherein participants could describe themselves or indicate preference to not respond), year of study, and major were taken via paper survey before beginning the intervention phase of the study. Participants were also asked two additional separate questions: if they or someone they
know has ever struggled to lose weight or if they or someone they know has ever experienced prejudice based on body weight (Appendix F).

Assessment of Response to Case Study Patient

Participants were asked to rate the following about their case study patient using Likert scales from 1-5, as detailed here: diet quality (1 = very poor, 5 = excellent), likelihood the patient would follow recommendations made by the doctor in the case scenario (1 = not at all likely, 5 = very likely), personal interest in working with the patient (1 = not at all interested, 5 = very interested), overall importance of weight on health (1 = not at all important, 5 = very important), and personal level of comfort working with obese patients in general (1 = not at all comfortable, 5 = very comfortable).

Intervention

Participants arrived at a computer laboratory on campus within the designated timeframe and were seated at individual computer terminals with headphones for noise cancelation and ease of participation, and to ensure the audio of other participants was not heard. Participants were provided informed consent forms, which were signed before being randomly assigned to one of three groups: intervention (HAES) group, conventional group, or control group. Participants were not made aware of the different study groups or the purpose of the study.

Intervention Groups

The intervention group watched a 17-minute-long Rudd Policy Center video entitled “Weight bias in Healthcare” and read a brief journal article on the Health-at-Every Size approach and weight stigma. Both the video and paper supported a HAES approach to patient care and described the effects of weight stigma.

The conventional group watched a 17-minute video emphasizing the uncontrollable risk factors of obesity and weight stigma in the United States, also from the Rudd Center, entitled “Weight
Prejudice: Myths and Facts." Participants in this group also read a brief journal article about an uncontrollable risk factor for obesity. The control group watched a video clip of similar length to the other two groups from the United States Department of Agriculture (USDA) on food safety practices and read a brief handout on safe food handling. The topic of food safety was chosen as one that relates to nutrition/health but is neutral with respect to body weight.

**Case Study**

Following the intervention, participants were given a fictional case study patient description. The case study patient described a woman who was obese for BMI and was complaining of a headache (a condition unrelated to obesity). A detailed description of the case study patient’s dietary and lifestyle habits was provided, along with recommendations made by the patient’s doctor (see Appendix G). Participants were then asked to rate the diet quality of the patient, the likelihood the patient would follow diet and lifestyle recommendations made by the doctor in the scenario, their personal interest in working with this case study patient, how important they believe weight is to overall health, and their personal level of comfort working with obese patients in general. These variables mirror those measured in similar studies on students and practitioners, as well as the decreased focus on weight in the HAES model.

**Analysis**

Demographic data were analyzed for each group and compared. BMI was expressed in mean ± standard deviation, while categorical variables are expressed in frequencies and percentages. Differences in between-group BMI was analyzed with ANOVA. Categorical variables were compared with chi-square tests (Table 1).

All outcome data were analyzed using ANCOVA to test the effect of condition while controlling for key covariates: gender, self-reported BMI, major, year of study, personal experience with weight.
bias, and personal experience with struggles to lose weight. Planned comparisons were run with Bonferroni corrections when the effect of condition is significant or marginally significant ($p < .1$).

Statistical analyses were performed using SPSS version 27.$^{122}$

**Results**

**Demographics**

Participants were mostly (69.2%) female and non-nutrition majors (62.7%). Year of study was somewhat more evenly distributed, with freshman and sophomore participants each accounting for 28.1%, juniors at 14.4%, and seniors at 22.8%. A small number of graduate students ($n = 10, 6.5\%$) also participated in this study. Self-reported height and weight data were used to calculate BMI for participants. The average BMI for all participants was 23.0kg/m$^2$. BMI was significantly different between groups ($p = 0.033$); however, mean BMI scores for each intervention group were noted to be in the healthy adult range, per CDC categorization.$^{38}$

**Diet Quality**

There were no significant effects in participant ratings of case study patient diet quality for any group ($F(2,139)=1.64, \ p=.20$) or any covariates ($ps>.17$).

**Likelihood to Follow Recommendations**

There was a marginally significant effect of the intervention on participants’ ratings regarding the likelihood of the case patient to follow diet and lifestyle recommendations provided ($F(2,139) = 3.01, \ p=.052$). The conventional group ($M=3.31, SD=0.84$) rated the likelihood to follow recommendations marginally higher than the control ($M=2.98, SD=0.79, p=.08$). The HAES intervention group ($M=3.35, SD=0.93$) did not significantly differ from the conventional group ($p>.9$) or the control group ($p=.13$).

There was a significant gender effect ($F(1,139) = 4.02, p=.047$) on ratings regarding the likelihood of the case patient to follow diet and lifestyle recommendations provided. Female
participants ($M=3.33, SD=0.88$) rated the case patient as more likely to follow recommendations compared to males ($M=2.98, SD=0.80$) in our sample. All other covariates were non-significant ($ps>.16$).

