

CAUSAL EXPLANATIONS, MEDIA EFFECTS,
AND PUBLIC OPINION ON OBESITY

by

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Abstract

A public debate about obesity has emerged in America since this pressing public health issue moved into the political arena. Using survey data, this study showed that attitudes about the causes of obesity, or causal explanations, are central in individuals' decision-making on this topic. Public support for the different causal explanations was not influenced by media frames, but rather, public opinion on the causes of obesity is congruent with prominent political values in media coverage. Specifically, an increase in conservative values in media coverage of obesity likely contributed to the public sentiment that one's lifestyle causes obesity. It is suitable to think of the obesity debate in terms of competing causal explanations.

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Introduction

Obesity is a crucial public health issue in many countries. The United States has one of the highest rates of obesity with an estimated 80% of adults overweight or obese (World Health Organization Global Infobase). Given the prominence of obesity in America, it has quickly become a political issue and a topic of public debate, and the politics of obesity have since become a topic of study.

At present, knowledge of obesity politics is sparse and varied. Scholars have investigated the rhetoric in media coverage on obesity (Saguy and Riley 2005; Lawrence 2004), the philosophy surrounding responsibility for obesity (Kersh and Morone 2002; Wikler 2002), the psychology of anti-fat attitudes (De Jong 1980; Joeng 2007; Crocker et al 1993, Crandall 1994; Crandall and Biernat 1990), predictors of support for anti-obesity policy (Oliver and Lee 2005; Hilbert et al 2007; Evans et al 2005), and the determinants of public opinion on obesity (Oliver and Lee 2005). This study infuses a new perspective into this literature by proposing that public debate about obesity be understood in terms of causal explanations, or beliefs about the causes of a social problem. It also assists in closing a gap in the literature by linking media rhetoric and the determinants of public opinion. Can the obesity debate be understood in terms of causal explanations, and does the media influence public support for the different causal explanations?

In this paper I argue that causal explanations impact attitudes on obesity among the mass public. Attitudes about the cause of obesity are not influenced by media frames, but rather, public preference among competing causal explanations is possibly influenced by the prominent political values in media coverage. The findings have theoretical implications for our understanding of causal explanations and practical implications for public health efforts to reduce obesity.

Theoretical Framework and Expectations

Causal explanations are common components of individual decision-making. People easily generate causal explanations and link them to related judgments (Iyengar 1987). Causal explanations have been shown to guide a variety of judgments including presidential approval (Iyengar 1989), willingness to associate with or help afflicted groups in society (Martin et al 2000; Joeng 2007), the responsibility of different political actors (Iyengar 1989, 1991; Knobloch-Westerwick and Taylor 2008), and support for relevant policies, public spending, or tax cuts (Iyengar 1989, 1991; Jacoby 2000; Bullock and Fernald 2005). For example, beliefs about the causes of poverty were significant predictors of respondents' approval of President Reagan's job performance (Iyengar 1989).

The link between causal explanations and political judgments has been shown to apply to a range of issues including poverty, crime, terrorism, homosexuality, gun policy, mental health, and tax cuts for the wealthy (Iyengar 1987, Iyengar 1991; Haider-Markel and Joslyn 2008; Haider-Markel and Joslyn 2001; Martin et al 2000; Bullock and Fernald 2005). On the topic of obesity, laboratory experiments found that opinions on the cause of obesity are strong predictors of willingness to help those who are overweight, willingness to associate with overweight peers, and "anti-fat" prejudice (De Jong 1980; Crandall and Biernat 1990; Crocker et al 1993; Crandall 1994; Joeng 2007). If causal explanations structure obesity-related attitudes as they do in the laboratory, they should be major predictors of attitudes on the responsibility for obesity, government protection for those who are obese, and support for anti-obesity policies among the mass public.

Multiple typologies can be used to classify causal explanations. Iyengar's seminal work divided causes along the lines of individual and society, which is essentially Heider's typology (Heider 1944). This is akin to the locus dimension in attribution psychology which sorts causes as internal or external to the individual. Attribution psychology also identifies the stability dimension, which refers to the permanence of the cause-effect relationship, and the controllability dimension, which separates causes within human control from those outside the realm of human intervention such as genetic determinants of disease. The relevance of the controllability dimension for obesity has been investigated in the laboratory (De Jong 1980; Joeng 2007), and the locus dimension has been prominent in media discourse on obesity (Lawrence 2004). This study is the first to investigate the relevance of the controllability and locus dimensions to individual decision-making about obesity among the public at large.

In addition to exploring the relevance of causal explanations to the topic of obesity, the second goal of this study is to determine the extent of media influence on public support for

different causal explanations. The first of two media effects to be investigated is framing because media frames have been fairly consistently shown to influence individuals' preference among contending causal explanations (Iyengar 1991; Haider-Markel and Joslyn 2008; Jacoby 2000; Knobloch-Westerwick and Taylor 2008, Nelson and Kinder 1996, Strange and Leung 1999). They can even override underlying determinants of opinion such as party identification and level of education (Iyengar 1987).

Investigating framing effects is difficult because the phrase "framing effects" is used to refer to many different phenomena (Entman 1993; Scheufle 1999). Frames can refer to messages that present logically equivalent material in a different manner (Druckman 2001), or frames might present a different construction or definition of the issue, bringing different elements to the fore (Nelson and Kinder 1996). In looking at how frames affect causal explanations, scholars have considered frames using alternative verb voices (Knobloch-Westerwick and Taylor 2008), group-centric frames (Nelson and Kinder 1996), broad versus issue-specific frames (Jacoby 2000), issue frames (Haider-Markel and Joslyn 2001; Sharp and Joslyn 2001), and episodic versus thematic frames (Iyengar 1990, Strange and Leung 1999).

To fully assess the potential incidence of framing effects, I examine three types of frames. Firstly, issue frames could define obesity in terms of either genetic, lifestyle, or external causes. If one cause is covered in the media significantly more than the other two, respondents should pick up on this media consensus and favour that cause of obesity.

Second is the distinction between episodic and thematic frames. Episodic frames portray a particular individual or event (Iyengar 1990) and should encourage individualistic thinking and thereby lifestyle causes. Thematic frames, on the other hand, show trends and make connections between pieces of information (Iyengar 1990). They should promote societal causes, which in this case are the causes of obesity external to individuals.

Finally, issue frames could define obesity in terms of a related issue. This study evaluates frames based on poverty, race, medical costs, and childhood obesity. Frames that portray obesity in relation to poverty and race should encourage lifestyle explanations because of the tendency to hold relevant groups responsible for their problems, negative sentiments towards these groups, or both. Frames that focus on medical costs would likely generate the idea that obesity burdens others, a concept that is most likely to produce a backlash of individual responsibility. While some may see rising medical costs as a symptom and therefore irrelevant to the problem's causes, it is unlikely that this mindset would extend so far as to provoke genetic or external explanations of obesity. Alternatively, issue frames that mention children are likely to generate external explanations of obesity because children are rarely

blamed for their problems. Strange and Leung (1999) found that episodic frames were less effective when they featured children for exactly this reason.

A search for framing effects is also hindered by the discrepancy between the strong framing effects found in the laboratory and the near absence of framing effects identified using survey data. Bartels (1993) attributes these null findings to measurement error and poor methodology that fails to disentangle media coverage, the events themselves, and levels of media exposure. Others argue that there are limitations to framing effects that are absent in the laboratory. Competing frames, the source of the frame, the recipient's predispositions, the recipient's knowledge of politics, and personal experience with the topic can dampen framing effects (Druckman 2001, 2004; Chong and Druckman 2007; Philo 1990; Sharp and Joslyn 2001). Also, laboratory experiments assume that everyone pays enough attention to get the message, and experiments cannot account for public deliberation. Both attention and deliberation are known to alter opinion (examples Zaller 1992; Fishkin 1991).

In recognition of the difficulty in confirming the presence of framing effects, this study looks to determine whether or not framing effects were a possibility. I employ two public opinion surveys, one taken on each end of a marked increase in media coverage on obesity, to indicate changes in opinion. If changes in opinion mirrored changes in media coverage, it is possible that framing occurred. On the other hand, if media frames were incompatible with changes in opinion, it is unlikely that framing occurred.

Until this point, the theoretical framework of this study has built on the assumption that an increasing prominence of a particular frame should produce a greater likelihood of public support for that frame. This is the mechanism at work in the laboratory; however, the flow of information in mass publics is often more complex. Zaller's (1992) theory of mass opinion emphasizes not only the messages or frames in the media but also who pays attention to those messages and what predispositions they hold. Those who pay more attention are more likely to receive media messages, and louder messages filter down to citizens with lower levels of attention. When the media is in agreement, people tend to accept this media consensus and their predispositions matter little. When the media is divided, predispositions play a greater role because people then accept messages consistent with their predispositions and reject those that do not fit. Those who pay more attention generally have a greater ability to link their predispositions to specific attitudes because they have a store of contextual information resulting from media exposure.

Considering Zaller's theory, framing effects should be modified by attention and predispositions. Those who are more attentive should have opinions in tune with the dominant

media frame but use their predispositions more than others if the media offers competing frames. People should accept frames consistent with their predispositions and reject inconsistent frames. I will revisit the findings on framing effects and consider them in conjunction with attention and predispositions.

Both personal experience with obesity and political values are investigated as predispositions in this study. It is possible that those who experience overweight or obesity empathise with media portrayals of obesity, navigating them away from the individual responsibility inherent in lifestyle explanations and toward genetic causes or external causes. Those who are less familiar with obesity might become frustrated with others' apparent inability to maintain their weight and favour lifestyle explanations. Despite this intuitive logic, it has been shown consistently that one's own weight does not influence opinions on the cause of obesity, possibly because of ego defence, cognitive dissonance, or the blaming of social deviants, among other reasons (Crandall 1994; Crandall and Biernat 1990; Katz 1960; Markus and Nurius 1986; De Jong 1980). This is compatible with findings in political science about the muted role of self-interest in decision-making (examples Sears et al 1979; Sears et al 1980; Citrin and Green 1990). Indeed, the respondent's own weight had little impact on support for anti-obesity policy (Oliver and Lee 2005; Hilbert et al). Thus we expect personal experience with obesity to have no influence on beliefs about the causes of obesity among the public.

In contrast, political values, attitudes that specify desirable modes of being or end-states for the world (Rokeach 1968), have been shown to impact opinion on obesity. The conservative values of self-control and individual responsibility produce a general tendency among those holding these values to place responsibility on individuals for their problems, and obesity is no exception (Crandall and Biernat 1990; Crandall 1994). The relevance of political values to public opinion is compatible with the prominence of morality in media coverage (Saguy and Riley 2005). Further, it was theorized that a conversation based in the language of individualism reduces support for public health efforts by constraining our thinking to individualistic solutions (Williams 1989; Wallack and Lawrence 2005). Conservative values should favour lifestyle explanations and liberal values should not.

Since political values might guide attitudes on obesity, the second of two media effects investigated is the ability of the media to enhance the use of values in individual decision-making. One mechanism by which this might occur is media-based delivery of contextual information, which is required to connect higher-order ideas such as values with specific attitudes according to the sophistication hypothesis (example Zaller 1992; Jacoby 2006). However, Goren (2004) demonstrated that evidence for this phenomenon is actually missing

some key components, and he provides additional evidence to suggest that people of all levels of political sophistication can use domain-specific values. I ask whether or not the media provided contextual information that aided the use of values and recognize that both outcomes are possible.

Alternatively, the media could increase the number of times political values, specifically liberal or conservative values, are mentioned in relation to obesity. The more values are mentioned, the more value-based considerations should take hold in the minds of the public. When individuals formulate an opinion, they will average across all of their available considerations (Zaller 1992), so a greater number of value-based considerations would make political values a stronger force in their decision-making calculus.

Data and Methods

To evaluate public opinion on obesity and its determinants, I employed data from two surveys. First, the American Attitudes towards Obesity survey was taken in April and May 2001 and had 909 respondents. The data was collected and originally published by Oliver and Lee (2005). The second survey was an ABC/Time Magazine poll on obesity from May 2004 which had 1202 respondents.¹

Respondents' support for causal explanations of obesity served as an independent variable to predict other obesity-related attitudes and the major dependent variable that media effects were required to explain. As described above, this study investigates the controllability and locus dimensions of causality. The controllability dimension contrasts genetic explanations, which incorporate the concepts of genes or inheritance, and lifestyle explanations, which refer to individual behaviour. The locus dimension polarizes lifestyle explanations against causes external to individuals such as fast-food advertising. Accordingly, questions measuring causal explanations were classified as genetic, lifestyle, or external. Factor analysis confirmed this division (not shown).

In the 2001 survey, respondents were asked if they agreed with statements containing causes of obesity. For example, a statement classified as a lifestyle explanation read, "Many people are overweight because they lack the willpower to diet or exercise regularly." In the 2004 survey, respondents were asked how important each of a series of causes was in generating obesity in the country. The statement "The cost of buying healthy food" is an example of an external explanation, and "Genetics, or a family history" was classified as a genetic explanation. Appendix A includes the wording of all the survey questions measuring causal explanations. Figure 1 presents the scales of measurement, means, and standard deviations.

