IS BEING OVERWEIGHT BAD FOR YOU?
THE EFFECTS OF WEIGHT AND WEIGHT STATUS ON SELF-REPORTED HEALTH

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ABSTRACT

For nearly three decades, public health officials have been telling Americans that being overweight or obese is extremely dangerous for their health and well-being through public services announcements, popular health news articles, and scientific studies – all decrying the "obesity epidemic" plaguing the United States. In this same period, mean Body Mass Indexes and rates of overweight and obesity in the US have either increased or remained steady, but have seen no wide-spread reversal in direction. Thus, despite public health officials' diligent efforts, Americans do not seem to be responding to these messages. Any number of causal mechanisms could explain this; however, we should consider the possibility that Americans simply do not believe that being "fat," "heavy," or "overweight" is bad for their health. In this dissertation, we ask the question "do you think that being overweight is bad for your health?" by analyzing data from the National Health and Nutrition Examination Survey from 1999 to 2012 – an era in which the frequency of publication on the obesity epidemic reached a record high.

Ultimately, we find that Americans are more likely to associate their own status as overweight individuals with lower self-reported health when this status is defined through multiple avenues at once: being clinically overweight, perceiving themselves as overweight persons, and having clinicians tell them directly that they are overweight. Saying "being overweight or obese is unhealthy" is not enough. If Americans do not believe that they are overweight, and if they do not receive personal counsel from medical professionals about their weight status, then they are unlikely to change their opinion of their overall personal health status in light of their status as overweight or obese individuals. Anti-obesity and weight-awareness advocacy has established the

mantra: being fat is bad for you. The challenge for public health officials now is to raise awareness about what overweight and obesity truly mean, and to convince clinicians to become much more determined in upholding clinical weight guidelines and informing their patients of their weight statuses.

This dissertation is dedicated to two wonderful women.

To my mother, Marie Villanucci, for everything. You gave me my life, and have continued to provide me with support and encouragement every day.

This is as much your accomplishment as it is mine.

To Aïcha Ly, for believing in me always, for loving me,

and for always having more faith in me than I had.

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CHAPTER 1

INTRODUCTION AND BACKGROUND

A man is rolled into the operating room on a gurney, half-conscious as the attending medical staff scramble to prepare for the pending procedure. He is sweaty, limp, and extremely overweight. The point of view changes and we now find ourselves observing the scene from the man's perspective as an oxygen mask is strapped to his face and his head is turned toward the bright examination light above. His vision blurry and narrow, he sees the doctor and nurse move into his frame of vision. "Alright, what do we got?" the doctor asks nonchalantly. The nurse consults the chart: "Just came in. Heart attack. Five-nine, three-hundred pounds, thirty-two years-old." Expressionless yet befuddled, the doctor, with his hands moving mechanically as he readies the patient, asks aloud: "How the hell does that happen?"

With frantic orchestral music playing in the background, we begin a tour of this man's life in reverse chronological order from his perspective. The first scene features the man grabbing the left side of his chest as he stumbles down the street. We then witness an adult life marked by the consumption of junk food, wheezing, inability to keep up with a young child at play, and lethargy. As the music becomes louder and more unsettling, we move into the man's teenage years, where he is at once rewarded with food for every major accomplishment while also encouraged to exercise more and chastised for hiding chocolate in his sock drawer. As we move further backward in time, the contradictions become clearer: the man's parents are told by physicians that their son's weight is a problem, and yet they feed him fast-food, extra-cheese pizzas, and other fattening meals apparently out of convenience. Ultimately, we arrive at infancy, where the subject is

seated in a high-chair, pitching a fit and throwing his dry Cheerios onto the floor. His mother kneels in front of him and begins feeding French fries into the camera, while another woman kneels beside her, looking into the baby's eyes and remarking coldly: "I still can't believe you give this child French fries." The mother, with a fixed, toothsome smile on her face, never breaking the air of pleasantness, responds in a baby-friendly sing-song voice: "I know. But it's the only thing that'll make him stop."

In under two seconds we are sent back through the man's life, this time in proper chronological order, ultimately arriving once again at the operating room. We are now looking directly downward upon the man as a nurse begins cutting the clothes off his morbidly obese body, his skin pallid and wet as he struggles to breathe. The words "Your child's future" are printed across the screen, followed by "doesn't have to look like this" (Children's Healthcare of Atlanta, 2014).

The above storyline is a retelling of a popular public service announcement (PSA) produced by Children's Healthcare of Atlanta in 2014. The message – as if it were not clear enough – is that unhealthy childhood lifestyle habits lead to weight issues, which in turn lead to serious health problems in early adulthood. Almost all public health advocacy regarding excess weight is concerned with convincing Americans that being overweight, obese, or "fat" is an important determinant of poor health and even premature death. The concern over the weight of the nation among public health organizations within government, the non-profit sector, and universities is so strong that the term "obesity epidemic" has been used to describe the rapid increase in Americans' weights and the grave consequences that could follow from this massive shift. Typhoid, cholera, influenza, Ebola: each are examples of true viral or bacterial "epidemics" that have

plagued human society in recent history, and we are now told that our body weights are worthy of at least appropriating the term to describe our present health risks.

Background

A Recent History of the Weight of the Nation

It is observably true that the American people have become heavier throughout the latter half of the 20th century and into the 21st century. To control for the possibility that Americans have also become taller (perhaps due to increased nutritional value in their diets), epidemiologists prefer to use a standardized unit called the Body Mass Index (BMI) – rather than units of mass – when discussing body-size and composure in almost all cases. BMI is a ratio of weight to height, and is calculated as weight in pounds divided by height in inches-squared, multiplied by 703.[1] Between 1963-1965 and 1999-2002, the average adult American's BMI has increased by roughly 3 BMI units (and the average child's by more than 4 units) (Ogden et al. 2004:2).

This increase in BMI also resulted in an increase in obesity rates in the US. The Centers for Disease Control and Prevention (CDC) along with dozens of other federal and international health agencies use BMI to set parameters for weight categories (Table 1); among these categories is "obesity," defined as having a BMI greater than or equal to 30 (NLBHI 1998). Between the mid-1970s and early 1990s, overall adult obesity rates increased from roughly 13% to 22.5% in the United States (Flegal et al. 1998). However, Basu (2010:1) shows that BMIs in the right-tail of the BMI distribution have been

[1] BMI is more commonly calculated as weight in kilograms divided by height in meters-squared both in the United States and abroad. However, since Imperial units are used in examples throughout this dissertation, the Imperial formula is given here.

increasing more than have the values in the left tail, implying that very heavy people account for a disproportionate share of overall BMI increase (especially, and unfortunately, among children). Today, roughly 71% of all adult Americans are either overweight or obese (NCHS 2014).

Table 1
Clinical weight category classification using BMI[2]

Clinical Weight Category	BMI
Underweight	< 18.5
Normal Weight	18.5 – 24.9
Overweight	25 – 29.9
Obesity	30 +

BMI and BMI classification schemas are not without their critics. The practice of segmenting BMI into desirability categories began in the 1940s with the Metropolitan Life Insurance Company, whose actuarial department had the notion that BMI could be a predictor of risk from an insurance standpoint (Anders et al. 1985). The models developed by Metropolitan, however, were only concerned with outcomes of death, and were hyper-focused on small differences in outcomes since life insurance payouts are quite substantial; there was no examination of quality of life or non-fatal clinical outcomes (Anders et al. 1985). Nonetheless, BMI categorization soon became common practice in public health research. In the late 1990s, BMI classification gained national attention after a contentious restructuring in the United States. Previously, federal guidelines defined "overweight" as having a BMI of 27.8 for men and 27.3 for women (Kuczmarski and Flegal 2000). In 1998, partly to become accordant with the World

[2] The terms "morbid obesity" and "super-morbid obesity" refer to BMI ranges 35-39.9 and 40+, respectively. These are occasionally used in clinical applications, however generally "obese" is used to refer to anyone with a BMI of 30 or greater. In this dissertation, the term "obese" or "obesity" refers to anyone with a BMI of 30 or greater, although at times morbid obesity and super-morbid obesity are used to specify extremely high weight categories in specific examples.

Health Organization (WHO) and other major public health institutes, the National Institutes for Health and Human Services (NIH) announced that "overweight" would now refer to anyone with a BMI of 25 or greater regardless of sex, thereby substantially lowering the threshold for overweight in the United States (Kuczmarski and Flegal 2000). That millions of Americans were turned overweight "overnight" became a trope for obesity-skeptics. The ease and casualness with which millions of people were moved from the realm of normal weight into one of inappropriate weight provided fodder for critics who argued that BMI classification schemas were not meaningful from a clinical perspective and only helped to reinforce rather frivolous social definitions of body size.

The fact to which no one could object, however, was Americans' increasing mean BMIs and obesity rates. Americans saw a fairly striking increase in BMI throughout the latter-half of the 20th century, resulting in a population that is more overweight than not. Americans were undeniably following a path toward wide-spread obesity, and public health officials were concerned. Wang et al. (2008) exemplified this panic when they used federal public health datasets to predict that by 2048, 100% of Americans would be either overweight or obese.

However, as data from the 21st century became available, public health researchers noticed an interesting adjustment to BMI and obesity rate increases. Basu (2010) and Ogden (2012) show that both BMI levels and obesity rates have either slowed or flattened for most subsections of the American populace since the turn of the 20th century, while other studies showed that childhood obesity rates fell in more states than they increased by 2013 (CDC Pediatric Nutrition Surveillance System 2013). Flegal et al. (2012) and Ogden et al. (2014) concluded that there was no increase in obesity rates in

the general adult and child US populations during the first decade of the 21st century. The cause of this levelling-off was and is unknown (just as it is unknown if this is a permanent ceasing), but one thing became clear: this apparent "good news" would do nothing to ebb the tide of literature focusing on the supposed "obesity epidemic." Indeed, it is curious that at almost the exact moment at which obesity rates and mean BMIs appeared to have stabilized, the opprobrium over this "devastating" epidemic erupted in popular health news and scientific journals.

"The Obesity Epidemic"

In her book *What's Wrong with Fat?*, Abigail Saguy tracks the reporting of the American obesity epidemic in popular health news and scientific journals and uncovers a disconnect between actual change in BMI and media fascination. Between 1980 and 1998, there was virtually no coverage mentioning the term "obesity epidemic" in *The New York Times, Newsweek, US News & World Report,* or *The Washington Post* (Saguy 2013:46). In 1999, however, these major American news sources apparently became absorbed with concern over this "new" epidemic. Stories mentioning the term "obesity epidemic" in the body-text of the four aforementioned news sources increased from 5 individual stories in 1999 to 68 stories in 2003 – an increase of 1360% (Saguy 2013:46). Scientific journals followed the same pattern almost identically. Scientific journal articles focusing on obesity rose from 2000 in 1998 to 11,000 by 2010 according to the Pubmed academic journal database (Saguy 2013:109). Despite the fact that the first decade of the 21st century was entirely unremarkable in terms of mean BMI or obesity rate increase,

American news outlets and many health advocates continued ringing the alarm over the obesity epidemic and the national crisis it would precipitate (Gard 2011:33-35).

The most direct mode of alerting Americans to the dangers of excess weight has undoubtedly been the PSA. In addition to the specific instance used in the opening of this chapter, government and public health-sponsored PSAs focusing on weight have become a mainstay of the American media landscape thanks in large part to broadcasting by The Advertising Council (usually shortened to The Ad Council). The Ad Council is a non-profit organization that partners with the United States government and non-profit organizations to promote social beneficence in education, health, and civic engagement among other areas. The Ad Council regularly runs as many as six different anti-obesity, US government-sponsored PSA campaigns annually through television, radio, and print media, most of which focus on the dangers that obesity poses to one's health, especially the health of children (Ad Council Catalogue 2014).

Anti-obesity PSAs in the US can often be just as jarring as anti-drug or anti-violence PSAs. In the mid-1990s, The Presidential Council on Physical Fitness partnered with the Ad Council to launch the now-infamous "Gopher Cakes" PSA: a mock commercial for a chocolate-coated snack cake featuring a house full of children (some of whom are overweight) jubilantly eating piles of the treats to a catchy jingle. Eventually, the children's rapacious devouring of the cakes results in their collapsing on the floor in motionless heaps – incapacitated by Gopher Cakes – while the jingle darkly sings "eat Gopher Cakes 'til you explode!" (AdCouncil n.d.)

Other PSAs are more serious and far less "humorous." In 2014 the US Department of Health and Human Services released a print PSA showing a mock

package of Marlboro cigarettes with French fries inserted in place of the cigarettes, the tagline reading “The obesity death rate is overtaking cigarette smoking.” In 2016 The New York City Department of Health and Mental Hygiene released a PSA warning that consumption of energy drinks could lead to blindness and foot amputations via type 2 diabetes. In 2012 Children’s Healthcare of Atlanta (the same group that produced the PSA recounted at the start of this chapter) released a controversial PSA called “Stop Sugarcoating,” which featured black and white photographs of real overweight children with subtitles such as “It’s hard to be a little girl if you’re not,” “It may be funny to you, but it’s killing me,” “He has his father eyes, his laugh and maybe even his diabetes,” and perhaps most shocking “Chubby kids may not outlive their parents.” Examples of this type of PSA are replete in American broadcasting and advertising, and the message is unmistakable. Being “chubby” means your parents might have to bury you, your beverage choices could result in loss of a sensory organ and even a limb, and generally, being fat is just as bad for you as inhaling tar and smoke, and is a condition that you should try to avoid at the cost of your well-being and life. Americans’ weights are simply out of control, and we must act now to stop this epidemic of fatness in our society.

But obesity is a curious case of an epidemic. It is not contagious, it does not “flare up” in pockets of society, and it can take years for its ill effects to become evident; sometimes these effects never emerge at all. Further, despite the bombardment of messages decrying the dangers of this epidemic and the incredible resources poured into fighting it, there has not been much measurable decrease in average weights or obesity rates for decades. If this epidemic were truly comparable to viral and bacterial epidemics with which we are more familiar, should not we see some decrease of its prevalence,

given the myriad proven treatment and cures we have for it? Why have we not? Could it be, perhaps, that Americans simply do not believe that being heavy is truly that much of a detriment to their health?

Research Agenda of This Dissertation

"Do you think that being overweight is bad for your health?" This simple question could help us understand whether the apparent levelling of BMI increase in the general population is in due (in part) to an acceptance by the populace at-large that being overweight or obese is truly deleterious to one's health. Perhaps, conversely, Americans do not hold this opinion, and what we are presently witnessing in terms of BMI trends is due to some other social, medical, or biological force.

This dissertation will not concern itself with understanding population-level weight fluctuations: there is enough epidemiological literature already on that very topic. Rather, it will explore the question of whether Americans believe the rhetoric that excess weight is bad for them. If the answer is no, then the United States government, public health agencies, universities, and countless non-profits have largely been "speaking past" Americans for the better part of two decades and need a serious change in approach to creating and disseminating anti-obesity messages. If the answer is yes, then we might need to consider that we are past the point of "raising awareness" among the populace. Perhaps Americans have accepted this "truth," yet no matter how convinced they are of its veracity, are unable to adjust their weights accordingly.

The question "do you think that being overweight is bad for your health?" can have two quite different meanings. It can mean "do you think that being overweight is

generally bad for a person?" if "you" is used in the informal sense to refer to the general third-person. It can also mean "do you think that your status as an overweight person is bad for your personal health?" if "you" is used in the literal sense to refer to the recipient of the question. Asking the former question is methodologically fairly easy: simply ask a person for his opinion of what obesity or overweight means for the general public's health. The second question, however, is a bit trickier.

If overall health is the outcome variable in this question, then we need to have some type of self-reported general health variable on which respondents can rank themselves. We then need to use an independent variable that measures whether one is overweight/obese. But this is a conceptually complicated endeavor unto itself. We could rely on clinical measures of weight to classify people as normal weight, overweight, or obese. However, if someone is clinically overweight, but has never been told so by a physician, then he might not be aware that he qualifies as an overweight person. Therefore, we should incorporate an independent variable into our questioning that asks whether an individual has ever been told that he was overweight by a clinician. Complicating the matter still, if a person is clinically overweight, but does not *think* that he is overweight, then asking how his excessive weight affects his health is not very useful. We should then use a self-perceived weight status variable (in combination with clinical BMI) in order to detect effects of identifying as an overweight person on self-reported health.

We are now left with three measures of weight all contributing to self-reported health. As if the question "do you think that being overweight or obese is bad for your health?" had not grown complex enough, we find through our initial exploratory data

analysis that self-perceived weight status varies by a number of demographic variables, thereby behooving us to understand what predicts self-perceived weight status itself before we begin using it in any analyses of self-reported health. Once we accomplish the goals of understanding the determinants of both self-perceived weight status and self-reported health, we are then left with the question of whether one's BMI, self-perceived weight status, or "diagnosis" of overweight actually encourages any lifestyle changes related to losing weight. If we want to know whether people believe that being overweight is bad for their health, we can simply look to self-reported health as the final outcome variable, however we should also want to know whether people "do" anything about their weight in light of being clinically overweight, being told that they are clinically overweight, and/or self-perceiving as overweight. After all, if the "obesity epidemic" has largely been characterized by non-reduction in obesity rates and mean BMIs, we might suspect that despite people's opinions on the deleteriousness of excess weight, they simply do not feel any sentiment strongly enough to seriously address their weights.

This dissertation will attempt to answer three broad research questions that address the above paragraph's ponderings.

1.) What are the determinants of self-perceived weight status? (Chapter 3)
2.) Is being overweight associated with poorer self-reported health? (Chapter 4)
3.) Is being overweight associated with attempting to lose weight? (Chapter 5).

In Chapter 3 we will examine self-perceived weight status and how it varies by sex, race, age, actual BMI, and having been told that one is overweight by a clinician.

In Chapter 4 we will examine self-reported health and how it varies by sex, race, age, actual BMI, having been told that one is overweight by a clinician, self-perceived weight status, and the presence of an obesity-associated comorbid condition. In this chapter we include self-perceived weight status in addition to our two other measures of weight (BMI and clinical diagnosis) to get the most robust understanding of the relationship between weight and health possible with our data. We also include a variable that checks for the presence of what we will define later as an "obesity-associated comorbid condition" in order to separate weight's effects on health from those effects that are likely caused by a discrete medical condition such as congestive heart failure or diabetes.

In Chapter 5 we will examine attempting to lose weight and how it varies by sex, race, age, actual BMI, having been told that one is overweight by a clinician, self-perceived weight status, and the presence of an obesity-associated comorbid condition. Here we want to understand if being overweight or obese, or suffering from a condition often attributed to one's weighing too much, motivates one to attempt actual weight loss.

CHAPTER 2

DATA AND METHODS

All analysis performed in the course of the forthcoming study relies on data obtained from the National Health and Nutrition Examination Survey, more commonly abbreviated as "NHANES". The NHANES is an interview and medical examination-based health survey conducted by the National Center for Health Statistics (NCHS) (a subsidiary of the Centers for Disease Control and Prevention [CDC]) that has existed in some form since 1960 (Table 2). In its most recent manifestation, the NHANES has assumed the prefix "Continuous" to imply that it should henceforth be conducted every year rather than only sporadically as it has been in the past. The Continuous NHANES began in 1999 and has been conducted each year in 2-year survey waves since. This study examines data from Continuous NHANES survey waves conducted between 1999 and 2012.

Table 2

Chronology of NHANES survey administration[3]

1960-1962	NHES I*
1963-1965	NHES II
1966-1970	NHES III
1971-1975	NHANES I
1976-1980	NHANES II
1982-1984	HHANES**
1988-1994	NHANES III
1999-Present	Continuous NHANES

*"National Health Examination Survey" – the survey did not include much in the way of nutritional inquiry at this point.

**"Hispanic Health and Nutritional Examination Survey" – a special HANES focusing more closely on the American Hispanic population, which was relatively small and under-studied at the time.

The Continuous NHANES consists of many modules and subsections, however it is fundamentally divided into two major parts: the survey-interview component and the

[3] https://www.cdc.gov/nchs/nhanes/history.htm

medical examination component. The survey-interview component consists of an NHANES employee administering an in-person questionnaire to a survey respondent and is chronologically antecedent to the medical examination component. The survey-interview asks the respondent a set of base demographic, medical, and nutritional questions and then may proceed to ask the respondent questions from varying survey subsections depending on the respondent's prior responses. Participants who complete the survey-interview may elect to participate in the medical examination component, in which the respondent is subjected to a battery of bio-metric and clinical examinations (such as being weighed, having one's blood pressure taken, having blood drawn for body chemistry tests, and so on). The medical examination component may also contain survey questions specific to certain elements of the medical examination, but these are still counted as clinical in nature since they occurred during a medical screening.

Despite being advertised as a nationally-representative sample study, the NHANES does not draw each of its survey waves from a simple national sample. Rather, unique study sites ("primary sampling units", or PSUs) are chosen for each survey wave in a number of states that likely do not represent the demographics of the United States at-large. After over-sampling for certain socio-economic, age, and racial/ethnic groups, sampling weights are generated by the NCHS to help adjust the NHANES data in light of its highly complex design. Recently (as of 2010), the NCHS has begun providing masked-PSU weights for use in Taylor Series Linearization when combining multiple waves of Continuous NHANES data (NHANES Guidelines 2013:10). Additionally, because the NHANES is fundamentally split between the survey-interview and medical examination components (which have somewhat different study samples), analysts must

be careful to select the correct set of sample weights when creating their models. NHANES analytic guidelines recommend using the sample weight from whichever component contributes the least number of unique cases to a model (NHANES Guidelines 2013:10). For example, if one creates a model that uses a medical examination variable with 15,000 unique valid cases along with a survey-interview variable with 900 unique valid cases, he should in turn use the survey-interview weights for his entire model.

Key Variables and Sample Restrictions

The forthcoming study will reference certain variables repeatedly and will include some variables that have been significantly recoded from their initial structure. Let us take a moment to review our most important independent, dependent, and control variables.

Age

In our study, we control for the effect of age on all three of our primary outcome variables and use age to restrict our sample to the adult population. For our purposes, "adult" will refer to persons between the ages of 20 and 69. NHANES analytic guidelines suggest setting a lower age limit of 20 to define the adult population since many individuals under 20 can still be classed as children for the purposes of the study and subject to different lines of questioning (NHANES Guidelines 2013:4). The upper age limit of 69 was set in order to preserve sample size (mortality begins to significantly reduce sample sizes past 69) and to help stabilize the relationship between weight and

health. At high ages, the relationship between weight and health becomes unstable, with overweight people finally succumbing to the ills of their weight, while ill people often begin to lose weight, and thin people begin to suffer from geriatric conditions related to bone density and musculoskeletal conditions.

Although age is retained as a continuous variable in many models, at times it is also recoded into three dummy variables to check for effects on larger age groupings. Our three recoded age dummy variables are transformed so that 1=20 to 35 and 0=all others, 1=36 to 50 and 0=all others, and 1=51 to 69 and 0=all others.

Race

In this study, we limit ourselves to two racial groups: non-Hispanic Blacks and non-Hispanic Whites, with Whites serving as the reference group. Sample sizes of Asians and Native-Americans are very low, and due to inconsistency within the NHANES' gathering of racial/ethnic data on Hispanics, NHANES analytic guidelines warn against performing analysis on the Hispanic sample without significant specialized knowledge of the NHANES' historical issues within its Hispanic sample.

The NHANES does not allow for a person to select multiple specific racial identities. Rather, respondents may only select a two-or-more races option. This makes it impossible for us to include people who identify as one of our racial groups of interest in combination with some other racial group (for example, a person who identifies as a non-Hispanic Black person and an Asian person). Given this, our sample is truly "Black and White" in a very classically American sense.

Sex

Sex is divided into males and females and our analyses exclude anyone who gives an alternative or missing response.

BMI

Referred to interchangeably as BMI, clinical BMI, measured BMI, or actual BMI, the Body Mass Index is a standardized measure of body size, reported in the NHANES as a continuous variable rounded to the nearest tenths-place. BMI is a measured variable in the NHANES, not a self-reported variable. Respondents are weighed and measured by a medical technician in order to derive BMI. Calculated as weight (in kilograms) divided by squared-height (in centimeters), BMI is often used to determine weight-status for individuals while controlling for their height and is the basis for clinical guidelines that define underweight, normal weight, overweight, and various levels of obesity.

