The relationship between narrative classification of obesity and support for public policy interventions

Paul H. Thibodeau [a, *], Victoria L. Perko [b], Stephen J. Flusberg [c]

[a] Department of Psychology, Oberlin College, Oberlin, OH, USA
[b] Oregon Research Institute, Eugene, OR, USA
[c] Department of Psychology, Purchase College, State University of New York, Purchase, NY, USA

ABSTRACT

In 2013, the American Medical Association made the controversial decision to classify obesity as a "disease" in the hopes of encouraging research, reducing stigma, and ultimately lowering the prevalence of the condition. Critics argued that the disease label would reduce feelings of personal responsibility among the obese and therefore discourage healthy self-regulation, a possibility that has received some recent support in the psychological literature. However, public health issues such as obesity are complex and depend not only on personal action, but also on wider societal trends such as social policy interventions. In the present study, we systematically investigated the relationship between four narrative classifications of obesity ("sin", "addiction", "disorder" and "environment") and support for a variety of policy interventions designed to address the issue. An initial norming study revealed that the obesity narratives differed reliably in how much they attributed blame for the condition to the individual versus the environment. A correlational study showed that participants who agreed with narratives that blamed the individual were more likely to support policy interventions that penalized people for being overweight while participants who agreed with narratives that blamed the environment were more likely to support policy interventions designed to protect people suffering from obesity. A follow-up experiment revealed that these narratives had causal power as well: participants exposed to just one of the narratives were more likely to support policy interventions consistent with the blame attribution of the narrative for both obesity as well as anorexia. Individual differences in political ideology and personal experience with weight issues also influenced agreement with the narratives and support for particular policy interventions across these studies. These findings suggest that public messaging campaigns that utilize extended narratives may be a useful tool for increasing support for effective policy interventions.

© 2015 Elsevier Ltd. All rights reserved.

How should obesity be classified? Is it a "disease," (and if so, what kind?) a "risk factor" for other diseases like diabetes, a "symptom" of underlying pathology, all of these things, or something else entirely? This is an important issue not only in the context of accurate medical classification, but also because different labels may affect how the general public reasons about obesity. Here we ask, what are the goals of labeling obesity as something like a "disease", and does such labeling actually achieve its intended purpose?

Over the last 50 years obesity rates have risen rapidly all over the world, at all levels of age, race, and sex (Wang and Beydoun, 2007). The condition has been linked to an increase in the risk of serious medical conditions (Bray, 2004; NIH, 1998), and is associated with decreases in quality of life (Fontaine and Barofsky, 2001; Jensen, 2005; Withrow and Alter, 2011) and expected lifespan.

A recent survey found that most of the American public (81%) believes that obesity is an "extremely" or "very serious" problem (Mendes, 2012). This is up from 69% in 2005; for the first time, there is more concern among the general public for obesity than health problems relating to alcohol or cigarettes. And the majority of the public (57%) feels that the government should implement programs that address health risks associated with obesity (Mendes, 2012).

Although a wide range of strategies for stemming the rise of obesity have been promoted and implemented by health professionals, the American Medical Association's recent decision to formally label obesity a "disease" has proven especially

* Corresponding author. Department of Psychology, Oberlin College, 120 W. Lorain St, Oberlin, OH 44074, USA.
    E-mail address: paul.thibodeau@oberlin.edu (P.H. Thibodeau).

controversial. The AMA hopes such a classification will help lower the prevalence of the condition by encouraging research, reducing stigma, and "chang[ing] the way the medical community tackles this complex issue that affects approximately one in three Americans" (p. 1, AMA, 2013).

Of course, simply calling obesity a "disease" does not necessarily reduce the stigma associated with the condition. There are many different types of diseases, which are associated with varying levels of stigma. For example, people generally take a more sympathetic view toward cancer or Type 1 diabetes than alcoholism, Type 2 diabetes, or mental illness (Dean and Poremba, 1983). Therefore, it is not obvious that people will react to the disease label in the way the AMA intends. It is even possible that this labeling might lead people to overestimate the actual harms associated with being obese (Campos et al., 2006).

For conceptual clarity, it is useful to contrast the term "disease" with the related constructs "illness" and "sickness". Whereas "diseases" are the purview of the medical establishment and medical practitioners (typically appealing to anatomical and/or physiological factors), "illness" and "sickness" are tied more directly to the subjective experience of an individual, and how that relationship is experienced in a social context, respectively (Boyd, 2000). One way to characterize the efforts of the AMA in classifying obesity as a "disease" appeals to this important distinction: publish health officials hope that changing the way the medical establishment conceptualizes the condition also changes the societal perception of obesity (obesity as "sickness") as well as the personal experience of obesity (obesity as "illness").

This distinction also helps clarify one line of opposition to the AMA's classification of obesity as a disease. Classifying obesity as a "disease" may lead people to adopt a stronger "illness" narrative for their experience of obesity. This may, in turn, lead them to view obesity as a condition grounded in genetic and physiological factors beyond their control, which may negatively impact healthy self-regulatory behavior. Indeed, some go so far as to call the AMA's decision a case of "inventing illness and another step towards eroding people's autonomy and making them passive participants in their health" (p. 1, Ablow, 2013). A recent empirical study found some support for this concern (Hoyt et al., 2014): when obesity was described using disease language, overweight participants seemed to show a decrease in both healthy self-regulatory behavior as well as concern for being overweight.

However, the distinction between "disease", "illness" and "sickness" also helps to illuminate the broader goal of the medical establishment. Namely, the decision to classify obesity as a "disease" is not only intended to influence those who are obese, as some claim (e.g., "the message that obesity is a disease may undermine important psychological determinants of salubrious behaviors for obese individuals − the very people these public health messages are targeting"; p. 998, Hoyt et al., 2014; see also Teixeira et al., 2012). In fact, the goals of this particular framing strategy are much broader, aimed at a societal level, attempting to instill widespread support for policy interventions that address the complex set of factors that contribute to obesity (Allison et al., 2008). In other words, one critical goal is to get the wider public to view obesity not only as a disease, but as a "sickness" that requires broader social support (Boyd, 2000).

Implicit in this approach is the assumption that people do not currently think of obesity as a disease − or else how would such a classification shift people's conception of the condition? However, eating disorders like anorexia have long been identified as symptoms of an underlying pathology (e.g., Crisafulli et al., 2008). For this reason as well, it is important to empirically test the effects of describing obesity as a disease on people's attitudes toward the condition.