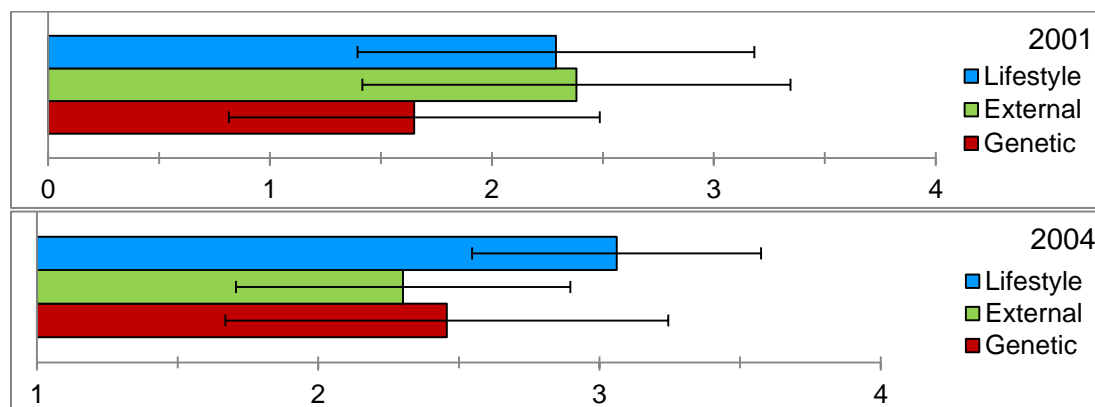


FIG.1. Average support for lifestyle, external, and genetic causes of obesity in 2001 and 2004.

¹ All statistical analysis of the survey data was performed in Stata v.11.0.

Analysis of the survey data relied mostly on OLS regression and logistic regression. Five obesity-related attitudes served as dependent variables: responsibility for obesity, support for government protection for those who are obese, support for anti-obesity policy, belief in lifestyle causes over external causes of obesity, and belief in lifestyle causes over genetic causes of obesity. I now address the rationale and descriptive statistics for the explanatory variables.

First, the demographic characteristics of respondents could impact opinion on obesity because the lived experience of obesity differs by ethnicity, class, gender, and age. Racial minorities and the poor are more likely to be overweight (CDC 2010), and stigmas associated with weight differ by gender, ethnicity, and age (example Latner et al 2005). However, demographic effects can point to a myriad of other factors. For example, if men and women hold different opinions about the cause of obesity, this could indicate the importance of a weight-based stigma, but it could also result from the general tendency among women to favour systemic causes of social problems and men to favour individual-level causes (Iyengar 1989). As self-interest is readily swamped by other considerations in decision-making (examples Sears et al 1979; Sears et al 1980; Citrin and Green 1990), demographic differences probably reflect differences in general worldview brought about by social position rather than alternative experiences with obesity.

To assess the influence of demographic characteristics on opinion, age, gender, race, income, education, and having at least one child less than 18 years of age were included as independent variables. The 2001 survey over-sampled for African American respondents, and the 2004 survey used weighted variables to ensure representativeness. Age was a continuous variable with an average between 45 and 47 in both samples. Gender, race, and having children were coded as dummy variables. Respondents with low incomes often held different opinions than their counterparts, so income was used as a dummy variable to account for this non-linearity (less than \$35,000 = 1). For the same reason education was coded as a dummy variable (no college =1).

Since the respondent's own weight could still influence their opinions on obesity despite the low impact of self-interest, body mass index (BMI) was introduced as an ordered categorical variable: underweight (BMI < 18.5), normal weight (BMI \geq 18.5 & < 25), overweight (BMI \geq 25 & <30), and obese (BMI \geq 30). BMI categories were chosen over a continuous variable because the continuous variable never reached statistical significance, probably because it could not account for non-linearity in the observations. The BMI variables should be interpreted with caution because respondents were asked to report their weight and height. A further caution is in order because the underweight category has relatively few respondents in either survey

(2001 n = 36, 2004 n = 28), but the categories were not adjusted for this because they were defined by medical terminology. To further measure the bearing of the respondent's weight, a dummy variable indicating experience with weight-based discrimination was used from the 2004 survey. A similar question was asked of half the respondents in 2001, but it was excluded to avoid the possible errors resulting from imputing values or using a weighted variable in a dataset with a low number of observations.

Aside from weight, the respondents' own lifestyle behaviours could influence their opinions on obesity. If these variables are relevant, respondents with a typically healthy lifestyle should consistently diverge from others. Respondents were asked how many times a week they get vigorous exercise, eat at restaurants (2001: scale 1-7 mean 2.13 std. dev. 1.18), eat fast-food (2004: scale 1-7 m 1.45 sd 1.46), and eat pre-packaged meals (2001: scale 1-7 m 2.43 sd 1.28).² Exercise was coded as a series of dummy variables because the 2004 survey first asked respondents if they exercised and only asked those who said yes how often they exercised.³ It was possible to control for bias in self-reporting lifestyle behaviour in 2004 because respondents were asked for the personal importance of both eating right and exercising regularly (m 3.36, sd 0.69), but also the personal importance of living life without having to think about diet and exercise (m 3.23, sd 0.89). Each is measured on a scale of 1 through 4, a 4 being very important.

Several questions measuring obesity-related attitudes were available in both surveys. They should be included in regressions because some anti-obesity attitudes must predict opinion on other obesity-related issues. At the very least they might exhibit covariance, in which case they need to be included in order to determine which variable really has the explanatory power. Both surveys asked respondents for the perceived seriousness of obesity as a public health issue on a scale of 1 to 4, with 4 being the most serious (2001: m 3.23 sd 0.68; 2004: m 3.12 sd 0.78). In 2001, respondents were asked if the government should take a more active role in protecting the obese from discrimination (scale 1-4 m 2.04 sd 1.14).

Only the 2004 survey asked who is responsible for obesity. The question was on a scale of 1 to 4, a 4 indicating high responsibility, but a fair number of respondents volunteered an answer of "no responsibility at all." These respondents were included in the lowest category because not every respondent had the option to give that answer. Data analysis repeated using an extra category showed no difference in the substantive findings. Three questions that asked

2 Fewer than 8 categories (0 to 7 times a week) were used because there were not enough respondents in the upper categories.

3 2001: no exercise (n=213)/ less than monthly (137)/ once a week (66)/ 2-4 times (289)/ 5-7 times (198)
2004: no exercise (n=260)/ once or twice a week (86)/ 3 times (248)/ 4-5 times (323)/ 6-7 times (283)

about the responsibility of different actors in the food industry were merged because respondents might not have differentiated these questions. This left measurements of the responsibility of four actors: individuals (m 3.54 sd 0.81), governments (m 2.28 sd 1.10), schools (m 2.91 sd 1.08), and the food industry (m 2.83 sd 0.95).

The 2001 survey contained additional questions about general political attitudes that respondents might have employed in forming attitudes on obesity. Party identification was split into three categories: Republican, Independent or no preference, and Democrat. Those giving no party preference were categorized with Independents so the observations were not lost in regression analysis. Similarly, ideology was separated into conservatives, moderates and non-ideologues, and liberals.

Political values can guide opinion formation as well. Individualism was measured on a scale of 0 to 4, a 4 being the most individualistic (m 2.01 sd 1.19). A second value-oriented question asked respondents to agree or disagree with the statement, "One of the biggest problems in this country is that we give everyone an equal chance." African Americans were generally opposed to this statement, and support was correlated with Republican partisanship, conservative ideology, and other conservative values. Thus the question evaluated antipathy to the means required to create equal opportunity (scale 0-4, 4 = strongly agree, m 1.54 sd 1.23).

A variable was constructed to measure the tendency to blame individuals for their problems because previous work demonstrated the impact of this value on opinion about the cause of obesity (Crandall and Biernat 1990; Crandall 1994). The variable consists of the average of four questions, two each about blaming the poor and blacks for their problems. For example, one statement read "Most poor people are poor because they are irresponsible with their money." This measures the tendency to prefer individual-level explanations over structural arguments about the causes of social problems. The questions were asked on a thermometer scale from -2 to 10, which was shifted to 0 to 12 (m 4.58 sd 2.10). To control for prejudice underlying this blaming tendency, the average of three questions about how friendly respondents found the poor, blacks, and the obese was reversed (scale 0-12, m 5.69 sd 2.23). High values indicate more blame or more prejudice.

Finally, the 2001 survey measured support for other public health policies, which people might use as a shortcut in thinking about anti-obesity policy. As over 80% of respondents supported mandatory helmet laws for motorcyclists, this variable was not used in regression analysis. Variables measuring support for banning smoking in public places (m 2.67 sd 1.32) and tobacco taxes (m 2.49 sd 1.28) were used on a scale of 0 to 4, a 4 indicating strong support. The question wording for all of these other variables appears in Appendix A.

There was no measure of attention to the media available in either survey, so education was used as a proxy measure. Education is a suitable proxy measure because it is linked with the propensity to gather and store information and having a profession in which exposure to news media is more common (Sniderman et al 1991).

Moving on from the survey data, I performed a LexisNexis search of “major US newspapers” for articles containing the word “obesity.” The 37 major newspapers in LexisNexis are likely to reflect the popular media messages that reached the wider audience and therefore permit an assessment of media content from this time period. Lexicoder was used to code these articles based on the presence of words and phrases related to each cause, issue frame, or set of political values. Care was taken to establish accurate and balanced dictionaries of words that indicate the presence of each frame or set of political values (Appendix B).

Identification of episodic and thematic frames was performed manually based on a pre-determined set of criteria (Appendix C). In the interest of time, the percentage of articles displaying episodic or thematic frames was determined using a sample of 200 articles from every 3-month interval between December 2000 and May 2004. The total number of articles displaying each frame was estimated by multiplying that percentage by the total number of articles. Samples were identified using a random number generator (randomizer.org).

Results

Responsibility and Government Protection

The study begins by determining the role of causal explanations in forming obesity-related attitudes. First, how do respondents decide who to hold responsible for obesity? Factor analysis (not shown) indicated that the answers to questions about responsibility split into two factors: the responsibility of individuals versus the responsibility of governments, schools, and the food industry. Individual responsibility minus the average responsibility attributed to other actors was used as the dependent variable in an OLS regression (Table 1). The strongest predictors of who respondents held responsible for obesity were their beliefs about what causes obesity. Respondents who believed that lifestyle causes obesity were more likely to favour individual responsibility, and those who thought obesity has causes external to the individual favoured the responsibility of other actors. Respondents' opinions on genetic causes of obesity were not statistically significant, and neither was BMI. Age and education were the only significant demographic variables.

TABLE 1. OLS regressions explaining tendency to favour individual responsibility for obesity and support for government protection of the obese from discrimination.

Independent variable		Coefficient (Standard error)	
		Responsibility for obesity (2004)	Government protection for obese (2001)
Causes of obesity	Lifestyle	0.860 (0.055)*	-0.065 (0.047)X
	External	-0.905 (0.049)*	0.167 (0.043)*
	Genetics	0.010 (0.034)X	0.210 (0.050)*
Demographic	Age	-0.005 (0.002)**	-0.003 (0.003)X
	Female	-0.014 (0.056)X	0.107 (0.088)X
	African American	-0.090 (0.099)X	0.419 (0.105)*
	No college	-0.184 (0.058)**	0.180 (0.089)***
	Income below \$35,000	0.041 (0.061)X	0.327 (0.088)*
	Children under 18	-0.014 (0.059)X	0.117 (0.088)X
Obesity-related	Obesity is serious	-0.083 (0.036)***	0.048 (0.060)X
	Underweight (BMI < 18.5)	0.074 (0.168)X	-0.401 (0.219)****
	Overweight (25 ≤ BMI < 30)	0.070 (0.061)X	0.022 (0.095)X
	Obese (BMI ≥ 30)	-0.023 (0.077)X	0.170 (0.109)X
Constant		0.830 (0.209)	1.039 (0.273)
n		998	738
R ²		0.3827	0.1199

*p < 0.001 **p < 0.01 ***p < 0.05 ****p < 0.10 X not statistically significant

Using the clarify option in Stata, it was possible to demonstrate how changes in opinions on the causes of obesity would change respondents' attitudes about who is responsible. The

hypothetical respondent in this simulation was a 30 year-old African American woman who has a college education, an annual income over \$35,000, children under 18, a normal BMI, and moderate concern for obesity as a public health issue. If she had maximum support for lifestyle causes coupled with minimum support for external causes, she would place responsibility almost entirely on the individual (right-hand side, Figure 2). On the other hand, if she had maximum support for external causes and minimum support for lifestyle causes, she would find other actors generally responsible (left-hand side, Figure 2). Therefore attitudes about who is responsible for obesity depend mostly on opinions about what causes obesity.

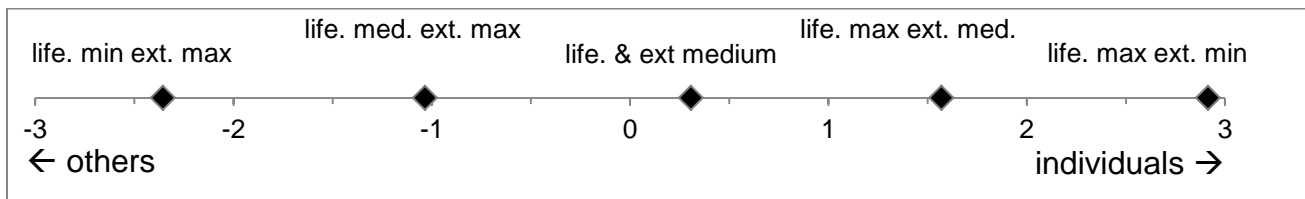


FIG. 2. Predicted attributions of responsibility for obesity based on changes in lifestyle and external causal explanations of obesity for a hypothetical respondent.

How did respondents decide whether or not to support government protection of the obese from discrimination? Regression analysis predicting support for government protection showed that causal explanations of obesity were again essential factors in decision-making (Table 1). This time beliefs in external causes and genetic causes of obesity were important, and support for lifestyle explanations was not statistically significant. African American race and having an annual income below \$35,000 remained important indicators of support for government protection, and underweight was the only significant obesity-related variable.