In our sample, we exclude all individuals who qualify as "underweight" by CDC standards because underweight is often a result of diminished health and wasting, therefore making comparisons between weight and health somewhat unreliable. An underweight individual is someone with a BMI under 18.5 (for example, a person standing 5 feet, 7 inches tall we become underweight at 117 pounds). We also set an upper limit BMI of 60 (equivalent to a person standing 5 feet, 7 inches weighing 381 pounds) to remove the most extreme outliers on the right tail of the BMI distribution.

The CDC, World Health Organization (WHO), and other large public health organizations assign labels to arrays of BMI as well, and many of these labels are used herein (see the introductory chapter of this dissertation for a detailed list of these labels).

It is important to note, however, that the NHANES does not report clinical weight category labels – it only reports numerical BMI data.

Self-Perceived Weight Status

In the survey-interview portion of the NHANES, respondents are asked to describe their weight as either "underweight," "about right," or "overweight." This question is asked *before* a respondent participates in the medical examination portion of the NHANES, at which point a respondent might be swayed in his perception of his weight status by the numbers presented by the medical worker before him. In this study, we exclude anyone who self-identifies as underweight largely because there are so few people in that category.

Having Been Told that One Is Overweight by a Clinician

During the survey-interview portion of the NHANES administration, respondents are asked if they have "ever been told by a doctor or other medical professional" that they had any number of medical conditions; among these possible conditions is "overweight.[4]" Respondents may answer "no," "yes," or give a refused/do not know response.

Although this variable is meant to determine whether a clinician (a term we use here to combine physicians with non-physician medical professionals such as nurses) has informed a patient that he is overweight, we do not know for sure whether the patient was in fact overweight at the time of his "diagnosis"[5] of overweight. We can determine a

[4] The exact text of this specific question in the NHANES interview manual reads: "Has a doctor or health professional ever told {you/SP} that {you were/s/he/SP was} overweight?"

[5] We use the term "diagnosis" somewhat loosely throughout this dissertation. We use it when referring to having been told by a clinician that one is overweight or is ill with any of our obesity-associated comorbid

patient's BMI, calculate his clinical weight category, and compare that to his diagnosis of overweight, but it is possible that weight fluctuations between this diagnosis and the time of the survey administration can somewhat obscure the accuracy of said diagnosis. Further, it is possible that a patient can answer "yes" that he has been told that he is overweight by a clinician, however this could have occurred many years in the past, and the same patient may have been told that he is *not* overweight by a clinician since then. Additionally, a patient could have been told that he is overweight, but has since lost weight and would no longer be told that he is overweight by a clinician. These are limitations that are, unfortunately, inherent in this variable.

For our purposes, those who answered "no" to this question serve as the reference group, and any missing or refused/do not know cases have been dropped.

Having Been Told that One Has an Obesity-Associated Comorbid Condition

During the same part of the survey-interview portion of the NHANES in which respondents are asked if they have ever been told that they are overweight by a clinician, they are also asked about their medical history and whether they have been told that they had any number of chronic or acute medical conditions.

Because our objective in using these variables in our modelling is to control for the effects of medical conditions on self-reported health or attempts to lose weight in order to isolate the unique effects of being overweight, we are only concerned with medical conditions that are generally associated with obesity or excessive weight. There

conditions. Technically, only a physician or a nurse practitioner may issue a proper diagnosis. However, it is possible that some other kind of non-physician clinician told the respondent that he was overweight, which would thus not qualify as a true diagnosis. However, for our purposes, we are using the term "diagnosis" to mean any declaration by a clinician about the health status of his patient.

is no absolute consensus of what constitutes an "obesity-associated comorbid condition," however drawing from the CDC, NIH, and the WHO, we have identified some generally agreed-upon conditions that also exist in our NHANES data. These conditions are high blood pressure (hypertension), high cholesterol, heart attack, stroke, diabetes, congestive heart failure, and coronary heart disease.[6]

In our modelling, we generally combine these variables into one binary measure of obesity-associated comorbidity, where 0=respondent has no obesity-associated comorbid conditions and 1=respondent has at least one obesity-associated comorbid condition. At times we will also refer to these variables in their original form, where 0=respondent has not been told that he has a given condition and 1=respondent has been told that he has a given condition. As with our variable that asks whether one has been told that he is overweight by a clinician, these variable also refer to "ever" having been told, and therefore suffer from the same limitations (although with some conditions – such as congestive heart failure – it seems unlikely that one would be diagnosed with such a condition and then completely recover from it later on).

Self-Reported Health

Self-reported health (SRH) is one of our primary outcome variables and is central to this entire study. In the survey-interview portion of the NHANES, SRH is coded

[6] That these diseases are considered "obesity associated" by many organizations does not preclude other diseases and conditions from also being associated with overweight and obesity. Musculoskeletal conditions, respiratory problems, and other diseases related to organ health may very well have an association with excess weight. We are using this selection of obesity associated conditions in this dissertation because they represent a sample of diseases that are almost universally considered to be closely associated with excess weight.

according to fairly standard conventions: 1=poor, 2=fair, 3=good, 4=very good, and 5=excellent (Table 3).

Table 3
Distribution of original self-reported health variable

Original Self-Reported Health Variable	N	%
Excellent	2,163	19.5%
Very Good	3,856	34.7%
Good	3,498	31.5%
Fair	1,252	11.3%
Poor	345	3.1%
Missing	0	0.0%
Total	11,114	100%

Because we want to create a dichotomous variable for use in binary logistic regression, we have recoded SRH where 0=poor, fair, and good while 1=very good and excellent; essentially, our reference group is lower health (Table 4). Some may question the wisdom of including "good" into the reference category as a measure of lower health since, after all, "good" is a positive adjective and implies that one's health is not bad. This is a fair criticism. We have taken the step to combine "good" with "poor" and "fair" largely because sample sizes for the lowest two values of SRH were very small after we applied our various sample exclusions. Simply, too few people who are in our eligible sample reported their health as "poor" or "fair" to make for a viable sample. Once "good" is combined with "poor" and "fair", we obtain a sample that is (fairly) evenly divided between lower health and better health.

Table 4
Distribution of re-coded self-reported health variable

Re-coded Self-Reported Health Variable	N	%
Higher Health	6,019	54.2%
Lower Health	5,095	45.9%
Total	11,114	100%

Attempts at Weight-Loss

In our final analytical chapter, we explore the determinants of attempting to lose weight. During a survey-interview module that asks a number of questions about the respondent's weight-status, respondents are asked whether they have attempted to lose weight within the past year regardless of their BMI or self-perceived weight status. People often attempt to lose weight even when they are not overweight for many reasons, just as people who are overweight often do not attempt to lose weight, and so this question is administered to all respondents without discrimination.

In its original coding, this variable is dichotomous save for the refused/do not know options. We have simply dropped missing and refused/do not know cases from our study data, but otherwise have preserved this variable so that 0=respondent has not tried to lose weight within the past year and 1=respondent has tried to lose weight within the past year.

Sample Restrictions

Our study sample is restricted by a number of qualifiers and conditions. Respondents included in our sample are respondents who participated in both the interview and clinical examination portion of the NHANES between the 1999-2000 and 2011-2012 survey waves and who: are between 20 and 69 years old, are either non-Hispanic Blacks or non-Hispanic Whites, are not pregnant, have a BMI between 18.5 and 60, and who have seen a physician within the past 12 months of having participated in the NHANES. Additionally, we limit our sample to people who provide valid responses to questions that ask whether they have ever been told that they are overweight by a

clinician, how they perceive their own weight status, and whether they have ever been told that they had an obesity-associated condition by a clinician. With none of these restrictions, our total possible adult sample would be 38,024[7]. With our selected restrictions, our sample drops by 26,910 individuals to 11,114. Certain models contain additional sample restrictions, and these will be noted in turn, however it should be assumed that the above restrictions have been applied to all models in the forthcoming dissertation.

The decision to limit this sample to those respondents who have seen a physician within the past 12 months might give the reader concern that we are skewing our sample by over-sampling persons who reported lower health, have more obesity-associated maladies, and are older. This is not an unreasonable worry. People tend to visit the doctor or end up in the care of a doctor when something is wrong with them. To check for any skewing that might affect our data in light of this important sample restriction, chi-square tests and t-tests were performed on our model variables by whether the respondent has seen a doctor in the past 12 months or not (all results are presented in Appendix A of this chapter).

We find that, across the board, there are significant differences between our two groups (those who have seen a doctor in the past 12 months and those who have not). Those who have seen a doctor in the past 12 months are 13 percentage points more likely to report lower SRH and 27 percentage points more likely to have been diagnosed with an obesity-associated condition than are those who have not seen a doctor. Those who

[7] This number reflects one exclusion: juveniles. Juvenile survey respondents partake in a different battery of modules than do their adult counterparts, so they are almost always separated in NHANES analyses. For the curious, our completely unrestricted sample size would be 71,916.

have seen a doctor are also 11 percentage points more likely to self-perceive as overweight, 17 percentage points more likely to have been told that they are overweight by a clinician, 12 percentage points more likely to have attempted to lose weight in the past year, 3 percentage points more likely to be Black, and 21 percentage points more likely to be female than are respondents who have not seen a doctor in the past 12 months. Those who have seen a doctor are, on average, 5 years older and have a 1 unit higher BMI than those who have not seen a doctor.

We have thus selected a sample that is significantly "sicker" (both in terms of SRH and presence of obesity-associated conditions) than the general population, which is intrinsically important to understand as we progress through this dissertation. Therefore, to be prudent, all general models from our forthcoming chapters were re-run with the requirement that a respondent has seen a doctor within the past 12 months removed as a sample restriction to see if including this restriction affects our results in any significant way. We found no significant differences between our models run with the sample restriction and our models run without the sample restriction. That is so say, although our restricted sample is indeed "sicker" than the general NHANES sample, the difference between groups in our predictor and control variables do not change significantly by presence or absence of this sample restriction. Therefore, while readers should understand that percentages presented in some descriptive crosstabulation tables will likely reflect the particular skewness of our restricted sample, our logistic regression models still reflect generalizable results (when significant).

Complete Cases

In all of our forthcoming analyses, we limited our sample to complete cases, meaning respondents who provide valid responses to questions concerning self-perceived weight status, having been told that they are overweight by a clinician, and all questions asking if they have ever been diagnoses with an obesity-associated comorbidity. Naturally, this generates certain biases in our results. We created a dichotomous variable where 0 = incomplete cases (at least one missing value in the above variables) and 1 = complete cases to check for what types of sample distortion are incurred by limiting to complete cases (these tables are omitted, but the results are presented below).

By limiting our sample to complete cases, we lose 5332 out of 17,813 (30%) of all cases due to missing values in at least one study variable. A complete case sample is 13 percentage points more likely to self-perceive as overweight, 16 percentages points more likely to report attempting to have lost weight in the past year, 5 percentage points more likely to be White, and 7 percentage point more likely to be female than is a sample that contains missing values. A complete case sample is also roughly 10 years older and 2 BMI points higher than a sample with missing values. There are no significant differences in self-reported health between these two samples. In short, by limiting our sample to complete cases, we create a sample that is more female, White, aged, likely to have tried to lose weight, larger (in terms of BMI), and more likely to think that it is overweight (not surprising given that the sample is unduly White and female) than a sample with missing values.

Limiting our sample to complete cases does not result in any bias in self-reported health, which is the focal outcome variable of this dissertation. Perhaps more importantly,

by limiting our sample to complete cases, we avoid the issue of introducing bias from the skip-patterns inherent in the NHANES. Since the NHANES is a module-based survey, missing values are hardly missing at random, since certain people will not be asked entire batteries of questions in part due to chance, but also in part due to their previous responses. Including people with a missing value from a variable in one module, but who have valid values in another module, could result in even more sample distortion than we incur by using a complete cases sample.

The reader may wonder why we did not employ multiple imputation to resolve our missing data issues rather than relying on list-wise deletion. Simply, because we have so many cases in our dataset, we do not suffer any serious sample size or significance issues by restricting our sample to complete cases. Any form of substitutional imputation also brings its own forms of sample bias, and given the relatively minimal distortion we incur using list-wise (complete case) deletion, we did not believe that employing multiple imputation would reap any additional benefits in terms of significance, and would likely only change the nature of our bias, but not significantly reduce it.

Modelling

Binary logistic regression is the primary modelling technique employed in this dissertation. All outcomes variables are dichotomous and all reported coefficients are in marginal effects (referred to in tables as "M.E.").

Marginal effects provide the reader with a more intuitive understanding of the results of logistic regression. Traditional logit coefficients indicate the direction of a relationship, however the magnitude is often difficult to interpret given the requirement

to think in terms of natural logs when interpreting a result. Odds ratios are often preferred over logit coefficients for intuitive understanding, but even here interpretation can be tiresome when attempting to compare odds ratios within a model. Rather than comparing the odds of an outcome between two groups, marginal effects report the percent increase in probability of an event occurring when the predictor variable increases by 1. For example, if our dependent variable is hitting a home-run where 0=not hitting a home run and 1=hitting a home run, and our independent variable is skill level where 0=non-professional ballplayer and 1=professional ballplayer, and we have an M.E. of 0.4, we can say that the probability of hitting a home run increases by 40% when one is a professional ballplayer in contrast to a non-professional ballplayer.

In instances where we do not have binary predictor variables, M.Es can still be understood in additive terms as long as the relationship between our predictor variable and outcome variable is reasonably linear. This allows for variables such as BMI and age to be used in their continuous forms while still providing an easily interpretable statistic.

Determining model-fit with logistic regression is a topic that is populated with ideas and devoid of consensus. In the spirit of making our forthcoming models and results as comprehensible and intuitive as possible, we will report in this dissertation the R-squared "coefficient of discrimination" statistic proposed by Tjur (2009). The Tjur R-squared takes the difference of means of predicted probabilities for each value of the predictor variables and combines them into one figure. Essentially, if our independent variables are indeed good predictors of our given outcome, then the predictor values with events should produce higher average predicted probabilities, resulting in a greater Tjur statistic. Tjur R-squared ranges from 0 to 1, with 1 being perfect model fit.

Lastly, there are a few occasions throughout this dissertation where models have been run for very specific reasons – typically to check for non-linear relationships or effects of recoding that were ultimately fruitless – but where the tables produced by such modelling are omitted. It should be assumed that in these models just as in those presented, the same sample restrictions and sample weights have been applied just as they have been in all displayed models.

With our understanding of the data and the methods we will use to examine them now fully articulated, we will begin our analysis of the overarching question "do you think being overweight is bad for your health?" by examining the very idea of what it means to be overweight, how individuals define that term, and how individuals' self-application of the term "overweight" varies by demographic and experiential factors.

CHAPTER 3

DETERMINANTS OF SELF-PERCEIVED WEIGHT STATUS

This chapter explores some demographic and experiential factors that may influence how one perceives his own weight status. Understanding this relationship is important for two reasons that are immediately relevant to this dissertation. First, since we will use self-perceived weight status classifications ("about right" and "overweight") in later analyses exploring the influence of weight on self-reported health, and since the vast majority of the NHANES data utilized herein comes from self-reported survey responses, it is crucial that we understand variation in self-perceived weight status. Second, since the overarching policy objective of this work is to inform whether public health efforts to associate overweight and obesity with unfavorable health may be resonating with the American public, it is necessary to know how closely – or distantly – individuals' perceptions of their weight status align with clinical definitions.

There are essentially two competing forces in society that are vying to influence how we interpret our weight: the public health/anti-obesity advocates who argue that we should become more sensitive to our weights and recognize when we are overweight as individuals, and our internal tendency to acclimate to our own body sizes and to the body sizes of those around us.

Since the 1990s, public health efforts to raise awareness of America's obesity "epidemic" have increased steadily, and legislative efforts to curb obesity and overweight (through taxes on unhealthy foods, public expenditure on childhood obesity programs, and so on) have received greater attention. If public health educational efforts have been "successful," then we might expect to see an increase over time in the likelihood of

overweight individuals saying that they are overweight even when controlling for demographic variables that are causally antecedent to the consideration of our weight statuses.

Conversely, as America has become a "heavier" country over the past three or four decades, it is equally plausible that Americans would have adjusted to the higher BMIs of those around them and may be less likely to identify as overweight as time passes without significant reductions in obesity rates or mean BMI. If many individuals are overweight and those around them are overweight or obese, they may simply become used to heavier bodies and begin to craft a "new normal" regarding body size appropriateness. Complicating this scenario are socio-cultural norms and expectations about body size that vary by sex, race, and age.

For our purposes, I will assume that even if obesity rates and mean BMIs have not seriously decreased within our data range (1999-2012), the massive public health campaigns against overweight and obesity should have been successful in motivating Americans to see themselves as overweight. I therefore propose two hypotheses that I will explore in this chapter:

1.) People will be more likely to see themselves as overweight in later waves of our data than in earlier waves of our data.
2.) People who have been told that they are overweight by a clinician will be more likely than people who have not been told they are overweight by a clinician to self-perceive as overweight.

To address these hypotheses, I have developed logistic regression models that determine the impact of time, race, sex, age, and actual measured BMI on one's perceived weight status (0="about right", 1="overweight"). I also include a variable that asks respondents if they have been told that they are overweight by a clinician in the past (0=no, 1=yes). All outcomes are reported in marginal effects (unless reported as probabilities in crosstabulations).

Background

Understanding how respondents determine their "self-perceived weight status" requires a careful examination of the socio-demographic determinants of how we perceive our own body's appropriateness. Americans do not simply compare the metrics they receive from scales and tape measures to official, clinical BMI charts when evaluating whether their bodies are "about right" in size or "overweight." Rather, they rely on their surroundings, communities, and upbringing.

Self-Perceived Weight Status

Self-perceived weight status cannot be clinically "correct" or "incorrect," and yet is employed in many public health surveys both as a predictor and outcome variable. The generally agreed upon labels for self-perceived weight status are those which are readily familiar to people who have no clinical experience at all: underweight, normal or about right, and overweight. This classification scheme is a highly sociological concept for two main reasons: it is socially value-laden (with certain categories being stigmatized while others are celebrated as "proper"), and it varies depending upon the social ecology, time-

period, and current fashions or popular trends in any given society. In a sense, then, this concept could also be called "self-perceived weight appropriateness."

As we shall see in our results section (specifically in Table 6), there is considerable discordance between clinically defined weight categories based on BMI and self-perceived weight status. A quarter of all clinically normal weight respondents "incorrectly" believe that they are overweight, while nearly a third of clinically overweight respondents do not believe that they are "overweight." Previous literature on the topic of weight-status self-identification and weight appropriateness has established that certain demographic factors mediate variation between one's actual BMI and his self-perceived weight status; specifically race and sex. We will consider two others as well: age and having been told that one is overweight by a clinician.

Race and Sex

In general, White Americans begin to self-identify as "overweight" at lower BMI thresholds than do Black Americans – a phenomenon that persists across much of the BMI spectrum. Johnson-Taylor et al. (2008), Bennett and Wolin (2006), and Dorsey et al. (2009) all use NHANES data (Johnson-Taylor et al. use 1999-2004, the others use 1999-2006) to show how race – among other demographic variables – affects perception of weight status when controlling for BMI.[8] Each study shows that roughly half of clinically overweight Black Americans report themselves as "about right," while around 40% of overweight White Americans do the same.

[8] Bear in mind that any reference to an NHANES self-identified weight classification variable refers to the same variable that I am using in this study, where the questioner asks "Do you feel that your weight is underweight, about right, or overweight?" and where the respondent may select one of those three responses, or answer "I don't know" or may refuse to answer.

Each of these aforementioned studies also cites sex as an equally or more important demographic variable in determining self-perceived weight status. Not only are women far more likely than men to perceive themselves as overweight when controlling for actual BMI (Johnson-Taylor et al. [2008], Bennett and Wolin [2006], and Dorsey et al. [2009]), but they also desire a BMI that is almost 3 points lower than that desired by men (Maynard et al. 2006:1337). Paeratakul et al. (2002) reinforce these NHANES and Behavioral Risk Factor Surveillance System (BRFSS)-based findings through the use of survey data from the US Department of Agriculture from 1994 through 1996 to show that women were more likely than men to self-identify as overweight when controlling for actual BMI.[9] Racial effects were again present, with White women being more likely to perceive themselves as overweight – whether correctly or incorrectly – than Black women, and White men being more accurate in identifying themselves as overweight than were Black men. Using NHANES III (1988-1994) data, Chang and Christakis (2003) focus more closely on interactions between sex effects and weight groups, noting that normal weight women are twice as likely as normal weight men to misclassify themselves as overweight. Gunnar et al. (2013) make this sex relationship even more stunning with their finding that women are more likely to underestimate their actual weight than are men, which implies that women see themselves as overweight more often than do men *even though women seem to underestimate their own weight*. The implication here is that social ideas about what constitutes a "fat body" differ greatly for men and women. Neither men nor women determine whether they are overweight simply by looking at the number on a scale.

[9] Continuing Survey of Food Intakes by Individuals and the Diet and Health Knowledge Survey (N=5440)

Age

Previous literature is mixed in opinion concerning cohort effects on self-perceived weight status, but leans toward a conclusion that age is either an insignificant or very weak predictor variable. Currently (as of the date of this dissertation), the oldest cohort with substantial numbers lived through an era with very little public focus on weight, and where the term "obesity epidemic" would likely never have been encountered in normal life. Indeed, stark increases in mean BMI and obesity prevalence did not begin in earnest until the 1970s, thus we might suspect that age could have an effect on weight perception, with older people being more likely to perceive "overweightness" at lower BMIs than are younger people.

Burke et al. (2010) use NHANES III (1988-1994) and Continuous NHANES (1999-2004) data to explore cohort effects on self-perceived weight status. For Americans, the probability of self-identifying as overweight has decreased between the two broad survey waves, and the change over time has also been larger the younger the age group, especially among women (Burke et al. 2010:1229). Indeed, when interacted with sex, cohort effects appear mixed. For men in the older age grouping (56-74 years old), perceiving oneself as overweight actually increases between the two survey waves, but not for normal weight men. Among the obese (BMI>=30) for both sexes, the probability of perceiving oneself as overweight barely changed (Burke et al. 2010:1229-1230). Whether this mixed and often muted association between age and weight categorization has changed since the dawn of the "obesity epidemic" is our primary reason for including age in our coming analyses.

Having Been Told that One Is Overweight by a Clinician

Lastly, this dissertation will address an experiential variable that has been woefully understudied in the field of obesity research: having been told that one is overweight by a clinician. This binary variable (0=no, 1=yes) is included in order to measure the effect of a doctor's (or other medical professional's) influence on how one feels about his body, and will play an important role later on during investigations into the effect of being overweight or obese on self-reported health.

The motivation to include this variable stems primarily from my interest in Charles Rosenberg's concept of the "tyranny of diagnosis" (Rosenberg 2002). In Rosenberg's imagining, being diagnosed with a specific disease is a sort of gateway for the patient in two ways: it begins the process of self-identification as a particular type of ill person, and it establishes many essential qualities of the physician-patient relationship. For our purposes, the former is more applicable. If physical weight (or BMI) has some bearing on one's self-perceived weight, and if demographic variables do as well, then we would expect a "diagnosis" of overweight to also bear some power of determination. Rosenberg writes:

> Diagnosis is a cognitively and emotionally necessary ritual connecting medical ideals and personnel to the men and women who are its clients. Such linkages between the collective and the uniquely individual are necessary in every society, and in ours *the role of medicine is central to such negotiated perceptions and identities*. The system of disease categories and diagnosis is both a metaphor for our society and a microcosm of it. (Rosenberg 2002:256) [italics are mine]

Starr (1982) supports the notion that a physician's word carries great authoritative weight for patients in the US, while Parsons (1975) argues that once a patient has been diagnosed with a disease by a physician, he begins to see himself as a member of that disease class. Perhaps, then, a clinician's declaration that one is overweight would push him to adopt this identity himself. We may be able to detect this effect by predicting self-perceived weight status with our variable that asks if an individual has ever been told that he is overweight by a clinician.

We turn now to our analytical section, in which we will address the question of how our various predictor variables (race, sex, age, BMI, and having been told that one is overweight by a clinician) affect one's self-perceived weight status.

