Provisional chapter

Lay Theories of Obesity: Causes and Consequences

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Additional information is available at the end of the chapter

Abstract

Both the scientific community and the general public have come to recognize the increasing prevalence of obesity as a significant public health crisis. To help address this issue, recent research has begun to explore *lay theories* of obesity—the mental models that structure how non-experts think about the causes and consequences of the condition. In this chapter, we develop an integrative review of the literature on lay theories of obesity, drawing on research in public health, communications, and psychology to illuminate the factors that shape beliefs and attitudes toward the condition, as well as the consequences of specific lay theories for cognition and behavior. At the individual level, we discuss how certain ways of thinking about obesity facilitate obesity treatment and prevention. At the societal level, we discuss how certain ways of thinking about obesity lead people to support (and oppose) specific types of obesity-related policy interventions. We pay special attention to the role of narrative framing and individual demographics in the etiology of lay beliefs and explore how particular psychological mechanisms (e.g., empathy) can affect attributions and attitudes.

Keywords: obesity, framing, narrative, communication, lay theories, causal attribution

1. Introduction

It is now common knowledge that obesity is unhealthy and poses a significant risk to millions of adults and children worldwide [1]. Being overweight predisposes people to a variety of serious medical conditions [2, 3] and is associated with a lower quality of life and expected life span [4–6]. But despite widespread appreciation of the dangers of being extremely overweight, incidence rates have been steadily climbing for years, resulting in what many doctors and public health officials view as an urgent public health crisis [2, 3]. In the past 50 years, obesity rates have risen rapidly all over the world, at all levels of age, race, and sex [7].

As our scientific understanding of the causes and consequences of obesity grows, it is especially important to track how the general public thinks about the condition. People have "lay theories" [8] about the causes and consequences of obesity that can differ markedly from the comparatively complex and nuanced scientific perspectives on obesity that have developed in recent years. For example, although public health officials have identified a range of complex social, physiological, and psychological factors that contribute to being obese [9], many people still think that individuals alone are responsible for maintaining a healthy weight [10, 11] (but see [12]). Such a disconnect represents an important obstacle for policy makers who seek to design and implement interventions that would address causes of obesity outside a person's control—since many people deny that obesity results from anything other than poor lifestyle decisions made at the individual level. In a democracy, public perceptions can be just as important for addressing complex issues as scientific theories and breakthroughs, since policy interventions are more likely to be accepted when they are consistent with the general public's understanding of an issue such as obesity [13, 14].

By investigating lay theories of obesity, therefore, researchers may gain a better understanding of why obesity rates are on the rise while at the same time they may be able to identify effective ways to address this public health crisis [15–17]. For example, it is important to know whether people think that self-regulatory behaviors such as diet and exercise can help maintain a healthy weight or whether people think that their weight is primarily determined by factors outside of their control. Several recent, but controversial, scientific studies have questioned the efficacy of diet and exercise for the prevention and treatment of obesity [18, 19]. This work has received substantial attention in the popular press, which is often distilled to pithy headlines such as, "Why you can't lose weight on a diet" [20]. How do people interpret these claims in light of what they know about obesity—and what do people know about obesity in the first place? Can messaging strategies be developed to promote support for the kinds of interventions that public health officials have argued will provide better treatments for obesity and reduce the prevalence of an issue that poses significant costs to individuals and society?

In this chapter, we develop an integrative review of the literature on lay theories of obesity, drawing on research in public health, communications, and psychology to illuminate the factors that shape beliefs and attitudes toward the condition, as well as the consequences of specific lay theories for cognition and behavior. We pay special attention to the role of narrative framing and individual demographics in the etiology of lay beliefs, and explore how particular psychological mechanisms (e.g., empathy) can affect how people think and reason about obesity.

2. Trait theories

People often think about obesity in the same way they think about other physical or psychological traits: as a basic attribute that individuals possess to varying degrees. Dweck et al. [21, 22] have identified two opposing lay theories that characterize how people think and reason about a variety of traits, which are distinguished by the degree to which the trait is viewed as

malleable [21, 22]. People who hold an "entity theory" of intelligence (also known as "fixed mindset"), for example, think about the intellect as something hard-wired and stable, while those who hold an "incremental theory" (also known as a "growth mindset") believe their intellectual abilities can grow through effort and hard work. Holding one of these theories is associated with a great deal of downstream behavior and cognition. For instance, incremental theorists are more committed to their learning goals and are more persistent in the face of adversity than people who think their intellectual abilities are fixed.