Using the same hypothetical respondent as above, it was possible to estimate changes in support for government protection based on changes in attitudes about genetic and external causes of obesity. A maximum possible belief in genetic and external causes would make this otherwise undecided respondent somewhat supportive of government protection, with a position just above 3 on a scale of 1 to 4 (right-hand side, Figure 3). If the respondent disagreed completely with genetic and external causes, she would be reasonably opposed to government protection, with a position less than 2 on the 1 to 4 scale (left-hand side, Figure 3). Overall, causal explanations were important variables, and they had a moderate impact on attitudes about government protection for the obese.

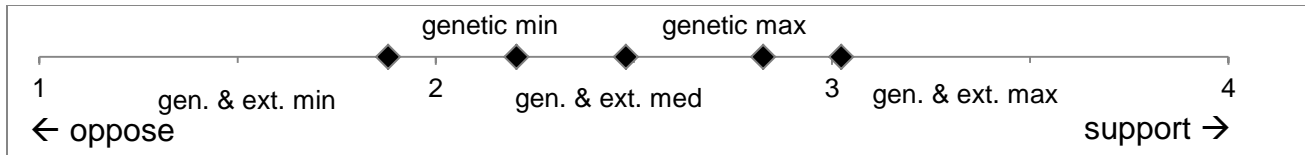


FIG. 3. Predicted support for government protection for the obese based on changes in genetic and external causal explanations of obesity for a hypothetical respondent.

Policy Support

Above it was determined that causal explanations are important predictors of attitudes on responsibility for obesity and government protection of the obese. Are causal explanations also involved in citizens' reasoning about support for anti-obesity policy? Table 2 presents ordered logit models predicting support for regulating or banning food advertisements aimed at children and introducing snack taxes in both 2001 and 2004. Other policies included in the surveys had similar results (not shown). The impact of changes in opinion on the causal explanations was estimated using the clarify option in Stata (Appendix D).

TABLE 2. Ordered logit models of support for two anti-obesity policies in 2001 and 2004.

Independent variable		Coefficient (Standard error)			
		2001		2004	
		Regulate food ads for kids	Tax on junk food	Ban food ads aimed at kids	Tax on junk food
Causes of obesity	Lifestyle	0.135 (0.088)X	0.082 (0.088)X	0.014 (0.168)X	-0.226 (0.170)X
	External	0.405 (0.079)*	0.291 (0.079)*	0.466 (0.134)*	0.633 (0.136)*
	Genetics	-0.027 (0.089)X	-0.028 (0.089)X	-0.099 (0.079)X	0.127 (0.080)X
Demographic	Age	0.016 (0.005)*	0.004 (0.005)X	-0.003 (0.004)X	-0.017 (0.004)*
	Female	0.364 (0.157)***	-0.115 (0.160)X	0.453 (0.128)*	0.224 (0.129)****
	African American	-0.153 (0.196)X	0.235 (0.199)X	-0.403 (0.234)****	0.047 (0.238)X
	No college	0.234 (0.160)X	0.304 (0.161)****	-0.428 (0.133)**	0.063 (0.133)X
	Income below \$35,000	0.400 (0.157)***	0.520 (0.160)**	-0.096 (0.142)X	0.255 (0.139)****
	Children under 18	0.259 (0.154)****	-0.021 (0.154)X	-0.117 (0.134)X	-0.179 (0.137)X
Obesity-related	BMI1	-0.301 (0.427)X	-0.126 (0.398)X	-0.679 (0.419)X	-0.064 (0.376)X
	BMI3	0.036 (0.168)X	-0.457 (0.172)**	0.068 (0.141)X	-0.249 (0.142)****
	BMI4	0.343 (0.190)****	0.042 (0.188)X	-0.153 (0.173)X	-0.111 (0.175)X

Independent variable		Coefficient (Standard error)			
		2001		2004	
		Regulate food ads for kids	Tax on junk food	Ban food ads aimed at kids	Tax on junk food
Obesity-related	Obesity is serious	0.119 (0.108)X	0.163 (0.106)X	0.182 (0.082)***	0.169 (0.084)***
Responsibility for obesity	Individual	-	-	-0.201 (0.108)****	-0.026 (0.109)X
	Government	-	-	0.238 (0.070)**	0.228 (0.070)**
	Schools	-	-	0.131 (0.068)****	0.047 (0.071)X
	Corporate	-	-	0.343 (0.086)*	0.234 (0.089)**
2004 Survey	Personal importance of healthy lifestyle	-	-	0.118 (0.097)X	0.168 (0.100)****
	Personal importance of carefree lifestyle	-	-	-0.032 (0.071)X	-0.084 (0.070)X
2001 Survey	Liberal	0.268 (0.182)X	0.040 (0.180)X	-	-
	Conservative	-0.196 (0.187)X	-0.114 (0.189)X	-	-
	Democrat	0.203 (0.176)X	0.232 (0.173)X	-	-
	Republican	0.006 (0.195)X	-0.213 (0.198)X	-	-
	Equal chance a big problem	-0.304 (0.065)*	-0.143 (0.065)***	-	-
	Tendency to blame	0.094 (0.036)***	0.085 (0.037)***	-	-
	Prejudice behind blame	-0.008 (0.033)X	-0.037 (0.033)X	-	-
	Ban smoking in public places	0.180 (0.059)**	0.063 (0.061)X	-	-
	Cigarette tax	0.265 (0.063)*	0.312 (0.064)*	-	-
	Cut 1	0.909 (0.589)	0.693 (0.579)	1.311 (0.543)	2.005 (0.543)
	Cut 2	3.411 (0.591)	3.068 (0.589)	2.380 (0.545)	2.938 (0.546)
	Cut 3	3.769 (0.593)	3.356 (0.591)	3.341 (0.552)	4.039 (0.553)
	Cut 4	5.812 (0.616)	5.544 (0.616)	-	-
	n	724	722	986	983
	Prob > χ^2	0.0000	0.0000	0.0000	0.0000
	Pseudo R ²	0.1014	0.0726	0.0782	0.0741

*p < 0.001 **p < 0.01 ***p < 0.05 ****p < 0.10 X not statistically significant

The hypothetical respondent used for predicting policy support was a 45 year-old Caucasian man with an income below \$35,000, no college education, no children, a normal

BMI, and a medium level of support for all the other variables except blame and prejudice for which he had mean values. He was not an ideologue or partisan.

In 2001, agreeing with external causes of obesity, supporting tobacco policy, and holding certain political values had the greatest impact on policy support. If this otherwise undecided respondent moved from a medium to maximum belief in external causes, he would be 11.4% more likely to support regulating ads in 2001 and 15% less likely to oppose this measure. A shift from medium to maximum support for both tobacco policies made this respondent 16.2% less likely to oppose ad regulations in 2001 and 12% more likely to support it.

Political values had a slightly smaller impact than support for external causes and tobacco policy. A shift from mean to maximum tendency to blame individuals increased the probability of support for a snack tax by 10.6% and decreased the probability of opposition by 10.8%. Belief in equal opportunity had a greater effect on support for regulating ads than for introducing a snack tax. A move from medium to minimum resistance to equal opportunity made this respondent 11.1% less likely to oppose the regulation of ads and 9.0% more likely to support the policy. In contrast to the variables just discussed, making the respondent a liberal Democrat increased support by only about 8% for ads and about 4% for a tax, and being obese produced at most 6% changes in the probability of support or opposition.

In 2004, believing in external causes of obesity and attitudes about the responsibility for obesity were important determinants of policy support. A shift from medium to maximum belief in external causes meant the respondent would be 16.6% less likely to strongly oppose a snack tax in 2004 and 20.3% more likely to strongly support it. Individual responsibility was only statistically significant for ads, and it made respondents 6.4% more likely to strongly oppose the policy. If individual responsibility is increased to the maximum and the other three responsibility variables move to the minimum, the respondent would be 31.9% more likely to strongly oppose the policy. This change in combination with maximum support for external causes cut the increase in the probability of strong opposition in half, to 14.7%. In contrast with the importance of attitudes about cause and responsibility, the personal importance of a healthy lifestyle produced only a 3-5% increase in support, and being obese made a difference of about 1-3%.

There were a few noticeable changes across the two years. Respondents with children were 4% more likely to support for regulating ads in 2001, but this variable was not statistically significant in 2004. Lifestyle causes had larger coefficients in 2001, although they were statistically insignificant. Maximum support for lifestyle explanations added about 3-4% to the impact of belief in external causes in 2001. In 2004, respondents concerned about the obesity epidemic were about a 3-4% more likely to strongly support policy, but this attitude did not reach

statistical significance in the 2001 equations. It is also worthy of note that in 2001 support for banning smoking in public places influenced support for regulating ads but not for snack taxes, and in 2004 the responsibility of individuals and schools impacted support for banning food advertisements aimed at children but not for snack taxes.

Overall, causal explanations were strong predictors of three obesity-related attitudes: responsibility for obesity, support for government protection of the obese, and support for anti-obesity policy. Respondents who believed in external causes of obesity were more likely to place responsibility on political actors other than individuals. They were also more likely to support government protection of the obese and anti-obesity policy. Respondents who agreed with genetic explanations were more likely to support government protection, and those who agreed with lifestyle explanations were more likely to hold individuals responsible. Since causal explanations were major predictors of obesity-related attitudes and this relationship existed in both 2001 and 2004, causal explanations are central to individuals' decision-making about obesity. Having established this, the study now addresses the second major question. Can the media influence support for the different causal explanations among the public?

Media Effects

So far the study has established that causal explanations are important components of individual decision-making about obesity. The next step is to determine the extent of media influence on public support for the different causal explanations. To answer this question, the difference in public support for the three causal explanations between 2001 and 2004 was used as the dependent variable. Then two aspects of media coverage were evaluated for compatibility with the change in public opinion: media frames and media portrayal of political values. This timeframe is likely to yield media effects because the number of articles in major US newspapers containing the word "obesity" almost tripled during the three years between the surveys (Figure 4).

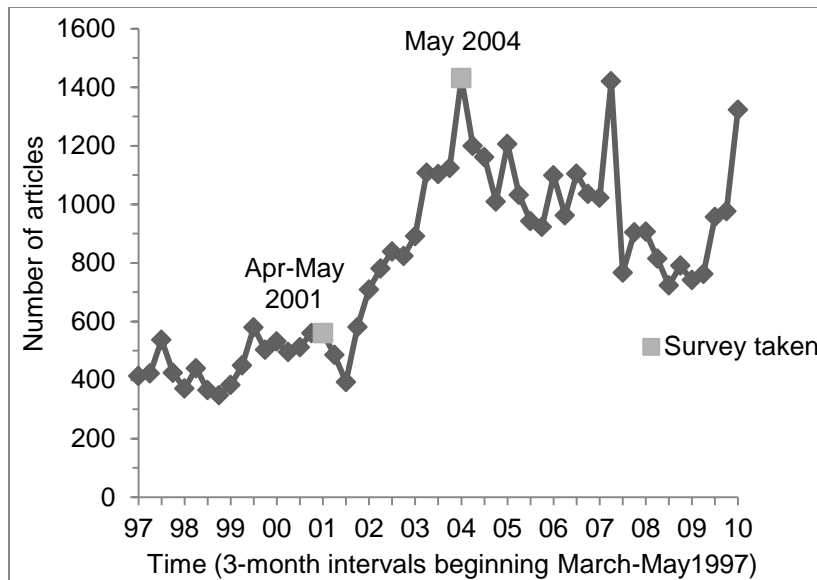


FIG. 4. Number of articles in major US newspapers containing the word “obesity” over 12 years as determined by LexisNexis searches.

Returning now to the survey data from this time, Figure 5 describes respondents’ support for genetic, lifestyle, and external causes of obesity relative to each other in both 2001 and 2004. The difference in public support for lifestyle over genetic explanations exhibited no change over the 3-year period (mean 0.64 in 2001 and 0.61 in 2004, Figure 5A). The locus dimension, in contrast, witnessed an increase in support for lifestyle causes over external causes (mean -0.09 in 2001 and 0.76 in 2004, Figure 5B). Support for genetic causes increased over the three-year interval relative to external explanations, bringing them to about equal levels of support in 2004 (mean -0.73 in 2001 and 0.16 in 2004, Figure 5C). This is best summarized by asking: why did lifestyle explanations and genetic explanations gain relative to external explanations over the three years, and why did lifestyle explanations emerge as the most preferred causal explanation for obesity in 2004?

However, Figure 5 could also be interpreted to suggest a loss in support for external causes while support for the other two causes remained constant. Since there was a large increase in media coverage during this time, it is unlikely that neither lifestyle causes nor genetic causes gained support. Perhaps there was a loss in support for external causes and a gain in support for the others, but that possibility is captured in the first interpretation because it assesses the relative gain in support for both lifestyle causes and genetic causes of obesity.