Here, we investigate how classifying obesity in different ways affects support for obesity-related policy interventions. While obesity treatment and prevention can be facilitated by self-regulatory behavior (Israel et al., 1994), it is widely recognized that there are a complex range of causal contributors to being obese, many of which are outside a person's control (Allison et al., 2008). These include, critically, environmental factors (e.g., corporate manipulation and cultural stigma) that can be best addressed at the societal level through the implementation of targeted public policy programs (Brescoll et al., 2008; Miller, 2004).

In three studies, we explored a range of narratives that differed in how they described and apportioned blame for obesity. We chose to explore extended narratives, rather than single-word or short-phrase classifications, because people tend to think and reason about complex issues like obesity through the use of larger narrative structures that include, for example, extended metaphors and analogies (Lakoff, 2002; Stone, 1988). Prior work on attitudes toward and conceptions of obesity have shown that both the general public (Barry et al., 2009) and health professionals (Neumark-Sztainer et al., 1999) view obesity as a complex condition with a variety of causes on consequences. Grounding discussions of obesity in narratives, therefore, may be a more fruitful mechanism both for measuring people's conception of obesity and for targeting attitude change (see, e.g., Thibodeau and Boroditsky, 2011).

We predicted that exposing people to narratives that highlight causes of obesity that are outside a person's control would increase support for interventions designed to protect obese individuals. In contrast, exposing people to narratives that identify intrinsic factors for obesity should increase support for relatively punitive policy interventions. We also predicted that individual difference variables (e.g., political ideology, personal experience with a weight problem) would influence how people responded to the narratives and support for the policy interventions, as previous work has found that factors such as political ideology can mediate the effects of narrative frames (e.g., Thibodeau and Boroditsky, 2011; see also Gollust, 2013). Specifically, we predicted that people with a personal history of weight issues and a left-leaning political ideology would be more likely to support policy interventions designed to protect obese individuals (Oliver and Lee, 2005).

1. Norming study

We adapted obesity narratives from work by Barry and colleagues (2009), who cataloged seven metaphors for obesity that varied in the degree to which they highlighted individual (e.g., laziness) and environmental (e.g., corporate manipulation) causes. We sought to *quantify* four of these narratives ("sin", "addiction", "disorder", and "environment") along a dimension of Blame Attribution to understand the relative degree to which they apportioned blame to environmental and individual factors.

1.1. Method

1.1.1. Participants

We recruited and paid 100 people for the norming study through Amazon's Mechanical Turk (www.mturk.com; Buhrmester et al., 2011). This pool of participants is often more representative of the general population than convenience samples (Berinsky, Huber and Lenz, 2012). We chose to sample data from 100 participants to ensure reliable point estimates for ratings of the four narratives (Simmons et al., 2011). These data were collected in May of 2014 with approval of the Oberlin College IRB.

We restricted our sample to people living in the US with a good performance record (90% approval rating). Participants ranged in age from 19 to 69 (median = 34), and roughly half were male (46%).

The sample showed a leftward skew on both a categorical (41%, 47%, and 12% identified as Democrat, Independent, and Republican, respectively) and continuous measure of ideology — on a 101-point scale that ranged from 0, very liberal, to 100, very conservative, the mean was 42.3 (SD = 25.70). This breakdown of political affiliation reflects current demographic polling, which suggests that people in the United States are most likely to identify as Independent (38%) or Democrat (32%) compared to Republican (24%) (Pew, 2015); however, conservatives are somewhat underrepresented in this sample.

All studies reported here followed the ethical requirements of the Oberlin College Institutional Review Board. Data from one participant was excluded from analysis because an incorrect completion code was submitted, indicating that they either did not follow instructions or complete the study.

1.1.2. Materials and procedure

The materials included four adapted narratives that highlighted different causal factors for obesity (Barry et al., 2009). The "sin" narrative explicitly blamed individuals for being overweight and attributed obesity to personal failures (e.g., gluttony, sloth, antipathy). The "addiction" and "disorder" narratives were sub-types of a general "disease" classification. The narrative of "addiction" attributed relatively more blame to the behavior of an individual, evoking comparisons to alcoholism or drug abuse. The "disorder" narrative, on the other hand, implicitly appealed to individual factors outside a person's control, like a genetic predisposition to obesity. The "environment" narrative emphasized the social environment and stigmas associated with being obese (note that this narrative was labeled "eating disorder" by Barry et al., 2009 and that the narrative that we label "disorder" was labeled "disability" by Barry et al., 2009). We made slight wording changes to these narratives so that they could be perceived as descriptions of obesity or anorexia (which is a focus of the experimental study described below; see supplemental text for full wording of the narratives).

The narratives were presented one at a time in a randomized order for each participant. Participants made two ratings for each narrative. They were asked to rate both the degree to which "this description blames the individual for obesity" and the degree to which "this description blames the environment and situational causes for obesity" using five-point scales that ranged from "strongly disagree" to "strongly agree".

1.2. Results

Ratings were reliable across participants, ICC [model = "twoway"; type = "agreement"] = .51, 95%CI = [.308, .813], F[7775] = 100.00, p < .001, as measured by the intraclass correlation of the eight judgments (Shrout and Fleiss, 1979). Blame ratings attributed to the individual were negatively correlated with blame ratings attributed to the environment, r[47] = −.464, p < .001. People rated the "sin" narrative, for instance, as high in blaming the individual and low in blaming the environment. Because of the strong negative correlation between these pairs of ratings, we consolidated the two measures by reverse-coding the second (environmental blame) and averaging it with the first (individual blame) for a unified measure of Blame Attribution for each narrative. Higher values reflect more personal blame (see the dotted line in Fig. 1).

These consolidated measures (i.e. average estimates of individual and environmental blame) were also reliable, showing a moderate agreement across participants, ICC[model = "twoway"; type = "agreement"] = .615, 95%CI = [.334, .957], F[3391] = 163.00, p < .001.

