Evaluating the Effect of a Weight-Inclusive Approach in an Introductory Nutrition Course

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ABSTRACT

Objective: Determine how undergraduate students enrolled in Fundamentals of Nutrition, an introductory nutrition course, exhibit weight-normative and weight-inclusive thinking throughout the semester-long course.

Methods: Student responses to eight weekly question submissions and one end-of-semester survey were collected and analyzed using qualitative data analysis methods, including template analysis and thematic analysis.

Results: Themes observed and discussed include that diet culture permeates students' prior understanding of nutrition, students were curious about new perspectives regarding weight inclusivity, there was some difficulty reconciling weight-normative ideas with new weight-inclusive content, and weight-inclusive topics were top interests over the entire semester.

Conclusions and Implications: Students are receptive to weight-inclusive topics, and incorporating weight inclusivity into dietetics, nutrition, and health-related programs is important to mitigate harms of anti-fat bias, diet culture, and eating disorder development.

INTRODUCTION

The weight-inclusive approach in healthcare emphasizes that health and well-being are multifaceted and works toward improving equitable health care access and reducing weight stigma.[1] This approach counters the weight-normative approach, which emphasizes that weight is a meaningful indicator of health and weight loss is an achievable and effective treatment for disease prevention. Despite evidence that weight loss is not sustainable and may lead to weight cycling, which has adverse health effects, the weight-normative approach remains the dominant paradigm in healthcare, public policy, and society. There has been increasing criticism of elements of the weight-normative approach, including the use of the BMI as a measure of health, campaigns for the "obesity epidemic," and the weight loss industry, which profits from the establishment of "unhealthy" bodies.[2] The weight-normative approach is not only based on research with methodological shortcomings, but also leads to negative health outcomes, including decreased mental well-being, poor body image, increased chronic stress due to anti-fat bias, and unequal access to healthcare, as many patients avoid seeking treatment out of fear that their doctor will not take their health concerns seriously.

The effect of anti-fat bias is prevalent in the nutrition field as well, as many dietetics programs emphasize the importance of diet for "weight management".[3] A shift to a weight-inclusive paradigm in nutrition education is essential to reduce anti-fat attitudes and to improve health behaviors independent of weight.[4] This educational shift includes teaching about the set point, the theory that the body naturally tries to maintain a set weight by adapting its metabolism.[5] While a growing number of dietitians practice a weight-inclusive approach, most were not formally trained in this perspective.[4]

Multiple studies on the effects of weight-inclusive education at the post-secondary level have shown promising results for deconstruction of weight-normative messaging. In a recent study, undergraduate students in a lifecycle nutrition course who listened to eight podcasts discussing a range of weight-inclusive topics showed greater improvements on scores of body appreciation, intuitive eating, anti-fat attitudes, and attitudes about weight and health than students who listened to nutrition podcasts unrelated to weight and health.[6] In another study, public health undergraduates who were shown instructional videos emphasizing that weight is a result of genetic and environmental factors scored lower on measures of anti-fat bias than students who watched videos emphasizing personal responsibility for one's weight.[7]

The goal of the weight-inclusive approach in this introductory course is to help students develop a positive relationship with food and gain a better understanding of how to recognize and counter anti-fat bias and diet culture. To determine how undergraduate nutrition students exhibit weight-normative or weight-inclusive thinking throughout the semester in a course that takes a weight-inclusive approach, written work from NFS 1043: Fundamentals of Nutrition, taught by Dr. Lizzy Pope, was analyzed. This introductory nutrition course is a prerequisite for other nutrition courses and is taken by students of a wide variety of majors. The course's basic topics include the Dietary Reference Intakes, the digestive system, macronutrients, micronutrients, hydration, anti-fat bias, weight science, and principles of intuitive eating. Prior to each week, students are expected to submit a question they have regarding the week's lecture topics, called "application questions."

The data set was collected in the spring semester of 2023. With prior Institutional Review Board (IRB) approval, students in the course were notified that their application questions would be collected anonymously with all identifiers removed. Students could opt not to have their work included in the data set. Four application questions were collected near the beginning of the semester, and four were collected near the end of the semester. The prompts included: "Submit a nutrition-related question you're coming into class hoping to explore," "Submit a question you have about carbohydrates," "Submit a question you have about fat," "Submit a question you have about protein," "Submit a question you have about diet culture or weight inclusivity/weight normativity," "Submit a question you have about energy balance or weight science," "Submit a question you have about fat bias or Virgie Tovar's work," and "Submit a question you have about eating disorders or intuitive eating." There was an average of 280 responses to each application question. In addition, the data set includes student responses to an end-of-semester survey asking, "What are the top 3 things that you learned about nutrition and/or health this semester?" There were 161 responses to the end-of-semester survey.