**Interest in Working with Case Study Patient**

There was a significant intervention effect on interest in working with the case study patient ($F(2, 139) = 4.80, p = .01$). The control group ($M=3.28, SD=1.02$) had significantly lower interest in working with the case study patient than the conventional group ($M=3.74, SD=0.97, p = .007$). The HAES condition ($M=3.73, SD=0.87$) did not significantly differ from the conventional condition ($p = .74$) or control condition ($p = .18$).

There was also a significant effect of academic major ($F(5, 139) = 3.16, p = .01$). Compared to those in non-health related disciplines, including those studying business ($M =3.23, SD =0.94$), nutrition majors reported significantly greater interest in working with the case study patient ($M =4.09, SD = 0.85, p=.003$). All other majors did not differ from each other ($ps>.9$). All other covariates were non-significant ($ps > .12$).

**Importance of Weight on Overall Health**

There was a significant intervention effect on the importance of weight on overall health ($F(2,139) = 3.72, p=.027$). The conventional group ($M=3.65, SD=0.91$) rated weight as less important on overall health when compared to the control condition ($M=4.17, SD=0.82, p=.025$). The HAES group ($M=3.77, SD=0.83$) did not significantly differ from the conventional group ($p>.9$) or the control group ($p=.19$) in our sample. All other covariates were non-significant ($ps>.14$).

**Comfort with Obese Patients**

There was no significant intervention effect on comfort with obese patients ($F(2,139)=1.50, p=.23$). However, there was a significant effect of BMI on participant ratings of comfort working with
obese patients \((b = .05, SE = .02, p = .014)\). Participants with higher self-reported BMI described more comfort with working with obese patients. All other covariates were non-significant \((ps > .16)\).

**Discussion**

Significant intervention effects were seen in participants’ ratings of interest in working with the case patient and rating the importance of weight on overall health with those in the conventional group rating their interest in working with the case study patient higher and their importance of weight on overall health lower than the control group. Additionally, there was a marginal intervention effect observed in ratings of the likelihood that the case study patient would follow the doctor’s recommendations in the case scenario. In this instance, the conventional group again rated the likelihood higher than the control. We found no significant differences between the novel intervention (HAES) and either the conventional or control group.

Significant effects were also found for academic major regarding interest in working with the case study patient, with nutrition majors rating their interest in working with the case patient higher than those participants in non-health related majors. Finally, a significant effect of BMI was found in relation to participants’ personal comfort working with obese patients, such that participants with higher self-reported BMIs having a higher level of comfort with obese patients.

Our findings that the conventional approach, but not the novel (HAES) approach impacted response to the case study patient and to reported comfort with obese patients in general were surprising. This may be due to the similarities in theme between the HAES and conventional group videos. Both videos were made by the Rudd Policy Center and while the HAES video focused specifically on a weight-neutral approach and bias in healthcare settings, both videos target improving empathy and considering the perspective and experiences of overweight and obese people.
Strengths and Limitations

This study has several strengths, including the use of randomization, surveying a cross-section of health-related majors, and the use of a control group. The three-group design also allowed for testing the effectiveness of a novel approach to weight bias reduction.

This research is not without limitations. The sample size of the study was lower than the estimated needs described previously. This study used a convenience sample and did not conduct a follow-up to evaluate if any effects of intervention persist over time. The use of similar videos, both from the Rudd Center, may make comparing the HAES and conventional interventions more difficult. Still, we did find differences between the conventional and control groups, indicating some impact of intervention.

Conclusions

In conclusion, this study showed that response to a case study patient with obesity may be impacted positively through the use of attribution theory-based content provided in a brief intervention; however, it should be noted that another component of the intervention used in this research also likely evoked empathy, which has been shown to reduce bias in previous research.¹⁰⁰