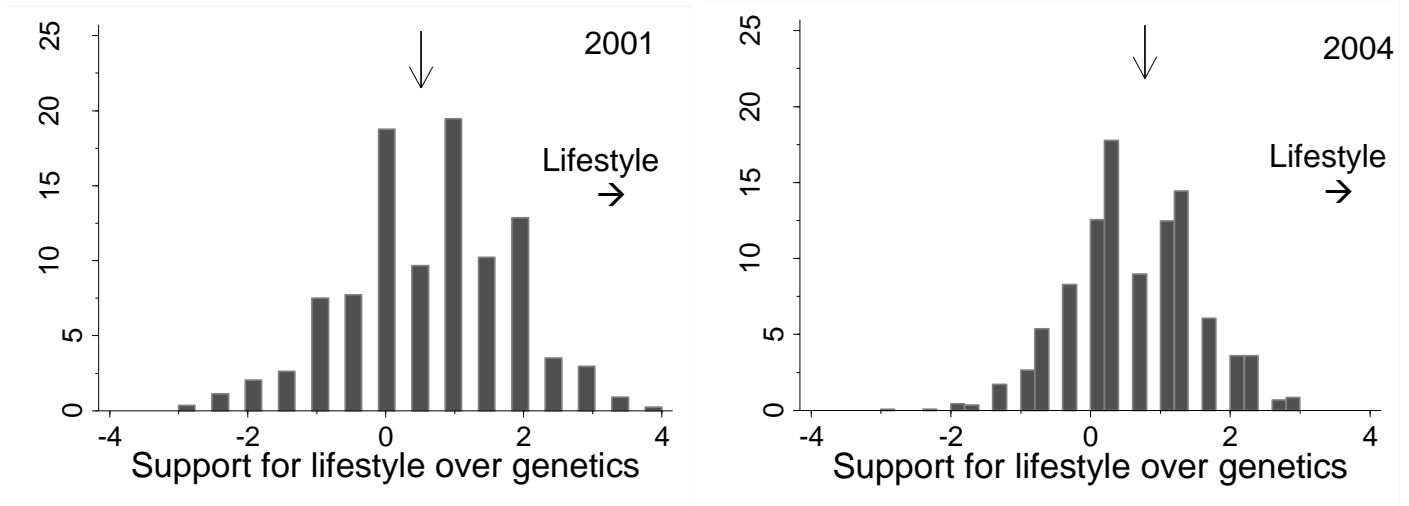


FIG. 5A. Support for lifestyle causes of obesity minus that for genetic causes in 2001 and 2004.

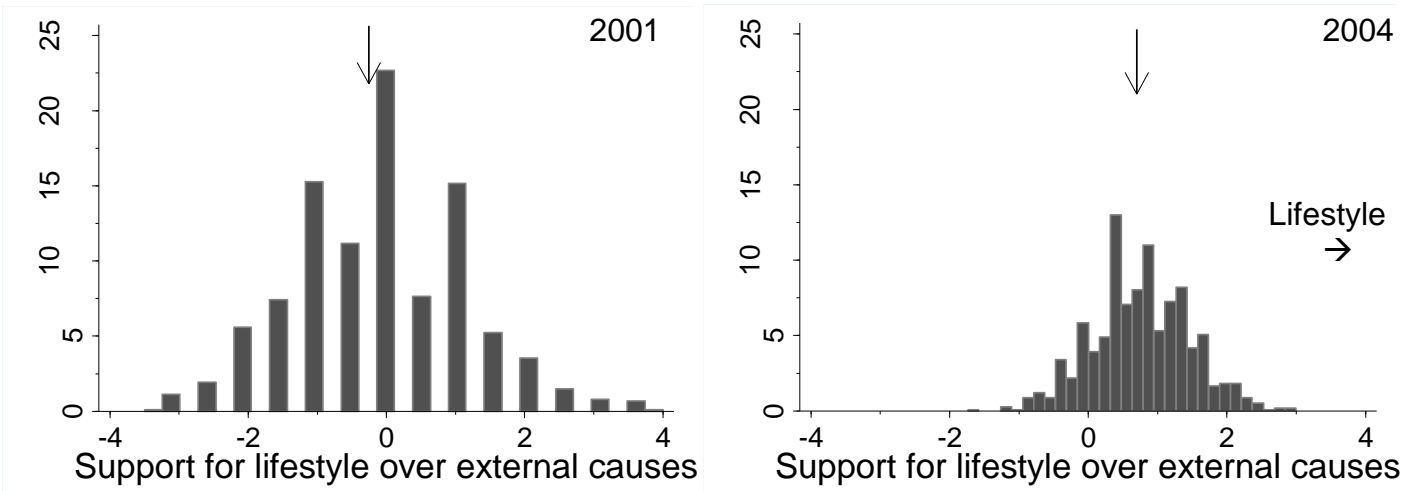


FIG. 5B. Support for lifestyle causes of obesity minus that for external causes in 2001 and 2004.

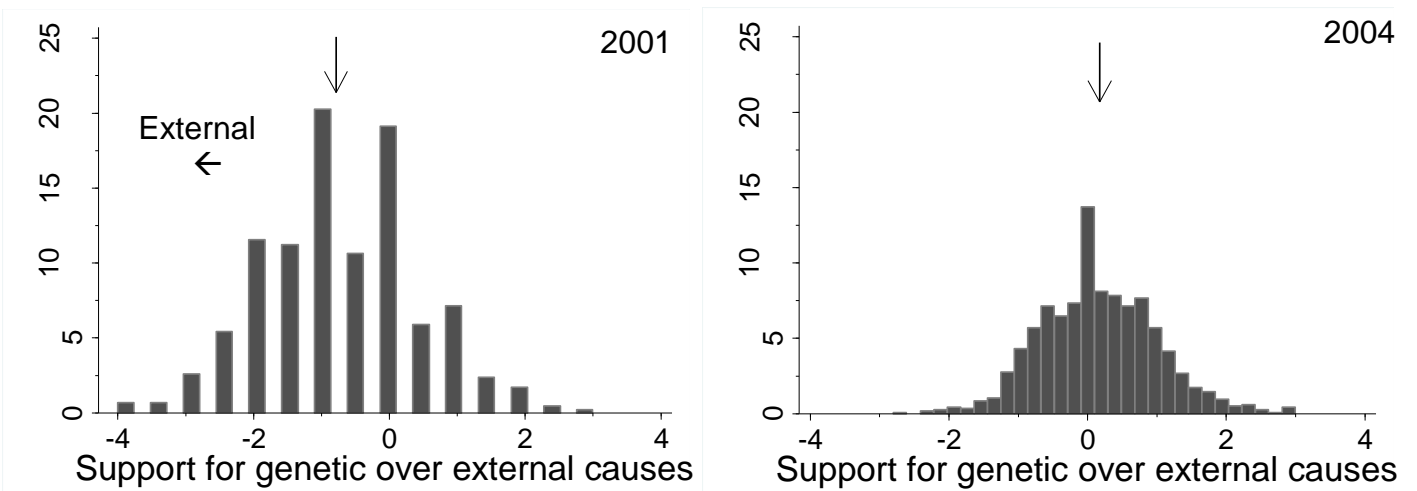


FIG. 5C. Support for genetic causes of obesity minus that for external causes in 2001 and 2004.

Framing Effects

Framing effects were the first of two media effects tested for their ability to explain changes in public support for the causal explanations of obesity. Overall three types of frames were examined, and the first was issue frames that define the issue of obesity in terms of one of its causes. Were issue frames consistent with the popularity of lifestyle explanations in 2004 and the increase in support for lifestyle causes and genetic causes relative to external causes?

Prior to the first survey, genetic frames were the most prominent. They were about twice as prevalent as external causes and about 1.3 times as prevalent as lifestyle explanations in the media (Figure 6). This high coverage of genetic causes of obesity is at odds with low support for genetic causes among respondents in 2001 (Figure 5). The three frames then received similar amounts of coverage before the 2004 survey (Figure 6), but equal coverage does not explain why lifestyle became the most preferred cause among respondents in 2004 (Figure 5).

Therefore, the prevalence of issue frames that defined obesity in terms of the three different causes was simply incompatible with popular opinion in both years.

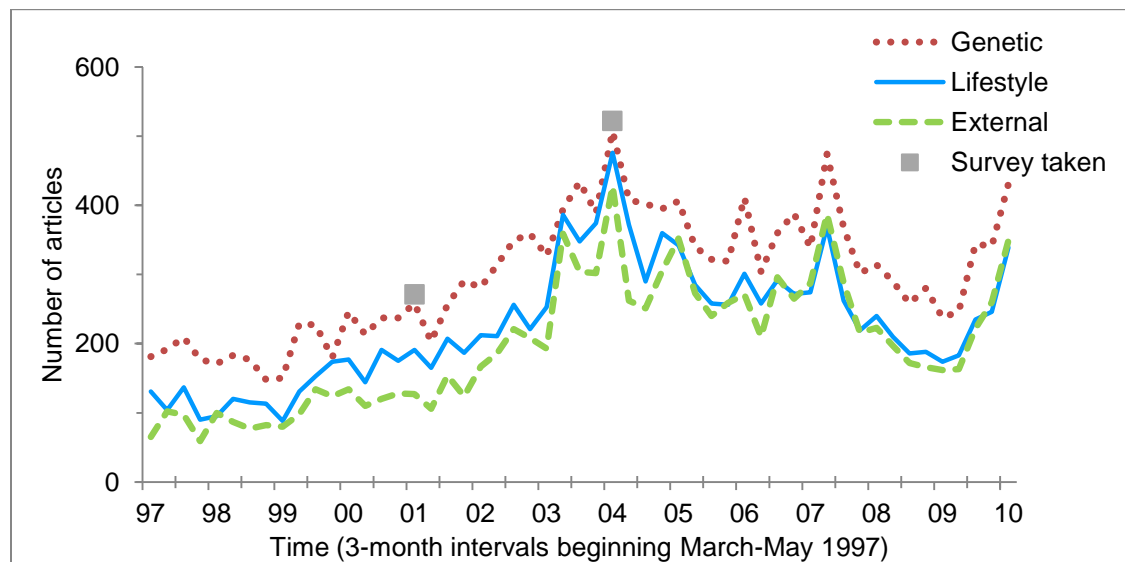


FIG. 6. Number of articles in major US newspapers mentioning each causal explanation of obesity in 3-month intervals as determined by LexisNexis searches.

Rather than looking at the amount of media coverage of each issue frame in 2001 and 2004, the relative change in coverage during the three years might correspond to changes in opinion. Specifically, coverage of lifestyle and external causes increased at a greater rate than did coverage on the genetic causes of obesity (Figure 6), so respondents might have been swayed by the relative rise in popularity of both lifestyle causes and external causes. This would explain why respondents had a greater belief in lifestyle causes than in genetic causes in 2004, but it would not explain why respondents also favoured lifestyle causes over genetic causes in

2001 (Figure 5A). Furthermore, media coverage on external causes increased relative to coverage on genetic causes (Figure 6), but respondents in 2004 actually demonstrated greater support for genetic causes than for external causes (Figure 5C). The change in the relative popularity of the causes in the media was incongruent with observed changes in public opinion.

Although media coverage of the three causes of obesity was not compatible with public opinion, the equal coverage of the three causes in 2004 was an instance of competing frames. Competition can reduce framing effects because people can choose the frame that fits with their predispositions (Chong and Druckman 2007; Zaller 1992). Below I return to the possibility that competing frames induced the use of predispositions and thereby a disconnection between dominant frames and public opinion.

In a second attempt to find framing effects, the study evaluated episodic and thematic frames in the media. Episodic frames should promote lifestyle causes and thematic frames should promote external causes. Prior to each of the surveys, the media covered thematic frames about twice as much as episodic frames (Figure 7). Despite the dominance of thematic frames, respondents rated lifestyle and external explanations equally in 2001 and increased their support for lifestyle explanations in 2004 (Figure 5A). The prominence of thematic frames also conflicts with the increase in popularity of genetic causes over external causes (Figure 5C). Again, the frames in the media were inconsistent with changes in popular opinion.

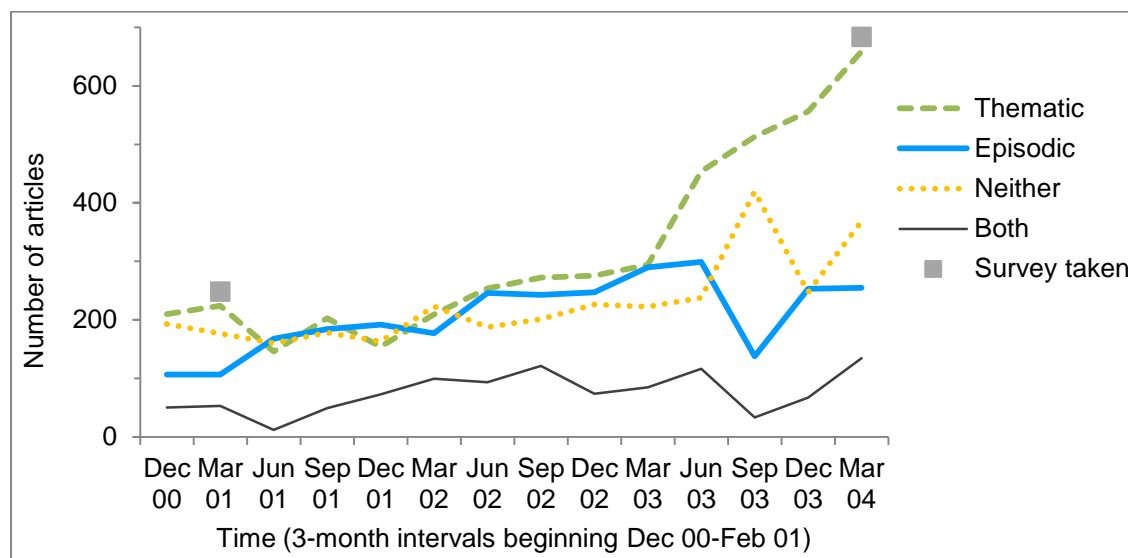


FIG. 7. Estimated number of episodic and thematic frames in articles from major US newspapers mentioning obesity, based on a representative sample.

In relation to episodic and thematic frames it is important to acknowledge that this study relied solely on newspaper articles. Iyengar focused his work entirely on television, which he argued is prone to episodic frames because of time constraints and the need to entertain

viewers (Iyengar 1991). Although newspaper articles from this time included predominantly thematic frames, television during this period could have featured mostly episodic frames. However, it has been shown that the content and frames in television and newspapers are fairly similar (example Semetko and Valkenburg 2000).