METHODS

To code student responses for the eight sets of application questions, a template analysis approach was used. Template analysis is a qualitative analytical method that involves creating a structured coding template, with a degree of flexibility that allows the coding process to be adapted to the data set.[8] After developing an expected coding template based on a subset of data, this template can be revised. Template analysis is useful for open-ended questionnaire responses, the type of data that was analyzed. Based on a subset of data, a codebook was developed that included ten codes: weight-normative, weight-inclusive, diet culture, dichotomization of food, diet naming, nutrition confusion, anti-fat bias, basic/applied nutrition, unclear intent, and questioning diet culture (see Appendix). Throughout the coding process, codes were applied to the data, and possible revisions to the codebook were noted if there appeared to be a meaningful cluster of data that was not captured by the current codes. For example, the countering anti-fat bias code was added to better describe common responses to the seventh application question collected. The finalized template was applied to the whole data set. The end-of-semester survey was coded by applying codes related to the weight-inclusive topics in the course, including positive view of the macronutrients, weight-inclusive thinking, anti-diet culture views, countering anti-fat bias, intuitive eating, as well as negative portrayal of these topics.

Thematic analysis was used to assess themes in the data after coding was complete. Thematic analysis is a flexible method for qualitative data analysis used to capture patterns that are meaningful in relation to the research question.[9] For this data set, a latent thematic approach was best, as this analyzes data by exploring the underlying ideas and assumptions that led to the output, or in this case, the student response. The goal was to understand what conceptualizations about nutrition, food, and weight students had at the beginning of the course, and if these conceptualizations changed as they were introduced to weight-inclusive topics. The themes selected are broader than the codes and were reviewed and refined depending on whether they represented the data set as a whole. The themes are explicitly defined and explained in the Results and Discussion.

RESULTS AND DISCUSSION

Theme 1: Diet culture permeates student understanding of nutrition

A common theme, especially in the first half of the data, is the pervasiveness of diet culture. It was evident that most students had been exposed to diet culture messaging prior to enrolling in Fundamentals of Nutrition, because diet culture viewpoints were represented throughout the application questions. While interest in basic applied nutrition was present throughout the entire semester, most questions didn’t come from just a standpoint of neutral curiosity or unfamiliarity but rather represented some previous knowledge about nutrition learned from diet culture. When asked to submit any nutrition-related question they hoped to explore in the class during the first week of the semester, many students wondered about how they could be healthy, specifically by maintaining a certain diet. One student asked, ‘How much unhealthy food is okay to eat in a day and how do you balance healthy versus unhealthy?’ Many students entered the class with at least some exposure to the idea that some foods are “healthy” and “good” while others are “unhealthy” or “bad,” and were hoping to learn how to better follow a “healthy” diet. Diet culture, an insidious system that encourages weight loss, promotes dieting, and upholds the idea that thinness, muscularity, or a specific body shape is equivalent to both better health and moral virtue, makes it so that many students carry a lot of baggage related to food and health, such as experiencing body dissatisfaction and engaging in harmful dieting behaviors due to internalization of diet culture ideals.[10] Students are often so used to these messages that they assume an introductory nutrition course at the college level will echo the same sentiments, which is often true given that many registered dietitians and nutrition professionals are trained through weight-normative curricula and hold biases against patients due to their weight.[4]

With each new week, new diet culture thinking showed up in students’ application questions. This was especially evident in the questions regarding the three macronutrients, in weeks five through seven of the semester. The first macronutrient covered was carbohydrates, and diet culture showed up in questions about “good” versus “bad” options (‘What categorizes a good carb from a bad carb?’), the effects of eating “bad” carbohydrates (‘Are there bad carbs and what are they and when or why shouldn’t we eat them?’), and confusion about whether carbohydrates can be “healthy” (‘Are carbohydrates healthy for you in moderation?’). For some questions, it was unclear whether students were reflecting diet culture, but there was still evidence of related thinking, such as one student who assumed carbohydrates are only in foods commonly criticized by diet culture

('Are carbohydrates found in all types of foods, or just starchy foods like bread and pasta?').