Implications for future research and practice

Future research including more comprehensive interventions and long-term follow-up is needed to address weight bias. The mixed results of previous studies⁹⁷,¹⁰⁰,¹⁰¹ indicate that best practices about bias interventions may not be truly known. Especially important would be the need for interventions that provide more than short-term education, as these types of interventions may actually increase some types of bias.¹⁰¹
Table 1. Demographic Data for Participants in Each Intervention Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Size Acceptance (n=51)</th>
<th>Conventional (n=55)</th>
<th>Control (n=47)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender n(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>13 (25.5)</td>
<td>22 (40.0)</td>
<td>12 (25.5)</td>
<td>47 (30.8)</td>
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<tr>
<td>Female</td>
<td>38 (74.5)</td>
<td>33 (60.0)</td>
<td>35 (74.5)</td>
<td>106 (69.2)</td>
</tr>
<tr>
<td>Body Mass Index*</td>
<td>22.2±3.3</td>
<td>22.7±3.5</td>
<td>24.2±4.5</td>
<td>23.0±3.8</td>
</tr>
<tr>
<td></td>
<td>Mean±SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Year n(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>16 (31.3)</td>
<td>11 (20.0)</td>
<td>16 (34.0)</td>
<td>43 (28.1)</td>
</tr>
<tr>
<td>Sophomore</td>
<td>8 (15.7)</td>
<td>22 (40.0)</td>
<td>13 (27.7)</td>
<td>43 (28.1)</td>
</tr>
<tr>
<td>Junior</td>
<td>8 (15.7)</td>
<td>9 (16.4)</td>
<td>5 (10.6)</td>
<td>22 (14.4)</td>
</tr>
<tr>
<td>Senior</td>
<td>13 (25.5)</td>
<td>11 (20.0)</td>
<td>11 (23.4)</td>
<td>35 (22.8)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>6 (11.8)</td>
<td>2 (3.6)</td>
<td>2 (4.3)</td>
<td>10 (6.5)</td>
</tr>
<tr>
<td>Major n(%)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nutrition Major</td>
<td>22 (43.1)</td>
<td>17 (30.9)</td>
<td>18 (38.3)</td>
<td>57 (37.3)</td>
</tr>
<tr>
<td>All Other Majors</td>
<td>29 (56.8)</td>
<td>38 (69.1)</td>
<td>29 (61.97)</td>
<td>96 (62.7)</td>
</tr>
</tbody>
</table>

*p-value <0.05
CHAPTER 4: PRESENTATION OF CASE STUDY PATIENTS IN NUTRITION COUNSELING TEXTBOOKS: A CONTENT ANALYSIS

Background

Prejudice about body weight and size is common.\textsuperscript{3,12,13} Weight bias, defined as negative attitudes or unreasonable judgements towards people based on their body weight and size,\textsuperscript{3} is prevalent in both the general population and among current and future health care professionals, including dietetics students.\textsuperscript{15,18,53} This prejudice can negatively affect patient interactions, quality of treatment, and health outcomes.\textsuperscript{2,4}

In a randomized online survey of responses to case study patients among dietetics students (n=182) Puhl and colleagues\textsuperscript{53} found that dietetics students rated the diet quality and likelihood to follow recommendations of obese patients lower than otherwise identical normal weight patients with the same diagnosis and diet history. Although this was a small study, it nonetheless suggests bias based on weight and not on actual behaviors or medical history.\textsuperscript{53}

In a survey of 76 female undergraduate students in dietetics (n=38) versus other majors (n=38), dietetics students showed weight bias about the same as their non-dietetics peers on the Fat Phobia Scale, a measure of explicit weight bias\textsuperscript{49} discussed in chapter two of this work. Although this study was also limited by its small sample size, it suggests that enrollment in dietetics programs may not itself decrease weight bias.

Providing information about obesity in college courses can influence students’ knowledge, attitudes, and beliefs. Indeed, what and how information is provided could lead students to make assumptions about the behaviors, diet quality, and adherence of patients of various weight statuses. It is arguable that these attitudes are influenced by textbooks, which are important sources of information in college classrooms.\textsuperscript{123,124} Research from the fields of medicine and nutrition suggest that textbooks can
be a source of bias with respect to gender\textsuperscript{123,125} and aging.\textsuperscript{124} In 2017, \textit{Inside Higher Ed} reported that Pearson Education removed material from a nursing textbook containing racial and ethnic stereotypes about patient pain tolerance.\textsuperscript{126} These articles support a need for serious investigation of the content of textbooks and how they might impact student attitudes and behaviors.

Case studies are important pedagogical tools used to teach students critical thinking as it relates to patient care.\textsuperscript{117,127} Case studies, which are often featured in college textbooks can also be sources of bias by reinforcing stereotypes or existing beliefs about particular groups of people. Despite the potential influence on attitudes, to date, no known studies have examined the presentation of case study patients of various weight statuses in nutrition textbooks. Behaviors, attitudes, and dietary habits of patients are often described in most detail through case studies, especially in texts that relate to nutrition counseling. Therefore, the aim of this study was to examine the presentation of case study patients of different weight statuses in nutrition counseling textbooks.