Data and Method

The main outcome variable for this chapter is self-perceived weight status, which is contained in many previous iterations of the NHANES including the 1999 to 2012 Continuous NHANES waves employed in this dissertation. The measure contains three possible values: "underweight," "about right," and "overweight," however due to small subgroup sample size (and our desire to have a binary dependent variable)[10], the self-identified "underweight" category has been removed from our study sample, resulting in a binary outcome variable where 0="about right" and 1="overweight." The question is asked of respondents during the survey-interview portions of the NHANES and *not*

[10] Since we are concerned with issues of excess weight, it makes sense to restrict our self-perceived weight status variable to a reference group that is not overweight and a comparison group that is overweight. Including the underweight would force us to present and interpret results that are not in line with our research agenda and would likely only serve to muddle the discussion of our results with unnecessary analysis.

during the medical examination, which means that respondents are not immediately exposed to any clinical guidelines, charts, or measuring instruments at the time of this questioning. The predictor variables in this chapter are race (0=White and not Hispanic, 1=Black and not Hispanic), sex (0=male, 1=female), measured/clinical BMI, age (20 to 69 years old), and "has a doctor or health professional ever told you that you were overweight?" (0=no, 1=yes). Due to low sample sizes and the tendency for such respondents to be disproportionally ill, persons with BMI less that 18.5 (i.e. people who are clinically "underweight") have been excluded from our study sample. In sum, there are no self-identified or clinically-defined underweight individuals in any modelling in this chapter, nor in any of our forthcoming chapters.

Every model is premised on the same set of conditional statements as well, many of which are latent in the predictor variables. All respondents must be either non-Hispanic Black or non-Hispanic White, must be between 20 and 69 years-old, cannot be clinically underweight (i.e. have a BMI less than 18.5), cannot be pregnant, must have seen a physician within the past 12 months, and must have provided a valid response to questions about self-perceived weight and having been told that he is overweight by a clinician.

Binary logistic regression is employed to measure the marginal effects of our independent variables on self-perceived weight status. NHANES 12-year sample weights are used in all models. Because the NHANES contains amalgamated data from in-person interview and clinical survey components, NHANES analytical guidelines suggest using the sample weights from the survey component which contributes the least number of cases to a given model before respondents are dropped due to missing values. To be in

accordance with these guidelines, the NHANES 12-year medical weights (rather than interview weights) are used in each model to best reflect the nationally representative nature of the NHANES survey.

Results

It may be helpful to examine the distribution of clinical weight status by sex and by race before beginning a more complex analysis of demographic influences on weight perception. In Table 5, we can see that Blacks are more likely to be obese than are Whites, while Whites are more likely to be overweight or normal weight than are Blacks. By sex, women are more likely to be obese or normal weight than are men, while men are more likely to be overweigh than are women.

Table 5
Distribution of clinical weight category by sex and race

Race | Sex	White	Black		Male	Female		Total
Normal (BMI 18.5-24.9)	28%	18%		21%	28%		27%
Overweight (BMI 25-29.9)	34%	30%		39%	27%		34%
Obese (BMI 30+)	37%	52%		40%	45%		39%
Total	100%	100%		100%	100%		100%
Counts	(7,440)	(3,674)		(5,088)	(6,026)		(11,114)
N=11,114							

Having reviewed the distribution of clinical weight status by sex and race, we turn our attention to the basic relationship between clinical weight categories and self-perceived weight status – the less firmly defined primary outcome variable of this chapter. In Table 6, we see that there is a great deal of disagreement between these two measures. At the beginning of our survey timeframe, roughly 29% of all overweight people believed that they were in fact "about right," and by the end of our survey timeframe that number had risen to 37%, indicating that Americans are becoming less likely to see themselves as overweight even when clinical guidelines would say that they

are in fact overweight. Likewise, the percentage of normal weight people who consider themselves to be "about right" has increased from 69% at the start of our survey timeframe to 84% at the end of our timeframe, again reinforcing the idea that Americans are interpreting "overweight" to signify a higher BMI threshold as time passes. Only the obese see a general, stable agreement between clinical weight status and perceived weight status, with roughly 94% of obese respondents reporting that they feel overweight from 1999 through 2012.

Table 6
Distribution of self-reported weight status by clinical weight category over survey wave

	Clinical Weight Category		
Self-Perceived Weight Status	Normal (BMI 18.5-24.9)	Overweight (BMI 25-29.9)	Obese (BMI 30+)
1999-2004			
About Right	69.40%	29.10%	5.70%
Overweight	30.60%	70.90%	94.30%
Total	1195	1384	1473
2005-2008			
About Right	71.20%	29.70%	5.50%
Overweight	28.80%	70.40%	94.50%
Total	849	1068	1300
2009-2012			
About Right	83.60%	37%	6.70%
Overweight	16.40%	63.10%	93.30%
Total	1000	1309	1536

N=11,114
Chi-square significance tests for each time span return p-value less than .001

As BMI increases, so does the probability of one self-perceiving as overweight, until we arrive at BMI 35 (the clinical threshold for morbid obesity), at which point almost all respondents begin to identify as overweight (Figure 1). In fact, there is no discernable change in curve of the line at either the overweight threshold or the obesity threshold, which implies that moving into a new clinical weight category is either not detected by the individual or that he simply does not consider weight status grouping to be a meaningful event regarding his own perception of his weight status. We checked for

non-linearities by incorporating quadratic and cubic BMI into our general model that predicted self-perceived weight status (controlling for race, sex, age, BMI, and having been told that one is overweight by a clinician). Logit coefficients and odds radios (in parentheses) for BMI were 2.04 (7.68), for BMI-squared were -.04 (.96), and for BMI-cubed were .00 (1.00).

We also notice in Table 6 that respondents have become more likely to say that they are "about right" at higher BMI levels over time. This can be interpreted as a reinforcement of the idea that Americans grow more accustomed to larger bodies as their social environment becomes "heavier." While mean BMIs and obesity rates have either not significantly increased or have only slightly increased in the US between 1999 and 2012, Americans, it seems, have adapted to this historically "fat," if somewhat stable landscape. This increased probability of saying that one is "about right" at higher BMI levels may also be buttressed by the noted (Basu 2010) increase in BMI among people in the right tail of the BMI distribution (i.e. those in the most severe states of obesity), who may provide an increasingly extreme archetype against which Americans compare themselves. Given the amount of time that Americans have been living with a majority-overweight population and the increasing number of very obese individuals, it is not surprising that we see overweight people self-perceived as "about right" more frequently in 2012 than in 1999.

That we have seen this increased probability in clinically overweight Americans self-perceiving as "about right" over time does not mean that there was necessarily any fundamental change in the nature of BMI's effect on self-perceived weight status over time – Americans simply begin "feeling" that they are overweight at higher BMI

thresholds. We mention this caveat because we will later see in Appendix B the average marginal effects of BMI on self-perceived weight status do not change between 1999 and 2012, indicating that the nature of BMI's effect on self-perceived weight status has not changed between 1999 and 2012, but rather only the point on the BMI scale at which Americans generally begin to self-perceive as "overweight" has increased.

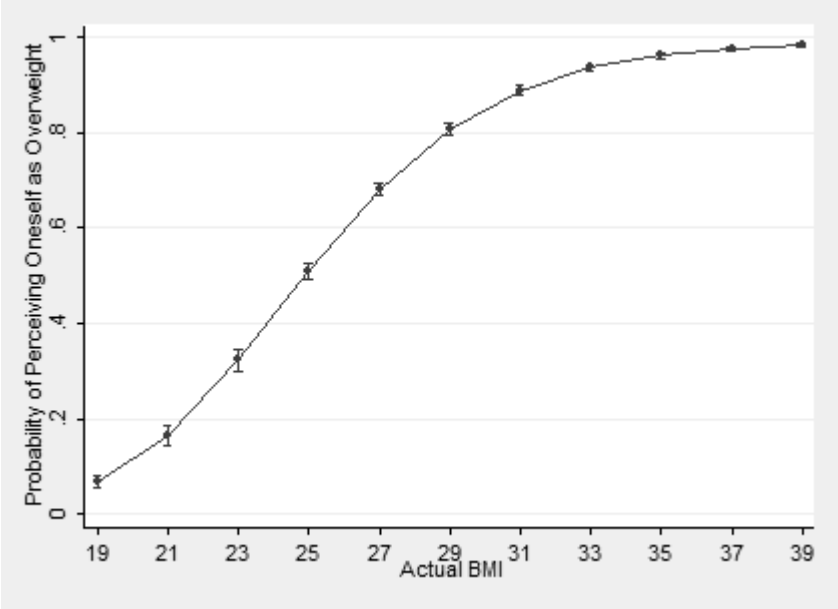

Figure 1. Probability of perceiving oneself as overweight by actual BMI (N=11,114)

Having established the general relationship between BMI (both as a continuous variable in Figure 1 and as a clinically defined categorical variable in Table 6) and self-perceived weight status, we can move into exploration of demographic variables and how they contribute to one's definition of his own body-size classification. The relationships between many of these variables and self-perceived weight status have been explored by previous research in the fields of epidemiology, public health, and to a far lesser extent sociology, however we want to enrich these studies by applying them to a larger timespan

of Continuous NHANES data than has been typically used in the past, and by introducing a previously neglected experiential variable: having been told that one is overweight by a clinician.

Despite our extended NHANES timespan, we ultimately do not find any significant changes in marginal effects for BMI, race, sex, age, and being told that one is overweight by a clinician over the course of our survey timespan (Appendix B). We will first address the unique effects of survey wave on self-perceived weight status, and then move into analysis of our demographic variables without discussion on time interactions since there do not appear to be any.

Time/Survey Wave

The Continuous NHANES is compiled in two-year survey waves (1999-2000, 2001-2002, etc.), therefore two-year intervals are the units of measure for our "time" predictor variable. According to Table 7, time is negatively associated with self-perceiving as overweight with a marginal effect of -.01, meaning that for each progressive survey wave, Americans become less likely to see themselves as overweight by roughly one percentage point. This should be a particularly troublesome finding for public health advocates who might be familiar with prior research involving earlier waves of NHANES: it appears that the trend toward public acclamation to heavier body sizes has carried on despite public health efforts to raise awareness of what overweight and obesity are and how to prevent them.

Table 7
Marginal effects of survey wave, BMI, race, sex, age, and being told that one is overweight by a clinician on self-perceived weight status[11]

DV: Self-Perceives as Overweight	M.E.	SE	z	p	CI-low	CI-high
Survey Wave (1999-2012)	-0.01*	0.00	-7.04	0.000	-0.02	-0.01
BMI	0.05*	0.00	38.82	0.000	0.05	0.05
Black	-0.15*	0.01	-18.07	0.000	-0.17	-0.14
Female	0.18*	0.01	20.70	0.000	0.16	0.20
Age (20-69)	0.00*	0.00	3.45	0.001	0.00	0.00
Yes, Told Overweight by Clinician	0.11*	0.01	9.24	0.000	0.08	0.13

N=11,114
*p<.05
Tjur R-squared=.45

Age, Sex, and Race

Age proved to be a significant predictor of self-perceived weight status in our sample, although significance could not extend to every age group.[12] When we create dummy variables for different age groups, we notice a generational effect on self-perceived weight status (Table 8). Age was recoded from its continuous form into three dummy variables: one in which 1 = 20 to 35 year-olds, one in which 1 = 36 to 50 year-olds, and one in which 1 = 51 to 69 year-olds. The oldest group did not return significant results, however we see that the older of the two remaining age groups (36 to 50 year-olds) were significantly more likely to view themselves as overweight when controlling for actual BMI, race, sex, and having been told that one is overweight by a clinician compared to the rest of the sample. The youngest age group (20 to 35) was less likely to view themselves as overweight compared to the rest of the sample. These results may be

[11] This model was also run without the inclusion of the variable asking whether one has ever been told that he is overweight by a clinician in order to ensure that we were not obscuring any of the effects of BMI and our demographic variables. In this limited model, there was no significant change in any of our results at 95% confidence.

[12] Additionally, when controlling for race, sex, self-perceived weight status, and having been told that one is overweight by a clinician, age showed no significant relationship to actual measured BMI in a linear regression model.

due to the fact that the "obesity epidemic" is a relatively recent phenomenon, and millions of Americans are alive today who grew up in a time when obesity/overweight levels were much lower than they are today. Perhaps older Americans are more critical of their body weights because they developed a sense of a "normal sized" or (in the language of the NHAHES) "about right" body during a time when wide-spread obesity was less common.

Table 8
Age dummy variable effects on self-perceived weight status[13]

DV: Self-Perceives as Overweight	M.E.	S.E.	Z	p	CI-low	CI-high
Age where 1=20-35 year-olds	-0.04*	0.01	-4.75	0.000	-0.06	-0.03
Age where 1=36-50 year-olds	0.02*	0.01	2.34	0.019	0.00	0.04
Age where 1=51-69 year-olds	0.01	0.01	1.43	0.153	0.00	0.03

N=11,1114
*p<.05

Both sexes show disparity between clinical weight status and self-perceived weight status, although the character of these disparities is remarkably different. In Table 7, we see that the marginal effect of sex on self-perceived weight status is .18, meaning that women are roughly 18 percentage points more likely than men to perceive themselves as overweight even when controlling for actual BMI. When we interact sex with BMI and examine sex's marginal effects on self-perceived weight status at varying BMI levels, we notice that these differences between males and females remain fairly stark across the BMI spectrum, reaching their greatest around the clinical overweight line

[13] For this table, three separate logistic regression models were run where the respective age dummy variable was inserted as a predictor variable along with race, sex, actual BMI, and having been told that one is overweight by a clinician. For the first model, the age dummy variable where 1=20-35 year-olds and 0=all other ages was used. For the second model, the age dummy variable where 1=36-50 year-olds and 0=all other ages was used. For the third model, the age dummy variable where 1=51-69 year-olds and 0=all other ages was used. The results, for age dummies, of these three models are shown in the table above. These three age dummy variables *were not* run in the same model.

and remaining fairly large into the clinical obese category (Table 9). These findings reinforce previous literature on sex differences in weight appropriateness.

Racial effects on self-perceived weight are also in line with previous literature, however we uncover more detail about the particular nature of this relationship and how it can help us understand the cultural understandings concerning race and weight appropriateness. The marginal effect on self-perceived weight status of being Black versus being White is -.15, meaning that Blacks are 15 percentage points less likely than Whites to believe that they are overweight even when controlling for actual BMI (Table 7). When we interact race with BMI and examine race's marginal effects on self-perceived weight status at varying BMI levels, we find that – like sex – racial effects on self-perceived health status vary depending on actual BMI (Table 9). While the greatest differences in self-perceived weight status between men and women are at the clinical overweight mark, the greatest difference between Blacks and Whites is at the clinically obese mark.

Being Told One Is Overweight by a Clinician

Turning now to the only non-demographic predictor variable in this set of modelling, we find some significant relationships between one's self perceived weight status and the experience of being told by a doctor or other healthcare professional that he is "overweight." Having a clinician tell one that he is overweight had a surprisingly strong effect when controlling for actual BMI and our other demographic variables.

Table 9

Marginal effects of survey wave, race, sex, age, and being told that one is overweight by a clinician – all interacted with BMI – on self-perceived weight status[14]

DV: Self-Perceives as Overweight	M.E.	SE	z	p	CI-low	CI-high
Black at BMI 20	-0.03	0.02	-1.60	0.110	-0.06	0.01
Black at BMI 25	-0.17*	0.02	-10.71	0.000	-0.20	-0.14
Black at BMI 30	-0.21*	0.01	-15.37	0.000	-0.23	-0.18
Black at BMI 35	-0.10*	0.01	-8.28	0.000	-0.12	-0.08
Black at BMI 40	-0.04*	0.01	-4.87	0.000	-0.05	-0.02
Female at BMI 20	0.17*	0.02	8.97	0.000	0.13	0.21
Female at BMI 25	0.33*	0.02	20.67	0.000	0.30	0.36
Female at BMI 30	0.16*	0.01	14.05	0.000	0.14	0.18
Female at BMI 35	0.04*	0.01	6.08	0.000	0.03	0.05
Female at BMI 40	0.01*	0.00	3.55	0.000	0.00	0.01
Age 20-35 at BMI 20	-0.05*	0.02	-3.09	0.002	-0.08	-0.02
Age 20-35 at BMI 25	-0.07*	0.02	-4.63	0.000	-0.11	-0.04
Age 20-35 at BMI 30	-0.03*	0.01	-2.29	0.022	-0.06	0.00
Age 20-35 at BMI 35	-0.01	0.01	-0.87	0.385	-0.02	0.01
Age 20-35 at BMI 40	0.00	0.00	-0.33	0.743	0.00	0.00
Age 36-50 at BMI 20	0.02	0.02	1.31	0.189	-0.01	0.06
Age 36-50 at BMI 25	0.03*	0.01	2.27	0.023	0.00	0.06
Age 36-50 at BMI 30	0.01	0.01	1.30	0.195	-0.01	0.04
Age 36-50 at BMI 35	0.00	0.00	0.55	0.583	-0.01	0.01
Age 36-50 at BMI 40	0.00	0.00	0.27	0.790	0.00	0.00
Age 51-69 at BMI 20	0.02	0.02	1.19	0.233	-0.01	0.06
Age 51-69 at BMI 25	0.02	0.01	1.52	0.128	-0.01	0.05
Age 51-69 at BMI 30	0.00	0.01	0.41	0.682	-0.02	0.03
Age 51-69 at BMI 35	0.00	0.00	-0.13	0.895	-0.01	0.01
Age 51-69 at BMI 40	0.00	0.00	-0.31	0.753	0.00	0.00
Yes, Told Overweight by Clinician at BMI 20	0.15*	0.04	4.02	0.000	0.08	0.22
Yes, Told Overweight by Clinician at BMI 25	0.20*	0.02	8.21	0.000	0.16	0.25
Yes, Told Overweight by Clinician at BMI 30	0.08*	0.01	7.22	0.000	0.06	0.10
Yes, Told Overweight by Clinician at BMI 35	0.01*	0.01	2.49	0.013	0.00	0.02
Yes, Told Overweight by Clinician at BMI 40	0.00	0.00	0.86	0.389	0.00	0.01

N=11,114
*p<.05

[14] As with Table 3 in this chapter, this table employs three different age dummy variables. Three separate logistic regression models were run where the respective age dummy variable was inserted as a predictor variable along with race, sex, actual BMI, and having been told that one is overweight by a clinician. For the first model, the age dummy variable where 1=20-35 year-olds and 0=all other ages was used. For the second model, the age dummy variable where 1=36-50 year-olds and 0=all other ages was used. For the third model, the age dummy variable where 1=51-69 year-olds and 0=all other ages was used. The results, for age dummies, of these three models are shown in the table above. These three age dummy variables were not run in the same model.

Additionally, as with Table 4 in this chapter, this model and all of the associated age dummy variables models were run without the inclusion of the variable asking whether one has ever been told that he is overweight by a clinician in order to ensure that we were not obscuring any of the effects of BMI and our demographic variables. In these limited model, there were no significant change in any of our results at 95% confidence.

As shown in Table 7, a clinician's "diagnosis"[15] of overweight has a decently sized marginal effect on self-perceived weight status, even when controlling for actual BMI. That is to say, when holding one's physical, measured weight-by-height constant, simply being told that he is overweight by a clinician alters his own perception of his weight status. In fact, the largest difference between those who have been told that they are overweight and those who have not been told such occurs around the BMI 25 mark, which demarcates the exact point at which one becomes clinically overweight. Those who are clinically "obese" see less of an impact, as we can assume that their status of overweight becomes obvious at such high BMI levels, much as it did when we examined sex and racial effects on self-perceived weight status.

The marginal effect, then, of having a clinician tell one that he is overweight is largest at the precise point at which clinicians determine that one's BMI has become problematic (or at least problematic enough to label *over*weight). This may provide at most a pale ray of hope for anti-obesity public health advocates who may be troubled by the persistent concern that patients do not listen to their physicians.

It is important to note that this model – like all the models in this chapter – only includes individuals who have seen a physician (not simply a "healthcare worker") in the past year, and therefore removes any bias that might be introduced by those people who

[15] I am using the term "diagnosis" here loosely, since we do not know if a respondent was truly diagnosed as overweight or not. Firstly, the NHANES asks if respondents "have been told" that they are overweight, not if they have been "diagnosed" as overweight. Secondly, some people would have received this determination about their weight status from a nurse practitioner, RN, or some other type of healthcare worker who may or may not be legally allowed to issue diagnoses. I am using "diagnosis" in a very quotidian sense to signal one's being told by a person in a position of medical power that he is overweight.

have not been told they are overweight simply because they have not encountered a physician recently.

Disparity in "Diagnosis?"

The significant influence of clinicians' "diagnosis" of overweight on patients' self-perceived weight status is striking, and supports Rosenberg's theory that diagnoses may lead to a patient's perception of the self as a sick person. Given this potential for influence over the patient's view of his own weight, we ought to question if clinicians' declarations that one is overweight depend at all on the patient's race or sex. Previous studies using non-NHANES data have shown that physicians (just like patients) are subject to weight-status misestimation and often misestimate at different rates depending on demographic characteristics of their patients (Caccamese et al. 2002, Post et al. 2011). It is therefore imperative for us to ask: do physicians and other healthcare workers wield this power of the overweight diagnosis evenly between genders and races, or is there significant variation in usage of this diagnosis?

To address this question, I have taken the predictor variable that asks "have you been told by a physician or other healthcare professional that you were overweight?" and held it instead as a dependent variable. Race, sex, age, and actual BMI remain the predictor variables in this round of modelling.

To begin, we should ask how closely a clinician's diagnosis of "overweight" aligns with clinical weight status categories of their patients. As shown in Table 10, while normal weight respondents rarely report that a clinician told them that they were overweight, only slightly more than a quarter of truly overweight respondents said that

they had been told by a clinician that they were overweight. What is more, only three-quarters of *obese* respondents reported that they had been told that they were overweight by a clinician.[16] Clearly then – and despite the attempts to treat weight categories as standardized, clinically discrete groups for use in epidemiology and the private clinical setting – clinicians are perhaps less in accordance with weight status guidelines than is the general population (see Table 6). Alternatively, clinicians could be aware of a patient's weight status, but are simply deciding not to disclose this to the patient, which may have a very legitimate and beneficent purpose, but nonetheless somewhat undermines the idea of BMI and weight status as clinically important metrics about which we as a populace should care.

Table 10
Distribution of being told that one is overweight by a clinician by clinical weight category

	Clinical Weight Category			
Ever Told Overweight by Clinician	Normal	Overweight	Obese	Total
No	95%	72%	25%	60%
Yes	5%	28%	75%	40%
Total	100%	100%	100%	100%
(Count)	3,049.65	3,762.99	4,301.36	11,114
N=11,114				

And what of demographic effects on clinicians' diagnosing of patients as overweight? When looking at differences by sex, we find that women are somewhat more likely than men to have been told by a clinician that they are overweight, even when

[16] There are two important points to remember here; one that supports these findings and one that might diminish them somewhat. First, this model includes only those respondents who have seen an actual physician in the past year. Although we cannot be sure what type of physician this was, we do know that any surprisingly low numbers in people reporting that they had not been told they were overweight by a clinician are not due to respondents not having seen a clinician recently. Second, it is likely that some of these adults have shifted weight categories, which may influence the findings. For example, an overweight person may not have been told that he was overweight because the last time he saw a doctor he was normal weight, and had only gained weight recently. Likewise, normal weight people who have been told that they were overweight may have been overweight or obese at the time and may have recently lost weight.

controlling for actual BMI. (Table 11). Normal weight women are more likely to receive this "diagnosis" than are their normal weight male counterparts by three percentage points, while for overweight women the difference compared to overweight males jumps to six percentage points. Even among the obese, women are more likely to be told they are overweight by four percentage points. Among the morbidly obese (BMI=35) our results become insignificant (although among the super-morbidly obese we see a significant difference in reverse, with men becoming more likely than women to be told that they are overweight, although 0 is included in this confidence interval).

Table 11
Marginal effects of race and sex, interacted with BMI, on being told that one is overweight by a clinician[17]

DV: Yes, Told Overweight by a Clinician	M.E.	SE	z	p	CI-low	CI-high
Black at BMI 20	0.02*	0.01	2.14	0.033	0.00	0.04
Black at BMI 25	0.01	0.01	0.75	0.454	-0.02	0.04
Black at BMI 30	-0.06*	0.01	-4.06	0.000	-0.08	-0.03
Black at BMI 35	-0.12*	0.02	-5.91	0.000	-0.16	-0.08
Black at BMI 40	-0.10*	0.02	-5.04	0.000	-0.14	-0.06
Female at BMI 20	0.03*	0.01	4.41	0.000	0.02	0.04
Female at BMI 25	0.06*	0.01	4.72	0.000	0.03	0.08
Female at BMI 30	0.04*	0.01	2.65	0.008	0.01	0.07
Female at BMI 35	-0.02	0.02	-1.04	0.300	-0.06	0.02
Female at BMI 40	-0.03*	0.02	-2.16	0.031	-0.06	0.00

N=11,114
*p<.05
Tjur R-squared=.42

Sex, then, has a somewhat influential role in a clinician's decision to tell a patient that he or she is overweight even when all of our other demographic factors are being considered. This should not be completely surprising since clinicians are – after all – part

[17] This model was also run without the inclusion of the self-perceived weight status variable in order to ensure that we were not obscuring any of the effects of our demographic variables when interacted with BMI. In this limited model, there was no significant change in any of our results at 95% confidence save for Black at BMI 30, where marginal effects shifted from -.06 (when controlling for self-perceived weight status) to -.09 (when *not* controlling for self-perceived weight status).

of the same social world as the rest of us. Therefore, we would expect to see significant results when we consider racial effects on a clinician's "diagnosis" of overweight as well.