These ratings revealed that the "sin" narrative attributed the most blame to the individual (M = 1.399, SE = .071) followed by the
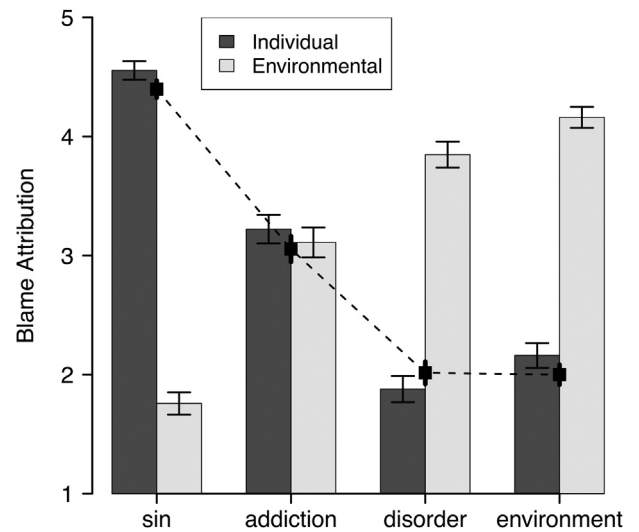

Fig. 1. Blame Attribution by Narrative. The dashed line reflects a consolidated measure of Blame Attribution (shifted upward so that it can be overlaid on this plot); the higher the point, the more blame was attributed to the individual. Error bars denote standard errors of the means.

"addiction" narrative (M = .056, SE = .108). The "disorder" (M = −.985, SE = .094) and "environment" (M = −1.000, SE = .083) narratives were rated as placing much more blame on the environment. Pairwise tests showed that there was no difference between the "disorder" and "environment" narratives, t[98] = .159, p = .874, but that all other pairwise comparisons were significant, ps < .001.

1.3. Discussion

This norming study provides a principled basis for quantifying how these narratives attribute blame to the causes of obesity. As predicted, the "sin" narrative was perceived to most strongly blame the individual, followed by the "addiction" narrative. The "disorder" and "environment" narratives, on the other hand, were both perceived to blame environmental factors. This pattern confirms most of our (and Barry et al., 2009's) intuitions — although the lack of a difference between the "disorder" and "environment" narratives was somewhat surprising.

Importantly, this study represents an empirical confirmation of something that is often simply assumed in research on conceptions of obesity: that there is an inverse correlation between blame attributed to the individual and blame attributed to society. That is, we have shown that people who tend to blame the individual for being obese also attribute less blame to society (and vice versa). It is possible that we did not observe the predicted difference between "disorder" and "environment" narratives because of the specific issues highlighted by these narratives. A narrative that focused on different environmental factors (e.g., the presence of parks and sidewalks and the availability of healthy food options) might be rated higher in environmental blame.

Blame Attribution values for these narratives are useful because this dimension is thought to affect support for public policy interventions (Barry et al., 2009). While previous work has treated the narratives as ordinal categories that increasingly attribute blame to the environment, a continuous measure of Blame Attribution allows us to more accurately assess the relative degree to which the narratives highlight environmental and individual causes of obesity. For instance, we can be confident not only that the "addiction" narrative attributes more blame to the individual than

the "disorder" narrative, but we can additionally say that the "disorder" narrative is much more similar to the "environment" narrative than the "addiction" narrative in how they attribute blame (since the difference in Blame Attribution is .02 between "disorder" and "environment" compared to 1.04 between "disorder" and "addiction"). Continuous predictors are also advantageous because they allow for statistical tests that are best suited to scalar data (e.g., OLS regression and structural equation modeling).

2. Correlational study

The correlational study sought to address two important questions: first, is there a relationship between agreement with the narratives and support for specific types of policy interventions? And second, are there individual difference variables that predict agreement with the narratives and support for the policy interventions?

2.1. Method

2.1.1. Participants
We recruited and paid 200 people through Mechanical Turk, using the same inclusion criteria as in the norming study. A larger sample size (of at least 160) was required to test for relationships between the observed and latent variables in a structural equation model (Soper, 2015). Data from 2 participants were excluded because they either did not provide an accurate completion code or because they had participated in a related study. These data were collected in May of 2014 with approval of the Oberlin College IRB.

Participants ranged in age from 18 to 75 (*median* = 33), roughly half were male (48%), and most (82%) had completed at least some college, although the range of educational background included participants who had not completed high school as well as some participants with advanced degrees. The political ideology of the participants was similar to that of the norming study and showed a slightly leftward skew, with 39% identifying as Democrat, 41% as Independent, and 19% as Republican (*Mean* on a 101-point scale = 39.6, *SD* = 26.30).

Roughly half of the participants (48%) reported a history of weight problems or an eating disorder (note that this percentage was in response to a general question about whether participants had experienced prior issues with their weight *and/or* an eating disorder; we did not ask separate questions about participants' history with being overweight and their history with an eating disorder). Of these, 54% identified their experience with weight or an eating disorder as mild, 35% identified their experience as moderate, and 12% identified their experience as severe. Statistics from the National Eating Disorders organization suggest that the prevalence of weight issues and eating disorders in our sample is consistent with the general population: approximately 30 million Americans (roughly 10%) have been diagnosed with a clinically significant eating disorder, and about 2 in 3 Americans are overweight or obese (NEDA, 2014; NIH, 2012).

2.1.2. Materials and procedure
Participants read each of the obesity narratives in a randomized order. Their task was to rate their agreement with each narrative and their perception of the prevalence of the attitude expressed by the narrative:

1) To what extent do you agree with this description?
2) In your opinion, how prevalent is this opinion in society? Do you think a minority of people hold this view or do you think it represents a wide spectrum of the population?

Both questions were rated on 5-point scales. The scale for the first ranged from "strongly disagree" to "strongly agree"; the scale for the second ranged from "extremely uncommon" to "very widespread".

Participants then rated their support for eight policy interventions designed to stem the rise of obesity on a five-point scale that ranged from "strongly oppose" to "strongly support" (adapted from Barry et al., 2009; Brescoll et al., 2008). We chose eight policy interventions that could be viewed as relevant to both obesity and anorexia (a distinction that is relevant to our follow-up experiment). Most of these policy interventions seek to protect or treat individuals who are currently or at risk for becoming obese; however, at least one policy, which would allow health insurers to charge higher premiums for overweight individuals, seemed to be more punitive (see supplement for full text of policy interventions).

Afterward, participants were asked several demographic and background questions (e.g., age, sex, gender, educational background, history of a weight problem or eating disorder).

2.2. Results

There was a high correlation between ratings of support for the policy interventions (α = .74, N = 198), which suggested that using a consolidated measure of policy support would be more parsimonious and powerful than analyzing support for the eight policies separately. A principal components analysis revealed that seven of the eight policy interventions loaded highly onto a single factor. However, the relatively punitive policy intervention loaded highly onto a second factor. We will refer to the first principal component as reflecting support for "protective" policy interventions and the second principal component as reflecting support for "punitive" policy interventions. These two factors captured more than 55% of the overall variance in the ratings of the policy interventions. Of note, the principal components are normalized and range, approximately, from −3 (extremely low support) to 3 (extremely high support).