\textbf{Methods}

\textbf{Specific Aim}

The aim of this study was to review how case study patients of various weight statuses are described in nutrition education and counseling textbooks with respect to adherence to treatment, engaging in stereotypical behaviors, such as lack of physical activity and consumption of nutrient-poor and calorically dense items, and their interactions with nutrition or other health professionals. Behaviors and attitudes of case study patients were chosen based on stereotypes and prejudicial attitudes identified in explicit anti-fat bias scales described in the literature review chapter.\textsuperscript{49,54,55}

\textbf{Textbook Search}

In order to examine how obese patients are presented in nutrition textbooks, nutrition counseling textbooks) were identified for review. Texts were identified using the University of Massachusetts Amherst Libraries Global Online Bibliographic Information (GOBI) database\textsuperscript{128} with the
assistance of a reference librarian. GOBI is an online textbook database for use in research and academic settings. Use of online bibliographic databases for identifying textbooks or using all known textbooks in a content area for a specified time period for content analysis appears in another study of health texts. Title keywords used were “nutrition” and “counseling.” Search results were limited to print textbooks in English, published in the United States since 2009, representing a 10-year period prior to the search date. Exclusion criteria included books published before 2009, previous versions of texts when a newer edition was also available, and any book not presenting case studies as examples. In addition to this, online searches for textbooks used in nutrition counseling courses at accredited dietetics programs were conducted and an expert in counseling in dietetics was contacted for any additional references. Neither of these yielded additional textbooks.

Analysis

Content analysis is a research method for interpretation of qualitative data. Content analyses are performed when identifying themes or experiences that are not quantitative in nature. Content analysis was chosen for this project in order to capture the presentation of case study patients of various weight statuses within nutrition counseling textbooks.

Because the process involved starting with specific data and drawing themes, this paper reflects an inductive approach to content analysis. Our approach began with locating variables (described below) in each case study identified and then describing findings overall.

Each case study was coded individually, documenting the following: the name of the textbook, publisher, year of publication, authors, the name of the case study patient, weight status of the patient: underweight, normal weight, overweight/obese or not listed, body Mass Index (BMI) could be listed directly (in kg/m²) or calculated if height and weight information were listed and interpreted according to Centers for Disease Control and Prevention criteria for adult BMI. Patients were also classified by
weight status if they were described as such within the case study explicitly (e.g., if a patient is listed as obese without the BMI provided). Patient age, patient sex, patient race/ethnicity, patient career/career history for patients described as retired.

In addition to the demographic information above, the following was also coded for each case study patient: patient’s reason for visit to a dietitian (disease or condition for which they were seeking treatment and whether the patient was referred by a medical doctor or other healthcare provider or sought treatment on their own), patient medical history (list of diagnoses or described conditions in the case study), plan of treatment (recommendations for weight loss, yes/no; recommendations for diet modification, yes/no and a description of the recommended modifications; recommendations for change in lifestyle habits, yes/no and description of lifestyle recommendations provided), adherence to treatment (adherent, non-adherent, or not listed), interactions with the dietitian (positive, negative, or neutral).

All data collection began with verbatim documentation of text information before themes were determined and descriptive data analyzed. This was done by a single researcher. Data collection was conducted via Microsoft Excel Worksheet.

Results

Initial search yielded 12 textbooks. Four texts were excluded due to publication prior to 2009. Two additional texts were found to be textbook supplements or review of a textbook and also excluded. Two additional texts were excluded because it was an older edition of another text on the list. One text was noted without case study patient descriptions. This left a sample size of n = 3 textbooks\textsuperscript{132–134} meeting the selection criteria.

Case studies were reviewed individually in each textbook for inclusion. Only case studies that featured adults were included. One pediatric case study, which revolved around a pregnant teenager,\textsuperscript{132}
was identified and excluded from the analysis. A second case study involving an adult man who sought counseling on smoking cessation was also excluded, as it did not relate to food or nutrition.

The total number of case study scenarios with clients/patients in all texts was 30 case patients/clients. Two were excluded (one pregnant teenager and one client for whom smoking cessation was the only intervention discussed). “Jane” from the Sauter text is repeated 10 times, making the number of unique and appropriate case study patients in all texts 21.

Race was listed explicitly for only 2 (9.5%) of the case patients. Of these, one is listed as white and the other as African American. One other case patient is described as having parents who live in Mexico, but no listed race/ethnicity for the patient himself is provided and cannot be conclusively inferred from where his parents reside.

Ages are listed explicitly for 14 (66.6%) of the case study patients and listed within a decade for one additional case patient ("in his 60s") for a total of 15 (71.4%). Ages range from 26-76 years old, and a large percentage (47%) of case study patients with explicitly listed ages are over 40 years old. Case study patients with ages not explicitly listed are assumed to be adults based on descriptions of having jobs, spouses, or being described as a “woman” versus a “girl”. The only pediatric case patient presented is a 16-year-old female who is excluded for pregnancy, a condition in which weight status is expected to change and during which metrics such as BMI are less useful data.