Concerning race, we find that Whites have a slightly higher probability of being told they are overweight compared to Blacks (Table 11). However, while sex differences are small and occur mainly within the overweight category, it is curious that when looking at race, differences in being told that one is overweight by a clinician do not manifest in any substantial form until one crosses into the clinically obese category (BMI=30). At BMI=20 and BMI=25 levels (essentially corresponding to normal and overweight clinical weight levels), there are either very small or insignificant differences in marginal effects of race between Blacks and Whites. At BMI=30 (obese), we see that Blacks are less likely to be told they are overweight by a clinician than are Whites by six percentage points. This reminds us of our analysis of race's effects on self-perceived weight status, where racial effects peaked at the fairly high BMI level of 30. However in this case, we find that, surprisingly, racial effects continue to become greater even further up the BMI scale. In fact, marginal effects for race are largest (-.12) at the clinical threshold for morbidly obese (BMI=35) and even remain shockingly strong (-.1) as we cross into the super-morbidly obese category (BMI=40).

If we are intrigued by the fact that clinicians are influenced by sex in their determination of whether to issue a "diagnosis" of overweight, we should be stunned by race's influence of a clinician's input according to these models. According to this analysis, a Black person who stands five feet, five inches tall and weighs 210 pounds (BMI=35) would be less likely to be told that he is overweight by a clinician than would a White person of the same build by a margin of thirteen percentage points, and a Black

person of five feet, five inches who weighs 240 pounds (BMI=40) would still be less likely to receive this "diagnosis" than his White counterpart by ten percentage points. Conceptually, we should see this not as evidence of clinicians being overly alarmist with their White patients, but of being decidedly out of step with clinical guidelines with their Black patients.

Therefore, not only do race, sex, and a doctor's opinion of one's weight have an effect on how one interprets his own weight status, but one's race and sex also partially determines how a doctor interprets one's weight status. In our endeavor to understand how demographic and experiential factors influence one's self-perceived weight status, we also found a third factor that we must consider: disparity in what could be loosely called "diagnostic opportunity," or the inequality of experiencing a clinician's voice of concern over one's weight even when he is part of a clinically defined non-normal weight group. Whether the experience of being told that one is overweight by a clinician is a positive, desirable experience (perhaps from a public health, anti-obesity perspective), or a stigmatizing, unhelpful, negative experience (from a FatCrit, feminist, or other alternative viewpoint) is a matter of discussion beyond the scope of this dissertation. But suffice it to say that self-perception of one's weight status has been shown to be a complex determination that is influenced by one's innate demographic characteristics, his experience in the clinical setting, and the prejudices of the observing clinician as well.

Let us now turn to a discussion of these findings during which we shall propose some possible explanations of the phenomena observed in the preceding results, consider their implications for public health efforts at large, and begin to discuss how these

findings will help us understand later analyses of weight's (in its many measures) impact on self-reported health.

Discussion

Anti-obesity efforts and campaigns – whether backed by the federal government or private institutions – are primarily concerned with convincing Americans that obesity is a problem; be it a problem of individual health, population health, economics, or productivity. A critical element of these agendas, however, is the effort to inform people about the clinical definitions of overweight and obesity. From child percentile growth charts (used to measure childhood obesity), to free online BMI calculators, to the now-commonplace practice of reporting a patient's BMI to him during routine check-ups and more serious hospital admissions, clinicians and public health advocates are making tremendous efforts to educate the public in overweight and obesity detection.

If Americans know their BMIs and clinical weight statuses, they may be more receptive to anti-obesity messages and campaigns that highlight the potentially ruinous effects of excess weight on the body. This aspiration, however, rests on the assumption that people will incorporate an understanding of weight's (BMI's) correspondence with labels such as "overweight" and "obese," and that this knowledge will be accepted (which we measure by proxy by examining how Americans self-identify their weight status at varying levels of BMI and after being told they are overweight by a clinician – see Table 9).

As our results show, there is considerable disunity between one's clinical weight status and his self-identified weight status. When controlling for actual BMI, Americans

have apparently become less likely to see themselves as overweight as the 21st century has pressed onward. Overweight men and normal weight women are the categories with the most distance between their clinical weight status and their self-perceived weight status. Blacks and Whites also differ in how much discrepancy exists between clinical weight status and self-perceived weight status, with Black Americans being far less in line with clinical guidelines than White Americans and more likely to perceive themselves as belonging to a lower weight status group when controlling for actual BMI.

Lastly, we saw that being told that one is overweight by a clinician made him more likely to self-identify as overweight even when controlling for BMI and demographic factors. These differences between "diagnosed" and "non-diagnosed" individuals were significant and fairly consistent for normal weight respondents and overweight respondents, and only collapsed within the obese category.

Time Effects

Both Table 6 and Table 7 indicate that as time has progressed since 1999, Americans have become less likely to see themselves as overweight year after year. Less than two-thirds of clinically overweight people self-identify as overweight according to our most recent data, which is up from nearly 71% in the earliest years of the Continuous NHANES. It seems that, contrary to our first hypothesis, Americans are becoming less likely to see themselves as overweight as the age of the "obesity epidemic" carries on.

This is striking given the amount of attention that has been paid to issues of overweight and obesity by public health officials, including many government agencies. Indeed, First Lady Michelle Obama's primary initiative during Barack Obama's eight

years in office was curbing obesity (especially in children) through healthy eating and exercise. “Snack taxes,” reforms to public school lunch programs, employee incentives to utilize gyms, and countless other formal and informal efforts to stem America’s “epidemic” of corpulence may have been successful in convincing Americans that the country does indeed have a general weight-based problem, but it has not yet changed Americans’ perceptions of their own weight status. In fact, the opposite has occurred, despite mean BMIs and obesity rates either rising or staying the same for most demographic groups.

Effects of Having Been Told that One Is Overweight by a Clinician

Before doctors and other healthcare workers can begin to remedy what ails our bodies, they are first tasked with telling us what is wrong. “I don’t know” is not usually the type of answer that one would expect from a clinician, nor is it one that many would accept. Indeed, we rely on clinical workers to tell us things about our body based on their specialized knowledge that we cannot infer by ourselves.

Given that clinical knowledge is specialized and largely contained within a professional class of workers, it makes sense that we generally believe a clinician when they tell us that we are ill with some specific malady, or that our body needs some specific remedy or therapy. This apparently carries into the realm of weight perception as well; when a clinician tells us that we are overweight, we become more likely to internalize that message and see ourselves as overweight.

The effect of a clinician's "diagnosis" seems to have more effect on an individual's self-perceived weight status when said "diagnosis" comes as a bit of a surprise, or at least perhaps provides some truly new information for the individual. In Table 9, we see that having been told that one is overweight by a clinician has its strongest effects within the clinically "normal" and "overweight" categories, and that these effects begin to dwindle as one's BMI moves more deeply into the obesity categories. Presumably, at these high levels one no longer needs to hear that he is overweight from a clinician to arrive at this conclusion, whereas those who are clinically normal or only overweight (but not obese) find this "diagnosis" surprising or at least contrary to how they imagined themselves. This is indeed a testament to the power of the diagnosis in general, but specifically concerning weight issues. Even those people who are not clinically overweight, or who should at least be hesitant to classify themselves as overweight, are moved to see themselves as overweight when told so by a clinician. The diagnosis is powerful enough to convince us that we are overweight even when we likely would not have arrived at this conclusion absent a clinician's input.

This is confirmation of the argument that if public health officials and anti-obesity activists are truly committed to convincing Americans of the deleterious effects of overweight and obesity, then an important step is to involve the clinician in this endeavor and ensure that patients who are overweight are told of their condition in order to potentially change their minds about their own weight status and possibly encourage active change. Right now, the power of the clinician's diagnosis seems to be underutilized in the anti-obesity struggle, with only 28% of all overweight Americans who have seen a physician within the past year reporting having been told that they were

overweight by a clinician (Table 10). Given what we know about the impact that a clinician can have on self-perceived weight status, if even a slim majority of clinically overweight Americans were told that they were overweight by their clinician, the impact on how Americans view their weight could be significant.

Age, Sex, and Race Effects on Self-Perceived Weight Status

Although we do not have significant results for age as a continuous variable or among the oldest age grouping (51 to 69) of our age dummy variables, we can see that people aged 36 to 50 are more likely to see themselves as overweight compared to those outside of their age group, while those aged 20 to 35 are less likely to do so. It would be no far stretch to suspect that those people who grew up in an era during which obesity and overweight rates were lower would hold themselves to a lower BMI standard concerning weight appropriateness, while the later Generation X and early Millennial generations, who came of age during an era of increased obesity and overweight rates, might not think of themselves as overweight until higher BMI levels.

While race and sex both affect one's self-perceived weight status, they function differently in one particularly noticeable way: the distribution of marginal effects across the BMI spectrum. The point of greatest difference in self-perceived weight status between men and women is at a much lower BMI level than is the point of greatest difference between Blacks and Whites, which makes sense since the points of greatest difference in clinical weight categories between men and women is overweight, while for Blacks and Whites it is obese. Americans, it appears, do not determine their weight status through the use of clinical guidelines, nor do they take a broad comparative approach

(comparing themselves to everyone else around them), but rather contrast their body size to those whom they consider their natural racial and gender peers.

Policy and Health Implications

Most anti-obesity public health campaigns argue that being overweight or obese can lead to both immediate and long-term serious health problems. Latent in this argument is a hope that Americans will be able to determine whether or not they are overweight and, in turn, heed the message of the anti-obesity advocates. What we have seen thus far is that self-perceived weight status is a highly variable concept that depends of gendered expectations of body-size appropriateness and the cultural norms about body size within discrete racial groups. Therefore, if public health advocates are to even *attempt* to disseminate the idea that being overweight is bad for one's health within the population, they need to consider how this message should be tailored to resonate more clearly with different population groups.

There are two related lines of rhetoric as to why sociologists as well as public health advocates should care about social disparities in weight perception: anti-obesity message resonance and potentially higher rates of morbidity.

Anti-Obesity PSAs and Popular Health News

Although all Americans should – per the hopes of public health advocates – heed the warnings of anti-obesity PSAs and public health news regardless of their individual BMIs in order to stave off excess weight gain, address weight-related issues with their children or loved ones, and support anti-obesity legislation (such as sugary drink taxes,

incentives to get unhealthy foods out of schools, etc.), it seems likely that anti-obesity messages may resonate more with people who are overweight themselves or who are at serious risk of becoming overweight. As a comparative example, we would expect that prostate cancer screening PSAs likely resonate more with middle-aged and elderly men than with teenage boys or women, even though each group should care about the message.

That being said, if there exists significant gaps between clinical weight status groups and self-perceived weight status groups, we could reasonably expect that some people who are the clear targets of anti-obesity initiatives are essentially less receptive to these messages due to a dissonance between the intention of the message and the identity of the individual. To put it vulgarly, if you do not believe that you are overweight, you may see an anti-obesity PSA and think "Good thing I'm not fat!" and go about your day having largely ignored the message; anti-obesity messages might be "going over the heads" of many overweight Americans and some obese Americans.

This problem could be worse in some demographic groups than in others. Men, generally speaking, are already far less likely than women to see themselves as overweight even when controlling for BMI, as are Blacks compared to Whites. If we take for granted that anti-obesity public health initiatives and efforts do provide some kind of common benefit in the form of education about weight-related health issues and information concerning access to weight-management resources, then we might also say that males and Blacks are less likely to profit from these benefits due largely to their own self-perception of their weight statuses.

Compounding this problem even further is disparity in how clinicians diagnose overweight among patients, which leads into our second round of implications concerning potentially higher rates of morbidity.

Potentially Higher Rates of Morbidity

We will explore in Chapter 5 exactly how self-perceived weight status and having been told that one is overweight by a clinician affect motivations to lose weight among our respondents. However, in the meantime, we can reasonably assume that *clinically* overweight and obese Americans who *believe* that they are overweight would be more likely than Americans who do not believe they are overweight to monitor their weight or try to reduce their weight. If there is disparity in self-perceived weight perception between various socio-demographic groups, we could imagine that some groups might be more impacted by weight-related health issues than other groups.

For example, even obese Americans who are not told that they are overweight by a clinician are less likely to self-perceive as overweight than are their obese peers who have been told thusly. That difference could mean that millions of Americans who do not have the privilege of regularly seeing a doctor – or who see a doctor who does not bother to inform them of their weight status – could perhaps be ignorant of the myriad weight-related health issues for which they are at risk. Likewise, since Black Americans are less likely than White Americans to self-perceive as overweight, we might worry that the Black population is less likely to be on watch for weight-related health issues than is the White population. For public health advocates who sincerely believe that excess weight poses a serious health risk, these differences should raise alarms due to the potential for

somatic health disparities on the basis of sex, race, access to physicians, and other important social stratifiers.

Considering Sex and Race Effects on Overweight Diagnoses

Although not the main focus of this chapter, our results from Table 11 where we noted differences in how clinicians apply the "diagnosis" of overweight based on race and sex deserve some discussion. Looking back to Table 11 (where being told that one is overweight by a clinician is the dependent variable) we should wonder why differences between men and women generally fall within the BMI ranges of normal weight and overweight, while differences between Blacks and Whites do not appear until nearly the obese threshold and continue into the super-morbid obesity category (BMI>=40).

This curious and unexpected finding could be explained through the function of stereotyping, and depends on the assumption that most clinicians are likely to be White men (or, at least, still hold many normative views about sex and race). If we accept that people's bodies are viewed through gendered and raced social lenses (wherein, for example, women are more likely to be called overweight than are men even when controlling for actual BMI), we should also consider that these biases are *more likely to be challenged by sex than by race* in current American society.

Most White men, presumably, come into intimate contact with a number of women in their personal and professional lives: mothers, wives, sisters, daughters, nieces, bosses, coworkers, employees, and so on. They likely experience women in a variety of sizes, and may even be involved in the weight management of wives, girlfriends, and relatives. White men may view weight appropriateness through a gendered lens, but they

are also likely to be immediately familiar with numerous counterexamples of any stereotypes about women's bodies that they may hold.

Such a relationship with Blacks in general is probably less likely. Even in cosmopolitan areas, racial segregation can still be strong in the workplace and intimate social organizations. Within the family, racial homogeneity is even more extreme among Whites. With White-Black intermarriage rates still very low in the United States, it is likely that White men have far fewer Black individuals in their families to act as counters to popular stereotypes about Black Americans (which are often propagated, without malice, by health news that shows obesity rates and obesity-associated medical condition rates at higher levels among Black Americans). Stereotypes, in the absence of empirical negative cases, flourish.

Therefore, I argue that in a country where the workplace is still often racially segregated, and where interracial intimacies between Whites and Blacks is still unusual, a predominantly White male clinician population may be more critical of women's weights at lower BMI levels because they know a variety of women of many shapes in their intimate lives. However, they may be equally influenced by popular stereotypes of Blacks – especially women – as grossly obese to such an extent that it does not seem odd to them when a Black patient is overweight, and so no special attention is paid to it. To put it most vulgarly: when White male doctors see an overweight White woman, they may think "you're fatter than a lot of women I know," whereas when they see an overweight Black person, they may think "this just seems like a typical Black person to me."

This is not to chastise White male clinicians (or those clinicians who hold normative gendered and racial views) in any especially strong way, but merely to say that

when a professional group is so populated by a given segment of society, we could easily expect that segment's prejudices to be more pronounced within the group. And having fewer intimate and familiar counterexamples of Blacks in their lives than they have of women, White male clinicians may be more influenced by racial stereotypes than gendered stereotypes. Lastly, this phenomenon would also be just as applicable to White female clinicians, for whom all of the preceding arguments could have been made just as strongly.

Limitations

In this chapter, we encounter a number of NHANES variables that have inherent deficiencies, at least concerning their application herein. Our primary outcome variable that asks how the respondent self-perceives his weight status does not provide an "obese" option, which narrows the specificity with which we can identify exactly how concordant or discordant a respondent is with his clinical weight status.

The self-perceived weight status variable also suffers, I believe, from a construct validity issue insofar as it posits the labels "overweight" and "about right" as well-suited, reasonable values for an ordinal variable. I argue that – perhaps somewhat more strongly among Black respondents who, according to previous literature, are more inclined to prefer heavier bodies than Whites – there may be a fair percentage of respondents who would identify as "overweight" and "about right." Both racial differences in body-size preference and general positive attitudes toward heavier bodies in the populace at-large may account for some people identifying as perfectly fine overweight persons. While both "about right" and "overweight" contain positional value judgments, "about right"

does not position itself on any kind of yardstick, but merely says that one is right, correct, and proper. “Overweight,” contrarily, can easily be interpreted to mean that one is above a given threshold, but without the qualification (or absence of qualification) of goodness or rightness. Briefly, given the right set of circumstances, one could easily consider himself an overweight person who is about right.

An unavoidable limitation in the data comes from the absence of any information about the respondents’ physicians or other healthcare workers with whom they have had contact. When determining racial and sex effects associated with our variable that asks if one has ever been told that he is overweight by a clinician, we should bear in mind that more likely than not, the respondent – regardless of race or sex – is engaging with a White, and also likely male, physician. Given the greater racial and gender heterogeneity among non-physician clinicians, there may be less of a predominance of White males in our clinician group, but the fact remains that we simply do not know. This affects our results – or at least has the potential to do so – insofar as we may have undetected racial effects influencing our results when we include the variable that asks about overweight diagnoses. Clinicians surely have some unique effect on self-perceived weight status, and clinicians likely do tell Whites and women that they are overweight at higher rates than they do Blacks and men, but we could also be measuring the phenomenon of White men (likely the dominant group among clinicians) projecting racial and gender biases about body-size appropriateness.

Concluding Remarks

Our first hypothesis stated that with all of the public health and governmental focus on warning Americans of the obesity "epidemic" in the country over the past roughly two decades, we would expect to see American's increasingly self-perceive as overweight thanks to all of the information now available on how to determine weight status and what it could mean for one's well-being. We must, however, retain the null hypothesis in this matter, as the opposite appears to be true: Americans are decreasingly likely to see themselves as overweight as the 21st century progresses into its second decade.

Our second hypothesis stated that those who had been told by a clinician that they were overweight would be more likely than those who have not been told that they are overweight to self-perceive as overweight. In this regard, we can reject the null hypothesis, with this overweight "diagnosis" proving to be quite an impactful variable in our models. Even when controlling for one's actual BMI, simply being told that one is overweight by someone tasked with monitoring our bodies and well-being appears to encourage one to see himself as being overweight.

Having a better understanding of what actually determines self-perceived weight status, we will now turn to our next chapter to ask how self-reported health is affected by this subjective measure of weight along with actual BMI and having been told that one is overweight by a clinician.

CHAPTER 4

DETERMINANTS OF SELF-REPORTED HEALTH

This chapter explores determinants of self-reported health (SRH), focusing specifically on the effects of BMI, self-perceived weight status, and being told that one is overweight by a clinician. Understanding these relationships is essential in determining whether public health efforts to convince the American public of excess weight's deleteriousness have been and are currently effective. If we find evidence that perceiving oneself as "overweight" is correlated with increased probability of reporting lower SRH, then we might assume that Americans are at least somewhat in line with the proclaimed beliefs of anti-obesity public health organizations.

The central question for this chapter is thus: are weight and weight status associated with SRH in the United States? In asking this, we propose three hypotheses:

1.) People who self-perceive as "overweight" will report lower SRH than those who self-perceive as "about right."
2.) People who are told they are overweight by a clinician will report lower SRH than those who are not told so.
3.) Actual, measured BMI will have a negative association with SRH (i.e. higher BMIs will result in lower SRH).

This investigation is novel for three reasons. First, it utilizes NHANES data from 1999-2012 – a larger span than previously used in similar studies to date. Second, it controls for the presence of specific comorbid diseases that are generally considered "obesity associated" conditions by the CDC, NIH, and other public health organizations

in order to isolate unique effects of being clinically overweight/obese and perceiving oneself as overweight. Third, it explores the effect of being told that one is overweight by a clinician to determine if the act of being "diagnosed" as overweight has a distinct relationship to SRH.

Ultimately, we find that when controlling for actual BMI (which, itself, is significantly associated with lower SRH), self-perceived weight status has no significant relationship with SRH. Conversely, being told one is overweight by a physician does make one more likely to report lower SRH, yet this effect is relatively small in comparison to the effect of discrete obesity-associated conditions such as congenital heart failure, coronary heart disease, stroke, heart attack, and diabetes, and is no more impactful than less severe obesity-associated conditions such as high cholesterol and high blood pressure. Race also has a strong relationship with SRH, but for our purposes our findings only reinforce a large body of well-established previous research.

Public health researchers may find the lack of significant results for self-perceived overweight and the moderate-to-weak results for diagnoses of overweight important in highlighting one of the regrettable failures of the anti-obesity movement of the late 1990s and early 2000s: convincing the US population that excess weight is unhealthy. Sociologists of health and medicine may find that the lack of correlation between self-perceived weight and SRH indicates that the general population has been hesitant to accept "overweight-ness" as a signal of poor personal health.

Background

There is no shortage of public health studies that use SRH as an outcome variable, yet the bulk of obesity epidemiology has thus far been concerned with somatic morbidity and mortality outcomes. Nonetheless, studying SRH and its relationship to weight is important for a number of reasons: 1.) SRH does have some predictive power for somatic health outcomes, 2.) variance in SRH can help us understand how different racial, gender, and age groups associate their weight, self-perceived weight status, and "diagnoses" of overweight with their individual health status, and 3.) SRH can be an indicator of overall well-being, even in cases in which it does not predict somatic health outcomes.

A review of SRH literature should begin by establishing the history of SRH validity for modelling purposes. We will begin here, and then explore SRH's relationship to weight and weight status in previous research.

Validity of SRH

DeSalvo et al. (2006) performed a meta-analysis of 22 "community-based cohort studies that reported (1) all-cause mortality, (2) a question assessing GSRH [General Self-Rated Health], and (3) an adjusted relative risk or equivalent" spanning the years 1966 through September of 2003 in an attempt to provide a thorough evaluation of SRH as a reliable indicator of somatic health (DeSavlo et al. 2006:267). The authors "found a statistically significant relationship between worse GSRH and an increased risk of death" and discovered that "[s]tudy participants' responses to a simple, single-item GSRH question maintained a strong association with mortality even after adjustment for key

covariates such as functional status, depression, and co-morbidity" (DeSalvo et al. 2006:273).

Schnittker and Bacak (2014), in an effort to evaluate SRH's validity over time, examined SRH's ability to predict mortality in General Social Survey (GSS) data from 1980 to 2002, which were linked to the National Death Index (NDI). The authors employ the GSS SRH variable in a number of hazard plots to test the predictive power of SRH when controlling for sex (to account for the nearly global inequality in life expectancy between men and women) and find that not only is decreased SRH a significant predictor of mortality, but that this effect has become stronger over time (Schnittker and Bacak 2014:5). The authors attribute this increase in SRH's predictive power to greater health-related news literacy by the general population, although they caution that this effect is weaker for those who receive the majority of their health news from online sources rather than from print publications (Schnittker and Bacak 2014:8).

Bailis et al. (2003) used National Population Health Survey data from Canada from 1994 to 1997 to refine the relationship between SRH and more clinically measurable somatic health indicators (such as smoking status, BMI, and "physical and mental health symptoms" to name some) as well as time. The authors find that their clinical measures are strong predictors of SRH, however they also indicate that SRH is somewhat predicted by mere intention to engage in healthful behaviors and by SRH responses from previous years (i.e. autocorrelative effects) (Bailis et al. 2003:210-211). Therefore, the authors conclude that SRH is "spontaneous" insofar as it changes readily with alterations in physical and mental symptoms, "but [is] also a reflection of an enduring self-concept" based on one's intentions and his view of himself as a healthy or

unhealthy person (Bailis et al. 2003:211-212). Of course, it is difficult to know if the autocorrelative effects of SRH over time are a result of pure self-concept or if they are simply a result of not having enough time pass between surveys (bear in mind, the data spans only four years) to allow for significant somatic health changes within the sample.