A recent study of dieters [23] found that people who hold incremental theories of obesity adopt qualitatively different strategies for losing weight compared to those who hold an entity theory of obesity. Consistent with prior research, incremental theorists were much more open to changing their lifestyle—to embrace a new diet, implement a novel exercise routine, or attend group meetings—in the service of achieving their weight-loss goal.

3. Causal theories

Another class of lay theories considers the causal origins of obesity, which may or may not have implications for beliefs about malleability. Research suggests that people often rely on narrative structures that include extended metaphors and analogies to think about complex issues like obesity [17, 24–27], and one recent study identified seven common narratives for obesity that capture different causal beliefs about the condition (see **Table 1**; [10]). Importantly, these narratives are also associated with different ways of thinking about how to address the problem of obesity—both at an individual and at a societal level [10, 16, 17].

A critical dimension that differentiates these lay causal theories is the degree to which they attribute personal responsibility or blame to obese individuals for being overweight. At one extreme is the view that individuals are entirely responsible for maintaining a healthy weight —the idea that addiction is a "sinful behavior." At the other extreme are views that suggest obesity is entirely the result of factors outside a person's control, such as a "toxic food environment" or "industry manipulation."

The idea that obesity is the result of "sinful behavior" evokes the biblical ban on sloth and gluttony [28] and places responsibility for maintaining a healthy weight squarely on the everyday decisions that individuals make about diet and exercise. Psychiatrist and media personality Keith Ablow embodies this perspective when he explains that obesity "is largely caused by poor decisions—like binging on food or eating lots of candy, ice cream or Cheetos" ([29], p. 1). On this view, rising rates of obesity are the result of more people making worse decisions about their health; addressing obesity, within this framework, is a challenge for individuals to eat healthier and exercise more.

Barry et al. [10] found that more than half of the participants in their survey of over 1000 people thought that "sinful behavior" was an important cause of obesity. Participants who endorsed this view tended to oppose policy interventions that public health officials argue would have a large impact on obesity [30]: by, for example, requiring restaurants and food producers to list nutritional information on menus and food packaging, to increase the availability of

healthy food and opportunities for exercise, and to broaden the reach of laws designed to protect people with disabilities.

Narrative	Theme	Important explanation
Sinful behavior	People are unwilling to work hard to control their impulses. People who are overweight are not even trying to get healthier	50.5%
Addiction	People get hooked on certain things and just cannot quit. When people get hooked on sugary, fatty foods, some cannot keep themselves from eating more and more	71.2%
Time crunch	Work has gotten in the way of important things. Obesity is a symptom of a society that emphasizes work at the expense of well-being	58.0%
Eating disorder	Society sends the wrong messages about what it means to be attractive which leads people to go on fad diets that make them fatter	65.2%
Disability	We blame the victim for things they cannot control. People who are overweight are treated badly even though their weight problems come from their parents	51.3%
Industry manipulation	Commercial interests dictate our choices and values. Advertising distorts how we value food. We used to eat to live, now we live to eat	54.1%
Toxic food environment	We are surrounded by choices that cheap but not good for us. Healthy foods are lost in a sea of unhealthy alternatives	77.5%

Participants identified which ones they thought provided an "important explanation" for why Americans are overweight. The narratives are ordered in terms of how much blame they ascribe to the individual: from highest to lowest.

Table 1. Seven narratives identified by Barry et al. [10] for explaining the obesity epidemic.

In a follow-up study, Thibodeau et al. [17] found that certain demographic characteristics of individuals are associated with thinking that being obese is blameworthy (i.e., to endorse the view that obesity is the result of "sinful behavior"; see [31] to get a sense for how these associations have and have not changed in the past few decades). Specifically, males, conservatives, and people who had a lower body mass index (BMI) or who had not personally suffered from an eating disorder were more likely to endorse the view that obesity is caused by poor decisions about diet and exercise (see also [32, 33], for related evidence that individuals with and without eating disorders have differing views of these conditions). This study replicated Barry et al.'s correlational finding [10]—showing that people who think obesity is blameworthy oppose societal-level interventions designed to prevent people from becoming overweight. In addition, Thibodeau et al. [17] found that these participants were more likely to support policy interventions that would increase individual accountability for maintaining a healthy weight (e.g., policies that would allow health insurers to charge higher premiums to people who are overweight). These results are illustrated in **Figure 1**.