Sex/Gender: the textbooks appear to describe gender more than they do sex (woman, man, she/her, he/him, instead of male/female which we might see in medically-oriented course texts). Gender/gender-related pronouns are listed for all 21 (100%) of case patients. There are 8 men (38%) and 13 women (62%). It is noteworthy that all patients for whom gender-related pronouns are described are on a gender binary, meaning that the texts lacked representation of non-binary, gender fluid, or queer individuals.
Occupation/class status was listed for 15 (71.4%) of case patients. Occupations range across many fields; however, presentations are highly gendered. Of the five male case patients who have listed occupations: two are listed as CEO or executive at a Fortune 500 company, one is a veteran, one is a police officer, and one is retired (without an explicit job mentioned). Of the 10 female case patients, two work as part-time retail employees, one is a secretary in a bank, one is a pharmaceutical sales representative, one a hairstylist, one a university student (non-traditional student with young children), one works in a corporate office (without a title listed, unlike the men with corporate jobs), one utilizes Social Security, one is a homemaker, and the only woman explicitly listed to have a supervisory role is one who works as a supervisor for a mail delivery program. Overall, men in these texts are listed as having jobs with higher earnings and more prestige compared to women.

Past and Current Medical History: There were 11 (52.3%) patients with some form of cardiovascular disease (CVD), 8 (38%) with diabetes, all of which were Type 2 Diabetes (T2DM) and one patient (4.7%) with pre-diabetes. One patient (4.7%) had a history of cancer. Three patients had conditions outside of these, including one (4.7%) each with major depressive disorder, arthritis, and a history of pica. Only three (14.3%) case study patients had no explicit past medical history, and all were referred to a dietitian for weight-related concerns (unplanned weight gain or overweight for BMI).

Treatment Plan: Weight loss was the explicit goal or recommended plan for treatment in nine (42.8%) of the case patients. Increasing fruit and vegetable intake was part of the treatment plan in two (9.5%) patients, one (4.7%) for “modifying diet” and four (19%) for seeing an RDN or receiving medical nutrition therapy (MNT) without further specification.

Weight status: Weight status was assessed in one of two ways: 1.) by entering patient height and weight, if explicitly listed, into the CDC’s BMI adult calculator or 2.) from the case patient description of BMI status, if explicitly listed. BMI data were available for calculation for 10 (47.6%) of the
case patients. Among those with BMIs that could be calculated, five were overweight, four were obese, and one was WNL for BMI. For three patients without data, but an explicit description of weight status, one was described as having an “acceptable” BMI, one as overweight, and one as 100lbs overweight. Two additional case patients without sufficient data to calculate BMI or an explicit statement of BMI were described as having gained 30 and 40lbs, respectively.

Weight loss recommended: Weight loss was recommended by a physician or other provider for six (28.5%) of case patients. An additional six patients (28.5%) desired weight loss themselves, and five (23.8%) patients were not recommended weight loss. For two additional case patients (9.5%) it is unclear as to whether weight loss is being recommended as part of nutrition counseling. Weight loss was not recommended for any patients whose BMI was within the “healthy” range, which is important to highlight.

Adherence of client: For adherence to treatment, I have included all the iterations of Jane, making the total number of cases 27. Among clients for whom there is a discussion of adherence to treatment, 8 (29.6%) are described as following their treatment plan and 5 (18.5%) are described as non-adherent or having difficulty with adherence.

Discussion

Case study patients were mostly overweight or obese for BMI. There was little representation of normal or underweight clients in the textbook scenarios (n =2 patients/clients out of the 21 total).

Many case patients presented with multiple health conditions. This is an appropriate description given the interconnectedness between various chronic diseases. However, despite the medical histories provided and the fact that patients were described with multiple concurrent health issues, only a handful of disease states were presented in the reviewed texts, namely, CVD, T2DM, and overweight or obesity.
Although CVD and T2DM are highly prevalent among adults in the United States\textsuperscript{136,137} these conditions were overrepresented in the case studies examined. Similarly, although cancer is highly prevalent in the US, especially as age increases\textsuperscript{138} and has nutritional implications requiring MNT, it was underrepresented in these texts. Indeed, only one case study patient/client had a history of cancer. One excluded case covers Iron deficiency anemia (IDA), but only as it relates to pregnancy, despite IDA being one of the most common conditions in the United States and worldwide and a risk for female athletes and people with history of gastrointestinal bleed\textsuperscript{139} IDA is also more prevalent among women of color in the United States compared to white women\textsuperscript{140,141}.

Notably missing from these texts was any counseling related to eating disorders, food allergy, sports nutrition, inborn errors of metabolism, chronic obstructive pulmonary disease (COPD), Cystic Fibrosis, Inflammatory Bowel Disease, Irritable Bowel Syndrome, Celiac disease, kidney disease, or other conditions of nutritional relevance for which an outpatient client may seek the assistance of a Registered Dietitian Nutritionist. Though some of the above-mentioned conditions may be presented in special topics textbooks, it is striking that only a few diseases are represented throughout the reviewed texts. Advanced renal disease, which disproportionately affects Black patients in the United States\textsuperscript{142} is highly prevalent and highly related to nutrition as well as to CVD and T2DM, but not discussed in any of the reviewed texts.

\textbf{Strengths and Limitations}

This study was the first known to examine the presentation of case study patients of various weight statuses within nutrition counseling textbooks and provide a content analysis.