SRH and Demographic Differences

The general acceptance of SRH as a valid indicator of individual health does not mean that it is immune from social influence or that it does not vary by demographic characteristics. While sex shows to be a weak or even insignificant predictor of SRH in many studies, race proves to be an important determinant for SRH. Using NHIS data from 2000 to 2003, Borrell and Dallo (2008) found that odds ratios for reporting "fair or poor" health were higher for non-Hispanic Black respondents than for their non-Hispanic White counterparts, even in their most comprehensive models which controlled for geographical region, length of time in the United States, presence of health insurance, education, income, presence of certain chronic comorbidities, BMI, quantity of physical activity, and smoking status (Borrell and Dallo 2008:235). Franks et al. (2003) find that while both sex and race are important predictors of SRH, racial effects are much stronger than are sex effects. What is more, when the authors look at all-cause mortality outcomes, they find that sex's impact on SRH is discordant with sex's impact on actual mortality differences, while race's impact on SRH is very accordant with racial mortality differences (Franks et al. 2003:2509-2510). While being female is associated with lower SRH, it is also associated with higher survival rates in hazard plots (Franks et al. 2003:2509-2510). Being Black, conversely, is associated with both lower SRH and lower

survival rates, implying that while women may report worse health than do men, they tend to outlive men; Blacks, however, report lower health than do Whites and actually die earlier than do Whites (Franks et al. 2003:2509-2510).

Sarkin et al. (2013) look at this significant racial effect on SRH over time and note that while racial differences between Blacks and Whites are fairly strong today, they used to be even stronger. During the late 1970s and early 1980s, the racial gap in SRH began to close somewhat, largely due to overall increases in SRH that tended to rise more sharply amongst Blacks (Sarkin et al. 2013:47). This narrowing of racial differences – which offered a hope that Black Americans might see continued improved health outcomes thanks to broader social changes occurring in the United States – stalled by the late 1980s, and the gap between Whites and Blacks in America has not significantly decreased in any permanent way since then (Sarkin et al. 2013:46-47).

Lastly, in a more limited study focusing on Chicago, Cagney et al. (2005) use Decennial Census data and two local (to the Chicago area) population surveys to study the effects of race on SRH, ultimately finding that while race is an important predictor variable, neighborhood-level *affluence* may be powerful enough to render the effects of race insignificant (Cagney et al. 2005:185). The interesting finding in Cagney et al.'s study is that when the authors control for poverty rates *rather than affluence rates*, the effect of race remains significant, if somewhat diminished, thereby implying that race cannot be thought of as a variable consumed by more powerful socio-economic variables (Cagney et al. 2005:186).

SRH and Weight

While numerous studies have investigated the relationship between various clinical weight measures (BMI, presence of obesity, weight category assignment), far less work has been done to articulate the relationship between how we see our bodies and how that affects perceptions of our own health. Okosun et al. (2001) employed NHANES III (1988-1994) data to check for a basic relationship between clinical weight status and SRH, ultimately finding that significant differences between weight groups' SRH emerged when comparing obese respondents to normal weight respondents (Okosun et al. 2001:433-434). Imai et al. (2006) use self-reported weight and height from 1997 through 2005 NHIS data to calculate a self-reported BMI statistic, which they then use to evaluate weight's effect of SRH. While they ultimately conclude that increased BMI is associated with lower SRH, they note that this effect begins at much lower BMI levels for women than it does for men, and that these numbers may be affected by gender-based weight and height reporting biases (Imai et al. 2006:403).

Herman et al. (2011) examine the unique effects of actual BMI versus self-perceived weight status on SRH among Canadians, ultimately finding that self-perceived weight status has a stronger effect on SRH than does BMI (Herman et al. 2011:191). The two weight measures had some interesting interaction effects as well: the higher SRH ratings were found among clinically normal weight people who also felt that they were normal weight, while the lowest SRH levels were found among those who were obese and believed that they were overweight (Herman et al. 2011:191).

Self-perceived weight status therefore appears to play a significant role in determining SRH and in moderating the relationship between actual BMI and SRH.

Additionally, just as they moderated the relationship between actual BMI and self-perceived weight status, our demographic variables seem to play an important role in moderating relationships between our main predictor variables and SRH. In the following analysis, we will explore the effects of self-perceived weight status on SRH over a broader time span than has been previously examined using a nationally representative sample, and will create robust models that control for many of the aforementioned demographic variables as well as the experience of being told that one is overweight by a clinician and the presence of obesity-associated comorbidities.

Data and Method

As with the previous chapter, I will employ Continuous NHANES data from 1999 through 2012 in this analysis of SRH. For binary logistic regression, we need to collapse the SRH variable into two values, ideally by some intuitive mid-point of distinguishing value that separates good health from bad health. This feat is not possible – at least not in the ideal, preferred sense – given the nature of the distribution of SRH in the NHANES.

The original SRH variable contained five valid values from which respondents could select to reflect their self-reported general health: "poor," "fair," "good," "very good," and "excellent." 3.1% (n=346) of our respondents rated their health as "poor," 11.3% (n=1252) rated their health as "fair," 31.5% (n=3498) rated their health as good, 34.7% (n=3856) rated their health as "very good," and 19.5% (n=2163) rated their health as "excellent." We then dichotomized this variable for use in binary logistic regression to predict generally "lower health." There were two possible approaches to recoding the original variable: combining "poor," "fair," and "good" together as "lower health" and

combining “very good” and “excellent” together as “better health” (SRH-1), or combining “poor” and “fair” together as “lower health” and combining “good,” “very good,” and “excellent” together as “better health” (SRH-2). To test the impact of these two recoding methods, we ran the general model for this chapter using SRH-1, and then once again with SRH-2. The model with SRH-1 showed significant results for all predictor variables except age and self-reported weight status, while the model with SRH-2 showed significant results for all predictor variables except age. Initially, SRH-2 seemed to be the superior recoding since it returned significant results for an additional predictor variable (albeit them very weak results), however in later comparisons SRH-2 lost much of its appeal. When our sample was further restricted by survey wave, BMI category, and specific comorbidities, the low sample size of SRH-2’s “lower health” category became problematic (bearing in mind that SRH-2’s “lower health” category was populated by the two smallest categories of the original SRH variable: “poor” and “fair”). Marginal effects for many of our other predictor variables including race and having been told that one is overweight by a clinician were nearly 50% smaller using SRH-2 than using SRH-1, making these results noticeably smaller than comparable results reported in the literature supporting this chapter. Further, models that interacted self-perceived weight status with BMI categories and models that interacted self-perceived weight status with specific comorbidities contained no more significant results using SRH-2 than with SRH-1, and indeed many of the other predictor variables in these models showed weaker results using SRH-2 than SRH-1. Ultimately, we decided to use SRH-1 (where 0 = “poor” and “fair,” and where 1 = “good,” “very good,” and “excellent”) to preserve sufficient sample sizes for all the models in this chapter.

Our main predictor variable – self-perceived weight status – is unchanged from the previous chapter (0="about right," 1="overweight") as are all control variables (race, sex, age, actual BMI, and having been told that one is overweight by a clinician).

A new predictive measure appears in this chapter as well: comorbidity with obesity-associated comorbid conditions. The NHANES contains a series of medical history interview questions that ask respondents if they have ever "been told" that they had a given disease or condition "by a doctor or healthcare professional." From this list, I selected seven comorbidities that are typically defined by the CDC, WHO, NIH, and other large public health organizations as closely related to excess weight: diabetes, high cholesterol, high blood pressure (hypertension), congestive heart failure, coronary heart disease, heart attack, and stroke (it should be noted that other conditions – such as chronic joint pain – are often associated with very heavy body weights as well, but lack their own discrete variables in this section of the NHANES). I combined these seven individual questions into one variable that simply indicates whether the respondent has been diagnosed with one of these obesity-associated comorbidities (in other words, 0=no comorbidities, 1=at least one comorbidity). I will also explore the unique effects of each of these original seven obesity-associated comorbidities on SRH later in the results section of this chapter.

Although certain tables and models will focus more specifically on one particular relationship than another, every model controls for the same set of independent variables: race, sex, age, comorbidity, actual BMI, self-perceived weight status, and having been told that one is overweight by a clinician. All marginal effects reported herein can thus be seen as a truly unique effect of whatever independent variable is being reported ("unique"

at least within the context of our models here). The sample upon which all models in this chapter are built is also limited by the same series of conditional statements as was the sample from the previous chapter. All respondents must be either non-Hispanic Black or non-Hispanic White, must be between 20 and 69 years-old, cannot be clinically underweight (i.e. have a BMI less than 18.5), cannot be pregnant, cannot have a self-perceived weight status of "underweight," must have seen a physician within the past 12 months, and must have provided a valid response to questions about self-perceived weight, having been told that he is overweight by a clinician, and having been told that he has had any of the qualified obesity-associated conditions. NHANES 12-year sample medical weights are used to adjust the data just as they were in the previous chapter.

Binary logistic regression is employed to derive average marginal effects of selected independent variables on SRH in all models. Average marginal effects are rounded to the nearest hundredth's place, meaning that all differences between reference groups and test groups can be interpreted to the nearest percentage point difference.

With this approach, we begin to delve into the relationship between self-perceived weight and SRH in an attempt to enrich the extant – if somewhat lacking – sociological and public health literature on the topic, and to determine if Americans are in line with public health advocates' beliefs that excess weight is detrimental to their health.

Results

If we are to consider whether public health efforts to convince Americans that excess weight is bad for their health have been effective, we should first understand the basic relationship between actual BMI and SRH in our data since BMI is our only

objective measure of weight that we have. Then we ought to examine the relationship between self-perceived weight status and SRH, since we established in the previous chapter than one's actual weight category and perceived weight status very frequently do not align. After checking for demographic moderators of these relationships (by race, sex, and age), we can then control for the presence of obesity-associated comorbid conditions in order to determine if respondents truly consider their weight in determining their overall health status, or if they are actually considering only their comorbid maladies in this deliberation.

To begin, we interact BMI with time (i.e. NHANES survey waves) while controlling for the rest of our model predictor variables to get an idea of BMI's average marginal effect on SRH and how it has changed since the turn of the 21st century. Per Table 12 we see that BMI has maintained a significant effect of .01 over thirteen years, which may appear small until one considers that BMI is a continuous variable in this model. When predicted probabilities are generated for BMI in intervals of ten BMI units, we find that moving from one clinical weight category to the next highest results in a roughly 7 to 8 percentage point increase in the probability of one reporting lower health when controlling for our other predictor variables[18]. BMI proves to be an important predictor of SRH given the wide range of BMIs among Americans,[19] however this relationship has not changed over the course of the Continuous NHANES. Neither has

[18] Predicted probabilities for BMI on SRH in this model were as follow (predicted probabilities are in parentheses): BMI=20 (.32), BMI=25 (.39), BMI=30 (.47), BMI=35 (.55), BMI=40 (.62). Note that a BMI of 25, 30, 35, and 40 are the lower clinical thresholds for overweight, obesity, morbid obesity, and super-morbid obesity respectively.

[19] In fact, when we substitute our BMI variable with a standardized BMI variable, our average marginal effect on SRH rises to nearly .09, testifying to the relevance of BMI's effect on SRH given the BMI distribution in the United States.

the predicted probability of reporting lower SRH by BMI category changed, with predicted probabilities of reporting lower SRH remaining steady at roughly .4, .4, and .5 for our clinically normal weight, overweight, and obese respondents (respectively) for each survey wave from 1999 to 2012.[20]

Table 12
Marginal effects of BMI, interacted with survey wave, on self-reported health

DV: Self-Reported Lower Health						
IV: BMI at given year…	M.E.	SE	z	p	CI-low	CI-high
1999-2000	0.01*	0.00	4.73	.000	0.01	0.02
2001-2002	0.01*	0.00	5.37	.000	0.01	0.02
2003-2004	0.01*	0.00	3.83	.000	0.00	0.01
2005-2006	0.01*	0.00	5.76	.000	0.01	0.02
2007-2008	0.01*	0.00	6.01	.000	0.01	0.02
2009-2010	0.01*	0.00	7.55	.000	0.01	0.02
2011-2012	0.02*	0.00	7.28	.000	0.01	0.02

Average marginal effects of BMI when controlling for race, sex, age, self-perceived weight status, being told that one is overweight by a clinician, and presence of obesity-associated comorbidities.
N=11,114
*p<.05
Tjur R-squared=.13

To check for non-linear relationships between BMI and SRH, we re-ran the analyses for Table 12 using a quadratic and cubic recording of BMI, but failed to find any relationships of note. The absence of non-linear relationships between BMI and SRH means that this difference remains generally constant as we "move" up and down the BMI scale, and does not change much in magnitude as we compare BMI points that happen to lie in clinically defined weight categories (such as "normal," "overweight," and "obese.")

[20] This was determined by performing a logistic regression model with SRH as the dependent variable and BMI recoded into a categorical variable according to clinical guidelines used as the independent variable, while controlling for race, sex, age, self-perceived weight status, and having ever been told that one is overweight by a clinician. Predicted probabilities were then generated using STATA's MARGINS command.

Age, Sex, and Race Results

Age proves to be a significant predictor of our main outcome variable, though its effects are fairly small (Table 13 and Table 14), perhaps because self-reported health is usually interpreted as relative to age (that is, a 68 year-old may think himself in "very good" health relative to other 68 year olds, and thus reports the same SRH as a 20 year-old who may be "objectively" healthier). When we recode age into three dummy variables by age group, we find that only the dummy variable where 1=51 to 69 year-olds and 0=all younger people returns a significant result, showing that the oldest age group is more likely report lower SRH by 2.4 percentage points (table omitted).

Table 13
Marginal effects of BMI, self-perceived weight status, being told that one is overweight by a clinician, race, sex, age, and the presence of at least one obesity-associated comorbidity on self-reported health

DV: Self-Reported Lower Health	M.E.	S.E.	z	p	CI-low	CI-high
BMI	0.01*	0.00	11.67	0.000	0.01	0.02
Self-Perceives Overweight	0.01	0.01	0.86	0.392	-0.01	0.04
Yes, Told Overweight by a Clinician	0.04*	0.01	2.75	0.006	0.01	0.06
Black	0.12*	0.01	11.84	0.000	0.10	0.14
Female	0.01	0.01	0.66	0.508	-0.01	0.03
Age	0.00	0.00	-0.92	0.360	0.00	0.00
Yes, At Least One Comorbidity Present	0.12*	0.01	21.69	0.000	0.11	0.13

Average marginal effects when all variables are included in the logistic regression model.
N=11,114
*p<.05
Tjur R-squared=.11

Sex returns virtually no significant findings (Table 13), save for a one significant difference between men and women at lower BMI ranges when we interact sex with BMI (Table 14). This is surprising given the stark differences we saw in Chapter 3 between men and women in how they perceive their weight status, but also is somewhat expected based on the previous literature on this topic. One might – however – reasonably expect women (who very often see themselves as overweight even when they are clinically normal) to report lower SRH relative to men since they seem to be relatively "harsh" on themselves concerning issues of body-rightness. However, this is not the case, and

Table 14

Marginal effects of BMI, self-perceived weight status, being told that one is overweight by a clinician, race, sex, age, and the presence of at least one obesity-associated comorbidity – all interacted with BMI – on self-reported health

DV: Self-Reported Lower Health	M.E.	S.E.	z	p	CI-low	CI-high
Self-Perceives as Overweight at						
BMI=20	-0.03	0.02	-1.17	0.240	-0.08	0.02
BMI=25	0.00	0.02	-0.03	0.977	-0.03	0.03
BMI=30	0.03	0.02	1.67	0.096	-0.01	0.07
BMI=35	0.06*	0.03	1.99	0.046	0.00	0.12
BMI=40	0.09*	0.05	1.98	0.047	0.00	0.18
Yes, Told Overweight by a Clinician at						
BMI=20	0.09*	0.03	3.23	0.001	0.04	0.15
BMI=25	0.08*	0.02	4.00	0.000	0.04	0.12
BMI=30	0.06*	0.01	4.01	0.000	0.03	0.09
BMI=35	0.04*	0.02	1.81	0.071	0.00	0.08
BMI=40	0.01	0.03	0.49	0.624	-0.04	0.07
Black at						
BMI=20	0.20*	0.02	9.84	0.000	0.16	0.24
BMI=25	0.18*	0.01	12.58	0.000	0.15	0.21
BMI=30	0.15*	0.01	13.24	0.000	0.13	0.17
BMI=35	0.11*	0.01	8.00	0.000	0.09	0.14
BMI=40	0.08*	0.02	3.96	0.000	0.04	0.12
Female at						
BMI=20	-0.04*	0.02	-2.19	0.028	-0.08	0.00
BMI=25	-0.02	0.01	-1.74	0.081	-0.05	0.00
BMI=30	0.00	0.01	-0.18	0.860	-0.03	0.02
BMI=35	0.02	0.02	1.35	0.176	-0.01	0.05
BMI=40	0.04	0.02	1.89	0.058	0.00	0.09
Age at						
BMI=20	0.00*	0.00	1.91	0.056	0.00	0.00
BMI=25	0.00*	0.00	2.43	0.015	0.00	0.00
BMI=30	0.00*	0.00	2.38	0.017	0.00	0.00
BMI=35	0.00	0.00	1.30	0.193	0.00	0.00
BMI=40	0.00	0.00	0.61	0.543	0.00	0.00
Yes, at Least One Comorbidity Present at						
BMI=20	0.11*	0.02	5.41	0.000	0.07	0.15
BMI=25	0.14*	0.01	9.72	0.000	0.12	0.17
BMI=30	0.18*	0.01	13.65	0.000	0.15	0.20
BMI=35	0.20*	0.02	11.24	0.000	0.17	0.24
BMI=40	0.22*	0.03	8.44	0.000	0.17	0.27

Average marginal effects when all variables are included in the logistic regression model and interacted with BMI.
N=11,114
*p<.05
Tjur R-square=.11

women are no more or less likely than men to report lower SRH even when controlling for actual BMI and the presence of an obesity-associated comorbid condition. When BMI and comorbidity are removed as predictor variables, sex still proves to be a weak predictor of SRH, with sex returning an average marginal effect of .004 at a 95% confidence level.[21]

Race remains our only demographic control variable that retains some significant relationship with SRH – a fact that should not be surprising to us given the extant body of literature on this issue. In Table 13, we see that racial effects (being Black rather than being White) represent an average marginal effect of .12 when controlling for our other model variables, including BMI. Upon further exploration, however, we notice that these racial effects are not consistent across the BMI spectrum. In Table 14, we have interacted race with our continuous BMI variable and observed the marginal effects of race on SRH at various BMI levels (roughly representing the clinical normal, overweight, obese, morbid obese, and super-morbid obese weight categories) and noted that as BMI increases, racial effect diminish. We might derive from this that despite socio-cultural differences between Blacks and Whites in self-reported health, these differences decrease in relevance as the deleteriousness of excess weight becomes more apparent to respondents of both races. In short, racial differences in SRH are at least partly overcome by heft.

[21] When just race, sex, and age are included as predictor variables in Table 2, the average marginal effect for each is: race .194*, sex .004* and age: -.016 (*=significance at a 95% level of confidence).

Self-Perceived Weight Status

Having established that BMI has a unique and significant effect on SRH, we turn to our primary question of whether self-perceived weight status has any unique effect on how one rates his SRH. Given what we know about self-perceived weight status – that it varies greatly by sex and race, and that there is considerable disconnect between many people's clinical weight status and their self-perceived weight status – we might expect to see equally strong, or perhaps stronger, relationships to SRH since both self-perceived weight status and SRH are both self-perceived and subjectively defined by the individual, who is in turn influenced greatly by his or her race and sex.

This excitement is somewhat tempered. Analysis of our sample shows that while self-perceived weight status has no significant effect on SRH at the normal weight, overweight, or obese thresholds, there does seem to be some effect of self-perceived weight status on SRH once we cross into the strata of morbid obesity (BMI=35) and super-morbid obesity (BMI=40) (Table 14). Despite the moderate and significant effects of actual BMI on SRH, the perception of being overweight seems to only affect those at the highest end of the BMI distribution. This result is somewhat surprising, especially at the lower BMI levels. We might expect that those who are at a normal BMI level and still identify as overweight might be more likely to report lower SRH than those who identify as "about right" weight – the thinking being that perhaps they are more self-critical of their own weight and health. However, that does not appear to be the case; self-perceived weight status proves to be an insignificant predictor at these very levels.

When we interact self-perceived weight status with time (i.e. NHANES survey waves), we find no significant effect on SRH, meaning that self-perceived "overweight"

Americans were no more likely than self-perceived "about right" Americans to report lower SRH in 2011-2012 than they were in 1999-2000 (Table 15). This seemingly unremarkable result is actually quite interesting. Given the deluge of PSAs, public health news, and social outcry over the rise of the "obesity epidemic" in the first decade of the 21st century, we might justifiably expect to see a stronger correlation between one's thinking that he is overweight and that he is less healthy in 2012 than we would in 1999, yet this is simply not so. Perhaps our time span is too short, yet nonetheless the fact remains that no significant shift in the public's perception of its own health due to its perception of its own weight status occurred during the most vociferous years of anti-obesity public health efforts.

Table 15
Marginal effects of self-perceived weight status interacted with survey wave on self-reported health

DV: Self-Reported Lower Health

Self-Perceives as Overweight at…	M.E.	SE	z	p	CI-low	CI-high
1999-2000	0.01	0.03	0.38	0.705	-0.05	0.08
2001-2002	0.03	0.03	1.21	0.225	-0.02	0.09
2003-2004	-0.04	0.03	-1.28	0.201	-0.10	0.02
2005-2006	0.01	0.03	0.4	0.693	-0.05	0.07
2007-2008	0.03	0.03	1.01	0.313	-0.03	0.09
2009-2010	0.03	0.03	1.21	0.226	-0.02	0.09
2011-2012	0.01	0.03	0.46	0.646	-0.04	0.07

N=11,114
*p<.05

Obesity-Associated Comorbid Conditions

Having examined the effects of clinical BMI and self-perceived weight status, we can now turn to the understudied issue of comorbidity. The purpose of this analysis is to determine two things: first, if being told that one is overweight by a clinician has a unique effect on SRH, and second, if having an obesity-associated comorbid condition makes one more likely to report lower SRH. The logic behind this second question stems from the objective of anti-obesity public health advocates, who have worked to convince the

American populace that excess weight is harmful to one's health because it can directly lead to myriad non-communicable diseases (such as heart disease, diabetes, stroke, etc.) We want to understand if being diagnosed with an obesity-associated condition has a greater or lesser impact on SRH than does being diagnosed as "overweight," and if self-perceived weight status becomes a more salient predictor of SRH once one becomes diagnosed with an obesity-associated condition.

To begin, we can look at the effects of simply having been diagnosed with an obesity-associated comorbid condition on SRH when controlling for actual BMI, race, sex, age, self-perceived weight status, and having been told that one is overweight by a clinician. In Table 13 we see that respondents who report having been diagnosed with an obesity-associated comorbid condition are more likely to report lower SRH than those who do not report having such a condition by 12 percentage points. When we interact comorbidity with BMI, we see that this association between comorbidity and poorer health becomes stronger as BMI increases (Table 14), indicating that our suite of illnesses bear more strongly on those who are clinically overweight and obese.

We should also determine the effects of specific obesity-associated comorbidity on SRH lest we hastily deduce from our previous findings that the exact nature of the obesity-associated comorbidity has no impact on SRH (for example, we would be right to suspect that a woman whose comorbid condition is high blood pressure might be influenced by that comorbidity differently than would a woman whose comorbid condition is congestive heart failure). To accomplish this, a logistic regression model was created in which SRH was the outcome variable, all of our usual control variables were included, but the general morbidities variable was removed and replaced with each

specific obesity-associated condition variable (a non-missing morbidity value was still used as a condition of the model however). That is, each obesity-associated condition variable – which has values of 0="I have not been told I have…" and 1="I have been told I have…" – was included in one model. Additionally, being told that one is overweight by a clinician was also included as an independent variable in order to assess whether a "diagnosis" of overweight had any significant effect on SRH when accounting for the numerous other comorbidities that are often predicated on excess weight.