In order to investigate the relationship between blame attribution and policy support we first computed the degree to which each participant attributed blame to environmental (and individual) causes, using the agreement ratings from the present study in conjunction with the results from the norming study. Ratings of agreement for each narrative (from the present study) were multiplied by coefficients (constants from the norming study) and added together to yield a single measure of Individual Blame Attribution (i.e., using the equation: 1.399*sin + .056*addiction + −.985*disorder + −1.000 *environment).

2.2.1. Policy support
We found a significant negative correlation between Individual Blame Attribution and support for protective policies, r [196] = −.422, p < .001, and a significant positive correlation with support for punitive policies, r[196] = .383, p < .001. People who attributed more blame to environmental factors were more likely to support protective policy interventions and oppose punitive ones, and vice versa (see Fig. 2).

A 2 (policy type) by 4 (narrative type) repeated-measures ANOVA revealed a similar pattern of results when agreement ratings were included for each of the four narratives. Agreement with the "sin" narrative was associated with opposition to protective policy interventions and support for the punitive policy intervention, F[1193] = 51.875, p < .001, η^2 = .176; agreement with the "disorder" ("disorder", F[1193] = 36.360, p < .001, η^2 = .123), "environment" (F[1193] = 4.382, p = .038, η^2 = .015), and "addiction" (F[1193] = 9.938, p = .002, η^2 = .034) narratives was
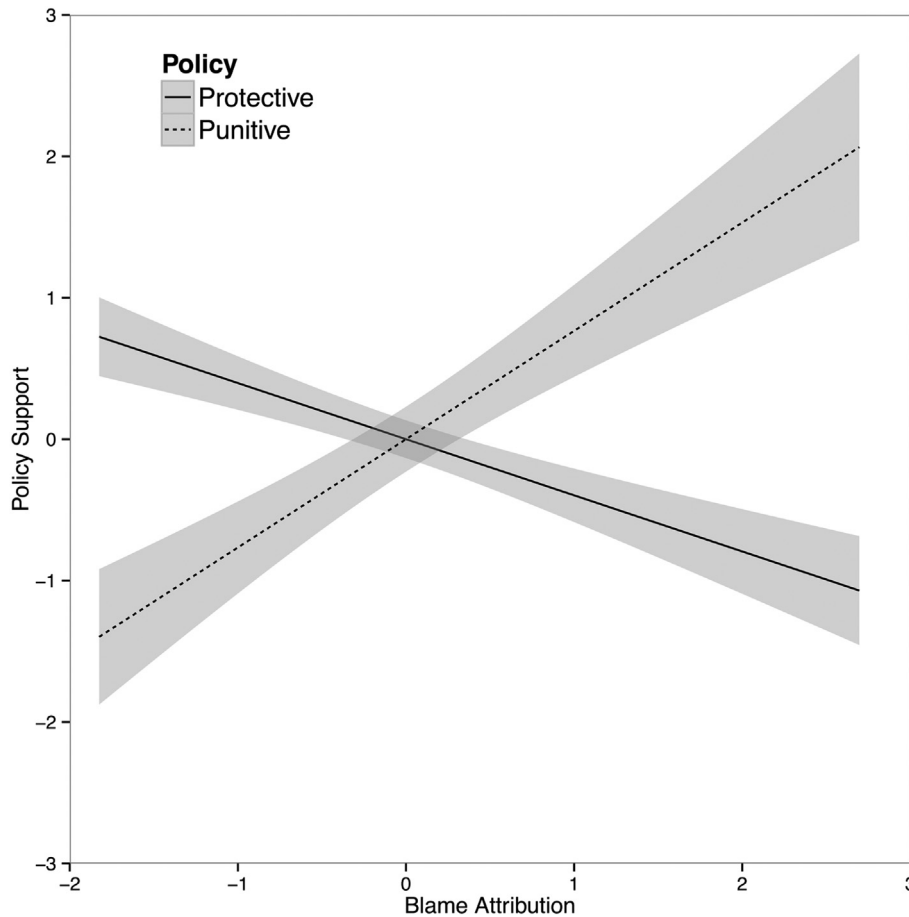
Fig. 2. Policy Support and Blame Attribution. Shaded areas for each line denote standard error.

associated with support for the protective policy interventions and opposition to the punitive policy intervention.

In order to investigate whether specific demographic variables predicted participant ratings in the hypothesized direction, we first fit an ordinary least squares (OLS) regression model with Individual Blame Attribution as a predictor of policy support (with an interaction term reflecting protective versus punitive policies). The model captured the significant negative relationship between Individual Blame Attribution and protective policies, $\beta = -.253$, $SE = .032$, $p < .001$, as well as the significant positive relationship between Individual Blame Attribution and punitive policies, $\beta = .384$, $SE = .045$, $p < .001$. We then added individual difference variables to the model to test whether they had an effect on policy support beyond what was accounted for by the Individual Blame Attribution measure.

The only variable that showed such an effect was a standardized continuous measure of political ideology. Left-leaning participants were more likely to support the policy interventions overall, $\beta = .529$, $SE = .095$, $p < .001$. This finding may reflect a general tendency for people on the political right to oppose government intervention (Oliver and Lee, 2005). However, politically conservative participants were more likely to support punitive policy interventions, $\beta = -.390$, $SE = .134$, $p = .004$. Conservatives may assign more responsibility to individuals and support policy measures that they perceive as increasing personal accountability.

Note that there was no correlation between the measures of perceived narrative prevalence and support for protective policies, r[196] = $-.024$, $p = .737$, or punitive policies, r[196] = $.041$, $p = 571$.

That is, when ratings of narrative prevalence were weighted in the same way as ratings of narrative agreement, there was no direct relationship between the measures of prevalence and support for the policy interventions. There were also no effects of perceived narrative prevalence on support for the policy interventions when the ratings of prevalence were included as categorical predictors, Fs < 1.6, ps $> .2$.

2.2.2. Blame attribution

Overall, we found that there were varying degrees of support for the four narratives, F[3787] = 23.06, $p < .001$, $\eta^2 = .081$. Although these data violated the sphericity assumption, $W = .682$, $p < .001$, the test remained significant on a Huynh-Feldt correction, $p < .001$. Planned t-tests revealed that the "environment" narrative was the most strongly supported (agreement with this narrative differed significantly from each of other others, ps $< .01$) and the "sin" narrative was the least supported (agreement with this narrative also differed significantly from each of the others, ps $< .01$). There was no difference between the agreement levels for the "disorder" and "addiction" narratives.