This study is not without limitations. The sample size of both textbooks and case studies within is small. Although a search with the GOBI database\textsuperscript{128} identified textbooks in this area, it is possible that some textbooks were not identified. Additionally, this study was unable to capture any additional
classroom materials that might be used for teaching counseling concepts, which may also impact weight bias.

Conclusions

This study found that case study patients described in nutrition counseling textbooks were homogenous in terms of weight status and disease state. Textbooks lacked representation of gender minorities and presented occupations in ways that align with gender stereotypes.

Implications for Future Research and Practice

Students studying nutrition and dietetics should be well-prepared to counsel and treat patients who present with a wide variety of disease states and nutritional concerns. This study indicated a lack of diversity with respect to weight status, disease state, and gender identity. This study also found evidence of gender stereotypes with respect to employment/class status.

Future editions of counseling texts should be more inclusive of the above, addressing clients of various weight statuses, including underweight and with a variety of diseases or conditions for which someone could seek counseling. The lack of representation with respect to gender identities highlights an important gap in training students to best serve the United States population and to best deliver inclusive care.

Although this is a small sample, the findings of this study call for more intentional reviews of textbook content, as well as other classroom materials.
CHAPTER 5: CONCLUSIONS AND FUTURE DIRECTIONS

Conclusions

This study adds to a growing body of research on weight bias and interventions to reduce it. Findings of mixed results from interventions\textsuperscript{1,97,100,101} and no clear best practice for weight bias reduction in the literature review led to the testing of a novel intervention using the HAES\textsuperscript{22,33} approach to measure weight bias via response to a case study patient with obesity.

Our findings in the response to case study patient paper were not as expected. We anticipated the HAES intervention would be more beneficial at reducing weight bias compared to the conventional approach, given that targeting attributions has not consistently shown to be effective.\textsuperscript{1,67,97} In our study, the conventional approach was superior for increasing interest in working with the case study patient and decreasing the rating of overall importance of weight on health compared to the control group. We note that the similarities between the HAES and conventional group intervention materials may, at least in part, account for our findings. We suggest that a longer-term intervention using HAES be tested.

Finally, our content analysis of case study patients in nutrition counseling textbooks revealed a strong focus on weight loss, overweight, obesity, and a small number of disease states. We also found a lack of diversity with respect to gender identity and noted that occupations were highly gendered in this sample of case studies. We conclude that additional research on course materials would be beneficial for better understanding how curriculum may impact weight bias.

Future Directions

Based on our findings, we believe that there is a need for longer-term interventions to reduce weight bias and an exploration of more effective practices. There must also be strong consideration for how short-term interventions may exacerbate existing biases and what implications that may have on programming and course content development.
Our review of case study patient data suggests a need for consideration of the content of college textbooks. The gender binary and occupational stereotypes were of particular concern and warrant further consideration. We believe there is an opportunity to review additional textbooks to examine how stereotypes and biases may be reinforced in college curricula.
REFERENCES


29. Glass I. “Tell me I’m fat”. Original air date: June 17, 2016.


122. Statistical Package for the Social Sciences. Published online 2020.


APPENDIX A: TOMIYAMA MODEL

APPENDIX B: EXPLICIT WEIGHT BIAS SURVEYS

FAT PHOBIA SCALE SHORT-FORM (FPS)

Listed below are 14 pairs of adjectives sometimes used to describe obese or fat people. For each adjective pair, please place an X on the line closest to the adjective that you feel best describes your feelings and beliefs.

1. lazy ______ ______ ______ ______ industrious
   5 4 3 2 1
2. no will power ______ ______ ______ ______ has will power
   5 4 3 2 1
3. attractive ______ ______ ______ ______ unattractive
   5 4 3 2 1
4. good self-control ______ ______ poor self-control
   5 4 3 2 1
5. fast ______ ______ ______ ______ slow
   5 4 3 2 1
6. having endurance ______ ______ ______ ______ having no endurance
   5 4 3 2 1
7. active ______ ______ ______ ______ inactive
   5 4 3 2 1
8. weak ______ ______ ______ ______ strong
   5 4 3 2 1
9. self-indulgent ______ ______ self-sacrificing
   5 4 3 2 1
10. dislikes food ______ ______ likes food
    5 4 3 2 1
11. shapeless ______ ______ ______ ______ shapely
    5 4 3 2 1
12. undereats ______ ______ ______ ______ overeats
    5 4 3 2 1
13. insecure ______ ______ ______ ______ secure
    5 4 3 2 1
14. low self-esteem ______ ______ ______ ______ high self-esteem
    5 4 3 2 1

Scoring
1) For items 3, 4, 5, 6, 7, 10, and 12: score as 1 2 3 4 5
2) For items 1, 2, 8, 9, 11, 13, and 14: score as 5 4 3 2 1
3) Add up the score for each item to get the total score. Then divide by 14 (or the number of items answered, whichever is less). The range of scores is 1 – 5. High scores = more “fat phobia”. Low scores = less “fat phobia”.
ANTI-FAT ATTITUDES TEST (AFAT)