As Table 16 shows, the marginal effects of these conditions on SRH seem to increase with our common understanding of specific disease severity. Diabetes, congenial heart disease, stroke, congestive heart failure, and heart attack all have upper confidence intervals above .2, while high blood pressure, high cholesterol, and being told that one is overweight have far smaller effects.

Table 16
Marginal effects of specific obesity-associated comorbidities on self-reported health

DV: Self-Reported Lower Health	M.E.	S.E.	z	p	CI-low	CI-high
Yes, Presence of Diabetes	0.23*	0.02	10.55	0.000	0.19	0.27
Yes, Presence of Coronary Heart Disease	0.21*	0.05	3.91	0.000	0.11	0.32
Yes, Presence of Stroke	0.20*	0.04	5.11	0.000	0.13	0.28
Yes, Presence of Congestive Heart Failure	0.19*	0.04	4.56	0.000	0.11	0.27
Yes, Presence of Heart Attack	0.14*	0.04	3.29	0.001	0.05	0.22
Yes, Presence of High Blood Pressure	0.10*	0.01	8.63	0.000	0.08	0.12
Yes, Presence of High Cholesterol	0.07*	0.01	5.96	0.000	0.04	0.09
Yes, Told Overweight by a Clinician	0.04*	0.01	2.74	0.006	0.01	0.06
N=11,114						
*p<.05						
Tjur R-squared=.15						

The overall message in our results thus seems clear: actual BMI and having been told that one is overweight by a clinician both have moderate, significant effects on SRH even when controlling for the presence of obesity-associated comorbid conditions, while self-perceived weight status returns significant results only at higher BMI levels. But what if we interact self-perceive weight status with our aforementioned comorbidities?

Does one's attitude regarding his weight-status' impact on his health change once he falls ill with an obesity-associated comorbid condition? Americans have been repeatedly told by public health agencies that excess weight can lead to many chronic and acute comorbidities. Therefore, we might hypothesize that even though most Americans do not believe that their weight status affects their SRH, this attitude might change once one is diagnosed with an obesity-associated condition. One might not think that his status as an overweight man negatively affects his health, but once his doctor tells him that he has diabetes, he may quickly begin to see his excessive weight as a serious health problem.

If this is our hypothesis, our results tell us that we cannot – with much confidence – reject the null. Table 17 is a compilation of eight different logistic regression models which explore interactions between self-perceived weight status and obesity associated comorbidities. In each model, self-perceived weight status was interacted with a given comorbidity (including being told that one is overweight by a clinician), and *all* comorbidities were controlled for by using the specific morbidities control variable (race, sex, age, and BMI are also controlled in the model).

As one can see, we do not detect any significant difference in marginal effect between thinking that one is "about right" and thinking that he is "overweight" even when looking within discrete obesity-associated comorbid conditions – except for within that group of respondents who have been told that they were overweight by a clinician (a fact that we have already established).

Part of the reason for these insignificant findings might be explained by low sample sizes within the "yes" categories for some conditions, although this cannot be the sole reason, as we see that high blood pressure and diabetes (which have thousands of

Table 17
Marginal effects of self-perceived weight status interacted with the presence of specific obesity-associated comorbidities on self-reported health

DV: Self-Reported Lower Health	M.E.	SE	z	p	CI-low	CI-high
Self-Perceives as Overweight | No, not Told Overweight by a Clinician	0.00	0.01	0.04	0.965	-0.03	0.03
Self-Perceived Overweight | Yes, Told Overweight by a Clinician	0.07*	0.03	2.38	0.017	0.01	0.14
Self-Perceives as Overweight | No Presence of Heart Attack	0.02	0.01	1.50	0.133	-0.01	0.05
Self-Perceives as Overweight | Yes Presence of Heart Attack	-0.07	0.07	-0.98	0.328	-0.21	0.07
Self-Perceives as Overweight | No Presence of Stroke	0.02	0.01	1.26	0.207	-0.01	0.04
Self-Perceives as Overweight | Yes Presence of Stroke	0.10	0.08	1.22	0.223	-0.06	0.26
Self-Perceives as Overweight | No Presence of Diabetes	0.03	0.01	1.87	0.061	0.00	0.05
Self-Perceives as Overweight | Yes Presence of Diabetes	-0.06	0.05	-1.30	0.193	-0.16	0.03
Self-Perceives as Overweight | No Presence of Coronary Heart Disease	0.02	0.01	1.55	0.120	-0.01	0.05
Self-Perceives as Overweight | Yes Presence of Coronary Heart Disease	-0.13	0.08	-1.70	0.090	-0.28	0.02
Self-Perceives as Overweight | No Presence of Congestive Heart Failure	0.02	0.01	1.44	0.150	-0.01	0.05
Self-Perceives as Overweight | Yes Presence of Congestive Heart Failure	0.02	0.10	0.17	0.866	-0.19	0.22
Self-Perceives as Overweight | No Presence of High Blood Pressure	0.03	0.02	1.74	0.082	0.00	0.06
Self-Perceives as Overweight | Yes Presence of High Blood Pressure	-0.01	0.02	-0.30	0.768	-0.05	0.04
Self-Perceives as Overweight | No Presence of High Cholesterol	0.02	0.02	1.35	0.178	-0.01	0.05
Self-Perceives as Overweight | Yes Presence of High Cholesterol	0.02	0.02	1.32	0.185	-0.01	0.06

N=11,114
*p<.05

cases) do not produce p-values noticeably lower than conditions with smaller samples such as heart attack and stroke. Rather, it seems that self-perceiving oneself as overweight does not have a large effect on SRH even when one is ill with an obesity-associated comorbid condition. The American populace at large seems to believe that simply being overweight is not very detrimental to its health; it is much more likely to accept the obesity-associated conditions as deleterious disease labels, probably to the chagrin of public health advocates.

Discussion

This discussion will focus on three important findings from our results: Americans' hesitance to associated self-perceived overweight (on its own) with worse health, the power of diagnosis and its struggle to imbue the "overweight" label with meaning, and the moderate relationship of actual BMI to SRH.

Ultimately, we retain the null for our first hypothesis (that people who self-perceive as overweight will report lower SRH) at most BMIs levels (although we can reject the null at morbid obesity levels), and we can reject the null for our second and third (that people who are told that they are overweight by a clinician, and that people with clinically higher BMIs will report lower SRH).

Overweight Does Not Always Equal Less Healthy

If public health advocates and official agencies have been promoting the idea that being overweight is dangerous and could lead to any number of maladies, then Americans' opinions on this matter appear fairly discordant. In fact, those within the

clinical overweight and obese categories appear to feel no association between their weight-status and their SRH. Instead, this association is evident only in the extremely obese, who likely suffer from myriad musculoskeletal issues and other health maladies not measured in this study that surely affect their SRH in a negative way.

It is one thing for something to be true in general, but not to believe or act as though it is particularly germane to your individual life. We may all agree that wearing seatbelts and bicycle helmets are important actions, but many of us feel that we are at no particular risk of grave injury, and thus will see ourselves as almost exceptional in this case. For overweight and obesity, a similar phenomenon may be popular amongst Americans. It would not matter if the majority of Americans believed that being overweight was harmful because they truly believed so, because they were simply repeating what they have heard in the press and from health agencies, or because they wanted to seem more concerned with their health than they really were. The fact would still remain that when asked about their weight status and their health status in distant enough intervals within a survey (as they are through the NHANES), Americans do not associate being overweight *within themselves* with lower SRH.

The problem of course – at least from an epidemiological and mainstream public health perspective – lies in the fact that if most individuals do not accept this message about the health dangers of weight gain in their own individual lives, then you effectively have an entire population largely unconvinced by your message, even if they appear to offer *prima facie* support for it. Much can be done in the way of population-wide efforts to curb overweight and obesity rates from imposing taxes on unhealthy foods, to spending more on nutrition and exercise programs, to reforming public assistance

programs that provide people with food. But at some point, the responsibility for weight management falls to the individual, and an important step in convincing individuals to actively monitor and combat their own excess weight is convincing them that *their* weight could be bad for *their* health. It is on this point that Americans seem to disagree with public health advocates.

The Tyranny of Diagnosis meets Overweight

Diagnosis – and more specifically the act of being diagnosed – is a powerful force in medicine, often altering how an individual views himself as a person and beginning his "career" as a sick person. We have already seen in the last chapter how having a clinician tell one that he is overweight is positively related to his perceiving his own weight status as overweight, even when controlling for demographic factors and actual BMI. We thus concluded that diagnosis played a role in the self-determination of weight appropriateness for Americans.

In this chapter, Rosenberg's famous concept finds itself on less sure footing. Looking squarely at our list of comorbidities and their effects on SRH (Table 16), we see that being told that one is overweight by a clinician shows the weakest relationship to SRH, implying that all other obesity-associated conditions are more influential on determining one's SRH than is the supposed root cause of many of these ailments. Surely it is expected – and probably a very good thing – that the average American views something like diabetes as deleterious to personal health, since hopefully this will persuade him to monitor said condition more closely and take positive actions to diminish its effects. Conversely, if the aim of anti-obesity public health advocacy is to instill

within the general population an understanding that simply being excessively heavy is a threat to one's own health, then most Americans seem to be less than emphatic in the acceptance of this message. PSAs and public health news do not argue that having a heart attack leads to one becoming obese; they argue that being obese and overweight lead to many other diseases. Excessive weight is thus the root cause of many health problems, and should be feared (or at least recognized as harmful), yet it is precisely a diagnosis of this root cause that shows the weakest relationship to SRH.

We might therefore conclude that diagnosis' "tyranny" does not yet fully extend its reign into the land of corpulence, although it does have a small foothold. While Rosenberg's concept of the diagnosis states that it has an influence on the patient outside of the actual symptomology associated with dysfunctions of the body, there is also the condition that the disease label itself first be negotiated and accepted by its encompassing society. Perhaps if the NHANES had diagnosis categories specifically for obesity, we would be able to detect a stronger diagnostic effect.

However, the overweight "diagnosis" does become more relevant when we look at its interaction effects with self-perceived weight status. Despite its having the smallest marginal effects in Table 16, when we look at the marginal effects of self-perceived weight status among respondents who are already diagnosed with an obesity-associated comorbid condition, we see that it is in fact the only scenario in this chapter in which self-perceived weight status shows broad, significant (if still very small) marginal effects on SRH. According to Table 17, among respondents who have been told that they are overweight by a clinician, those who self-describe as overweight are 7 percentage points more likely to report lower health than those who self-describe as about right.

What does this mean for the power of diagnosis concerning overweight? Although we should be restrained in our ardor over these findings, we might be able to say that perceiving oneself as overweight only begins to have an effect on SRH when this status is confirmed by a clinician. It is one thing to feel that you are overweight because you are unhappy with your shape, have been told so by friends or family, are aware of clinical definitions of weight status, or simply feel that you are heavier than you used to be. It is another thing for a person tasked with ensuring your health to bestow this same label upon you. The diagnosis is confirmation that being overweight has gone from an aesthetic worry – or perhaps a health concern only in passing – to a real and present health issue.

These results may tell us (although we do not know if they will continue at the present rate or increase moving into the future) that the public health efforts to convince Americans of excess weight's detrimental effect on health can become more effective once Americans' self-perceived weight statuses come more in line with clinical guidelines and these same individuals encounter qualified health professionals who reinforce clinical weight standards. This two-pronged approach – within the public sphere and within the examination room – may be public health advocates' best chance at achieving this goal.

If that is true, then our findings from the last chapter are even more relevant and important. We saw how huge numbers of Black Americans and males incorrectly (according to clinical guidelines) perceive their weight status, and how many who are indeed overweight are not told so by a clinician. If the interaction between self-perceived weight and being diagnosed as overweight is part of the solution to convince people of

overweight's health risk, then we have observed a vast pool of people who may experience a shift in SRH given a change in self-perception and greater input by clinicians.[22]

Body Mass Index and Self-Reported Health

Actual, measured BMI displays some significant relationship with SRH, and one can see how BMI's effect on SRH could indeed manifest in some important ways in our country's population. As mentioned at the start of this chapter's results section, predicted probabilities for reporting lower SRH are nearly identical for those who are clinically normal weight or clinically overweight, however they increase when one becomes clinically obese. Given that over one-third of our sample is clinically obese, we could suspect that these effects of BMI are certainly impactful for a huge portion of the American public.

When employed as an interaction variable, BMI has an important moderating effect on the relationship between race and SRH as well. When interacted with race, we see that increasing BMI essentially removed racial differences between Blacks and Whites concerning SRH, although only at very high BMI levels. This helps us understand that racial difference in SRH does not represent an unbridgeable race-based cultural difference. Blacks and Whites certainly have different points at which their BMIs appear

[22] We should pause here to remember that a primary motivation of this dissertation is to evaluate the effectiveness of anti-obesity advocates' efforts and messages, not to state that there is an objectively correct way that one should feel about his weight. A reader who is passionate about the dangers of excessive weight may read this set of conclusions as saying that many people do not see the "truth" about their own weight and are putting themselves in harm's way. Setting aside the complicated and hotly debated issue about the "true" effects of overweight and obesity on individual health, we should also be clear that these conclusions presume that anti-obesity advocates are correct in their mission and that being overweight or obese is inherently "bad" for one's health. Yet this is only one outlook, and not one that I necessarily share as the researcher.

to impact their SRH, but both consider BMI as a determinant of SRH, and therefore this racial difference is a matter of degree and not some sort of fundamental disagreement in worldview.

The general conclusory point one could make given these results of BMI's effect on SRH would be that increased BMI does cause a sense of increased un-wellness in most people, however it is far less impactful than discrete disease categories, possibly because self-reported health truly has no yardstick other than one's own life experiences. It is uncommon for someone to suddenly be struck with a bout of obesity as they could be struck with a heart attack, stroke, or diabetes diagnosis, and therefore one can become acclimated to his own body, his ability to function mechanically, and the daily aches and pains (or lack thereof) that he experiences. Many epidemiologists have been adamant that BMI is a useful tool for predicting health outcomes, and we indeed support this general theory here, albeit with some important reservations about its magnitude.

Limitations and Conclusion

Despite self-reported health's reliability as a measure of overall personal health, the construct of the SRH variable in the NHANES limits us in our ability to predict health outcomes in logistic regression modelling. In the NHANES, SRH is defined as a five-point scale. In addition to the obvious subjectivity latent in the terms "excellent" and "very good" (and the difficulty in conceptually distinguishing one from the other), there is also the issue of distribution of cases among these values that we examined in the data and method section. This thus poses a conceptual limitation in any analysis that deals with this newly dichotomized SRH variable: those who responded that their health was

"good" – which is undeniably a positive declaration of health – are counted amongst the "lower health" ranks. While technically true ("good" is lower on the SRH scale than "very good," and "excellent"), this may seem somewhat unintuitive to many readers.

The nature of our comorbidity questions also poses a challenge to our interpretation of the results from these models. In the NHANES, each of these specific disease questions asks the respondent if he "has ever been told" that he has the given disease by "physician or other healthcare professional," so we cannot verify when a patient was told that he had a specific condition, nor for how long he has been "ill" with this condition. By including only respondents who have seen a physician within the past 12 months, we try to mediate this uncertainty by ensuring that those respondents who answer "no" to a given comorbid condition have, hopefully, at least had the chance to have been told so by a healthcare professional. It would still be possible for a respondent to have been told that he has a given condition at some point in the past, but has had that "diagnosis" reversed more recently by a healthcare professional.

Further, just as with the variable that asks if a respondent has ever been told by a clinician that he is overweight, we cannot be sure what type of healthcare professional told the respondent that he did or did not have a given condition. There may be important differences in being told, for example, that you have high cholesterol by your cardiologist compared to a nurse at a blood drive, but we would be unable to detect any such differences due to the nature of the NHANES questionnaire. Although it has been mentioned previously, it is because of this characteristic of the variable construction that the term "diagnosis" is often used loosely throughout this dissertation. A proper diagnosis can only be made by a physician or nurse practitioner in most cases, but we would expect

that most Americans still receive declarative health information about themselves from physicians thanks to the structure of the American health insurance system (which demands that a physician or nurse practitioner be included as part of a medical visit in order to assign an ICD code) and the nature of ER utilization (in which an attending physician must validate the work of nurses).

In sum, it seems that Americans are reluctant to associate their weight with their health, unless there is a "perfect storm" of self-perceived overweight and clinician diagnosed overweight status (actually being clinically overweight helps as well). When reviewing our initial hypotheses, we find that we must be more conservative and restrained than we originally planned. We speculated that people who self-perceive as "overweight" would report lower SRH scores than those who self-perceive as "about right." In fact, this is generally not the case, and self-perceived overweight only becomes a truly significant predictor of SRH when a clinician's diagnosis moderates the relationship. We also hypothesized that people who are told they are overweight by a clinician would report lower SRH scores than those who were not told so. Here we can reject the null hypothesis as we did find significant differences in SRH between the "diagnoses" and the "non-diagnoses" groups, although these differences were smaller than the differences within any comorbidity grouping. Lastly, we asserted that actual, measured BMI would have a negative association with SRH. Here again we can reject the null as actual BMI shows a significant effect on SRH, which is important given the broad range of BMIs in the US population.

The extent to which Americans associate their weight with their health is not fully known given our findings that BMI affects SRH while self-perceived weight status does

only at extremely high BMI levels. However, one thing is clear: a clinician's "diagnosis" of overweight impacts SRH on its own, and also produces a significant relationship between self-perceived weight status and SRH when we interact these two predictors and look at those people who have indeed been "diagnosed" as overweight. The power of the diagnosis – the word of the physician – is shown once again in this study. Given such, would Americans actually try to adjust their BMIs in order to address a diagnosed weight issue? Does the influence of the physician continue to wield some of the only real power when we begin looking at responses to overweight diagnoses? If so, how do Americans' responses to being told they are overweight compare to their responses when they are told that they have some other obesity-associated malady? Do people react more strongly (by attempting to lose weight) when they are told they have hypertension or when they are told they are overweight? What of diabetics, or heart disease patients?

In the next chapter, we will examine Americans' "responses" to being told that they are overweight, by looking at whether they pursue weight loss upon being diagnosed with an obesity-associated comorbid condition, and how this regiment adherence varies by actual BMI, self-perceived weight status, race, sex, and age. This is an important area to explore in answering our general thesis question "do people believe that being overweight is bad for them?" because it asks us to consider *actions* that people take (or do not take) to better their health considering their weight and obesity-associated disease state, not simply how they rank their health. It is to this attempt at exploring weight's effects on health behavior that we now turn.

CHAPTER 5

DETERMINANTS OF WEIGHT-LOSS ATTEMPTS

In our last chapter, we addressed our primary topic – to determine if Americans believe that being overweight or obese is "bad for you" – by looking at the relationships between various measures of weight (actual BMI, self-perceived weight status, and having been told that one is overweight by a clinician) and self-reported health (SRH). That analysis assumed that measuring the association of weight and SRH was a valid way of measuring sentiment; "feeling" less healthy at higher weights means that you feel that your weight affects your health.

However, consider the fact that we often admit that something may be unhealthy, but we continue to do it (or "be" it) anyway. In these cases, the causal agent in question often does not have immediate effects; smoking, for example, might not impair your health at all for decades. But there are also cases in which an action or personal status is immediately alarming to us, enough to affect our behavior in an immediate sense (for example, if you learned that a certain prescription drug resulted in severe, permanent organ damage, you may likely stop taking said drug).

This chapter is primarily concerned with measuring the belief that being overweight/obese affects one's health by examining self-reported attempts to lose weight within the past year (of the survey's administration to the respondent). Every respondent who is asked his self-perceived weight status is then asked whether he has made efforts within the "past year" to lose weight, regardless of his self-perceived weight status. When controlling for actual BMI (among our other demographic control variables), we can determine what effect simply believing one is overweight has on his motivation to lose

weight. We can also do this for people who are told that they are overweight by a clinician to determine if the effect of an overweight "diagnosis" uniquely affects weight-loss behavior. We can then go a step further and control for the presence of obesity-associated comorbid conditions, which will help us better understand whether respondents are attempting to lose weight because they believe that their weight/their being told they are overweight, *per se*, is a problem, or if this desire to lose weight is actually explained by a diagnosed health condition that the respondents consider more serious in nature.

Our three main hypotheses are therefore:

1.) People who self-perceive their own weight status as "overweight" will be more likely than people who self-perceive their weight status as "about right" to report attempting to lose weight within the past year, when controlling for actual BMI.

2.) People who are told that they are overweight by a clinician will be more likely than people who have not been told that they are overweight by a clinician to report attempting to lose weight within the past year, when controlling for actual BMI.

3.) People who are ill with an obesity-associated comorbid condition will be more likely than people who are not ill with an obesity-associated comorbid condition to report attempting to lose weight within the past year, when controlling for actual BMI, self-perceived weight status, and having been told that one is overweight by a clinician. We expect that including comorbidity into our models will reduce the effect sizes on self-perceived weight status and having been told that one is overweight by a clinician.

Our first hypothesis assumes that an individual will have been more motivated to lose weight if he perceives himself as overweight, rather than simply meeting a clinical definition of overweight. To accept that a change in one's body shape must be undertaken, a problem should first be identified and accepted. Regardless of whether one meets a clinical definition of overweight, it seems a stretch to think that attempts to lose weight would commence without believing that oneself is indeed overweight.

Likewise, our second hypothesis assumes that the word of a physician – already established as an important factor in understanding self-perceived weight status and self-reported health – will have a significant and important effect in predicting weight loss attempts. Since weight loss can be considered a type of prescription, health regimen, or medically-oriented task, it makes sense that hearing that one is overweight from a clinician would spur such action in individuals regardless of their place on the BMI spectrum.

Lastly, our third hypothesis argues that while weight (in its various forms) might be an important predictor of attempts at weight-loss, the presence of obesity-associated comorbid conditions that are somatically deleterious are likely to be impactful in encouraging a respondent to attempt to lose weight. If a person of BMI=28 believes that he is overweight (which he is), he may pursue some sort of weight-loss regimen simply because he wants to address his weight issue. However, if that same person is also ill with diabetes, hypertension, or a serious heart disease, perhaps he will be more motivated to lose weight since each of these diseases has a more immediate and arresting effect on one's personal health than simply being "heavy."

Background

If Americans attempted to lose weight as soon as they were clinically overweight, we could not only imagine a very pleased clinical healthcare field, but also a content public health advocacy industry, satisfied that its warnings over the potential dangers of excess weight had been heeded by the general public. Unfortunately for the healthcare industry, this is not the case; social determinants of weight-loss are as complex as those which predict health or weight status perception.

Determining whether someone is likely to attempt to lose weight is a complex endeavor that is affected by physiological, perceptive, experiential, and demographic factors. It is true (quite instinctively) that measured, clinical BMI is positively associated with attempting to lose weight, although this affects some groups more strongly than others. While people with higher BMIs are more likely to report engaging in weight-loss behavior than are people with lower BMIs, this effect is much stronger for women than it is for men (Lemon et al. 2009; Yaemsiri et al. 2011). Being divorced or never married is also positively associated with attempting to lose weight, however this is only true for women, while marital status appears to have no effect on men's efforts to lose weight (Klos and Sobal 2013).

Physicians' declarations and opinions also have a significant effect on their patients' likelihood of attempting to lose weight. Patients who are counselled by their physicians to lose weight for any reason are typically more likely than those who have not been told to lose weight to attempt weight loss, even when controlling for actual BMI and other demographic factors (Baron 2011; Post et al. 2011). That being said, it appears that physicians are hesitant to actually advise patients to lose weight despite a readiness

to tell them that they are overweight. Using BRFSS data from 1996, Sciamanna et al. (2000) find that only 14% of clinically non-obese and 47% of clinically obese patients suffering from an obesity-associated comorbidity are counselled by their physicians to lose weight. This, of course, does not tell us whether patients with an obesity-associated comorbid condition are any more likely to pursue weight loss, since one does not require the instruction of a physician to make a change to his body weight in light of a disease diagnosis.

Other studies that focus on weight loss and illness tend to be clinical or epidemiological inquiries into the effect of weight-loss on morbidity and mortality outcomes among patients who are ill with a given disease or set of diseases. A few studies have, however, approached our present topic. Williamson et al. (2000) showed that only 34% of clinically overweight individuals with diabetes make any effort to lose weight, despite weight-loss being significantly associated with a 25% reduction in mortality among study participants. Singh et al. (2010) examined weight-loss behavior data among obese individuals with cardiovascular disease and found that only 49% attempted to lose weight within the past year despite the fact that 78% knew they were overweight and 80% said that they wanted to lose weight.