In a third and final attempt to identify framing effects, the study evaluated issue frames that defined obesity in terms of a related issue such as poverty, race, medical costs, and childhood obesity. The childhood obesity frame received about five times the coverage of the other issue frames before the first survey, and about six times the coverage before the second survey (Figure 8A). Although the media was heavily covering childhood obesity, which should promote external explanations, lifestyle explanations and genetic explanations increased in popularity relative to external explanations (Figure 5). Furthermore, childhood obesity was of similar prominence to general obesity in the minds of the public (Figure 8B), suggesting that childhood obesity did not become central in the public’s general assessment of obesity. For the third time, media frames were not compatible with changes in public opinion.

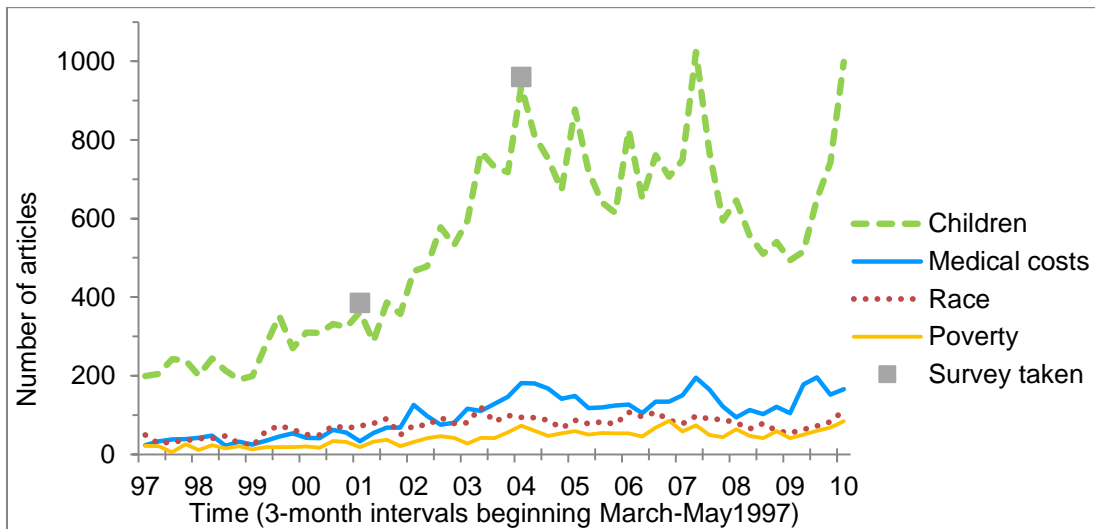


FIG. 8A. Number of articles in major US newspapers mentioning obesity in relation to poverty, race, medical costs, and childhood obesity.

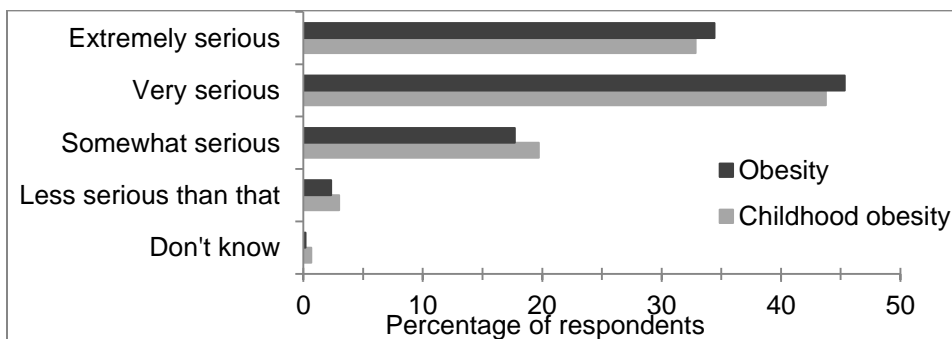


FIG. 8B. Seriousness of childhood obesity compared to overall obesity in 2004.

To be sure, the articles about childhood obesity could invoke ideas about parental responsibility and would therefore be consistent with the increase in support for lifestyle explanations among respondents. A fair number of the articles (read while coding for episodic and thematic frames) addressed the importance of teaching children good lifestyle habits. Sometimes this was discussed in relation to parents, but sometimes the articles depicted children as small adults who were already making bad lifestyle choices. Since our first instinct is generally not to link children with personal responsibility, I interpret these articles as attempts to make sense of childhood obesity within a discussion that is already defined by lifestyle explanations. I return to this point below.

Overall, media portrayal of the three types of frames was inconsistent with the results of the public opinion surveys. The increase in lifestyle explanations demonstrated in Figure 5 conflicts with increasingly similar coverage of all three causes, increasing coverage of thematic frames, and the prominence of the childhood obesity frame. As a simple argument about the prevalence of frames and concurrent opinion change is not sufficient to explain the changes in public opinion, I now turn to the interaction of media messages, individuals' attention to the media, and individuals' predispositions to explain the absence of framing effects and the change in public opinion.

Attention

This section revisits the framing results and considers the views of the respondents who would have paid the most attention to these frames, as indicated by the opinions of those with at least some college education (Table 3). Those who paid more attention should have been in agreement with a media consensus. Since genetic causes of obesity were covered more than the other causes in 2001 (Figure 6), those who paid more attention should have been more favourable to the idea that obesity is genetic, and indeed this was the case (Table 3). However, in 2004 these respondents were more likely to attribute obesity to lifestyle despite equal coverage of the three causes (Table 3, Figure 6). Thematic frames and childhood obesity frames were the dominant frames preceding both surveys (Figures 7 & 8A), and, as expected, those with at least some college education saw obesity as the result of causes external to individuals in 2001 (Table 3). However, contrary to expectations, they were more likely than other respondents to perceive lifestyle as the cause of obesity in 2004 (Table 3).

Overall, more educated respondents agreed with the media consensus in 2001 but not in 2004. Since there was no change from one dominant frame to another dominant frame, attention to the media does not explain why the opinions of more attentive respondents reversed over only three years. It is possible that competing frames about the causes of obesity

encouraged the use of predispositions, and more attentive respondents would have had a greater ability to use their predispositions, according to the sophistication hypothesis. Even in that scenario attention is an intervening variable, not the reason for the change in public opinion. Attention alone cannot explain the absence of framing effects or the change in public opinion.

TABLE 3. OLS regressions using demographic variables to explain lifestyle as a cause of obesity minus either genetic causes or external causes of obesity. Positive coefficients suggest that respondents are more likely to say lifestyle is the cause of obesity.

Independent variable	Lifestyle – genetic causes		Lifestyle – external causes	
	2001	2004	2001	2004
Age	0.010 (0.003)*	0.001 (0.002)X	0.003 (0.003)X	-0.001 (0.001)X
Female	-0.056 (0.089)X	-0.129 (0.057)***	-0.368 (0.089)*	-0.160 (0.042)*
African American	0.339 (0.111)**	-0.437 (0.105)*	0.317 (0.111)**	-0.393 (0.077)*
No college	0.257 (0.095)**	-0.149 (0.061)***	0.120 (0.095)X	-0.225 (0.045)*
Income below \$35,000	0.115 (0.094)X	-0.082 (0.065)X	0.213 (0.095)***	-0.139 (0.048)**
Constant	0.257 (0.151)	0.590 (0.102)	-0.071 (0.152)	0.823 (0.075)
n	768	1038	766	1020
R ²	0.0491	0.0346	0.0440	0.0866

*p < 0.001 **p < 0.01 ***p < 0.05 ****p < 0.10 X not statistically significant

This investigation into the role of attention, although unsuccessful, produced evidence of a larger trend behind the changes in public opinion. Not only did respondents with college education change their minds, but there was actually a strong reversal in support for lifestyle explanations along the lines of race and class (Table 3). In 2001, African Americans were 33.9 percentage points more likely than those of other races to say obesity is caused by lifestyle compared to genetics and 31.7 percentage points more likely to say obesity is caused lifestyle and not external causes (Table 3). In 2004 the opposite was true. African Americans were 43.7 percentage points less likely than those of other races to say obesity is caused by personal lifestyle compared to genetic causes and 39.3 percentage points less likely to favour lifestyle causes over external causes of obesity.

The influence of income and education completely reversed as well (Table 3). In 2001, respondents without any college education were 25.7 percentage points more likely than others surveyed at that time to say obesity is caused by personal lifestyle and not genetics. In 2004, this group was 14.9 percentage points less likely to favour lifestyle causes over genetic causes. The direction of the coefficients on income supports the findings for college although they are not statistically significant. Comparing respondents' support for lifestyle and external causes of obesity, those with low incomes were 21.3 percentage points more likely to favour lifestyle

causes in 2001 but 13.9 percentage points less likely to do so in 2004. Again, the direction of coefficients on education agreed with the findings for income.

Considering this observation, the study must now explain the popularity of lifestyle explanations in 2004, why middle- and upper-class whites experienced a greater shift in support toward lifestyle explanations, and why the greater support for lifestyle and genetic causes of obesity was at the expense of support for external causes. Additionally, the solution should clarify the unexpected absence of framing effects and why those with higher levels of attention held opinions at odds with the dominant frames in 2004. Since I have considered media messages and attention, I must now incorporate the third component of Zaller’s theory, predispositions, to answer these questions.

Predispositions

The evidence presented thus far identified causal explanations as an important ingredient in individuals’ decision-making about obesity. There was no evidence that media frames influenced public support for the different causal explanations of obesity, and framing effects could not be revived by considering media frames and attention to the media simultaneously. Considering the role of predispositions is the next logical step in explaining changes in public support for the different causal explanations of obesity.

How did respondents holding divergent predispositions differ in their beliefs about the causes of obesity? To answer this question, personal experience with obesity and political values, two highly relevant predispositions, were included in regression equations predicting support for either lifestyle causes over external causes, or lifestyle causes over genetic causes (Table 4). No measures of political values were available in the 2004 survey.

TABLE 4. OLS regressions estimating the impact of demographics, personal experience with obesity, and political values on support for lifestyle causes over either external causes or genetic causes of obesity.

Independent variable		Coefficient (Standard error)			
		2001		2004	
		Belief in lifestyle over external	Belief in lifestyle over genetic	Belief in lifestyle over external	Belief in lifestyle over genetic
Demographic factors	Age	0.003 (0.003)X	0.009 (0.003)**	-0.001 (0.001)X	0.001 (0.002)X
	Female	-0.231 (0.099)***	0.046 (0.098)X	-0.122 (0.045)**	-0.148 (0.060)***
	African American	0.437 (0.118)*	0.408 (0.118)**	-0.362 (0.078)*	-0.440 (0.106)*
	No college	0.007 (0.100)X	0.182 (0.100)****	-0.231 (0.045)*	-0.118 (0.062)****

Independent variable		Coefficient (Standard error)				
		2001		2004		
		Belief in lifestyle over external	Belief in lifestyle over genetic	Belief in lifestyle over external	Belief in lifestyle over genetic	
Demographic factors	Annual income below \$35,000	0.217 (0.099)***	0.107 (0.098)X	-0.138 (0.049)**	-0.037 (0.066)X	
	Children under 18	0.007 (0.097)X	0.109 (0.097)X	-0.015 (0.047)X	0.025 (0.064)X	
Opinion on obesity	Obesity is serious	-0.168 (0.065)***	0.117 (0.065)****	-0.020 (0.028)X	0.087 (0.038)***	
Personal experience with obesity	Underweight (BMI < 18.5)	-0.127 (0.240)X	-0.578 (0.239)***	-0.215 (0.132)X	-0.288 (0.177)X	
	Overweight (BMI ≥ 25 & < 30)	-0.040 (0.105)X	0.152 (0.105)X	-0.027 (0.049)X	-0.001 (0.066)X	
	Obese (BMI ≥ 30)	-0.11557 (0.121)X	-0.101 (0.121)X	-0.074 (0.063)X	-0.122 (0.085)X	
	Exercise	Never	-0.11 (0.196)X	0.032 (0.197)X	-0.103 (0.065)X	-0.113 (0.089)X
		Less than weekly	0.226 (0.201)X	0.150 (0.202)X	-	-
		1-2/wk	-	-	-0.018 (0.090)X	0.058 (0.122)X
		2-4/wk	0.013 (0.186)X	0.104 (0.187)X	-	-
		4-5/wk	-	-	0.047 (0.061)X	0.055 (0.083)X
		5-7/wk	0.017 (0.194)X	0.238 (0.195)X	-	-
	6-7/wk	-	-	0.051 (0.064)X	-0.073 (0.087)X	
	Eating at restaurants('01) Eating fast-food ('04)		0.005 (0.040)X	0.003 (0.040)X	0.033 (0.015)***	0.007 (0.020)X
	Eating pre-packaged food		-0.037 (0.036)X	-0.062 (0.036)****	-	-
	Faced discrimination for weight		-	-	-0.067 (0.075)X	-0.067 (0.102)X
Personal importance of a healthy lifestyle		-	-	-0.082 (0.034)***	0.050 (0.046)X	
Personal importance of a carefree lifestyle		-	-	0.021 (0.024)X	-0.039 (0.033)X	
Political values	Equal chance is a problem	0.078 (0.038)***	0.039 (0.038)X	-	-	
	Individualism	0.009 (0.039)X	0.044 (0.039)X	-	-	
	Tendency to blame	0.133 (0.022)*	0.126 (0.022)*	-	-	

Independent variable		Coefficient (Standard error)			
		2001		2004	
		Belief in lifestyle over external	Belief in lifestyle over genetic	Belief in lifestyle over external	Belief in lifestyle over genetic
Political values	Prejudice behind blame	0.002 (0.020)X	-0.043 (0.020)***	-	-
	Conservative ideology	0.129 (0.110)X	0.040 (0.110)X	-	-
	Liberal ideology	-0.177 (0.111)X	-0.154 (0.111)X	-	-
	Constant	-0.388 (0.383)	-0.825 (0.382)	1.245 (0.162)	0.432 (0.220)
	n	708	707	1012	1030
	R ²	0.1340	0.1390	0.1066	0.0557

*p < 0.001 **p < 0.01 ***p < 0.05 ****p < 0.10 X not statistically significant

To demonstrate the impact of these variables, the maximum change in the explanatory variable was presented as a percentage of the total possible change in the dependent variable (Appendix E). To put it simply, how does a change in each independent variable alter the respondent's opinion on the cause of obesity?