I. Social/Character Disparagement
  9. If fat people don’t get hired, it’s their own fault.
  12. Fat people don’t care about anything except eating.
  13. I’d lose respect for a friend who started getting fat.
  14. Most fat people are boring.
  16. Society is too tolerant of fat people.
  17. When fat people exercise, they look ridiculous.
  21. Fat people are just as competent in their work as anyone.
  23. Being fat is sinful.
  26. I prefer not to associate with fat people.
  28. Most fat people are moody and hard to get along with.
  29. If bad things happen to fat people, they deserve it.
  30. Most fat people don’t keep their surroundings neat and clean.
  31. Society should respect the rights of fat people.
  41. Fat people are unclean.
  44. It’s hard to take fat people seriously.

II. Physical/Romantic Unattractiveness
  2. If I were single, I would date a fat person.
  5. Fat people are physically unattractive.
  6. Fat people shouldn’t wear revealing clothing in public.
  15. I can’t believe someone of average weight would marry a fat person.
  24. It’s disgusting to see fat people eating.
  32. It’s hard not to stare at fat people because they are so unattractive.
  36. I would not want to continue in a romantic relationship if my partner became fat.
  38. I don’t understand how someone could be sexually attracted to a fat person.
  40. People who are fat have as much physical coordination as anyone.
  42. Fat people should be encouraged to accept themselves the way they are.

III. Weight Control/Blame
  1. There’s no excuse for being fat.
  4. Most fat people buy too much junk food.
  19. Most fat people are lazy.
22. If fat people really wanted to lose weight, they could.
25. Fat people have no will power.
35. The idea that genetics causes people to be fat is just an excuse.
39. If fat people knew how bad they looked, they would lose weight.
43. Most fat people will latch onto almost any excuse for being fat.
45. Fat people do not necessarily eat more than other people.

V. Additional Items
3. Jokes about fat people are funny.
7. If someone in my family were fat, I’d be ashamed of him or her.
8. I can’t stand to look at fat people.
10. Fat people are disgusting.
11. If I have the choice, I’d rather not sit next to a fat person.
18. I hate it when fat people take up more room than they should in a theater or on a bus or plane.
20. Most fat people don’t care about anyone but themselves.
27. Fat people don’t care about their appearance.
33. If I owned a business, I would not hire fat people because of the way they look.
34. I’d feel self-conscious being seen in public with a fat person.
37. The existence of organizations to lobby for the rights of fat people in our society is a good idea.
46. Fat people obviously have a character flaw, otherwise they wouldn’t become fat.
47. It makes me angry to hear anybody say insulting things about people because they are fat.
BELIEFS ABOUT OBESE PERSONS SCALE (BAOP)

Please mark each statement below in the left margin, according to how much you agree or disagree with it. Please do not leave any blank. Use the numbers on the following scale to indicate your response. Be sure to place a minus or plus sign ( - or +) beside the number that you choose to show whether you agree or disagree.

-3 -2 -1 +1 +2 +3
Strongly disagree Moderately disagree Slightly disagree Slightly agree Moderately agree Strongly agree

1._____ Obesity often occurs when eating is used as a form of compensation for lack of love or attention.
2._____ In many cases, obesity is the result of a biological disorder.
3._____ Obesity is usually caused by overeating.
4._____ Most obese people cause their problem by not getting enough exercise.
5._____ Most obese people eat more than nonobese people.
6._____ The majority of obese people have poor eating habits that lead to their obesity.
7 _____ Obesity is rarely caused by a lack of willpower.
8._____ People can be addicted to food, just as others are addicted to drugs, and these people usually become obese.
When the experimenter says “begin”:

Remove the piece of paper over the table below. Keeping the page turned with the table upside down, start with the left column (thin or good vs fat or bad).

Working as quickly as possible, put a check mark to the LEFT of each word that indicates fat OR bad or put a check mark to the RIGHT of each word that indicates thin OR good. For example, if the word was “skinny”, (a synonym for thin) you would put a check in the thin or good box (RIGHT side). If the word was “unpleasant”, (a negative word) you would put a check in the fat or bad box (LEFT side).

Note how many seconds it took to complete this column.

Now move on to the next column. Note the wording has been changed to pair thin with bad and fat with good. Repeat the process above with your newly assigned pairings.

Note how many seconds it took to complete this column.