Thibodeau et al. [17] also conducted an experiment to test whether reading a narrative about obesity could causally influence people's beliefs about the condition as well as their support

for public policy interventions. Some participants read a narrative that emphasized personal accountability (using a variant of the "sinful behavior" account), while others read a narrative that highlighted factors outside a person's control (combining elements of the "industry manipulation" and "toxic food environment" themes) before being asked about their support for a variety of obesity-related public policies. The results suggested that describing obesity as blameworthy (sinful behavior) decreased support for protective policy interventions (i.e., interventions that would emphasize education, regulation of food-related advertising and manufacturing, and increase legal protections for obese individuals) and increased support for punitive actions (e.g., by allowing health insurers to charge higher premiums to obese individuals). On the other hand, people who were exposed to a narrative that deemphasized individual blameworthiness were less likely to support punitive actions. However, they were no more likely to support societal-level policy interventions. Instead, support for societal-level policy interventions was most strongly predicted by participants' political ideology: left-leaning, politically liberal participants tended to support societal-level policy interventions more than right-leaning, politically conservative individuals.

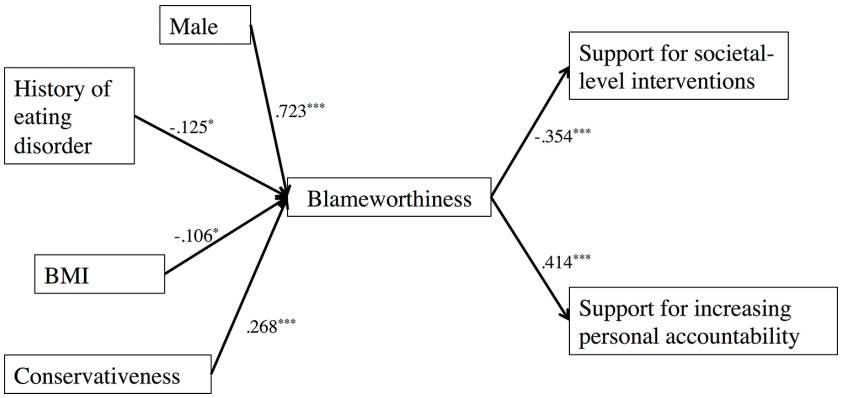

Figure 1. Relationships between demographic characteristics, beliefs about the blameworthiness of obesity (as measured by participants' agreement with narratives for obesity that varied in how they attributed blame for being overweight), and support for different types of interventions designed to address rising rates of obesity found in a study by Thibodeau et al. [17]. Values reflect path coefficients in a structural equation model (*$p < 0.05$, ***$p < 0.001$).

Together, this work suggests that there are several common narratives about the underlying causes of obesity and that these narratives provide a foundation for thinking about different ways of addressing the complex health issue. Specifically, the view that obesity is caused by a lack of personal motivation represents one common lay theory about obesity. The defining characteristic of this view is that it blames obese individuals for being overweight. This blame creates a stigma against obesity and represents a major obstacle to societal-level policy interventions that seek to address causes of obesity that are outside of a person's control (e.g., corporate manipulation and the availability of healthy food). Interestingly, this view can be further broken down into whether people believe it is a lack of exercise or an unhealthy diet that is the central causal factor in obesity, with predictable consequences for behavior: people

who believe that lack of exercise plays a larger role in obesity than diet are more likely to consume more food and be overweight [11].

At the other end of the extreme, there are a variety of lay theories about the causes of obesity that blame factors outside of a person's control by highlighting a "toxic food environment" or "corporate manipulation" as culprits in the obesity crisis. Many participants in Barry et al.'s study [10] endorsed these narratives as capturing important causes of the obesity epidemic, and this judgment was correlated with support for more protective policy interventions. However, an experiment designed to test whether reading such narratives would increase support for the protective policy interventions failed to find support for a critical prediction: people who read a narrative that minimized the blame attributed to obese individuals for being overweight were no more likely to support societal-level policy interventions that would address causes of obesity outside a person's control [17]. Below, we discuss a popular alternative causal model of obesity—that it is a "disease"—which may be better suited to eliciting such support.

4. Disease theories

In recent years, doctors and public health officials have sought to reduce the stigma of obesity and increase support for obesity-related research and policy interventions by officially classifying obesity as a "disease" [34–36]. Like narratives that highlight the role of environmental factors in obesity (e.g., "toxic food environment," "corporate manipulation"), describing obesity as a "disease" seems to reduce the personal responsibility associated with the condition. However, rather than appealing to external factors—the social and physical environments in which people live—thinking of obesity as a "disease" makes the condition less blameworthy by appealing to underlying physiological factors as the primary causes of weight gain [36].