Using Individual Blame Attribution as the dependent variable, we fit a series of OLS regression models to test which individual difference measures predicted attitudes toward obesity. The results we present here come from a model in which all of the variables were included and standardized. First, we found that people with a high BMI, $\beta = -.133$, $SE = .063$, $p = .037$, and people with a reported history of an eating disorder, $\beta = -.144$, $SE = .064$, $p = .026$, were more likely to attribute blame to environmental factors. That is,

direct experience with obesity (or an eating disorder) led people to attribute more blame to the environment and less blame to the individual. Struggling with weight and body image satisfaction may attune this population to the significant environmental factors that contribute to obesity (e.g., corporate manipulation, stigma) and shift blame away from individual influences like self-regulation (e.g., obesity may persist in these individuals despite significant willpower and perseverance). Such a view may also militate against feelings of worthlessness associated with being obese (Fabricatore and Wadden, 2004).

Second, we found that females were more likely than males to attribute blame to environmental factors, $\beta = -.687$, $SE = .128$, $p < .001$. There is more pressure on females to meet sociocultural ideals for body image (Grabe et al., 2008; Groesz et al., 2002), leading females to be more vulnerable to body dissatisfaction (Siever, 1994) and be at higher risk for eating disorders than males (Cantrell and Ellis, 1991). Indeed, females in our study reported higher rates of eating disorders and weight issues than males, t [196] = 2.179, $p = .031$.

Finally, we found that more politically liberal participants were more likely to attribute blame to environmental factors than conservatives, $\beta = -.234$, $SE = .063$, $p < .001$. This is consistent with conservative ideology, which tends to attribute more blame and responsibility to individuals (Weiner, 1993).

In addition, we found that adding ratings of perceived narrative prevalence significantly improved the fit of the model, F [4189] = 2.814, $p = .027$, $\eta^2 = .056$. Ratings of agreement with the narratives were positively correlated with ratings of prevalence: on average, $r[196] = .233$, $p < .001$, suggesting that people may agree with narratives that they perceive as more common, construing popular narratives as better supported (e.g., Iyengar and Simon, 1993).

2.2.3. Comprehensive model

To unify these findings, we fit a structural equation model that confirmed the findings presented above (see Fig. 3) using standard Maximum Likelihood Estimation. On this analysis, several individual difference variables (sex, BMI, history of weight issues and/or eating disorders, and ideology) as well as the prevalence of the narratives affected how people attributed blame for obesity, χ^2[df = 43, N = 198] = 97.554, $p < .001$ (CFI = .726; RMSEA = .080, SRMR = .089, AIC = 143.555, BIC = −129.841). Importantly, including the four individual difference variables as predictors of
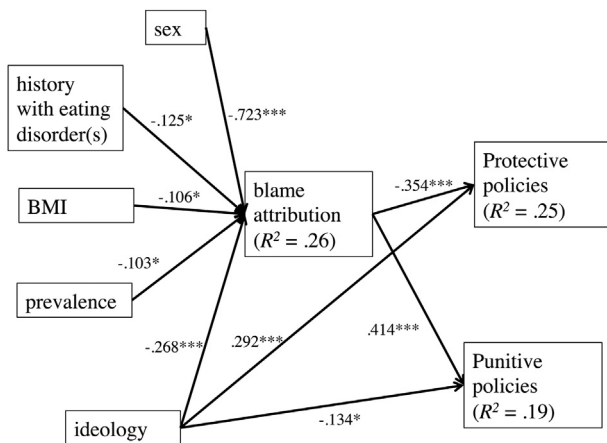

Fig. 3. Path analysis. A structural equation model of the effects of individual difference variables and narrative prevalence on blame attribution and policy support (with standardized path coefficients). Asterisks denote statistically significant coefficients, *$p < .05$, **$p < .01$, ***$p < .001$.

Blame Attribution provided a significantly better fit to the data than a model that excluded these predictors, χ^2[df = 4] = 54.092, $p < .001$ (AIC = 189.647, BIC = −96.902); similarly, including predictors of narrative prevalence provided a significantly better fit to the data than a model that excluded these predictors, χ^2[df = 4] = 11.396, $p = .022$ (AIC = 146.951, BIC = −139.598). In turn, Individual Blame Attribution and ideology directly affected support for the policy interventions. Including sex, BMI, and a history of eating disorders as direct predictors of policy support did not improve the fit of the model, χ^2[df = 6] = 3.449, $p = .751$ (AIC = 152.105, BIC = −101.561).

Note that the Blame Attribution measure was transformed for this analysis (by reflecting the scores, adding a constant, then square-rooting and re-reflecting the data) to eliminate multivariate skewness.

2.3. Discussion

This correlational study answered two specific questions about the relationship between the obesity narratives, support for policy interventions, and individual differences, and identified a distinctive mediator of policy reasoning. First, as predicted, we found that people who agreed with narratives that attributed more blame to environmental causes of obesity were more likely to support protective policy interventions, replicating Barry et al. (2009).

Second, females, liberals, people with a history of a weight issue or eating disorder, and people with higher BMIs were more likely to blame environmental factors for obesity. Of these, only political ideology directly affected ratings of policy support: participants who identified as politically left-leaning were more likely to support protective policy interventions while participants who identified as being on the right side of the political spectrum were more likely to support punitive policy interventions.

In addition, we found that people were more likely to agree with narratives that they viewed as more prevalent, indicating that a well-coordinated public health messaging strategy might effectively influence conceptions of obesity among the general public. Messaging that implicates environmental causes of obesity are likely to change how people think about the underlying causes of obesity and, in turn, support for policy interventions. In the following experiment, we tested whether exposing people to a single obesity narrative would affect their willingness to support (or oppose) particular policy interventions designed to stem the rise of obesity.