In the forthcoming analysis, we will explore whether the presence of an obesity-associated comorbid condition is associated with weight-loss attempts in order to determine whether obesity-associated somatic illness can, *per se*, motivate weight-loss. This analysis is new and important because it 1.) incorporates more waves of the Continuous NHANES than previously examined into the analysis, thereby maximizing sample sizes and ensuring that our sample truly represents Americans from the first

decade of the 21st century, 2.) develops more robust modelling that incorporates three different measures of weight and weight appropriateness, and 3.) explores the role that comorbidity plays in each of these models.

Data and Method

Our primary dependent variable in this chapter asks whether respondents have attempted to lose weight "in the past year," meaning in the twelve-month period before the respondent participated in the NHANES. This weight-loss variable is dichotomous, with 0 = respondent has not tried to lose weight in the past year and 1 = respondent has tried to lose weight in the past year. This question is asked after questions about self-reported height, self-reported weight, and self-perceived weight status are asked, and is posed to all respondents regardless of their clinical weight or self-perceived weight status.

Our primary independent variables are actual BMI, self-perceived weight status, having been told that one is overweight by a clinician, and the presence of an obesity-associated comorbid condition (congestive heart failure, coronary heart disease, heart attack, stroke, diabetes, and high cholesterol).[23] Our comorbidity variable is treated as dichotomous here, with 0 = no obesity-associated comorbidities and 1 = at least one obesity-associated comorbidity. Race, sex, and age will also be held as control variables. All our predictor variables exist in this chapter in the same form that they took in previous chapters.

[23] The reader may notice that high blood pressure is no longer included in this list; this is because high blood pressure belongs to a different subset of medical condition questions in the Continuous NHANES that could not be confidently matched to the subsection that asks about weight-loss, and for this reason it was omitted from this chapter

As in previous chapters, the forthcoming analysis will rely on binary logistic regression modelling to generate average marginal effects for each of our models. Because actual BMI is once again used in all models, we will use the NHANES 12-year medical weights for all sample weighting. The sample upon which all models in this chapter are built is also limited by the same series of conditional statements as was the sample from the previous chapter. All respondents must be either non-Hispanic Black or non-Hispanic White, must be between 20 and 69 years-old, cannot be clinically underweight (i.e. have a BMI less than 18.5), cannot be pregnant, must have seen a physician within the past 12 months, cannot have a self-reported weight status of "underweight," and must have provided a valid response to questions about self-perceived weight, having been told that he is overweight by a clinician, and having been told that he has had any of the qualified obesity-associated conditions.

Results

Americans are a particularly diet and exercise obsessed people, despite their relatively high BMIs and obesity rates. In fact, 43% of our study sample responded "yes" when they were asked if they have attempted to lose weight within the past year. When examining clinical weight categories, we see that 27%, 43%, and 57% of normal weight, overweight, and obese respondents report trying to lose weight, respectively. Concerning self-perceived weight status, 19% of people who believe they are "about right" and 58% of people who think they are "overweight" have tried to lose weight within the past year (Table 18).

Table 18
Distribution of weight-loss attempts by clinical weight status and distribution of weight-loss attempts by self-perceived weight status

N=12,362	Clinical Weight Category			Self-Perceived Weight Status	
Tried Losing Weight in Past Year?	Normal	Overweight	Obese	About Right	Overweight
No	73.0%	57.0%	42.6%	81.1%	42.3%
Yes	27.0%	43.0%	57.4%	18.9%	57.7%
Total	100% (3896)	100% (4111)	100% (4355)	100% (4675)	100% (7687)

Americans are also very "sick," in the sense that roughly half of everyone in our sample has been diagnosed with an obesity-associated comorbid condition (which does not even account for most maladies measured in the NHANES), and that clinical weight category is associated with the presence of said maladies. We should keep in mind that the percentage of our sample that is "sick" is higher than the true population percentage because we limited our sample only to individuals who have seen a doctor within twelve months of participating in the NHANES (while healthy people should also visit their doctors regularly, sick people often incur visits more frequently with their physicians). In Table 19, we see that of those who are diagnosed with an obesity-associated comorbid condition, 82% are either overweight or obese, while only 18% are clinically "normal" in terms of BMI. Thus, we might think that our various weight measurements would show a significant association with attempts to lose weight since most people who are ill with obesity-associated conditions are also facing weight challenges, at least by clinical standards.

Table 19
Distribution of clinical weight status by presence of at least one obesity-associated comorbidity

N=14,403	Ever Been Diagnosed with an Obesity-Associated Comorbid Condition	
Clinical Weight Category	No	Yes
Normal	40.2%	18.0%
Overweight	23.1%	35.0%
Obese	27.7%	47.0%
Total	100% (7413)	100% (6990)

In attempting to predict weight-loss attempts by our respondents, we take a step-wise approach. We first use actual BMI as our predictor of weight-loss attempts while controlling for race, sex, and age. Next, we enter self-perceived weight status and having been told that one is overweight by a clinician into the model to test for the effects of non-clinical measures of weight. Lastly, we insert our obesity-associated comorbidity measure into the model to see if any weight-related effects on weight-loss attempts are truly due to our weight variables or if they are in fact a function of knowing that one is diagnosed with a serious somatic illness.

BMI

In Table 20 (Model 1), we see that BMI has a significant effect on weight-loss attempts, with an average marginal effect of .02. However, when we control for the effects of self-perceived weight status and having been told that one is overweight by a clinician, (Table 20, Model 2) we see that the effects of actual BMI are weakened significantly. However, BMI still maintains a significant effect on one's decision to pursue weight-loss *when we treat BMI as a dichotomous variable* where 0 = clinically normal weight people and 1 = overweight and obese people. When we perform this recoding, we see a difference in average marginal effects of 4 percentage points between the clinically normal weight and the clinically overweight or obese, with the latter group being more likely to report attempting to lose weight (table omitted). However, it is clear from our modelling that both self-perceived weight status and having been told that one is overweight by a clinician are more impactful on the probability of reporting weight-loss attempts than is actual BMI.

Table 20

Marginal effects in step-wise modelling of the presence of at least one obesity-associated comorbidity, being told one is overweight by a clinician, self-perceived weight status, BMI, race, sex, and age on weight-loss attempts

DV: Yes, Attempted to Lose Weight in Past Year	M.E.	S.E.	z	p	CI-low	CI-high
Model 1						
BMI	0.02*	0.00	24.82	0.000	0.02	0.02
Black	-0.10*	0.01	-9.71	0.000	-0.12	-0.08
Female	0.18*	0.01	19.57	0.000	0.17	0.20
Age (20-69)	0.00*	0.00	-3.15	0.002	0.00	0.00
Model 2						
Self-Perceives as Overweight	0.29*	0.01	26.17	0.000	0.27	0.32
Yes, Told Overweight by a Clinician	0.10*	0.01	8.38	0.000	0.08	0.13
BMI	0.00*	0.00	2.90	0.004	0.00	0.00
Black	-0.05*	0.01	-4.69	0.000	-0.07	-0.03
Female	0.13*	0.01	14.23	0.000	0.12	0.15
Age (20-69)	0.00*	0.00	-6.85	0.000	0.00	0.00
Model 3						
Yes, Presence of at Least One Comorbidity	0.01	0.01	0.95	0.345	-0.01	0.03
Yes, Told Overweight by a Clinician	0.10*	0.01	8.14	0.000	0.08	0.12
Self-Perceives as Overweight	0.29*	0.01	26.14	0.000	0.27	0.32
BMI	0.00*	0.00	2.84	0.005	0.00	0.00
Black	-0.05*	0.01	-4.74	0.000	-0.07	-0.03
Female	0.14*	0.01	14.30	0.000	0.12	0.15
Age (20-69)	0.00*	0.00	-6.60	0.000	0.00	0.00

N=12,362

*p<.05

Model 1 Tjur R-square: .12

Model 2 Tjur R-square: .19

Model 3 Tjur R-square: .19

Self-Perceived Weight Status and Having Been Told One is Overweight by a Clinician

When we create our second model by adding self-perceived weight status and having been told that one is overweight by a clinician to our first model, we see that both variables have massively important effects on weight-loss attempts, but also that they sharply reduce BMI's impact on our outcome variable.

People who perceive themselves as overweight have a greater chance of reporting that they have tried to lose weight within the past year than those respondents who perceive themselves as about right by 29 percentage points, even when controlling for actual BMI (Table 20). In some ways, this is not terribly surprising, since we would expect people who define themselves as overweight to be more likely to want to shed some of this excess weight and return to a more "normal" or "acceptable" weight level. However, it is the fact that we control for clinical BMI that makes this finding interesting, since it implies that the power of self-perception is not only strong, but largely distinct from the power of actual BMI increase.

Likewise, people who are told that they are overweight by a clinician are more likely than those who have not been told so to report having attempted to lose weight within the past year by 10 percentage points (Table 20). Again, there is some intuitive understanding of this result, since we would expect that someone who has been told that they are overweight by a person tasked with maintaining his health might be more likely to do something to address his weight, just as he would be more likely to take a drug or begin some surgical or medical regiment in light of any other diagnosis. The effect size *per se* is quite striking for its largeness, however it is also fascinating because we see that it is still much smaller than self-perceived weight status. Even the word of a physician is

apparently not as impactful on our decisions to lose weight as is our own belief about our body-size appropriateness.

We also see that BMI's average marginal effect is significantly reduced by incorporating self-perceived weight status and having been told that one is overweight by a clinician into our model, suggesting that our actual, measured BMIs are less important in determining whether we will engage in weight-loss behavior than are these non-somatic measures of weight (Table 20).

What we still do not know is whether any of these weight-based effects are moderated by the presence of an obesity-associated comorbid condition. Are we truly measuring the effects of our weight variables, or do people tend to engage in weight-loss behavior more when they have been diagnosed with either an acute or chronic condition that is often attributed to excessive weight? This is a question that has been largely ignored in the already small sociological field concerned with non-epidemiological outcomes related to obesity and weight in general, and one that we will address by incorporating a measure of comorbidity into our third model for Table 20.

Obesity-Associated Comorbidities

In our third model, we insert our dichotomous obesity-associated comorbidity variable in order to control for the effects of being afflicted by said comorbidities on weight-loss attempts. Curiously, we find that this variable has no significant effect on weight-loss attempts (Table 20) even when we interact comorbidity with BMI and look for effects at higher BMI levels (Table 21). When we change the order in which we enter predictor variables into our various models and construct a model predicting weight-loss

attempts with race, sex, age, BMI, and obesity-associated comorbidities, we see that comorbidity produces a statistically significant average marginal effect of .04, but that this effect is reduced to insignificance upon introducing self-perceived weight status and having been told that one is overweight by a clinician into the models (tables omitted).

Table 21
Marginal effects of having at least one obesity-associated comorbidity interacted with BMI on weight-loss attempts

DV: Yes, Attempted to Lose Weight in Past Year	M.E.	S.E.	z	p	CI-low	CI-high
Yes, Comorbidity at BMI=20	0.01	0.02	0.42	0.674	-0.03	0.04
Yes, Comorbidity at BMI=25	0.01	0.01	0.71	0.481	-0.02	0.03
Yes, Comorbidity at BMI=30	0.01	0.01	0.96	0.337	-0.01	0.03
Yes, Comorbidity at BMI=35	0.01	0.01	0.89	0.371	-0.02	0.04
Yes, Comorbidity at BMI=40	0.01	0.02	0.73	0.464	-0.02	0.05

N=12,362
*p<.05
Tjur R-square: .19

It therefore seems that the presence of an obesity-associated comorbidity does not significantly influence Americans' decisions to pursue weight-loss when we already control for their actual weight, self-perceived weight, and having been told that they are overweight by a clinician. Perhaps this is due in part to Sciamanna et al.'s (2000) findings that physicians are often reluctant to directly tell patients to lose weight even when those patients are ill with an observably obesity-related disease. Whatever the reason, weight-loss attempts appear to be more reserved for weight itself, and less so for weight-related health issues.

Race, Sex, and Age Effects

Even in Table 20, Model 3 (our most heavily controlled nested model), we see that both race and sex maintain significant effects on weight-loss attempts. Women are more likely to report trying to have lost weight in the past year than are men by fourteen

percentage points, while Blacks are *less* likely to report trying to have lost weight in the past year than are Whites by five percentage points. Age shows very small effects when held as a continuous variable, however when we insert age as three distinct dummy variables, we find that being young is associated with a higher likelihood of attempting to lose weight within the past year. Age was recoded from its continuous form into three dummy variables: one in which 1 = 20 to 35 year-olds, one in which 1 = 36 to 50 year-olds, and one in which 1 = 51 to 69 year-olds. In Table 22 we show the average marginal effects for these dummy age groups and can see that only the youngest age group shows a significant, positive association with weight-loss attempts, indicating that younger people are more likely than older people to pursue some sort of weight-loss regimen when controlling for actual BMI, being told that one is overweight by a clinician, self-perceived weight status, race, and sex.

Table 22
Marginal effects of age dummy on weight-loss attempts[24]

DV: Weight-Loss Attempts	M.E.	S.E.	z	p	CI-low	CI-high
Age where 1=20-35 year-olds	0.06*	0.01	5.34	0.000	0.04	0.08
Age where 1=36-50 year-olds	-0.01	0.01	-0.77	0.443	-0.03	0.01
Age where 1=51-69 year-olds	-0.04*	0.01	-4.05	0.000	-0.06	-0.02

N=12,362
*p<.05
Tjur R-square: .19

Acceptance of the label "overweight" – whether one is actually clinically overweight or not – appears to be the prime motivator in engaging in weight-loss

[24] For this table, as with Tables 3 and 5 in Chapter 3, three separate logistic regression models were run where the respective age dummy variable was inserted as a predictor variable along with presence of an obesity-associated comorbidity, self-perceived weight status, race, sex, actual BMI, and having been told that one is overweight by a clinician. For the first model, the age dummy variable where 1=20-35 year-olds and 0=all other ages was used. For the second model, the age dummy variable where 1=36-50 year-olds and 0=all other ages was used. For the third model, the age dummy variable where 1=51-69 year-olds and 0=all other ages was used. The results, for age dummies, of these three models are shown in the table above. These three age dummy variables were not run in the same model.

behavior, with a clinician's declaration that one is overweight further encouraging attempts at weight-loss. Indeed, BMI alone proves to be a fairly weak predictor of weight-loss attempts when we control for the effects of self-perception and a "diagnosis" that one is excessively heavy. Surprisingly, we do not see significant effects of obesity-associated comorbid conditions on weight-loss attempts despite the fact that public health officials have been arguing that people should pursue proper diets and exercise regimens in the face of these non-communicable diseases and their increasing prevalence. Let us now turn to a discussion of the possible roots of our findings as well as their implications for public health and sociological research.

Discussion

Our goal in this chapter was mainly to understand what motivates Americans to attempt to lose weight. It is one thing to try and gauge Americans' beliefs about the relationship between weight and health by looking at the obvious self-reported health variable, however we want to know if associations between weight and health are strong enough to lose weight.

This approach is not without its conceptual limitations (which we will discuss at length in our limitations and conclusion section), however it is one avenue for understanding the complicated relationship between weight and health among a populace that at once seems health-obsessed while being simultaneously one of the heaviest groups of people in the world.

BMI

BMI's effect on weight-loss attempts is small but significant, with clinically overweight and obese people being more likely than normal weight people to report such attempts in the past year. Still, we see how BMI's effect size shrinks once we control for self-perceived weight status and having been told that one is overweight by a clinician. This fits into a larger theme of this dissertation of "weight" effects being more closely related to perceived weight and ideas about weight "rightness" than actual, measured weight.

Since attempting to lose weight is not a biological or somatic outcome, perhaps it then makes sense that we do not see strong associations between it and actual BMI. However, the continued relevance of BMI does indicate that despite all the variation in weight-loss attempts that is driven by demographic and experiential factors (such as being told that he is overweight or ill with an obesity-associated condition by a clinician), there is still a common social understanding that one ought to try to lose weight that is a product of physical size. Americans may disagree about what qualifies as overweight or where we fall on the self-reported health scale, but there is an apparent universal sensation that is felt at certain BMI levels that makes weight an unavoidable factor in our decision-making. We seem to "feel" our weight both in a literal sense and in a motivational sense despite our differences in socio-demographics.

Self-Perceived Weight Status and Having Been Told One is Overweight by a Clinician

Self-perceived weight status is a powerful predictor variable in this chapter, which should come as no surprise to anyone; people are more likely to be motivated to

lose weight when they believe themselves to be overweight. Although expected, the relationship between self-perceived weight status and weight-loss attempts is somewhat surprising in its sheer size.

Americans who self-perceive as overweight are more likely to have attempted to lose weight than those who self-perceive as about right by nearly 30 percentage points. This is striking given our results in Chapter 4 which showed no significant relationship between self-perceived weight status and self-reported health in general, returning significant results only at the morbid and super-morbid obesity levels of BMI. How would we explain such a large disparity between these two outcomes?

Plainly, it appears that the greater likelihood of pursuing weight-loss measures when self-identifying as overweight is not driven solely by an overarching concern about one's personal health. Self-perceived weight status is not associated with variation in SRH, implying that as one begins to believe that he is overweight, his proceeding decision to attempt to lose weight is likely not cause by a sense of illness *due to his weight*. The myriad causal agents that explain variation in weight-loss attempts (besides what we have presented here) remain unknown, however we could speculate that desire to be attractive to others, to be comfortable in one's own skin, or simply to conform to social definitions of body-size appropriateness could all play a role in spurring this motivation to lose weight.

The relationship between having been told that one is overweight by a clinician and weight-loss attempts is also strong and significant, showing that a medical professional's word is an important motivator for losing weight among our respondents. Perhaps this gives us some indication of the role that health concerns play in motivating

Americans to lose weight. Since it seems unlikely that the reason why a person would attempt to lose weight after receiving an overweight "diagnosis" is because he wants to be more physically attractive to the doctor or because he has suddenly undergone a fundamental transformation in how he sees his weight in a broader social context, we could deduce that the driving force behind the relationship between overweight "diagnoses" and weight-loss attempts is truly related to concerns over personal health. Looking back again to Chapter 4, we found that after racial effects and the effects of bring ill with an obesity-associated condition, having been told that one is overweight by a clinician is our next most impactful independent variable in predicting self-reported health. We thus might understand the relationship between having been told that one is overweight by a clinician and weight-loss attempts to be motivated by health concerns, since the word of a medical professional seems to resonate with Americans when they are considering their overall health.

The results from both self-perceived weight status and having been told that one is overweight by a clinician tell us that weight-loss attempts are more likely to be motivated by socially defined measures of weight appropriateness rather than by any somatic effects of actual BMI. This reminds us again of the relevance and importance of our research question from Chapter 3: what determines self-perceived weight status? If public health officials are concerned with motivating Americans to lose weight – especially those Americans who are indeed clinically overweight or obese – then they need to realize that the first step in this process is convincing Americans that they are overweight in the first place. Although body-positive and "healthy at any size" approaches may be desirable for any number of valid and (potentially more) important

reasons, the fact remains that if weight-loss motivation is the goal, then convincing Americans that they are truly transgressive in terms of weight needs to be the primary goal of public health advocates.

Obesity-Associated Comorbid Conditions

Reaffirming our speculation that weight-loss attempts are not heavily motivated by concerns over health, we find that being ill with any number of obesity-associated comorbid conditions is not significantly related to attempting to lose weight within the past year. Not even at the "morbidly obese" or "super-morbidly obese" BMI levels does the presence of a disease directly associated with obesity appear to correlate with weight-loss attempts among Americans.

A compelling explanation for this lack of association could lie in how Americans treat their illnesses generally. In addition to having relatively high-rates of obesity-associated conditions in a global context, America also has a massive healthcare system and a very pharmaceutical-oriented health treatment culture (being one of two developed countries in the world where drug companies can advertise on television, radio, and other forms of mass media). The US seems to define healthcare improvements as the ability to apply pharmaceuticals and medical or surgical treatments to issues that were previously untreatable, or would be address through lifestyle changes (stress, restlessness, constipation, etc.) Americans who need to treat their obesity-associated conditions have an assortment of medical treatment options at hand, and lifestyle adjustments – including weight loss – are slow, time-consuming, and often far more strenuous than medical alternatives. Although a "diagnosis" of overweight is somewhat related to increased

probability of weight-loss attempts, perhaps other diagnoses that are not directly concerned with weight are not thought of as treatable through weight-loss.

A second supplementary explanation for why we do not see any significant association between having been diagnosed with an obesity-associated comorbid condition and weight-loss attempts at high BMI levels is that at such levels of BMI, exercise becomes either impossible or unbearably difficult when one combines the deleterious effects of extreme weight with a person's given medical condition. This, however, assumes that exercise is necessarily a part of all weight-loss attempts, when diet could indeed play an equal or even more important role. Additionally, it does not explain the lack of motivation to pursue weight-loss among the merely "overweight" who would might assume are less burdened by the combination of weight and morbidity than their very obese counterparts.

Whatever the explanation, the ultimate point derived from these results is that illness does not appear to inspire weight-loss, even when that illness has been repeatedly attributed to excess weight by clinicians and public health advocates alike. When we include self-perceived weight status and having been told that one is overweight by a clinician into our models, comorbidity becomes an insignificant predictor variable of weight-loss attempts, which leaves us with yet more confirmation that weight-loss attempts are more a product of how we see ourselves than what afflicts us in terms of discrete disease conditions.

Limitations and Conclusion

There are numerous limitations we should consider in this chapter, both conceptual and structural due to the nature of the NHANES. Specifically, we shall focus on social desirability bias in our outcome variable, the concept of weight-loss as health-related, and the limitation of weight-related treatment options in the Continuous NHANES.

Our outcome variable – attempting to have lost weight in the past year – has an unquestionable element of social desirability. The United States is a country where the majority of people are overweight, where fitness trends and fad diets are commonplace, and where physical attractiveness is used to sell almost every product and service imaginable. We are, in short, a people who suffer from excess weight and who are simultaneously reminded of how unpleasant fatness is. Despite the fact that, as a people, we have only seen increases in mean BMI and obesity rates in the past three decades, we still often like to project that we are trying to be healthier and slimmer. The movement against so-called "fat shaming" is in fact a reactionary movement borne of the opprobrium directed at fat people by the general population, including by overweight and obese people themselves (Saguy 2013:62-66). We ought to remember this when we interpret the effect size of any of our predictor variables on weight-loss attempts in this chapter; there are a number of people who will say that they have attempted to lose weight simply to give the answer that they feel they should give, regardless of whether or not they actually made an earnest attempt to lose weight.

From a conceptual viewpoint, we should also consider the use of weight-loss attempts as a proxy measure of engaging in something "healthy" or addressing an

obesity-associated comorbidity in a healthful manner. Although the vast majority of our respondents who report having been diagnosed with an obesity-associated comorbid condition are in fact overweight or obese, 18% are clinically normal. For these individuals it is clear that weight-loss is probably not a suitable approach to addressing their condition, but we should also be sensitive to the fact that even many overweight and obese individuals may have a somatic basis for their condition that is not at all related to their weight. An overweight person may be hypertensive; however this could be purely the result of genetics and sodium consumption – perhaps his weight has nothing to do with his illness. In these cases, our assumption that attempting to lose weight in response to also being ill with an obesity-associated comorbid condition presumes that weight-loss is always an appropriate response, which it clearly is not.

Concerning survey design, we should also recognize that until the 2011-2012 Continuous NHANES wave, the NHANES did not have many questions that asked respondents how they were adjusting their weight in light of their various medical conditions or their weight. From 1999 to 2010, the Continuous NHANES contained only the generic-sounding "Have you attempted to lose weight in the past year?" variable. However, starting in the 2011-2012 wave, the NHANES added three questions asking whether respondents attempted to simply lose weight, whether they increased the amount of exercise in their normal routine, or if they had begun reducing the amount of fat and/or calories that they consumed daily. These would certainly give us a deeper understanding of how individuals might have addressed their weight, although once we apply all our sample exclusions to our models, our sample size for 2011-2012 becomes very small, and therefore suffers serious significance issues, making analysis of 2011-2012 difficult.

However, future researchers may want to examine these three weight-related outcome variables in the 2011-2012 and 2013-2014 NHANES waves to see how they affect the result shown herein. As of the writing of this dissertation, the 2015-2016 NHANES is scheduled to continue asking these three questions as well, so we may be optimistic for their future applicability.