Diet culture thinking represented an even bigger hurdle for students when learning about the importance of fats, the second macronutrient covered. Like carbohydrates, there was frequent dichotomization of "healthy"/"good" fats and "unhealthy"/"bad" fats. For example, a reoccurring notion involved the comparison of avocados to other foods, with one student asking, 'Why are some fats worse than others? (avocado fat vs fat on pork)?' and another saying, 'I often hear about unhealthy fats and the only "healthy fat" I know of is avocado. What makes a fat "healthy" vs "unhealthy" and what are some options for healthy fats?' Diet culture may be responsible for restricting students' understanding of "good" fats to only avocados. As the pork example illustrates, "healthy" fats were seen in direct contrast to specific "bad" types of fat, with saturated fat being a common target. Some students didn't even see "healthy" fat as an option: 'Is all fat unhealthy? Is it okay to eliminate fat from your diet entirely?'; 'Are there any good kinds of fats?'; 'Are low-fat/fat-free versions of products generally a healthier alternative?' These types of questions were influenced by messages picked up by students prior to the course, as concerns about fats were submitted in the weeks before they were the topic of discussion, with multiple students worrying about whether it is worse to eat carbohydrates or fats: 'What are worse for you fatty acids or carbs?' Students had a hard time understanding how to eat according to diet culture when both carbohydrates and fats are deemed problematic, with another student wondering about products claiming to reduce carbohydrates or fats: 'As we have concluded that when a product is low in fat, or fat free, the sugar content of that product is usually increased and vice versa. So, which option is generally the overall healthier choice, the sugary or fatty product?' This type of thinking reflects the categorization of foods within diet culture, which demonizes certain foods and elevates others, often depending on what fad diets and wellness plans are trending. Despite the impression that this dichotomization of food is important for making “better” or “healthier” food choices, those who engage in dieting and restrict “off-limits” foods have worse physical, mental, emotional, and social outcomes, including increased cardiovascular risk, less enjoyment of food, higher rates of disordered eating, decreased sensitivity to internal cues, and decreased body and life satisfaction compared to people who do not engage in dieting behaviors such as restricting perceived "bad" foods.[10] Additionally, it is a misconception that dieters who worry more about nutrition have a better nutrient intake, as intuitive eaters who do not deprive themselves of certain foods tend to not only gain more enjoyment from food but also eat a larger variety of foods and have a more balanced nutrient intake than dieters.

The application questions submitted regarding protein reflected far less negative thinking. One student asked, ‘Is protein the most important nutrient?’ While initially the questions appeared more neutral than the overt diet culture thinking represented in a significant portion of the questions submitted about carbohydrates and fats, the relative absence of concerns about protein may be seen as a reflection of diet culture as well; if two macronutrients are vilified, the third must be elevated in order to account for restriction of the other two. Some questions represented dieting behaviors, but rather than focusing on restriction, they focused on following a high-protein diet for muscle building or “bulking” purposes: ‘Can I build muscles faster from eating lots of protein? I can’t get fat from eating proteins, right?’ This example shows the difference in diet culture’s portrayal of protein compared to the other macronutrients, with students viewing protein as the “best” or highest priority macronutrient for the same reason they view carbohydrates and fats with fear—the desire to conform to the thin ideal. Because of the mostly positive view of protein in diet culture, it was more difficult to determine the intent behind many of the questions. For example, while students asked if it is ever possible to *under consume* the other macronutrients (‘Is there such a thing as not enough carbs?'), a large portion of students asked whether it is ever possible to *overconsume* protein, asking 'Can I eat too much protein?' and 'Is there any physiological downside to an excess in protein consumption?' While this could represent interest in applied nutrition and the effects of the macronutrients on the body, it may also reflect diet culture messaging.

Theme 2: Curiosity about new perspectives

In the second half of the semester topics including comparison of weight normativity to weight inclusivity, diet culture, anti-fat bias, and intuitive eating were explored directly rather than underlying in the basic applied nutrition units in the course. A theme that emerged is the necessity to repeatedly expose students to content involving weight inclusivity as well as to explicitly address questions students have about these topics.