Recent research suggests that this biomedical view of obesity has gone from a minority viewpoint just three decades ago to perhaps *the* dominant perspective today [37] (but see [11]). This shift represents an important achievement for public health communications. At a high level, the increased public recognition of obesity as a "disease" in recent years suggests that the way health officials talk about obesity has significant downstream effects on how the general public thinks about the condition. At a more practical level, one of the specific goals of the messaging campaign seems to have been achieved, as a majority of the US population recently reported that thinking of obesity as a disease would facilitate treatment of the condition [37].

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However, researchers have also identified drawbacks to the disease model of obesity. The belief that weight is somewhat fixed by biological factors may negatively impact dieting goals and exercise intentions, especially among people who are overweight [15, 38]. In other words, reducing the blameworthiness of being obese is a double-edged sword: it not only mitigates the stigma associated with being overweight but also fosters an entity theory of obesity, reducing an important source of motivation for maintaining healthy habits that can help people

lose weight (or gain it in the first place). In one study, for example, overweight participants who read a *New York Times* article describing obesity as a disease displayed lower body-image dissatisfaction compared to those who read an article arguing against the disease construal, but they also expressed less concern for healthy dieting and were more like to make unhealthy food choices when given the chance [15].

There are, certainly, many different types of diseases, and thinking about obesity in terms of one particular type of disease or another may have unique consequences for reasoning and behavior. For instance, conceptualizing obesity as a genetic disorder (i.e., caused by an underlying genetic predisposition) seems to be especially associated with the belief that people have no control over their weight [38]. In comparison to those who read a report that provided a psychosocial explanation for obesity, one study found that people exposed to a genetic explanation for the condition ate more cookies in a follow-up task [38]. On the other hand, conceptualizing obesity as a form of addiction disorder seems to have more inconsistent effects on eating behavior. One experiment revealed that while reading a message stating that food addiction is "real" (as opposed to a "myth") *does* lead people to be more likely to self-identify as a "food addict," these individuals did not consume a greater quantity of indulgent food in a subsequent "taste-test" task (though they did eat a wider variety of items [39]). However, another study found that participants who were told they had high food addiction tendencies (as opposed to low food addiction tendencies) consumed *fewer* calories in a follow-up taste test, a result which was mediated by increased concern for their diet [40].

Taken together, these findings help reveal the nuances underlying the "disease" model of obesity, and the complex, sometimes negative, consequences of messaging campaigns that tap into this way of framing the issue. Recent research suggests that some of the limitations associated with standard messaging strategies may be addressed by exposing people to personal testimonials that describe successful weight loss (rather than basic causal explanations [41, 42]). We discuss this work in the following section, which also hints at a psychological mechanism—empathy—that can be leveraged to increase support for societal-level obesity policy interventions.

5. The role of personal narratives

So far, we have discussed the nature and consequences of several prominent lay theories of obesity. For years, the dominant way of thinking about obesity was that it resulted from poor lifestyle decisions—that it was the result of "sinful behavior." This model represents a challenge to public health officials because it fails to recognize the causes of obesity that are outside a person's control. Alternative lay theories—that highlight "environmental" contributions to obesity or appeal to a person's underlying physiology by classifying the condition as a "disease"—seem to reduce the stigma associated with obesity. However, there are important drawbacks to both. Namely, simply highlighting environmental contributions to obesity does not seem to increase support for important interventions that would reduce the prevalence of obesity (although evidence suggests that reading about the negative conse-

quences of childhood obesity might; see [43]), and simply describing obesity as a disease can make weight gain feel inevitable and weight loss feel impossible.

Recent research suggests that reading personal testimonials about successful weight loss may help people construct a more positive mental model of obesity [41, 43–46]. Stories about individuals struggling (and succeeding or failing) to lose weight are ubiquitous, engaging, and provide a structured framework for thinking about the causes of and solutions to obesity [16, 17, 47]. Consider, for example, the popular reality television program "The Biggest Loser," in which morbidly obese contestants compete, through hard work and dedication, to lose the most weight over the course of the season. Although the show has been criticized for a variety of reasons—for promoting an unhealthy and unrealistic approach to weight loss [48] and because contestants have been found to regain lost weight after the show ends [18]—there is some evidence that it increases viewers' sense that they have control over their weight [49]. This suggests that exposing people to personal testimonials in which a protagonist succeeds at achieving a weight-loss goal—through healthy and realistic diet and exercise—may foster an incremental theory of the condition, making them more optimistic about obesity treatment in general [50].