3. Experiment

In the experiment we implemented a 2 condition (obesity or anorexia) by 4 narrative ("sin," "addiction," "disorder", and "environment") between-subjects manipulation to test whether the narratives could be used to persuade people to support (or oppose) specific policy interventions. We exposed half of the participants to an obesity narrative and half of the participants to an anorexia narrative, and then had them rate their support for the policy interventions. We included anorexia as a control condition because, like obesity, it has ties to underlying psychobiosocial causal and resultant factors (Garner et al., 1976). However, some work suggests that people are generally more sympathetic to a "disease" or "disorder" classification for anorexia (Crisafulli et al., 2008; but see Stewart et al., 2006). Therefore, the comparison between anorexia and obesity may provide further insight into the relationship between people's preexisting beliefs and the persuasive capacity of the narratives. This represents a novel contribution of the current experiment, as much previous work on narrative framing has focused on obesity in isolation (e.g., Dar-Nimrod et al., 2014;

Niederdeppe et al., 2014).

3.1. Method

3.1.1. Participants

We recruited and paid 800 people through Amazon's Mechanical Turk using the same inclusion criteria as in the norming and correlational studies. Prior work on the role of narrative framing (e.g., Thibodeau and Boroditsky, 2011) informed our decision to assign roughly 100 participants to each of the eight conditions. Data from 60 participants were excluded because they either did not provide an accurate completion code or because they had participated in a related study. These data were collected in May of 2014 with approval of the Oberlin College IRB.

The age, sex, educational, and political background of this sample was similar to that of the norming and correlational studies. Participants ranged in age from 18 to 75 (*median* = 29), more than half were male (62%), and most (86%) had completed at least some college. 41% of participants identified as Democrats, 42% as Independents, and 17% as Republicans (mean on 101-point scale = 38.1, SD = 25.75). Roughly half of the participants (51%) reported a history of weight problems or an eating disorder (65% of whom identified this experience as mild, 28% and 7% identified this experience as moderate and severe, respectively).

3.1.2. Materials and procedure

Participants were randomly assigned to read only one of the narratives and then rate their support for the eight policy interventions. For half of the participants, the narrative and policy interventions were presented in an obesity context and for half they were presented in the context of anorexia. Afterward, participants reported their gender, age, educational history, and ideology, as well as their height and weight, and history of weight issues and/or an eating disorder.

3.2. Results and discussion

In analyzing the results of the experiment, we first condensed our measures. Instead of using the four narratives as categorical predictors, we used the numeric Blame Attribution counterparts generated from the norming study. That is, people who were exposed to the "sin" narrative were coded as receiving a message that was valued at 1.399 in Blame Attribution; people who read the "addiction", "disorder", and "environment" narratives were coded as receiving a message that was valued at .056, −.985, and −1.000 in Blame Attribution, respectively. This technique is common in psycholinguistic work, particularly involving metaphor (e.g., Thibodeau and Durgin, 2011), in which one group of participants is asked to rate stimuli along a target dimension (e.g., aptness, conventionality) and these averaged ratings are used to predict the behavior of another group of participants (e.g., choices or reaction time).

We first included these independent variables (condition: anorexia versus obesity; Blame Attribution) in a model predicting Policy Support and found an effect of Blame Attribution, F[1736] = 4.416, p = .036, η^2 = .006. People who read a narrative that was high in Blame attribution were more likely to support punitive policy interventions, β = .087, SE = .038, p = .022, but no more likely to support protective policy interventions, β = .039, SE = .064, p = .545. We found no effect of condition (obesity vs. anorexia), F[1736] = .518, p = .472, or interaction between Blame Attribution and condition, F[1736] = .370, p = .543. That is, despite differences in how people may conceptualize anorexia and obesity, people were as likely to support the policy interventions when they had anorexia in mind as when they had obesity in mind. Further, the narratives did not differentially affect conceptions of anorexia and obesity. In other words, it appears that the general public may conceptualize obesity in a way that is similar to other eating disorders like anorexia on the dimensions captured in this study.

We then fit a second model that included several covariates (ideology, sex, history of eating disorders, BMI, and education; continuous variables were standardized, sex was contrast coded) in a regression model predicting Policy Support. We found a significant effect of three variables: Blame Attribution, F[1731] = 4.987, p = .026, η^2 = .006, ideology, F[1731] = 94.270, p < .001, η^2 = .113, and BMI, F[1731] = 4.799, p = .029, η^2 = .006.

Separate OLS regressions for protective and punitive policies revealed that people who received a message high in Blame Attribution were more likely to support punitive policies, β = .087, SE = .038, p = .022, but no more or less likely to support protective policy interventions, β = .039, SE = 064, p = 545. As shown in Fig. 4, people who were exposed to the "sin" narrative were less supportive of protective policies and more supportive of punitive policies. The "addiction" and "disorder" narratives led to more support for protective policies but not opposition to punitive policies. The "environment" narrative led to opposition to punitive policies but not support for protective policies.

We also found that the more left-leaning the participant's political ideology, the more he or she supported protective policy interventions, β = .772, SE = .064, p < .001. However, there was no effect of ideology on support for punitive policies, β = .052, SE = .037, p = .164.

Additionally, we found that people with a higher BMI were less likely to support punitive policy interventions, β = −.183, SE = 039, p < .001, but no more or less likely to support protective policy interventions, β = −.012, SE = .066, p = .860. We found no direct effects of individual difference variables like sex, education, or a reported history with an eating disorder on policy support.

4. General discussion

Obesity is a complex condition with important implications for individuals and society (Bray, 2004; Fontaine and Barofsky, 2001; NIH, 1998 Jensen, 2005; see also Campos et al., 2006). As a result, obesity should be classified in a way that is accurate, promotes healthy behavior, and reduces stigma, while respecting ethical and moral concern for obese individuals. Motivated by this goal, the
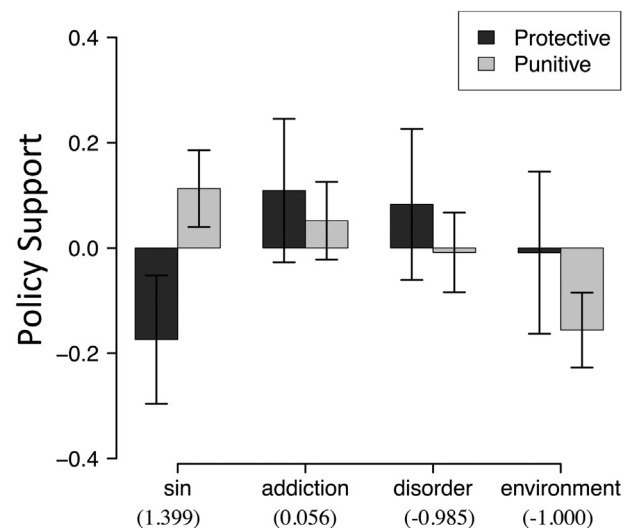

Fig. 4. Policy Support by Narrative. Error bars denote standard error of the means.