Based on the application questions submitted throughout the first half of the semester, diet culture and weight-normative thinking are common for students when they enter Fundamentals of Nutrition. Students experience confusion and begin to question their pre-existing perceptions as they are exposed to new ways of thinking in the course. A significant number of students reflected diet culture or weight-normative thinking in their work but were aware that these messages may not be entirely true. For example, one student wrote during week five of the course, 'Do carbohydrates inherently make you gain weight? They are presented as the villain in so much of diet culture but in this class they just appear to be an integral part of our diets!' Another wondered about the course's treatment of the macronutrients compared to messages they learned when they were younger: 'I have been told growing up that all carbs are bad, I know that this isn't true, so I would like to know how the three macronutrients work together to fuel our bodies.' Underlying confusion about diet culture messaging was also present in early questions submitted regarding the validity of dieting behaviors, such as someone who asked about popular diets in the first week: ‘There [is] so many fad diets that are spread around on social media that students are exposed to. What “diets” or ways of eating that are popular right now are dangers or fads?’

While there are many examples of students questioning and unpacking diet culture messaging throughout the first half of the course, most students were still unfamiliar with the concepts of weight inclusivity, diet culture, and anti-fat bias, as evidenced by the amount of basic questions regarding these topics in the four sets of application questions near the end of the semester (‘What is the difference between weight-inclusivity and weight-normativity?’; ‘What’s diet culture?’; ‘What is fat bias, and how does it affect individuals who experience it?’; ‘What is intuitive eating?’). Along with expressing unfamiliarity with the subjects, a large portion of students seemed interested in going deeper into the topics being introduced, with interest in details such as history and timeline (‘When did our current thin-worshipping culture start?’), the effects of social media (‘How has diet culture changed since social media became popular?’), or other ways these messages are spread (‘Is fat bias learned? If so, How?’). Students also expressed interest in incorporating topics into their own lives, such as intuitive eating principles (‘How do I incorporate all the aspects of intuitive eating? Do I start out slowly with a few aspects and add as I go?’) and less harmful language (‘What are some things I can be mindful of saying or not saying in order to not perpetuate diet culture in my community?’ and ‘How do we know when and how to use the right language with referring to overweight/fat individuals?’).

Like the student concerned about perpetuating diet culture, many other students also expressed interest in social change or activism around the topics being introduced in the second half of the semester. In week eleven (covering weight inclusivity and diet culture), more students questioned or countered diet culture than reflected it. For example, one student wondered about shifting to a weight-inclusive lens in healthcare: ‘Is there some sort of training health providers (especially family doctors) can have about weight inclusivity when it comes to health? Why do they always reference the BMI chart if we know it’s outdated?’ In week twelve (covering weight science and energy balance), more students wondered about the ethics of using the Body Mass Index (BMI): ‘It feels like there is pretty strong evidence for why BMI is a really bad metric, and there was never really any good evidence in the first place. Why is it still so pervasive?’ and ‘Why is the BMI system still used although it has no use if every body is different and weight does not determine overall health?’ In week thirteen (covering anti-fat bias), countering anti-fat bias in society and in one’s self was the dominant perspective compared to questions reflecting weight normativity or anti-fat bias. Students had a variety of questions about broad activism (‘How does fat bias persist in our culture and how can we get rid of it?’), specific interventions to reduce anti-fat bias (‘Are there any initiatives in medical schools to teach medical students about fat bias? I think it is important because I have heard that some doctors just attribute any pain or health condition to being overweight’), and self-reflection (‘Ways to work on your own fat bias?’).

It was evident that as students were introduced to topics they were largely unfamiliar with prior to the second half of the course, they were challenged to think critically about dominant paradigms in a new context. One student began to grapple with how to separate weight from health: ‘Does your physical body tell/say anything about your actual health inside your body?’ Others reflected on the effects of diet culture on their thinking, either in relation to their understanding of health (‘Is there ever an unhealthy weight to be or is my mind polluted with diet culture?’) or overcoming harmful messaging in general (‘How do we truly unlearn all that we have internalized from diet culture?’). Some directly referenced the effect of Fundamentals of Nutrition on increasing their awareness of diet culture and weight normativity: ‘Diet culture is something that I have noticed way more since we discussed it at the beginning of the semester. I'd always been aware, but now I feel like it is being shoved in my face constantly. The impacts it has on others and how it shifts how they treat themselves and others. Even how I perceive others and my personal biases. How do I communicate to someone who is dieting the nature of weight inclusivity?' and 'I understand that the weight normative [inclusive] approach is new to our society but this is the first time that I have heard that not everyone should be the same weight. There is even the science behind that everyone is destined to be a different weight. When is our society going to integrate the weight normative [inclusive] approach into our public?' Finally, students continued to find new examples of weight normativity and anti-fat bias into the last week of the semester: 'Why are bigger bodies often overlooked/excluded when it comes to eating disorders?' The evolution of students' curiosity about the new topics can be understood through existing literature regarding the importance of schema, a complex mental network of prior conceptual knowledge through which one understands the world, when learning new information or encoding it into memory.[11] When students are presented with new information related to existing schema, this contributes to the integration of new concepts, enhancing memory. This helps explain why in response to weight-inclusive topics being explicitly discussed in Fundamentals of Nutrition, students wonder how this new information is related to their prior conceptual knowledge and integrate new concepts into their understanding of nutrition, the relationship between weight and health, and social systems.