Variables measuring personal experience with obesity were either statistically insignificant or of low substantive significance. Being underweight had the greatest impact, moving respondents up to 6% of the distance between exclusively supporting lifestyle causes of obesity and completely supporting another cause. In 2004, respondents who ate fast-food every day were 3.35% more supportive of lifestyle over external causes than those who never ate fast food. Respondents in 2001 who ate prepackaged meals every day were 4% less supportive of lifestyle causes over genetic causes than those who ate none. These variables also fail to indicate a general relationship between personal behaviour and opinion on the causes of obesity because typically healthy behaviours were associated with both support of and opposition to the belief that lifestyle causes obesity. What matters here is that respondents who were of a normal weight, overweight, or obese did not link their weight or personal behaviour to their opinions on obesity.

As expected, political values had a strong influence on respondents' opinions as to the cause of obesity. The tendency to blame individuals was by far the most important factor. The greatest possible change in this variable moved respondents 18% of the distance between lifestyle causes and external causes and almost 20% of the distance between lifestyle causes and genetic causes. Beliefs about equal opportunity were about as important as the personal

experience variables, moving respondents about 2-3% of the distance between complete support for lifestyle causes of obesity and total support for other causes.

This section of the paper demonstrated that political values are a significant predisposition underlying respondents' reasoning on obesity-related attitudes. I now work this finding back into the search for media effects. How could media coverage and predispositions interact to bring about the observed changes in public opinion?

One change in public opinion was an increase in support for lifestyle explanations of obesity. Since lifestyle explanations are encouraged by conservative values, it is possible that values played a greater role in decision-making among respondents in 2004. However, it is impossible to verify this without measures of values in the 2004 survey. It is possible, though, to examine the role of the media in facilitating the use of values, particularly conservative values.

Political Values and Media Effects

So far the study showed that causal explanations are important components of public opinion but failed to identify media influence on these attitudes. The previous section demonstrated that political values can guide how respondents think about the causes obesity. I now investigate two mechanisms by which the media could have enhanced the importance of political values in decision-making about obesity.

First, the media could have delivered the contextual information necessary to connect values to particular attitudes. Respondents were sorted by education and then scatter plots of support for lifestyle over external causes (or genetic causes) versus the tendency to blame individuals were produced (not shown). The slopes of the trend lines indicate a linear, although imperfect, relationship between education and the use of values in determining support for lifestyle causes of obesity (Table 5).

Since the scatter plots did not control for other variables, OLS regressions predicting belief in lifestyle causes of obesity were repeated with interaction terms for education and the tendency to blame individuals (Appendix E). Although many of the coefficients lost statistical significance in the process, the impact of a maximum change in the tendency to blame individuals on respondents' support for lifestyle causes was estimated for respondents at five levels of education. With the exception of those having a graduate degree, there is a strong, positive relationship between education and the existence of a connection between blaming individuals and favouring lifestyle causes of obesity (Table 5).

More attentive respondents had a greater connection between their values and obesity attitudes, which is consistent with the sophistication hypothesis. If the sophistication hypothesis

TABLE 5. Trend lines from scatter plots and interaction terms in OLS regression test the impact of education on the relationship between the tendency to blame individuals and belief in lifestyle causes of obesity over either external causes or genetic causes of obesity.

	Highest level of education	n	Slope of trend line from scatter plot	Minimum blame (predicted value of support for lifestyle causes)	Maximum blame (predicted value of support for lifestyle causes)	Change (% of distance between lifestyle & other cause)
External	Less than highschool	64	0.0775	-0.164	0.171	4.47
	Highschool	266	0.1001	-0.667	0.288	12.73
	Some college	257	0.1412	-0.824	0.852	22.34
	Finished college	205	0.1444	-1.224	1.100	31.00
	Graduate degree	111	0.1384	1.009	1.073	14.31
Genetic	Less than highschool	64	0.0242	1.218	0.707	-7.30
	Highschool	266	0.1357	0.180	1.529	19.27
	Some college	257	0.1178	0.023	1.546	21.76
	Finished college	205	0.1267	-0.193	1.667	26.57
	Graduate degree	111	0.1495	-0.189	1.389	22.55

is correct, the relationship between education and the use of values should dampen by 2004 because respondents at all levels of attention would have received contextual information from the louder media messages about obesity. Again the survey data does not allow for a test of this hypothesis. It remains an open possibility as to whether or not the media facilitated the use of values by delivering contextual information.

A second mechanism by which the media could promote the use of values is to increase the inclusion of values in articles about obesity. Lexicoder was used to identify articles that mentioned words or phrases related to conservative or liberal values. Before the first survey, conservative and liberal values received about equal notice in the media, but before the second survey conservative values received about twice the coverage of liberal values (Figure 9). Total coverage of conservative values before the second survey was about nine times that before the first survey (Figure 9). This increased coverage of conservative values is in agreement with the greater belief in lifestyle explanations among the public.

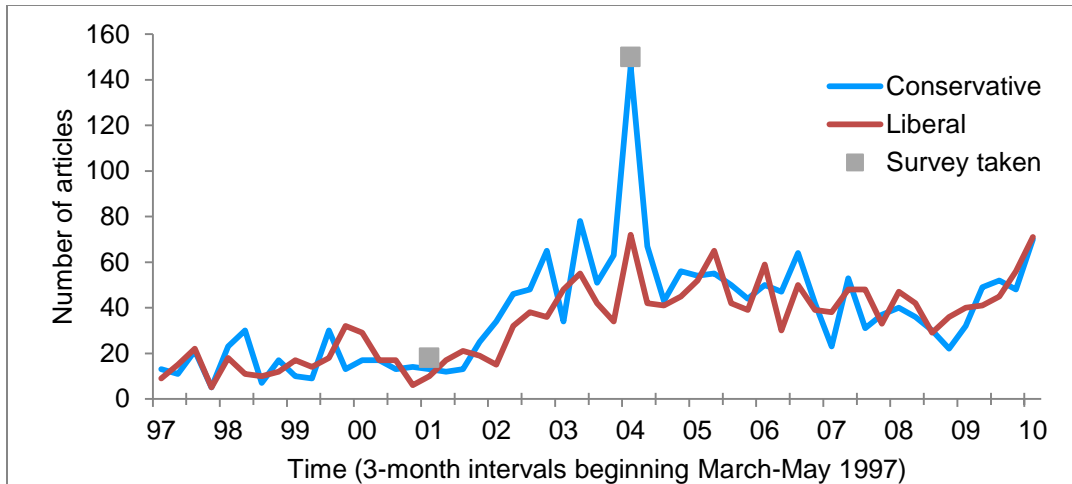


FIG. 9. Number of articles in major US newspapers that mention obesity and political values.

For additional evidence, the sentence proximity analyzer in Lexicoder was used to identify instances in which value-oriented words or phrases occurred in the same sentence as those indicating either lifestyle causes or external causes of obesity. Conservative values presented alongside lifestyle causes were at least twice as prominent as other combinations in the three months before the second survey (Figure 10). Since conservative values and lifestyle causes are compatible, this was likely to increase support for lifestyle causes among individuals holding conservative values. The secondary message in the media before the 2004 survey was conservative values in combination with external causes of obesity (Figure 10). As they are in conflict, respondents with conservative values should have decreased their support for external explanations. The discussion of values in relation to genetic explanations was rare and therefore omitted from Figure 10.

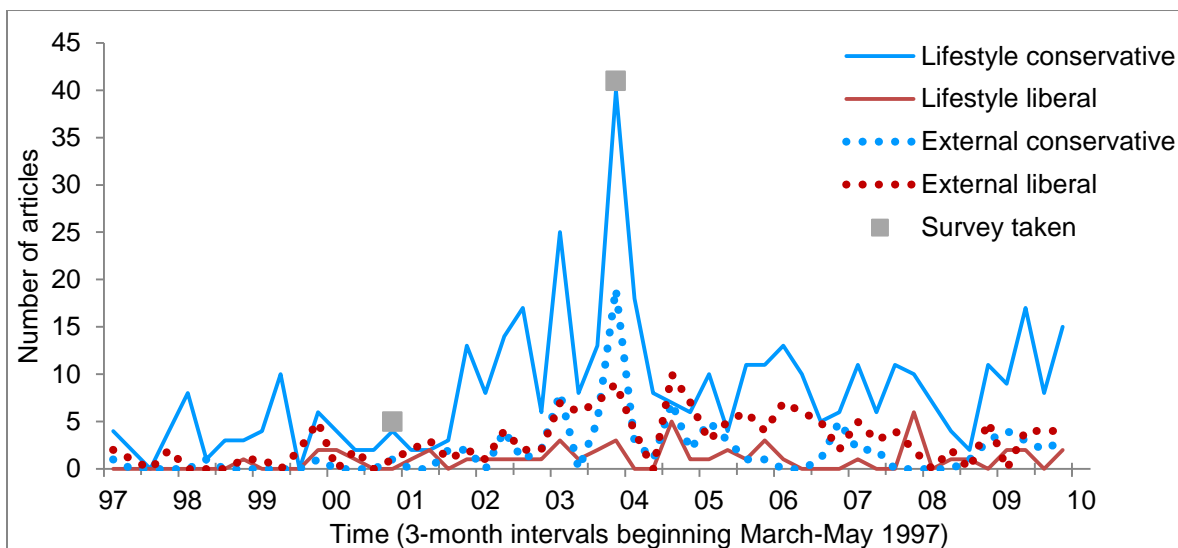


FIG. 10. Number of articles in major US newspapers that mention conservative or liberal values in the same sentence as lifestyle or external causes of obesity.

At last media coverage is congruent with public opinion. Conservative values were prominent in the media prior to the second survey, and they were particularly prominent in connection with causal arguments. This rise of conservative values in media coverage resonates with the shift in public opinion toward lifestyle explanations of obesity, since we know that respondents with conservative values were more likely to favour lifestyle causes in 2001. However, we cannot show that conservative values were stronger predictors of opinion in 2004 without measures of political values, so this study can only show that the simultaneous change in media coverage and public opinion is a convenient correlation.

It was also difficult to identify the exact nature of media influence. Although framing effects were a likely candidate according to previous research, they were ruled out. It is more likely that the media influence involved political values somehow. It could not be ruled out that the media delivered contextual information and thereby facilitated the use of values, but this hypothesis cannot explain why conservative values in particular were likely used by the public to generate lifestyle explanations of obesity. On the other hand, the prominence of conservative values in media coverage explains why it was specifically lifestyle explanations that became the most popular among the public in 2004.

However, there were two important changes in public support for the different causal explanations indicated in Figure 5. Can a greater use of conservative values also explain why support for both lifestyle causes and genetic causes increased relative to external causes? The answer relies on the observation that conservative values push people toward lifestyle explanations on both the controllability and locus dimensions (Table 4), whereas both external causes and genetic causes of obesity are compatible with liberal values. The rhetoric of individual responsibility is more antagonistic to external explanations of obesity, but genetic explanations offer an escape from the question of responsibility altogether. Genetic explanations of obesity are a better defence against lifestyle explanations in an environment characterized by conservative values. Thus the salience of conservative values also explains why respondents increased support for lifestyle causes and genetic causes at the expense of external causes of obesity. The study has achieved its second goal of identifying media effects consistent with changes in public support for the different causal explanations.

In addition to explaining the changes in public opinion, can an increase in the application of conservative values in individuals' decision-making explain the unexpected findings that arose throughout the study? One unexpected finding was that the opinions of the most attentive respondents were in agreement with dominant media frames in 2001 but not in 2004. An enhanced use of values would enable individuals to choose the frame that matches their

predispositions, and according to the sophistication hypothesis (see Zaller for example), these attentive respondents would be the most able to invoke their predispositions.

It is possible that competing frames assisted with the use of predispositions, but competing frames do not explain why it was lifestyle causes in particular that became the most popular. In contrast, the prominence of conservative values readily explains why respondents preferred lifestyle causes over the others. The prominence of conservative values in the media offers a better explanation than competing frames for the difference between the opinions of attentive respondents and dominant frames.

The use of values also resolves the second unexpected finding, that respondents were seemingly immune to thematic frames and childhood obesity frames. Conservative values are at odds with these frames, so individuals basing their opinions on conservative values would reject them. Further, this explains why childhood obesity was often interpreted in terms of individual responsibility. A media environment dominated by conservative values is more likely to produce the personal responsibility interpretation of childhood obesity than vice versa.

The last unexpected finding was an incredible reversal of demographic influences between 2001 and 2004. In 2001, African Americans with low incomes and no college education were the most likely to support lifestyle explanations, but in 2004 it was middle- and upper-class whites. This observation is probably not an artifact because both surveys took measures to ensure the sample was representative by race and class, and the coefficients in the regression equations were quite strong (Table 3).

This reversal is best explained by a combination of respondents' attention to the media and propensity to accept conservative values. The conservative worldview varies by race, and the general aversion of African Americans to conservative arguments seen here is expected. However, education is usually associated with liberal values and many low-income individuals hold conservative values, so a generally conservative outlook is less able to explain why middle- and upper-class respondents became the most supportive of lifestyle causes of obesity.