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APPENDIX D: PROPOSED CONCEPTUAL MODEL FOR WEIGHT BIAS REDUCTION

HAES intervention
Emphasizing size-neutral health practices for professionals

Change in Social Norms about Weight towards weight neutrality

Increased Empathy

Decrease in Weight Bias (explicit and implicit)
APPENDIX E: HUMAN SUBJECTS APPROVAL

Certification of Human Subjects Approval

Date: October 23, 2017
To: Heather Morrow Womboner, Nutrition
Other Investigator: Nancy Cohen, Nutrition
From: Lynnette Leidy Siwek, Chair, UMass IRB

Protocol Title: Testing the effectiveness of a size acceptance approach to reducing weight bias among future health and nutrition professionals.
Protocol ID: 2017-3567
Review Type: EXPEDITED - NEW
Paragraph ID: 7
Approval Date: 10/23/2017
Expiration Date: 10/22/2018
GCA #: 11

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

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

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

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

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

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

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

Please contact the Human Research Protection Office if you have any further questions. Best wishes for a successful project.
APPENDIX F: DEMOGRAPHIC AND EXPERIENCE SURVEY

Demographic Questionnaire

Please circle or write the response that best describes you. Note that you may choose not to answer any question for any reason.

1. I am a student majoring in
   1. Kinesiology
   2. Nursing
   3. Nutrition
   4. Pre-med
   5. Public Health
   6. Other major, please specify: ________________________________

2. I am a
   1. Freshman
   2. Sophomore
   3. Junior
   4. Senior
   5. Other, please specify: ________________________________

3. My gender is: ________________________________

4. My height is: _____ feet _____ inches

5. My body weight is: ____________ pounds

6. How often do you feel you have experienced prejudice based on your body weight or size?
   1. Not at all
   2. Rarely
   3. Occasionally
   4. Often
   5. Very often

7. Me or someone close to me has struggled to lose weight.
   1. Yes
   2. No
   3. Not sure
Please read the following case study and answer the questions below.

Mary is a 35-year-old woman who comes to her doctor’s office complaining of headaches. The staff at the doctor’s office take some measurements of Mary’s height and weight, and the doctor interviews her about her diet and lifestyle habits. Mary’s body mass index (BMI) is determined to be 31kg/m².* The doctor also asks Mary about her stress levels and if anything in particular seems to worsen her headaches. Mary reports that she has had increased stress at work, but isn’t sure her headaches are a result of her workload. She does state that her headaches might be worse on days where she has more coffee, but isn’t entirely sure. Mary reports that her weight has not changed in the last two years and that she is not very physically active, other than taking her dog for daily walks. The doctor checks her blood pressure and it is normal.

The doctor recommends reducing coffee/caffeinated beverages to one cup per day and for Mary to keep a journal of her headache symptoms and anything she notices about when the pain begins (i.e., is she at work, feeling stressed, having other pain, etc.). Mary agrees and schedules a follow-up appointment in one month.

The following is what Mary reports eating in a typical day:

- Breakfast: Coffee, toast, scrambled eggs, banana; occasional donut or pastry at work
- Morning: occasionally has 1-2 more cups of coffee at desk before lunch
- Lunch: Deli sandwiches with vegetables or salad (at her office). Diet soda or unsweetened iced tea.
- Snack: Fruit or yogurt.
- Dinner: Makes dinner at home most nights. Pasta, stir fry, and grilled chicken dishes are typical. Orders pizza once per week with family
- Evenings: 1-2 glasses of wine per week (usually on Saturdays)

*Body mass index (BMI) is a calculation of weight to height that approximates body fatness. For adults, BMI is classified as follows:

Underweight <18.5kg/m²
Normal weight 18.5-24.99kg/m²
Overweight 25-29.99kg/m²
Obese >30kg/m²

Please answer the questions related to the case study on the next page.
Questions

Circle the answer you feel best describes the case study patient above

8. Based on BMI, Mary is considered:

9. What is your impression of Mary’s overall diet quality, on a scale of 1-5, with 1 meaning that her diet is poor in quality (less nutritious) and 5 being the best possible diet (most nutritious)?
   1  2  3  4  5
   Poor  Fair/Average  Excellent

10. How would you rate Mary’s likelihood to follow the recommendations to limit coffee intake and keep a journal of her symptoms and experiences on a scale of 1-5, with 1 meaning that she is not likely at all to follow the doctor’s recommendations, and 5 being that she is very likely to follow the recommendations?
    1  2  3  4  5
    Not likely at all  Somewhat likely  Very likely

11. How interested would you be to work with Mary as your patient on a scale of 1-5, with 1 meaning not at all interested and 5 meaning very interested?
    1  2  3  4  5
    Not at all  Somewhat interested  Very interested
    Interested

12. How important do you think a person’s body weight is to their overall health on a scale of 1-5, with 1 meaning not at all important, and 5 being very important?
    1  2  3  4  5
    Not at all  Somewhat important  Very important
    Important

13. How comfortable do you feel working with patients who are overweight or obese on a scale of 1-5, with 1 meaning not at all comfortable and 5 being totally comfortable?
    1  2  3  4  5
    Not at all  Somewhat comfortable  Very comfortable
    Comfortable