Theme 3: Difficulty reconciling weight-normative ideas with new weight-inclusive content

As explained above, there was significant evidence of students' curiosity about the new perspectives being introduced, as well as their effort to unlearn previous diet culture messaging and promote a shift in personal and social contexts. However, throughout the course exploration of these topics there were some difficult points or common experiences among students reconciling weight-normative and/or diet culture ideas with new concepts. These common hang-ups or hesitancies for students exhibit another meaningful part of teaching nutrition through a weight-inclusive lens besides explicitly addressing weight-inclusive topics, which is for instructors to address student questions and concerns. The process of integrating new information into schema takes time and repeated exposure.[11]

First, throughout weeks eleven and twelve, many students still wondered about weight loss and had a difficult time separating weight from health outcomes, a key component of weight-inclusivity.[1] As students are introduced to the concept that weight is not a meaningful indicator of health, they think of claims they've heard repeatedly before, and wonder how they can be explained in the context of weight-inclusivity. For example, in week eleven (weight normativity/weight inclusivity) students wondered if there is still a certain point when a higher weight becomes "unhealthy": 'At what point does being overweight become adverse to health?' and 'Is it unhealthy to be overweight? I've heard opinions from proponents of diet culture and body neutrality and I really don't know anymore.' In week twelve, despite recent familiarization with scientific literature disproving the idea that weight loss is easily achievable and always positive for health, in the new context of energy balance and weight science students still wanted to know about "healthy" weight loss: 'What are some of the most effective strategies for individuals to achieve and maintain weight loss in a healthy manner?' Other students had a hard time integrating information about why weight changes are far more complex than "calories in, calories out": 'In the weight science video you said that not everyone can lose weight, if you are burning more calories than you are consuming why wouldn't there be a weight change?' and 'Calorie deficits are often essential for "cutting" or weight loss on the athletic level, while calorie excess is used for "bulking." How long should a deficit or excess be used to gain the desired result before returning to a balance?' Body weight is a result of complex genetic, biological, and environmental factors, so it is inaccurate to view weight as a direct result of energy expenditure compared to energy intake.[2] Finally, in week thirteen (anti-fat bias), some students still had a hard time separating weight from health in the context of healthcare ('How can doctors treating patients moving forwards be accepting but help a patient be aware of the risks of their current weight?'), and in "extreme" cases ('How does weight bias play in when someone is morbidly obese and is at risk of heart disease?'). In the latter example, the student reflects terminology defined by the BMI that pathologizes fat bodies, which the weight-inclusive approach moves away from due to increasing evidence that the BMI's use as an indicator of health is problematic[4], making it difficult for them to understand disease prevention through a weight-inclusive lens. Weight normativity in the healthcare system and medical messaging proved to be one of the largest challenges for students when accepting the new topics. For example, another student seemed willing to accept the idea of looking at health behaviors rather than weight to understand someone's health, but still revealed some hesitancy in their language, viewing weight-inclusive concepts as an "opinion": 'So in your opinion, the solution to many health concerns connected with obesity (diabetes, heart problems, cancers) is more along the lines of encouraging health behaviors (diet, exercise, alcohol, and tobacco use) rather than promoting weight loss?'

Another sticking point for students throughout the second half of the course was accepting the negative impacts of diet culture and anti-fat bias on health, despite evidence that both are harmful in numerous ways, such as by increasing chronic stress levels, reducing access to quality healthcare, promoting low body satisfaction and self-esteem, and increasing disease and mortality risk due to weight cycling.[1] Many students thought that both diet culture and anti-fat bias could be helpful or even "good," as one student phrased it during week thirteen: 'Can fat bias be good?'