However, individuals often hold competing values, and they can hold opinions based on one value but in conflict with another (Tetlock 1986; Feldman and Zaller 1992). A conservative media environment could have made conservative values more accessible for respondents than other values, so those holding both value sets would generate more conservative opinions than they would otherwise. Also, these respondents would have received more media exposure than others given their education. Still, the role of values struggles to fully explain the shift in demographic predictors of opinion. Future research could better illuminate the reasons for the observed changes in demographic predictors.

Overall, the prominence of conservative values in the media is the best explanation for the changes in public opinion and the unexpected findings. It explains public preference for lifestyle explanations, and why the increase in support for lifestyle explanations and genetic explanations detracted from support for external explanations. The use of values would diminish framing effects and allow more attentive respondents to deviate from the dominant media frame. Despite the continuity of this argument, we must keep in mind that it remains speculation due to methodological limitations.

Discussion

Findings

This study sought to answer two questions: can the obesity debate be understood in terms of causal explanations, and does the media influence public support for the different causal explanations? First, all three causal explanations – lifestyle, genetic, and external - were important ingredients of obesity-related attitudes. They predicted opinion on the responsibility for obesity, government protection of the obese from discrimination, and anti-obesity policy. This relationship was shown using data from 2001 and 2004, suggesting that it holds over time.

Having demonstrated the importance of causal explanations, the study turned to address the second goal of assessing media effects on public support for these causal explanations. The dependent variable that media effects were challenged to explain was the change in support for the three causal explanations between the surveys. Lifestyle causes emerged as the most popular among respondents in 2004, and the relative increase in support for lifestyle causes and genetic causes was at the expense of public belief in external causes of obesity.

Two types of media effects were investigated: framing effects and the promotion of political values. None of the three types of frames were consistent with changes in public opinion on the causes of obesity. In an attempt to recover framing effects, these findings were reconsidered alongside respondents' attention to the media. The opinions of more attentive respondents matched the dominant media frames in 2001, but not in 2004. Therefore attention in combination with media messages did not explain changes in opinion.

Rather, predispositions and the media's role in highlighting particular predispositions provided an answer to changes in public opinion. Respondents' personal experience with obesity had minimal effects on attitudes about the cause of obesity, but respondents holding conservative values were much more likely to believe in lifestyle explanations of obesity. This finding provided a backdrop for the assessment of values in media coverage.

Conservative values were increasingly prominent in media coverage on obesity leading up to the 2004 survey, and they were mentioned in combination with lifestyle causes of obesity more often than any other combination of values and causal arguments. The prominence of conservative values is in agreement with greater support for lifestyle explanations among the public. It also explains why genetic arguments became more popular than external arguments – they hold up better against conservative values. Finally, the salience of conservative values also would have allowed individuals to resist incompatible media frames.

Overall, the increase in conservative values provides the most compelling explanation for all the observations. However, the evidence supporting this argument is missing one important piece. It is not possible to prove that values had a more important role in 2004

because there were no values measures in the 2004 survey data. Rather, the study speculates that the prominence of conservative values in media coverage is the most likely explanation for the changes in public opinion, after ruling out framing effects and arguing that the sophistication hypothesis offers a less compelling answer.

Methodological Limitations

The findings above should be considered within the bounds of some methodological limitations. As the study looked for framing effects using media content and survey data, it is difficult to draw a causal link between media coverage and public opinion. The public could have reacted to current events rather than media coverage of the events. During the years between the surveys, the first lawsuits were launched against fast-food giants, *Supersize Me* premiered, and states were beginning to pass legislation to tackle obesity (Cawley and Liu 2008). Reaction to these events would also explain why conservative values rose above liberal values for only about a year, which conveniently encompassed the second survey. However, the media probably had a role above and beyond the events themselves because the events have to be interpreted, and the media offered a decisively conservative interpretation.

The methods used to assess the survey data contain weak points as well. It is most apparent that the 2004 survey did not include questions probing political values, which impeded the full development of the argument. Neither of the surveys asked respondents how much attention they paid to the media. Although education was used as a proxy measure, an actual measure of attention to the media would strengthen the argument.

Similarly, only one question in the 2004 survey asked for respondents' belief in genetic causes of obesity. Much of this study hinges on responses to that one question because it was used to determine, for example, that genetic explanations gained support relative to external explanations over the three years. This became part of the major dependent variable that media effects were asked to explain. The wording of this question, "Genetics, or a family history," further complicates matters because respondents may have conflated genetic inheritance and socialization into a lifestyle. However, factor analysis showed that answers to this question were quite distinct from those to the other questions about the causes of obesity, which indicates that respondents interpreted the question to mean genetic causes of obesity and not lifestyle or external causes. Therefore this question is an adequate measure of respondents' belief in genetic causes of obesity.

Beyond that, the surveys also used different question wording for what I have presented as identical variables in many cases. For example, respondents in 2001 were asked to agree or disagree with statements about why so many Americans are overweight, but respondents in

2004 were asked for the importance of each cause in generating obesity in America. We should be aware of these differences when comparing results from the two surveys.

Comparison of the regressions from the two surveys is also hindered by the inclusion of different variables as they were available. For example, party identification and ideology were included in the 2001 equation although they were not available in 2004. Since, the number of total variables influences the strength of all coefficients, the coefficients are not directly comparable between the equations. This is especially important because the 2004 survey included few questions overall that could be used as control variables in regression analysis, and as such the impact of the explanatory variables could be overstated in the regressions using data from 2004.

The last set of limitations concerns the coding of media content. Lexicoder requires that a dictionary of words or phrases be created from which it counts their incidence. The accuracy of these dictionaries is hindered by the ability to create equivalent lists of words and phrases for each category. Generating dictionaries for conservative and liberal values was the most difficult because conservative values translated to specific concepts, but the words used to measure liberal values were broader ideas. Many of the words that might indicate liberal values, such as “equality,” can indicate too many ideas other than liberal ideology to be useful in the dictionary.

Implications

The first major finding in this study was that causal explanations are important ingredients of attitudes about obesity. Therefore, obesity can be added to the list of issues for which causal explanations function as a determinant of mass opinion. This also implies that changes in public support for the different causal explanations can produce fluctuations in mass opinion. It follows that the public debate about obesity may be, at its core, a competition among causal explanations. This is a novel contribution to the literature on obesity politics.

What is the role of causal explanations in the obesity debate? Are we undergoing collective deliberation as to the real cause of obesity, or are we drawing political lines using opposing causal explanations? For example, we might favour lifestyle causes because we actually think the facts point to lifestyle causes, or we might favour lifestyle causes because we know this is the conservative position. The more that causal explanations become explicitly tied to political values, the more the obesity debate will become a case of competing values masquerading as competing causal explanations. This study revealed the undercurrent of values in the public debate about obesity.

The second major finding was that prominent political values in media coverage might have influenced public opinion on obesity. Normative concerns aside, the significance here is

that the tone and content of media coverage has implications for public opinion, or to put it simply, there are probably media effects. This finding acknowledges the function of the media in the current obesity debate, and it also demonstrates a link between the media and public opinion that is understudied in the literature on obesity politics.

This point about media effects adds to the general literature on causal explanations. Previous studies focused on framing effects, but there were no framing effects in this case. Rather, the evidence presented here allows us to speculate that public support for the different causal explanations could be susceptible to values promoted in the media. To fully understand how the media influences public opinion on the causes of social problems, we should move beyond just framing effects to a broader definition of media effects. At the very least, this work is an example of the need to address media messages, attention, and predispositions simultaneously when looking for media effects.

This study also has practical implications for government action to reduce obesity. Belief in external explanations of obesity produces support for anti-obesity policy, but a climate of conservative values would reduce support for external causes of obesity. Specifically, conservative values enhance support for lifestyle explanations, and they encourage liberals to take up genetic explanations as a better defence against lifestyle explanations than external explanations would be. Therefore an environment of conservative values diminishes support for government action to reduce obesity.

Addressing this phenomenon, Wallack and Lawrence (2005) recommend the promotion of “America’s second language” of community-oriented values, in order to increase support for public health interventions. The study at hand certainly provides evidence for that approach. This study also showed that belief in lifestyle explanations has no impact on policy support, and what matters is belief in external causes of obesity. Therefore, if individuals believe that obesity is caused by both lifestyle and external causes, they will still support anti-obesity policy. It is not necessary to reduce support for lifestyle explanations, but rather to enhance support for external explanations of obesity in order to gather public support for anti-obesity policy.

To summarize, the core of this study determined the influence of causal explanations and media effects on public opinion about obesity. Causal explanations guide the formation of obesity-related attitudes, but public belief in the different causal explanations might be susceptible to prominent political values in media coverage. This allows us to conceptualize the obesity debate as a competition among causal explanations built upon a foundation of corresponding political values.

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APPENDICES

Appendix A: Question Wording

TABLE A1. Question wording: causes of obesity.

	2001	2004
	<p>We are now going to read a series of statements about why many Americans are overweight. In response to each statement, please tell me whether you agree or disagree with the statement as an explanation for why many people are overweight. I need to know whether you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree. (Order of questions)</p>	<p>For each item I name, please tell me if you think it's one of the single most important causes of obesity in this country, very important, somewhat important or less important than that. The first is (READ ITEM). How about (NEXT ITEM)? (IF NEEDED: Please tell me if you think (ITEM) is one of the single most important causes of obesity in this country, very important, somewhat important or less important than that). ***SCRAMBLE ORDER OF ITEMS***</p>
Lifestyle	<ul style="list-style-type: none"> • Many people are overweight because they lack the willpower to diet or exercise regularly. (4) • Most overweight people eat whatever they want and view their weight as a problem. (5) 	<ul style="list-style-type: none"> • Poor eating habits • Watching too much television • Not getting enough physical exercise
External	<ul style="list-style-type: none"> • Many people are overweight because there is too much unhealthy and fatty food in restaurants and supermarkets. (1) • Many people are overweight because most diets are not very effective. (3) 	<ul style="list-style-type: none"> • Restaurant portions that are too large • Lack of information on good eating habits • Lack of information about food content • The marketing of sweets and other high-calorie foods to children • The cost of buying healthy food
Genetic	<ul style="list-style-type: none"> • Many people are overweight because being overweight is something you inherit from your parents. (2) • Most people are overweight because they are simply born that way. (6) 	<ul style="list-style-type: none"> • Genetics, or a family history

TABLE A2. Question wording: demographic measures.

	2001	2004
Age	<p>In what year were you born? If you were born in __, that would mean you are __ years old. Is that correct? 1 YES 2 NO</p>	<p>What is your age?</p>
Gender	<p>ASK ONLY IF UNCERTAIN Are you male or female?</p>	<p>RECORD GENDER 1 Male 2 Female</p>

	2001	2004
Race	<p>Which category best describes your race: black, white, Asian, Native American, or Other?</p> <ol style="list-style-type: none"> 1 BLACK/AFRICAN AMERICAN 2 WHITE 3 ASIAN/PACIFIC ISLANDER 4 NATIVE AMERICAN 5 OTHER 	<p>Are you of Hispanic origin or background? <i>(IF "YES," ASK:) Are you White Hispanic or Black Hispanic?</i> <i>(IF "NO," ASK:) Are you white, black, or some other race?</i></p> <ol style="list-style-type: none"> 1 White 2 Black 3 White Hispanic 4 Black Hispanic 5 Hispanic (no race given) 6 Asian 7 Other race
Education	<p>What is the highest level of education you have completed? (Do not read categories)</p>	<p>What was the last grade of school you completed?</p> <ol style="list-style-type: none"> 1 8th grade or less 2 Some high school 3 Graduated high school 4 Some college (ASK IF TECHNICAL SCHOOL; IF YES, PUNCH CODE 3, FOR HIGH SCHOOL) 5 Graduated College 6 Post-graduate
Income	<p>I am going to read a list of income ranges. Would you please stop me when I read the range that best describes your total household income from all sources in 2000. That would be BEFORE taxes and other deductions.</p> <ol style="list-style-type: none"> 1 Up to \$15,000 2 \$15,000-\$24,999 3 \$25,000-\$34,999 4 \$35,000-\$49,999 5 \$50,000-\$74,999 6 \$75,000-\$99,999 7 \$100,000 or more 	<p>What was the total combined income, before taxes, for all the members of your household last year? You can stop me when I get to the right category. Was it (READ LIST)</p> <ol style="list-style-type: none"> 1 Less than 20 thousand dollars 2 20 to 35 thousand 3 35 to 50 thousand 4 50 to 75 thousand 5 75 to 100 thousand 6 Or more than 100 thousand
Children	<p>Do you have any children under age 18? <<REGARDLESS OF WHETHER THEY LIVE WITH YOU>></p> <ol style="list-style-type: none"> 1 YES 2 NO 	<p>Do you have any children between the ages of six and 17 living at home, or not? IF YES: Would that be one child, or more than one?</p> <ol style="list-style-type: none"> 1 One child 2 More than one 3 No children 6-17