In other words, it may be more effective to adopt a "bottom-up," rather than "top-down," approach to changing the way people think about obesity. Describing the underlying causes and consequences of obesity at a high level—by classifying the condition as the product of one's "environment" or the result of an underlying "disease"—represents a "top-down" strategy: seeking to change the stigma associated with obesity and increase support for public policy interventions by situating the condition in a particular causal framework (e.g., [51–53]). The drawback of this approach, as noted in the previous section, is that the candidate causal structures seem to encourage some inferences that are at odds with the goals of public health officials.

An alternative "bottom-up" approach would describe specific instances of people successfully losing weight, which could provide the foundation for people to induce the "right" lay theory of obesity: one that acknowledges causes of obesity that are within *and* outside a person's control, which motivates individuals to maintain a healthy lifestyle *and* promotes support for interventions that would address the social and environmental context that has given rise to the current public health crisis.

One specific feature of personal testimonials is that they provide the reader an opportunity to feel empathy for an individual struggling to lose weight [54]. In this context, empathy reflects the process of identifying with someone else's struggle with obesity—taking their perspective and sympathizing with their condition [55]. A natural byproduct of such a feeling is an increased awareness of factors that cause obesity that are outside a person's control [41, 42, 56]. Thus, exposing people to personal narratives that describe successful weight loss may be particularly effective tools for public health officials. Such testimonials may lead people to support policy interventions that would address the social and environmental contexts that have given rise to obesity without completely mitigating the sense of personal responsibility that is needed to maintain healthy habits.

A recent series of studies have tested and found support for this possibility [41, 42]. In one experiment, participants read a personal narrative about a protagonist who had successfully lost weight (or not) and who attributed this outcome to their own personal motivation or to environmental reforms that enabled healthier eating and exercise [42]. One critical finding was that reading about successful weight loss elicited significant empathy from participants—both in the case of a protagonist who attributed successful weight loss to their own motivation and in the case of a protagonist who attributed successful weight loss to environmental reforms. These feelings of empathy were, in turn, highly predictive of support for obesity-related policy interventions.

This line of work suggests that personal testimonials about obesity may facilitate a more responsible and productive mental model of obesity. By describing a specific individual who works hard to lose weight, a personal narrative highlights the role of healthy self-regulation to prevent and reduce obesity. Such a description also seems to elicit empathy from readers, which leads them to recognize causes of obesity that are outside a person's control—and, in turn, to support important policy interventions. In other words, personal narratives seem to achieve the goals that have motivated recent work in the field of public health communications (e.g., by classifying obesity as a disease), and may have fewer or less serious unintended consequences (e.g., such an approach does not seem to undermine the importance of healthy eating and exercise).

6. Conclusions and future directions

In recent years, the general public has come to agree with public health officials who view obesity as a critical global concern. A 2012 survey found that 81% of the American public believes that obesity is an "extremely" or "very serious" problem [1]. However, recent research has found important differences between scientific and lay theories of obesity. While scientists and public health officials recognize an array of social, psychological, and physiological factors that contribute to obesity, non-experts often view the issue through a less sophisticated lens. In this chapter, we have described a variety of lay theories of obesity—focusing on trait-level beliefs, on causal models of obesity, and on personal narratives—that have important implications for the public health crisis.

At the trait level, some people think about psychological and physical attributes as relatively fixed, whereas others think of such attributes as relatively malleable. Empirical research has found that it is important for people to think of weight as malleable in order for obesity-related treatments to work. Talking about obesity as a disease, a strategy that public health officials have adopted in recent years to mitigate the stigma associated with being overweight, may, unfortunately, encourage people to think of weight as being caused by underlying physiological factors that are outside of one's control. Instead, focusing on the individual level—by describing a person who successfully loses weight through diet and exercise—may represent a more effective strategy for public health communications related to obesity. Personal narratives elicit more empathy than causal narratives. As a result, they may be able to mitigate

the widespread stigma against obesity and increase support for societal-level policy interventions designed to address causes of weight gain that are outside a person's control, while at the same time encouraging people to adopt an incremental trait theory of the condition.

There are a number of opportunities for future research based on this perspective. One goal of future work should be to consider how personal narratives for obesity affect causal and trait theories of the condition in more detail. For instance, how does a personal narrative about successful weight loss affect people who think of obesity as a disease? What is the most effective way to characterize a causal model of obesity that balances the complex suite of factors that have contributed to the rise of obesity? Another goal will be to figure out how to integrate theoretical and experimental research into scalable public health-messaging campaigns, putting what we now understand about lay theories of obesity—and how to change them—into practice.

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AUTHOR QUERIES

AQ1	Please check and confirm whether the edit made to the following sentence "In other words, reducing…" is appropriate.
AQ2	Please provide page range for Ref. [36].
AQ3	Please provide complete details for Ref. [42].