AMA recently made the decision to classify obesity as a "disease". Despite concerns over the influence of the "disease" label for healthy self-regulatory behavior (Hoyt et al., 2014), our findings suggest that there may be real benefits that result from talking about obesity as something caused by extrinsic factors.

Specifically, we found a predictable inverse relationship between conceptions of obesity that attribute responsibility to the individual and conceptions of obesity that attribute responsibility to society, and identified how this attitude mediates support for obesity-related policy interventions. Further, an experiment found that exposure to narratives for obesity that highlighted the role of environmental factors led to support for policy interventions that promoted the protection and treatment of obese individuals. Narratives that highlighted the role of the individual, in contrast, led to support for more punitive actions. While some steps may be necessary to protect, for instance, insurers and corporations against liability associated with an increasingly obese population and workforce, there is reason to believe that policy interventions that emphasize treatment and protection will be the most efficacious in the long run (Brescoll et al., 2008).

Importantly, the effect of the narratives on people's conception of obesity were similar to the effects of the narratives on people's conception of anorexia, suggesting that people are likely to support programs that aim to treat and prevent obesity just as they are likely to support programs that aim to treat and prevent another kind of eating disorder. Consider that in recent decades there has been a significant increase in the development of novel, effective treatments for anorexia (e.g., Stice et al., 2012). Perhaps not surprisingly, therefore, the prevalence of the disorder, which had been rising in the past, has stabilized in recent years (Smink et al., 2012). These positive outcomes can be tied to changing conceptions of anorexia and the increasing tendency to view the disorder as a "disease" (Brumberg, 2000). Our findings suggest some similarity in how a messaging campaign might affect conceptions of obesity and potentially lead to improvements in the treatment and prevalence of the condition.

At a theoretical level, the present work highlights the efficacy of extended narratives and metaphors as a mechanism for both measuring and changing attitudes (and complements work on the role of personal narratives; Neiderdeppe et al., 2014). Extended narratives, which pervade social and political discourse (Lakoff and Johnson, 1980), provide a more complete context and structure for thinking about complex issues like obesity, and influence how we reason.

Our work also suggests that there are a variety of associations that people have with the concept of a "disease". Addictions and disorders, for instance, are both considered kinds of diseases, but they may promote different conceptions of the condition. Describing obesity as an "addiction" may lead people to group the condition with more salient addictions — to alcohol, drugs, and cigarettes. Describing it as a "disorder", on the other hand, may lead people to group the condition with more salient disorders resulting from physiological or genetic causes. Though the results of our Norming Study revealed that such narratives reliably differed on the dimension of Blame Attribution, both of these classifications led to increased support for protective policy interventions in the Experiment. Nevertheless, there may be other ways in which these narratives differ. For example, describing obesity as an "addiction" may lead people to pursue treatments modeled after other addictions (e.g., Alcoholics Anonymous), whereas describing obesity as a "disorder" may lead people to pursue pharmacological interventions. Further empirical research is necessary to test these possibilities.

That is, one limitation of this work is that it focused on a relatively small subset of disease narratives and a relatively small subset of attitudinal and behavioral measures. In future work, we will seek to test the influence of narratives for obesity on other attitudes and behaviors. For instance, is there a way to describe obesity that decreases the attribution of individual blame but does not lead to a decrease in healthy self-regulatory behavior? And, to what extent does describing obesity as a "disease", "disorder", or "addiction" affect social stigmas associated with the condition? Future work will also seek to test the effects of these manipulations on even more representative populations in more representative ecological conditions.

Like the AMA and The Obesity Society (Allison et al., 2008), our work is driven by a utilitarian motive. As the science on obesity treatment progresses, health professionals should adopt narratives for the condition that are most likely to yield successful prevention and treatment programs, whatever they may be. Above all, this work highlights the importance of thinking about the distinct ways in which decisions made by the medical establishment affect the dynamic relationship between society's conception of and attitude towards a "disease" and an individual's subjective experience of "illness" (Boyd, 2000). Our results show tangible benefits to the "disease" classification of obesity at the societal level.

Acknowledgments

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2015.07.023.

References

Ablow, K., 2013. Obesity Is Not a Disease — and Neither Is Alcoholism. Fox News. Available at: http://www.foxnews.com/health/2013/06/20/dr-keith-ablow-obesity-is-not-disease-and-neither-is-alcoholism/.

Allison, D.B., Downey, M., Atkinson, R.L., Billington, C.J., Bray, G.A., Eckel, R.H., Finkelstein, E.A., Jensen, M.D., Tremblay, A., 2008. Obesity as a disease: a White paper on evidence and arguments commissioned by the council of the obesity society. Obesity 16, 1161—1177.

AMA press release: http://www.ama-assn.org/ama/pub/news/news/2013/2013-06-18-new-ama-policies-annual-meeting.page.

Barry, C.L., Brescoll, V.L., Brownell, K.D., Schlesinger, M., 2009. Obesity metaphors: how beliefs about the causes of obesity affect support for public policy. Milbank Q. 87, 7—47.

Boyd, K.M., 2000. Disease, illness, sickness, health, healing and wholeness: exploring some elusive concepts. J. Med. Ethics Med. Humanit. 26, 9—17.

Bray, G.A., 2004. Medical consequences of obesity. J. Clin. Endocrinol. Metabol. 89, 2583—2589.

Brescoll, V.L., Kersh, R., Brownell, K.D., 2008. Assessing the feasibility and impact of federal childhood obesity policies. Ann. Am. Acad. Polit. Soc. Sci. 615, 178—194.

Brumberg, J.J., 2000. Fasting Girls: the History of Anorexia Nervosa. Random House LLC.

Buhrmester, M., Kwang, T., Gosling, S.D., 2011. Amazon's mechanical Turk a new source of inexpensive, yet high-quality, data? Perspect. Psychol. Sci. 6, 3—5.

Campos, P., Saguy, A., Ernsberger, P., Oliver, E., Gaesser, G., 2006. The epidemiology of overweight and obesity: public health crisis or moral panic? Int. J. Epidemiol. 35, 55—60.

Cantrell, P.J., Ellis, J.B., 1991. Gender role and risk patterns for eating disorders in men and women. J. Clin. Psychol. 47, 53—57.