Some students thought diet culture and anti-fat bias could "motivate" people to engage in more health behaviors ('Is diet culture positive in moderation, encouraging healthy habits but not going so far as to encourage not eating to lose weight?' and 'Is fat bias related to health behaviors? Is fat bias really a horrible thing if it is used in certain ways to create motivation?'). Others were confused about whether perceived benefits of losing weight could offset the negative impacts of diet culture ('If people aren't comfortable with their weight do you think they should be taught to be happy with their current self or lose a couple pounds until they're happy with themselves?' and 'Is it okay for someone to want to lose weight and go on a diet? Is that something that should be encouraged even though it is possible to develop an ED?') The idea that increasing body dissatisfaction is a motivator for the adoption of health behaviors is a misconception perpetuated within the weight-normative paradigm; anti-fat bias, including weight-based bullying and discrimination, reduces quality of life and leads to harmful psychological and physical effects.[2] Additionally, the emphasis on weight may discourage people from practicing healthy behaviors because their efforts, such as sustained dieting, to obtain a "normal" or less stigmatized weight have been unsuccessful.[1] Finally, other students were concerned that countering anti-fat bias would "normalize" fat bodies: 'Is being weight-inclusive contributing to people thinking it's okay to stay out of shape?' This last question is also an example of students still equating weight with health.

Another lingering question among students when learning about the problems with anti-fat bias in society was whether anti-fat bias could also be extended to the self. For example, one student directly stated that they would not want to gain weight: 'Does it make me fat bias if I don't want to become fat myself?' Others were curious about intrapersonal weight bias compared to other types of anti-fat bias: 'I know there are different types of weight stigma. Could you not stigmatize others yet stigmatize yourself? Would that still be considered fat bias/weight bias, if you prefer yourself at a different weight but you don't stigmatize others?'

Even in the last week of the course, covering intuitive eating and eating disorders, there was lingering influence of diet culture messaging that students had a hard time looking past. This was evident in the number of students who approached the concept of intuitive eating as if it were a structured diet, a viewpoint that is antithetical to the principles of intuitive eating[12]: 'Can you eat whatever you want with intuitive eating? Or is there a specific diet?' Students projected dieting behaviors and concerns onto intuitive eating principles: 'Is calorie counting ever a productive way to intuitively eat?' and 'Can intuitive eating become unhealthy when not controlled?' Other students were unsure about how to incorporate intuitive eating due to the harmful effects of diet culture: 'How can you approach eating intuitively without feeling like you are eating too much or over-analyzing what you're consuming?' and 'For someone in recovery from an ED, how can one balance intuitive eating without slipping back into dieting/unhealthy habits or the guilt of eating what they perceive as too much?'

Overall, the influence of weight-normative and diet culture thinking can range from more overt to more subtle and can be difficult to address. Students need repeated exposure to the topics to overcome difficult points. Through the learning process, some students were able to recognize the effect of weight normativity and diet culture on their thinking and how this contributed to their hesitance to accept a new perspective: 'What are interventions that could be implemented today to reduce fat biases? I hate that I have these biases because when I think about it, I completely understand the science and factors that contribute to one's weight and how it has nothing to do with their health and personality, and values. However, unconsciously there is still hesitance.'

Theme 4: Weight-inclusive topics were top interests

Finally, the last set of responses analyzed was the end-of-semester survey, which asked students: “What are the top 3 things that you learned about nutrition and/or health this semester?” These responses were analyzed based on whether they represented any of the weight-inclusive course topics, including a positive view of the macronutrients, weight-inclusive thinking, anti-diet culture views, countering anti-fat bias, and intuitive eating, and it was noted if any responses represented a negative or conflicting perspective to these topics. 162 students completed the end-of-semester survey, and of all possible responses, over half identified these topics as one of the main things they learned. For example, students said one of the top things they learned was weight-inclusivity: ‘The weight inclusive approach to nutrition in general was new to me and I took away so much more from it than I originally expected I would’ and ‘Your health is NOT determined by your weight, and the size and shape of your body is the least interesting fact about someone.’ Others expressed that examining diet culture was one of their biggest takeaways: ‘I am able to find nutritional significance in anything I eat now which I am grateful for.’ The results of the end-of-semester survey illustrate that students appreciated learning about weight-inclusive topics that are not yet widely included in collegiate nutrition courses.