The two largest factors in predicting weight-loss attempts – at least according to our models based on this extensive span of NHANES data – are both forms of semi-subjective weight-status determination. Diagnosed disease categories with a clinical relationship with weight, however, appear to offer no predictive value concerning weight-loss. This might be unsettling to public health advocates and anti-obesity activists given the incredible amount of resources that have been poured into proliferating the idea that excess weight can lead to serious diseases, and therefore weight-control and weight-loss should be pursued by nearly everyone. These same groups may rejoice, however, in knowing that self-perceived weight status and being told that one is overweight by a clinician are indeed positively associated with trying to lose weight. Americans may not make the connection between their obesity-associated conditions and the need to lose weight, but how they interpret their weight appears to provide sufficient motivation to try and address their issues of corpulence.

In the next chapter, we will combine this interpretation with the analytical insights from our previous two chapters and discuss what we should make of the sum of our findings in this dissertation, and what to give as a response to our overarching question "do Americans think that being overweight is bad for them?"

CHAPTER 6

DISCUSSION AND CONCLUSION

Do Americans think that being overweight is bad for their health? The answer seems to be: when their status as overweight persons is externally reinforced and internally adopted, but even then, they appear to not believe this strongly enough to take direct action to reduce their weights.

We found that people with higher BMIs, as well as people who were told that they were overweight by a clinician, are more likely to report worse health than are people with lower BMIs. Self-perceived weight status, conversely, showed no significant relationship with SRH among our general sample. However, when we looked only at people who had been told that they are overweight by a clinician, we found that self-perceiving as overweight made one more likely to report lower SRH. In sum, "weight" has the strongest effects on SRH when one has a clinically high BMI, is told that he is overweight by a clinician, and accepts the label of overweight for himself.

In this "perfect storm," Americans may become more likely to report lower health. We found that while self-perceiving as overweight, having a higher clinical BMI, and having been told that one is overweight by a clinician are all associated with attempting to lose weight, being ill with an obesity-associated comorbid condition generally is not. "Heavier" Americans are more likely to try to lose weight than are "lighter" Americans, although the reason *why* seems to be fairly unrelated to health, since these obesity-associated comorbidities appear to have no effect in instilling the desire in the average American to reduce his weight.

How Did We Get Here?

It is my contention that two concurrent epidemiological phenomena explain the hesitancy of Americans to associate being overweight with poor health: the gradualness with which BMI has actually increased in the United States, and increasing life-expectancy rates and betterments in medicine that have greatly improved Americans' quality of life in the past half-century.

In the introduction to this dissertation, we read of Americans' BMI increases between the mid-1960s and the turn of the 21st century. This change is often portrayed as representing a dramatic spike in BMI: while only a tenth of all Americans were obese in the middle of the 20th century, today *nearly a quarter* of all Americans are obese. However, discussing obesity rates is a somewhat semantic endeavor; if one person's BMI increased from 29 to 30 while another person's BMI increased from 23 to 36, both would have "become obese" by clinical standards. When we speak in term of real BMI change, we see that during this same period, Americans' mean BMI increased by three BMI units, roughly equivalent to an annual increase of .08 BMI units. As a reference point, for a person standing 5' 10" tall, this would amount to an annual weight increase of roughly a half-pound – hardly a jarring "explosion" of weight gain.

Further, recalling Basu (2010), we know that in the US the right-tail of the BMI distribution has seen a sharper increase in BMI in recent decades than has the rest of the distribution, indicating that a disproportionate amount of BMI increase in this country rests with a minority of people who also happen to be very overweight in the first place. If one were to draw a line graph from the year 1500 to present based on reliable BMI data (which, of course, does not exist), he would probably see quite the marked increase in

BMI. However, for most Americans, the increase in mean BMI, even within discrete racial groups, has been very slow within their lifetimes. It thus seems unlikely that most people would notice a change of three BMI units over the course of the forty years when most Americans will see their own personal BMIs oscillate by at least three BMI units over the course of their adult lives.

This is all to say that changes in BMI among the American population may have been noticeable by many Americans (especially older ones), but for the American population at-large, there has been no striking escalation of weight gain that would instill any sense of panic or fear for its health. The way we look – the size that we are as a people – is profoundly normal to us. The fact that popular health news, public health agencies, and scientific journals did not pay much attention to this gradual change for a long time, only to enter a period of frenzied obsession in the early 2000s, does not negate this reality.

One may think that he is somewhat overweight, but if he sees himself as being unexceptional, and in fact very similar to most people around him, it seems reasonable that he would make no particular fuss about his weight concerning his health. Compounding this phenomenon is the matter of clinical and pharmaceutical health improvements that have been made over the past half-century that have not only increased life-expectancy in the US, but have arguably improved our individual sense of well-being in many instances.

Between the mid-1960s and the turn of the 21st century, life expectancy in the US has increased by roughly ten years (National Institute on Aging 2009). Breakthroughs in surgical procedures, vaccination, gene therapy, pharmacology, and allopathic medicine in

general have allowed Americans to temporarily escape – or at least lessen – the misery of diseases that have plagued our species for millennia. Even emergent diseases have been promptly addressed by modern medicine. AIDS, which promised an immediate and agonizing death only 25 years ago, is now managed by a single pill in many cases, with its victims living long, fairly healthy lives in the developed world. Most modern Americans can think of a disease that was once a curse when they were children, but has since been relegated to a manageable condition by medical breakthroughs and the genius of our medical practitioners and researchers. Americans have, in short, truly "witnessed" improvements in health on a massive scale.

This is in stark contrast to changes in their collective BMIs. Americans have seen very gradual increases in BMI occurring concurrently with remarkable increases in life-expectancy and medical beneficence. Withstanding the proclaimed association between overweight/obesity and poor health, Americans have seen themselves become fatter and healthier for decades. Indeed, Flegal et al. (2013) find that BMI is only associated with higher levels of all-cause mortality after one passes 35 in BMI. Being simply overweight or even non-morbidly obese has not generally been shown to cause premature death, and although Americans may not be aware of this epidemiological evidence, their perceptions of the world around them has put them largely in line with more scientific findings concerning weight's effect on overall health (or at least its effect on living).

There is, however, an important point to consider when we look at our results and begin to conclude that public health officials' efforts to convince Americans that being overweight is bad for their health has largely stalled. We know that Americans have become (between 1999 and 2012 at least) less likely to perceive themselves as

overweight despite no actual decrease in mean BMI. We also know that BMI's effects and self-perceived weight status' effects on SRH did not change during our survey timeframe. It is therefore possible, if not probable, that public health efforts have in fact been successful in hampering the movement towards lower associations between weight and SRH. In other words, we might expect that as Americans become less likely to see themselves as overweight – as they become "used to" heavier bodies – they might become less likely to think that being overweight is bad for their health. This has not been the case, and perhaps public health officials have been successful in maintaining currently levels of association between weight and health despite a tide working against them. This would be a quiet victory for the anti-obesity branch of the public health sector that may be unappreciated in prima facie analysis of our data.

Sociological Implications

The insistence by public health advocates that excess weight is intrinsically unhealthy may be somewhat undermined by trends in weight and overall health and mortality in the United States, but the concern over weight and its effects on one's well-being appear to manifest somewhat strongly once a person is told that he is overweight by a clinical medical professional (usually a physician) *and* accepts an identity of "overweight" himself. This phenomenon is profoundly sociological in nature, relying on deferral to authority and the management of identity as a means of determining one's physiological (and perhaps even mental) health.

The fact that clinicians can affect not only SRH, but also self-perceived weight status reinforces the notion that even when handling the most intimate of our

deliberations, we rely on professionals to tell us how we should see ourselves. Paul Starr (1982) famously writes that physicians not only have a hierarchical, direct power over staff and patients, but also a "cultural authority" that largely dictates how others construct their reality. Since the common person does not (supposedly) have the same access to the same highly specialized knowledge as does the professional, he must inform his decision-making based on the input of that professional. In our case, we find that Americans are more likely to align with public health notions about the deleteriousness of weight once a clinician has formally affixed the patient with a label (i.e. "overweight") that the patient knows *should* be interpreted as a sign of diminished health.

More, the acceptance of a specifically overweight identity also contributes to lower SRH, but only when the patient has also been told that he is overweight by a clinician. We are familiar with Rosenberg's (2002) position that the act of diagnosis is a powerful motivator in forming the way people feel about themselves, but also in positioning that patient within a broader medical system and bureaucracy. Yet it is important to remember Parson's (1975) concept of the "sick role" and how the patient tends to identify with his illness for myriad social reasons, but also in part because of the trust and authority placed in the physician. In our findings, it seems as though the two can hardly be separated when examining determinants of lower SRH. SRH becomes "worse" when the word of a clinician reinforces one's self-perception as an overweight person, or perhaps when the word of a clinician upsets a person's previously held view of himself, causing him to suddenly "know" that he is an overweight person. The power of Rosenberg's notion of the tyranny of diagnosis along with Starr's insistence on the

authority of the physician and the Parsonian sick role form the theoretical framework for understanding our results.

So, what, precisely, are the sociological implications of these findings and the suggested theoretical undergirding supporting them? Before all else, I argue that we see in these analyses that the relationship between weight and health in the United States is more about negotiating identity and less about somatic effects of weight. Physical health is so often thought to reside completely within the realm of the physical (with perhaps the exception of psychosomatic effects) that we could be forgiven for assuming that the relationship between weight (which is often seen as a physical state of being) and health would likewise be reduceable to the physical. Yet as we see, it is the construction of our identities through self-realization and confrontation from others that serves as the bridge between weight and SRH.

Policy Implications for Anti-Obesity Programs

If a "struggle" against obesity and overweight is a goal worth pursuing, then those invested in this mission ought to turn more fully toward sociological understandings of weight, identity, and health rather than depending too heavily on epidemiology and clinical studies. One of the stated goals of this dissertation was to determine if public health advocates' insistence that being overweight is dangerous for one's health resonated with the general population – if the sudden and intense fixation on the "obesity epidemic" had fertile ground in the American population. Our results indicate that this message appears to be slightly "going over the heads" of many Americans.

Firstly, the "fat is dangerous" method is likely completely bypassing millions of people who are clinically overweight, but who do not self-perceive as overweight. This circumvention does not appear to be something that will be resolved by current public health advocacy strategies, since self-perceived weight status is so strongly determined by race, sex, and experiential factors. If the public health industry wants to raise awareness about the potentially deleterious effects of excess weight, it must begin by raising awareness about exactly what qualifies as overweight and obese, and it must do this by taking the standards and expectation of various populations into consideration. For example, while Americans in general tend to scale themselves "down" in terms of self-perceived weight status (i.e. assign a lower weight status to themselves than fits their clinical BMI), this phenomenon is particularly strong amongst men and Blacks. Although clinical guidelines make no distinction between races and have removed sex differences in defining the terms "overweight" and "obese," public health advocates should consider that more effort will need to be put into dispelling ideas about largeness as inherently "manly" and that Black Americans are just naturally heavier than Whites and Asians.

Our results from Chapter 4 also indicate that the authority and deference given to physicians and other clinical practitioners needs to be capitalized upon, and physicians must be thoroughly integrated into any public health effort to reduce overweight and obesity rates through consciousness-raising. Not only does being told that one is overweight by a clinician strongly affect how Americans view their own weight statuses, it is also associated with lower SRH. Yet we found in our basic bivariate analysis in Chapter 3 that 72% of clinically overweight Americans and 25% of clinically obese Americans do not report having been told that they were overweight by a clinician, even

though they had seen a doctor in the past year. There is thus a clear opportunity for clinicians to become more involved in the anti-obesity movement by more directly confronting their patients on issues of weight. It is beyond the scope of this dissertation to try an estimate how much effort the public health industry is putting into encouraging clinicians to discuss weight with their patients and how much influence anti-obesity advocates have over clinicians, but if our findings tell us anything, it is that there is serious room for improvement.

Lastly, when looking at our conclusions in sum, we see that while being overweight is a strong predictor of attempting to lose weight (see Chapter 5), it is not a strong predictor of lower SRH. We could hypothesize from these findings that Americans are motivated to lose weight for reasons unrelated to health – a possibility that is buttressed by our lack of significant associations between obesity-associated comorbid conditions and attempting to lose weight. It is no particularly striking revelation that perhaps Americans who self-identify as overweight try to lose weight in order to conform to social standards of body-appropriateness, to be more attractive to other people, or for any number of reasons having little to do with health, however in the context of our other findings this may be important for public health officials to consider. We are not suggesting that public health advocates or clinicians resort to warning Americans that they risk being unattractive or saddling them with the stigmas that society already places on fat people; rather, public health advocates and clinicians could capitalize on Americans' desires to lose weight for basal, superficial reasons and funnel these individuals into the types of dietary and health-related programs that have been proposed by the public health industry in the struggle against obesity.

Whether through PSAs, clinical warnings, or scientific literature, Americans have been warned that being overweight is bad for their health, and therefore they should take steps to remain a normal weight or lose weight if they are overweight. There may be no need for the first part of that argument. Americans are under enough social pressure to avoid being overweight (which partly explains the enormity of the fad diet and fad exercise industries in the US), and therefore they may not need convincing. Rather, Americans need better instruction in understanding how overweight and obesity are defined through public health and clinical initiatives (in order to increase self-perception of overweight among the overweight and obese) as well as proper guidance in attaining their weight loss desires. Whatever the merits of wanting to lose weight for non-health reasons, this desire poses an opportunity for public health advocates to direct Americans into health-based weight-loss programs and veer them away from pseudo-scientific, potentially unhealthy "crash" diets and unrealistic exercise trends.

Recommendations and Future Research

This dissertation begins with a major assumption: that the goals of the anti-obesity movement, which is largely contained within the public health field, are worthwhile. From there, this study becomes very evaluative: we want to understand if the "fat is unhealthy" message being advanced by this movement resonates with most Americans, and we try to approximate this by determining whether people believe that being overweight is detrimental to their health. Ultimately, we uncover a complicated story. Both clinical and self-perceived weight status have minor effects on SRH at times, yet being told that one is overweight by a clinician is always associated with lower SRH, and

is also a strong predictor of self-perceiving as overweight and of trying to lose weight. Despite the fact that people who think they are overweight are more likely to try and lose weight than those who do not see themselves as overweight, they appear to pursue this end for non-health reasons. Therefore, when we ask the question "do you think that being overweight is bad for your health?" we see that weight is not always a great predictor of SRH, but nonetheless is associated with weight-loss behavior. So, are public health anti-obesity efforts working? Probably not very well, but it might not matter since overweight Americans try to lose weight even if they do not believe that their weight is negatively affecting their health.

Let us consider two sets of recommendations that can be made based on these findings: one set for public health advocates and one for sociologists interested in weight in America.

Public Health Recommendations

Mean BMI and obesity rates began to increase in the United States during a time of unprecedented national prosperity, availability of highly caloric foods at a low price, and fundamental transformation of American labor from agricultural and manual to clerical and servile. The rise of the "obesity epidemic" is therefore almost definitely a product of structural change. Public health advocates could continue to focus on individual choices as the main vector of weight gain in America, however this seems like a perpetually fruitless endeavor.

Further, as epidemiological evidence continues to prove that weight only becomes truly problematic at a population level at the "obese" threshold, not at the "overweight"

threshold, public health advocates ought to avoid making blanket statements about the immediate and terrifying dangers of being fat lest American witness even more discordance between public health statements and lived experiences.

Overweight Americans do not need to match the level of hysteria over weight exhibited by many in the public health sector to be motivated to lose weight. Advertisements, television shows, and movies filled with lean muscle-men, thin and busty women, and generally few fat people not inserted as comedic relief provide all the motivation we as a people need to lose weight. This is probably a bad thing, yet it is our present reality. Further, insisting that Americans recognize the dangers of weight appears to be a battle that will be hard-fought and tedious for a long time to come. Instead, public health advocates could likely better use their time crafting way to funnel the American people's constant desire to lose weight into more healthful channels that have as their primary aim the improvement of health rather than simply losing weight at any expense.

In sum, based on these findings and the body of research upon which this dissertation was built, public health advocates ought to consider:

- Focusing more on structural change, such as tax policy around unhealthy foods, laws mandating physical activity among children, private-sector programs that encourage employee health, and government support for subsidies that promote fitness and well-being for all Americans.
- Encouraging clinicians to be more engaged with their patients in matters of weight, since the word of a clinician is one of the consistently impactful determinants of self-perceived weight status, SRH, and attempting to lose weight.

- Capitalizing on Americans' desires to lose weight for non-health reasons, and providing support for programs that recognize those superficial reasons as legitimate, but provide a healthful framework in which to lose weight.

Sociological Recommendations

Whether Americans believe that being overweight is bad for them is a question that can only be understood through a sociological lens. First, there is no way to define "overweight" in any meaningful sense without considering the effects of social characteristics such as race, sex, and even one's lived experience (i.e. one's interactions with physicians). Additionally, the idea of what it means to be "healthy" is extremely relative and subjective, varying by important socio-demographic factors. Lastly, our determination of our own health statuses is a process of internal identity construction as well as external social influence, in this case from physicians and other clinical medical professionals.

The sociology of weight has thus far usually been divided into two main areas: the study of epidemiological data and the study of stigma management. How race, sex, immigration status, and many other demographic factors contribute to conceptions of weight and health has been explored by a number of sociologists to this point, however very few have attempted to make the connection between the broader anti-obesity public health movement of the late 1990s and early 2000s and the individual perception of one's own health relative to his weight. This dissertation has been one of only a few attempts to tie macro-level social-change initiatives to the extremely individual and personal, and how shown some promising trajectories for further research. If current patterns continue,

the United States may enter a new phase in its weight history, where mean BMIs and obesity rates begin to stabilize and life expectancy either remains the same or rises. This would signal a "new normal" of what a post-industrial, post-technological revolution society might look like in term of weight and health. Public health advocates would be left with two choices: to continue their campaigns that began at the height of mass panic over the looming obesity epidemic, or change approaches and either relax their focus on obesity or maintain it, but with a revised approach. Either way, the concepts set forth in this dissertation will need to be tested again in the future while incorporating new variables and new theoretical approaches.

Sociological researchers interested in continuing the work done in the course of this dissertation should considering the following ancillary research trajectories and possibilities for follow-up studies in the coming years:

- Other approximations of "general health" could be used as outcome variables, such as the NHANES question that asks about number of days that the respondent felt physically bad, or days during which he was depressed.
- Diet composition (e.g. how many servings of vegetables one eats per week) could be included as a predictor variable. Perhaps the way we eat affects our health when controlling for weight and weight status (e.g. perhaps people who eat more healthfully report better SRH than those who do not even when controlling for BMI and our measures of weight status).
- It would be interesting to see if any of these findings could be replicated using a state-based survey such as the BRFSS to determine if state-level anti-obesity

campaigns have any discernable effects on the relationship between weight/weight-status and SRH.

- Continuous NHANES waves from 2011-2012 onward contain all of the variables used in this dissertation with the addition of three new weight-loss related variables that can provide more detail in understanding *how* people tried to lose weight.
- As of the publishing of this dissertation, 2013-2014 NHANES data has been made available to the public, and 2015-2016 is in the process of being uploaded by the NCHS. As sample sizes increase, perhaps researchers will find that some of our insignificant findings herein become significant. Researchers may also be able to explore smaller groups such as Asians who likely possess characteristics related to weight and health that are quite different from those possessed by Blacks and Whites.

Conclusion

Americans do not make a clear association between their weights and their SRH, and so it appears that the anti-obesity public health advocates still have a significant amount of work ahead of them in convincing the population that being overweight is truly harmful to their health. Better customization of this message to discrete racial and gender groups, increased involvement of physicians in the weight control process, and increased focus on structural change rather than personal habit may lead to greater alignment between the opinion of the public health industry and the populace at large, although there is no guarantee that the positive association between population BMI and

life-expectancy will not continue to undermine this message. Nonetheless, unless the public health industry wants to experiment with using shame, increased social stigma, and non-health rationale in their warnings over weight's problematic nature (which they should not, and almost certainly would never do), the suggestions based on the research conducted herein might be some if its most promising opportunities.

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APPENDIX A

ANALYSIS OF DOCTOR-VISIT SAMPLE RESTRICTION

	Have you seen a physician in the past 12 months?	
	No	Yes
Self-Reported Health		
Lower	39.6%	52.6%
Higher	60.4%	47.4%
chi-square	82.55 (p=.000)	
How Do You Consider Your Weight?		
About Right	45.4%	34.5%
Overweight	54.6%	65.5%
chi-square	62.54 (p=.000)	
Has a Clinician Ever Told You that You Were Overweight?		
No	75.2%	58.1%
Yes	24.8%	41.9%
chi-square	147.30 (p=.000)	
Presence of Any Obesity-Associated Condition?		
No	66.7%	40.0%
Yes	33.3%	60.0%
chi-square	358.82 (p=.000)	
Have You Tried to Lose Weight in the Past 12 Months?		
No	68.2%	59.7%
Yes	31.8%	43.3%
chi-square	58.07 (p=.000)	
Race		
White	69.7%	66.9%
Black	30.3%	33.1%
chi-square	4.21 (p=.040)	
Sex		
Male	66.7%	45.8%
Female	33.3%	54.2%
chi-square	212.76 (p=.000)	
Mean Age	43	48
t	-13.08 (p=.000)	
Mean BMI	29.11	30.08
t	-4.79 (p=.000)	
N	1363	11,114

APPENDIX B

SURVEY WAVE EFFECT ON SELF-PERCEIVED WEIGHT STATUS

DV: Self-Perceives as Overweight	M.E.	S.E.	z	p	CI-low	CI-high
BMI at						
1999-2000	0.05*	0.00	18.32	0.000	0.05	0.06
2001-2002	0.05*	0.00	23.16	0.000	0.05	0.06
2003-2004	0.05*	0.00	17.51	0.000	0.04	0.05
2005-2006	0.05*	0.00	21.65	0.000	0.05	0.06
2007-2008	0.04*	0.00	16.79	0.000	0.04	0.05
2009-2010	0.05*	0.00	21.70	0.000	0.05	0.06
2011-2012	0.05*	0.00	22.50	0.000	0.05	0.06
Black at						
1999-2000	-0.17*	0.03	-5.79	0.000	-0.22	-0.11
2001-2002	-0.15*	0.02	-6.57	0.000	-0.20	-0.11
2003-2004	-0.15*	0.02	-6.46	0.000	-0.20	-0.11
2005-2006	-0.15*	0.02	-6.99	0.000	-0.20	-0.11
2007-2008	-0.10*	0.02	-4.47	0.000	-0.14	-0.05
2009-2010	-0.19*	0.02	-8.31	0.000	-0.23	-0.14
2011-2012	-0.14*	0.02	-7.69	0.000	-0.17	-0.10
Female at						
1999-2000	0.18*	0.02	8.23	0.000	0.14	0.22
2001-2002	0.19*	0.02	10.95	0.000	0.15	0.22
2003-2004	0.19*	0.02	9.15	0.000	0.15	0.23
2005-2006	0.18*	0.02	9.30	0.000	0.14	0.21
2007-2008	0.15*	0.02	7.53	0.000	0.11	0.20
2009-2010	0.18*	0.02	9.64	0.000	0.14	0.21
2011-2012	0.16*	0.02	7.96	0.000	0.12	0.20
Age at						
1999-2000	0.00	0.00	-0.20	0.838	0.00	0.00
2001-2002	0.00	0.00	-0.69	0.489	0.00	0.00
2003-2004	0.00	0.00	2.03	0.042	0.00	0.00
2005-2006	0.00	0.00	-0.18	0.860	0.00	0.00
2007-2008	0.00*	0.00	2.33	0.020	0.00	0.00
2009-2010	0.00	0.00	1.74	0.081	0.00	0.00
2011-2012	0.00*	0.00	2.91	0.004	0.00	0.00
Told Overweight by Clinician at						
1999-2000	0.05	0.03	1.60	0.109	-0.01	0.12
2001-2002	0.10*	0.03	3.32	0.001	0.04	0.15
2003-2004	0.09*	0.03	2.69	0.007	0.02	0.15
2005-2006	0.11*	0.03	3.78	0.000	0.05	0.16
2007-2008	0.17*	0.03	5.50	0.000	0.11	0.23
2009-2010	0.12*	0.03	4.33	0.000	0.06	0.17
2011-2012	0.11*	0.03	3.47	0.001	0.05	0.17
N=11,114 *p<.05						