Crisafulli, M., Von Holle, A., Bulik, C., 2008. Attitudes towards anorexia nervosa: the impact of framing on blame and stigma. Int. J. Eat. Disord. 41, 333—339.

Dar-Nimrod, I., Cheung, B.Y., Ruby, M.B., Heine, S.J., 2014. Can merely learning about obesity genes affect eating behavior? Appetite 81, 269—276.

Dean, J.C., Poremba, G.A., 1983. The alcoholic stigma and the disease concept. Subst. Use Misuse 18, 739—751.

Fabricatore, A.N., Wadden, T.A., 2004. Psychological aspects of obesity. Clin. Dermatol. 22, 332—337.

Fontaine, K.R., Barofsky, I., 2001. Obesity and health- related quality of life. Obes. Rev. 2, 173—182.

Garner, D.M., Garfinkel, P.E., Stancer, H.C., Moldofsky, H., 1976. Body image disturbances in anorexia nervosa and obesity. Psychosom. Med. 38, 327—336.

Gollust, S.E., 2013. Obesity in red and blue: understanding the associations between politics and obesity. Prev. Med. 57, 436–437.

Grabe, S., Ward, L.M., Hyde, J.S., 2008. The role of the media in body image concerns among women: a meta-analysis of experimental and correlational studies. Psychol. Bull. 134, 460–476.

Groesz, L.M., Levine, M.P., Murnen, S.K., 2002. The effect of experimental presentation of thin media images on body satisfaction: a meta-analytic review. Int. J. Eat. Disord. 31, 1–16.

Hoyt, C.L., Burnette, J.L., Auster-Gussman, L., 2014. "Obesity is a disease": examining the self-regulatory impact of this public-health message. Psychol. Sci. 25, 997–1002.

Israel, A.C., Guile, C.A., Baker, J.E., Silverman, W.K., 1994. An evaluation of enhanced self-regulation training in the treatment of childhood obesity. J. Pediatr. Psychol. 19, 737–749.

Iyengar, S., Simon, S., 1993. News coverage of the Gulf crisis and public opinion a study of agenda-setting, priming, and framing. Commun. Res. 20, 365–383.

Jensen, G.L., 2005. Obesity and functional decline: epidemiology and geriatric consequences. Clin. Geriatr. Med. 21, 677–687.

Lakoff, G., 2002. Moral Politics: How Conservatives and Liberals Think. University of Chicago Press, Chicago.

Lakoff, G., Johnson, M., 1980. Metaphors We Live by. University of Chicago Press.

Mendes, E., 2012. Americans' Concerns about Obesity Soar, Surpass Smoking. http://www.gallup.com/poll/155762/americans-concerns-obesity-soar-surpass-smoking.aspx.

Miller, J.D., 2004. Public understanding of, and attitudes toward, scientific research: what we know and what we need to know. Public Underst. Sci. 13, 273–294.

NEDA, 2014. National Eating Disorder Association: Getting the Facts on Eating Disorders. Available at: https://www.nationaleatingdisorders.org/get-facts-eating-disorders.

Neumark-Sztainer, D., Story, M., Harris, T., 1999. Beliefs and attitudes about obesity among teachers and school health care providers working with adolescents. J. Nutr. Educ. 31, 3–9.

Niederdeppe, J., Shapiro, M., Kim, H.K., Bartolo, D., Porticella, N., 2014. Narrative persuasion, causality, complex integration, and support for social policy. Health Commun. 29, 431–444.

NIH, 1998. Clincical Guidelines of the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. NIH publication no. 98, p. 4083. Available at: nhlbi.nih.gov/guidelines/obesity/ob_gdlns.pdf (September, 1998).

NIH, 2012. Overweight and Obesity Statistics. Available at: http://win.niddk.nih.gov/publications/PDFs/stat904z.pdf.

Oliver, J.E., Lee, T., 2005. Public opinion and the politics of obesity in America. J. Health Polit. Policy Law 30, 923–954.

Pew, 2015. Do You Consider Yourself a Republican, Democrat, or Indepenent? Party Identification. Available at: http://www.pewresearch.org/data-trend/political-attitudes/party-identification/.

Shrout, P.E., Fleiss, J.L., 1979. Intraclass correlations: uses in assessing rater reliability. Psychol. Bull. 86, 420.

Siever, M.D., 1994. Sexual orientation and gender as factors in socioculturally acquired vulnerability to body dissatisfaction and eating disorders. J. Consult. Clin. Psychol. 62, 252.

Simmons, J.P., Nelson, L.D., Simonsohn, U., 2011. False-positive psychology undisclosed flexibility in data collection and analysis allows presenting anything as significant. Psychol. Sci. 0956797611417632.

Smink, F.R., van Hoeken, D., Hoek, H.W., 2012. Epidemiology of eating disorders: incidence, prevalence and mortality rates. Curr. Psychiatry Rep. 14, 406–414.

Soper, D.S., 2015. A-priori Sample Size Calculator for Structural Equation Models. Available from: http://www.danielsoper.com/statcalc.

Stewart, M., Keel, P., Schiavo, R., 2006. Stigmatization of anorexia nervosa. Int. J. Eat. Disord. 39, 320–325.

Stice, E., Rohde, P., Gau, J., Shaw, H., 2012. Effect of a dissonance-based prevention program on risk for eating disorder onset in the context of eating disorder risk factors. Prev. Sci. 13, 129–139.

Stone, D., 1988. Policy Paradox and Political Reason. Scott Foresman, Glenview, Ill.

Teixeira, P.J., Mata, J., Williams, G.C., Gorin, A.A., Lemieux, S., 2012. Self-regulation, motivation, and psychosocial factors in weight management. J. Obes.

Thibodeau, P.H., Boroditsky, L., 2011. Metaphors we think with: the role of metaphor in reasoning. PLoS One 6, e16782.

Thibodeau, P.H., Durgin, F.H., 2011. Metaphor aptness and conventionality: A processing fluency account. Metaphor Symbol 26, 206–226.

Wang, Y., Beydoun, M.A., 2007. The obesity epidemic in the Unites States – gender, age, socioeconomic, racial/ethnic, and geographic characteristics; a systematic review and meta-regression analysis. Epidemiol. Rev. 29, 6–28.

Weiner, B., 1993. On sin versus sickness: A theory of perceived responsibility and social motivation. Am. Psychol. 48, 957.

Withrow, D., Alter, D.A., 2011. The economic burden of obesity worldwide: a systematic review of the direct costs of obesity. Obes. Rev. 12, 131–141.