CONCLUSION

Weight normativity was the dominant paradigm present in students’ thinking when they entered Fundamentals of Nutrition, and introducing weight-inclusive topics is essential to reduce harmful impacts of weight normativity, diet culture, and anti-fat bias. Overall, students were curious to learn about the new topics. Even though some students may not have fully embraced a weight-inclusive mindset or practice, they appreciated learning about the topics and actively questioned their pre-existing perceptions. A weakness of this research is the potential for subjectivity during data analysis, though this was addressed in the design by having two coders. Additionally, diet culture has continued to change and evolve since the data set was collected, and there are likely new issues of concern for students when it comes to challenging diet culture and weight normativity aside from the ones discussed. Another weakness is that student responses from only one course were included in the data set. One strength of this research is that qualitative data analysis allowed for greater understanding of student perceptions compared to quantitative measurements. Having two coders to analyze each response and compare codes allowed for in-depth discussion and understanding of student perceptions. Another strength is that using a weight-inclusive approach in nutrition education is still rare compared to programs that use a weight-normative approach, and this research adds to the growing body of literature about the importance of teaching these topics to students. Future research should continue to focus on incorporating weight inclusivity and changing student perceptions in dietetics, nutrition, and other health-related programs to mitigate harms of anti-fat bias and eating disorder development.

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APPENDIX

Table: Application Questions Codebook

Code	**Definition**	**Application/Example**
weight-normative (wn)	• weight is a risk factor for many diseases • we can all achieve "normal" weight • weight is an important indicator of health	• I should lose weight so I don't get diabetes • I would be healthier if I lost weight • My BMI says I'm obese, but I workout all the time. Am I unhealthy?
weight-inclusive (wi)	• health behaviors are risk factors for many diseases, not weight • we are all destined to be a different weight • weight is not an important indicator of health	• I like to do activities that make my mind and body feel good • It's ok to eat food that nourishes my mind and my body
diet culture (dc)	• worships thinness and equates it to health and moral virtue • promotes weight loss as a means of attaining higher status • demonizes certain ways of eating while elevating others • oppresses people who don't match up with its supposed picture of "health"	• I feel guilty when I eat food that has fat in it • I'll get fat if I eat too many carbs • counting your macros is the only way to stay thin • I need extra protein because I spend so much time in the gym • how do I know if a food is "clean"?
⇒ dichotomization of food (df)	• food is categorized as either/or	• are there "good" foods and "bad" foods? • what makes food "heathy" and "unhealthy"?
⇒ diet naming (dn)	• specific diets are mentioned, are assumed to provide weight loss and therefore health	• is there any benefit to a low carb diet? • why is the keto diet so successful?

nutrition confusion (nc)	• uncertainty is expressed about nutrition standards or regulations • conflicting nutrition advice is present	• with all of the nutrition information out there, how do we know what good nutrition is? • are the serving sizes on nutrition labels accurate? • where can I get nutrition information that isn't from some influencer on the internet?
anti-fat bias (fb)	• negative attitudes towards, and beliefs about others, because of their weight • biases are rooted in a sense of blame and presumed moral failing	• if someone can't lose weight isn't it because they didn't try hard enough? • a person who is fat must be lazy
basic/applied nutrition (ban)	• general nutrition topics i.e. dietary patterns, metabolism, digestion/absorption, sports nutrition, eating on a budget, disease, nutrients etc.	• should I take supplements? • will carb loading help me in the gym? • what's the difference between complex and simple carbs? • how does protein help to build muscle?
intent (i)	• the intent of a question is unclear; is it being asked from a weight-normative perspective rooted in diet culture or from a place of genuine curiosity?	• does having a higher metabolism drastically affect your weight? • what foods are positively nutritious? • can a fat-free diet be healthy?
questioning diet culture (qdc)	• uncertainty is expressed about previously learned content by way of questioning the validity of that content • an awareness of the negative effects of diet culture is present	• how does diet culture change how we look at nutrition? • what is a good way to eat without getting trapped by diet culture? • I've always been told carbs are bad, but I know this isn't true. Why?
countering anti-fat bias	• how to oppose anti-fat bias on intrapersonal, interpersonal, and institutional levels	• what can we do to make healthcare more equitable? • how to combat anti-fat bias in our daily lives?