TABLE A3. Question wording: obesity-related questions

	2001	2004
BMI	<ul style="list-style-type: none"> • During the past 12 months, what was your highest weight? • During this same time, what was your lowest weight? • How tall are you in feet and inches? • Are you pregnant or were you pregnant during the past year? 	<ul style="list-style-type: none"> • As accurately as you can tell me, for statistical purposes only, what is your weight? • And as accurately as you can tell me, what's your height in feet and inches with your shoes off?
Discrimination	-	<p>Have you ever felt that you were being discriminated against because of your weight, or not?</p> <p>1 Yes 2 No</p>
Exercise	<p>Now we'd like to ask you some questions regarding your knowledge of health and some health related behaviors. How often do you exercise hard for at least 30 minutes at a stretch?</p> <p>1 5-7 TIMES A WEEK 2 2-4 TIMES A WEEK 3 ONCE A WEEK 4 3-4 TIMES A MONTH 5 LESS THAN ONCE A MONTH 6 NEVER</p>	<p>Do you find the time to get any moderate to vigorous physical exercise in an average week, or not? That means exercise that increases heart rate and breathing.</p> <p>1 Yes 2 No</p> <p>About how many times a week do you get exercise?</p> <p>1 2 3 4 5 6 7 or more</p>
Eat at restaurants/ fast-food	<p>How many times a week do you eat out for dinner?</p> <p><<INTERVIEWER: THIS REFERS TO EATING OUTSIDE THE HOME>></p> <p>1 EVERY DAY 2 4-6 TIMES A WEEK 3 2-3 TIMES A WEEK 4 ONCE A WEEK 5 LESS THAN ONCE A WEEK 6 NEVER</p>	<p>About how often in an average week do you eat a meal from a fast-food restaurant like McDonald's or Burger King?</p> <p>1 Never 2 Less than weekly 3 1 time a week 4 2 times a week 5 3 times a week 6 4 times a week 7 5 times a week 8 6 times a week or more</p>
Eat pre-packaged food	<p>How often do you eat pre-packaged or prepared dinners such as TV dinners or takeout food?</p> <p>1 EVERY DAY 2 4-6 TIMES A WEEK 3 2-3 TIMES A WEEK 4 ONCE A WEEK 5 LESS THAN ONCE A WEEK 6 NEVER</p>	-

	2001	2004
Personal importance of lifestyle	-	<p>For each item I name, please tell me how important it is to you personally – very important, somewhat important, not too important or not important at all. The first is (READ ITEM). How about (NEXT ITEM)?</p> <p>***SCRAMBLE ORDER OF ITEMS***</p> <ul style="list-style-type: none"> a. Eating a healthy and balanced diet without too many calories b. Getting vigorous physical exercise on a regular basis c. Enjoying life without worrying too much about diet and exercise
Seriousness of obesity	<p>We'd like to start by asking you some questions about how serious you think the following health issues are for American society. In response to each health problem, could you tell us whether you think it is very serious, serious, not serious, or not a problem at all?</p> <p>(Asked fifth) What about obesity?</p>	<p>For each item I name, please tell me how serious a public health problem you think it is in this country – extremely serious, very serious, somewhat serious, or less serious than that. The first is (READ ITEM). How about (NEXT ITEM)?</p> <p>***SCRAMBLE ORDER OF ITEMS***</p> <ul style="list-style-type: none"> a. Heart disease b. Cancer c. AIDS d. Cigarette smoking e. Illegal drug abuse f. Alcohol abuse g. Obesity, that is, people being seriously overweight h. (ALWAYS AFTER G) Childhood obesity in particular
Responsibility for obesity	-	<p>Whatever the causes of obesity, I'd like to ask you about groups that may or may not be responsible for creating the problem. For each, please tell me if you think it bears a great deal of responsibility for the nation's obesity problem, a good amount, just some or hardly any. The first is (READ ITEM). How about (NEXT ITEM)?</p> <p>***SCRAMBLE ORDER OF ITEMS***</p> <ul style="list-style-type: none"> a. Manufacturers of high-calorie packaged and processed foods b. Marketers and advertisers of high-calorie packaged and processed foods c. Fast-food restaurants d. Individual Americans in their choice of diet and lack of exercise e. Government policies and laws on food content and marketing f. Schools that allow high-calorie snacks and sweets

	2001	2004
Negative feelings	-	If you honestly assessed yourself, would you say that you have at least some negative feelings about people who are overweight? 1 Yes 2 No
Government protection from discrimination	(Asked within section on causes) Now I'm going to read you some more statements. Here again, please tell me whether you agree or disagree. The government should play a more active role in protecting overweight people from discrimination.	-

TABLE A4. Question wording: general political questions from 2001 survey.

<p>Now we'd like to ask you some general questions about government policies and society. There are no right or wrong answers here. We'd just like to know your feelings about some political and social issues that people often talk about. I want to remind you that your answers are confidential and are important because they are part of a representative sample of all adults in the U.S. To each of the following questions, please tell me whether you agree, agree strongly, disagree, disagree strongly, or neither agree nor disagree.</p>	
Individualism	Our government's policies take too much care of people and deprive them of too much individual responsibility.
Equal opportunity	One of the biggest problems in this country is that we give everyone an equal chance.
Tobacco and helmet policy	<ul style="list-style-type: none"> We should outlaw smoking in all public places like restaurants, airports, and stadiums. We should tax cigarettes to pay for all the public medical costs caused by smoking. The government should require all people on motorcycles to wear helmets.
<p>Now I have some questions about different groups in our society. I'll read a few phrases that people sometimes use to describe various groups. Of course, no phrase fits absolutely everybody, but as I read each one, please tell me, using a number from 0 to 10, how well you think it describes each group. If you think it's a very good description of almost everyone in the group, give it a 10, if you think it applies to no one in the group give it a 0. If it fits people in the group about as well as it would the typical person, then give it a five.</p>	
Tendency to blame and prejudice	<p>What about poor people? Using the scale from 0 to 10, please tell me how well you think the following phrases describe poor people.</p> <ul style="list-style-type: none"> Most poor people are poor because they are irresponsible with their money. Most poor people are easier to get along with. Most poor people are poor because they are lazy. <p>What about overweight people? Using the scale from 0 to 10, please tell me how well you think the following phrases describe people who are overweight.</p> <ul style="list-style-type: none"> Overweight people are generally more friendly.

	<p>What about blacks? On a 10 point scale, how well do you think the following phrases describe black people:</p> <ul style="list-style-type: none"> • Blacks are less intelligent than whites. • Blacks would rather rely on welfare benefits than work. • Blacks are easy to get along with.
Now I have just a few more questions before we finish.	
Ideology	<p>Generally speaking, would you consider yourself to be a liberal, a conservative, a moderate or haven't you thought about this very much?</p> <p>1 LIBERAL 2 MODERATE 3 CONSERVATIVE 4 HAVEN'T THOUGHT ABOUT IT</p>
Party identification	<p>Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or what?</p> <p>1 REPUBLICAN 2 DEMOCRAT 3 INDEPENDENT 4 OTHER</p>

TABLE A5. Question wording: anti-obesity policy

2001	2004
<p>Now we'd like to ask you some general questions about government policies and society. There are no right or wrong answers here. We'd just like to know your feelings about some political and social issues that people often talk about. I want to remind you that your answers are confidential and are important because they are part of a representative sample of all adults in the U.S.</p> <p>To each of the following questions, please tell me whether you agree, agree strongly, disagree, disagree strongly, or neither agree nor disagree.</p> <ul style="list-style-type: none"> • The government should impose 'snack taxes' on unhealthy food and use the proceeds to support the production and distribution of nutritious foods. • There's too much advertising for junk food and fast food on television that is aimed at children. The federal government should regulate these ads the way they do for cigarettes and alcohol. 	<p>Thinking about government policies, would you support or oppose (ITEM)?</p> <p>INTERVIEWER: Get answer and then ask: Would you (support/oppose) that strongly or somewhat?</p> <p>a. A ban on advertising high-fat and high-sugar food on children's television shows and in children's magazines</p> <p>b. A tax on high-fat and high-sugar foods, with the money used for advertising and programs to fight obesity</p> <p>c. A law requiring restaurants to list the calorie count and fat content of all items on their menus</p> <p>d. Warning labels on high-fat and high-sugar foods about the health risks of being overweight</p> <p>e. A law setting a legal limit on portion sizes in restaurants</p>

Appendix B: Lexicoder Dictionaries

TABLE B1. Lexicoder dictionary for causes of obesity.

Lifestyle	External	Genetic
exercise habits, exercise routine, exercise program, fitness program,	nutrition information, nutrition label, nutrient information, nutritional information, dietary information	genetic, gene*, genomic, chromosomal
eating habits, eating right, bad diet, poor diet	diets fail, diets are hard, diets are challenging, diets are confusing, diets are tough, diet information,	born that way*, born like that*, born overweight
personal choice, individual choice, lifestyle choice, lifestyle	cost of food, food cost, food price, cost of healthy food	Inherit, heredity, hereditary, ancestry, heritable
self-control, lazy, laziness, willpower	urban sprawl, urban planning, urban design, community design, community planning	family history, runs in the family*
couch potato, too much TV*, too much television*	food policy, obesogenic, environment	
	marketing, advertising, advertise, food industry, food company, food producer, food manufacture, restaurant portion, restaurant serving	

*Indicates exact match only. Otherwise, Lexicoder was permitted to search for different endings on the word or phrase. The search was not case-sensitive.

TABLE B2. Lexicoder dictionary for issues frames.

Poverty	Race	Health care costs	Children
poverty , less fortunate, working poor	Hispanic, Latino, Latina, African American, black community, Caucasian	health care cost, medical cost, cost of treatment, drug cost	child, children, childhood, kids
welfare, government assistance	ethnic, ethnicity, skin color	medical coverage, insurance, deductible, preexisting condition	youth, teens*, teenager
low income, annual income	racial, racism	Medicare, Medicaid, Schip, S-chip	next generation, young generation, youngest generation
lower class, class divide, class division, class cleavage	racial cleavage, racial divide, race divide		school

*Indicates exact match only. Otherwise, Lexicoder was permitted to search for different endings on the word or phrase. The search was not case-sensitive.

TABLE B3. Lexicoder dictionary for political values.

Conservative	Liberal
self-discipline, self-control, self-reliance	social welfare, public good, public interest
personal responsibility, individual responsibility	consumer protection
personal choice, individual choice, responsible choice	government responsibility, responsibility of government, responsibility of the government, corporate responsibility, social responsibility, societal responsibility, society's responsibility, everyone's responsibility,
accept responsibility, take responsibility, take some responsibility,	
blame others, blame other people, blame society, blaming society, blame fast, blaming fast, blame McDonald's, blaming McDonald's	
nanny state, food police, fat police	Fairness, social justice, quality of life, work together
big government, personal freedom, individual freedom, private lives	
Morality, family values, gluttony	NOT: trade and consumer protection, center for science in the public interest

Appendix C: Criteria for Coding Episodic and Thematic Frames

Episodic stories contained: an individual case, a person's name, a personal story, a particular event, use of the personal "I" to tell the story (unless it was clear that a fact-based opinion was being presented, in which case the content of the argument was evaluated for frames)

Thematic stories contained: statistics, a national trend, names of multiple states or counties, comparisons or generalizations, connections between multiple ideas

Articles classified as neither contained: science stories purely presenting research results, interviews with book authors (unless it was a personal story about a self-help book), when obesity was solely mentioned as a risk factor for another disease

Appendix D: Results of “Clarify” Estimations

TABLE D1. First difference changes in probability for logit models of policy support

Policy and Category of support		Baseline probability	New probability or change in probability for variable shift described					
			External causes max.	External causes min.	External & lifestyle max	Obese (BMI≥30)	Obesity serious	Obesity not serious
Ads 2001	Strong oppose	8.3	-0.044	0.087	-0.052	0.061	-0.012	0.016
	Oppose	43.3	-0.150	0.102	-0.195	0.371	-0.031	0.027
	Neither	8.7	-0.006	-0.019	0.013	0.088	0.001	-0.003
	Support	0.317	0.114	-0.127	0.134	0.371	0.028	-0.029
	Strong Support	0.081	0.086	0.043	0.126	0.110	0.014	-0.011
Tax 2001	Strong oppose	0.117	-0.048	0.077	-0.057	0.112	-0.023	0.029
	Oppose	0.464	-0.097	0.055	-0.127	0.456	-0.037	0.027
	Neither	0.068	0.003	-0.013	0.002	0.068	0.003	-0.005
	Support	0.293	0.099	-0.094	0.123	0.303	0.042	-0.040
	Strong Support	0.058	0.043	-0.025	0.059	0.062	0.015	-0.011
Ads 2004	Strong oppose	28.5	-11.9	16.3	-12.0	31.7	-5.1	5.9
	Oppose	24.9	-5.3	0.2	-5.5	25.5	-1.6	0.7
	Support	21.5	1.6	-5.6	1.5	20.4	1.3	-1.9
	Strong Support	25.1	15.5	-10.9	16.0	22.4	5.4	-4.6
Tax 2004	Strong oppose	32.4	-16.6	23.0	-11.3	34.8	-5.3	5.9
	Oppose	22.2	-6.1	-2.0	-3.5	22.4	-1.1	0.3
	Support	23.6	2.5	-9.0	2.5	22.7	1.7	-2.2
	Strong Support	21.8	20.3	-12.0	12.4	20.1	4.7	-4.0

		Equal chance max	Equal chance min	Blame max	Blame min	Blame max, equal chance min	Tobacco policy max	Tobacco policy min	Liberal & Dem.
Ads 2001	Strong oppose	0.060	-0.035	-3.8	2.9	-5.7	-0.046	0.097	-0.028
	Oppose	0.084	-0.111	-12.6	5.1	-22.6	-0.162	0.106	-0.084
	Neither	-0.013	-0.002	-0.4	-0.6	-1.9	-0.007	-0.021	-0.000
	Support	-0.097	0.090	9.7	-5.4	13.9	0.120	-0.136	0.071
	Strong Support	-0.035	0.058	7.0	-2.1	16.4	0.095	-0.045	0.042
Tax 2001	Strong oppose	0.033	-0.025	-0.050	0.037	-6.5	-5.8	10.3	-2.4
	Oppose	0.032	-0.043	-0.108	0.035	-15.7	-12.6	6.0	-4.1
	Neither	-0.005	0.003	0.002	-0.006	-0.1	0.2	-1.7	0.3
	Support	-0.047	0.048	10.6	-0.051	14.3	12.3	-11.6	4.5
	Strong Support	-0.013	0.018	5.0	-0.014	8.0	5.8	-3.0	1.7

		Indiv. resp. max	Indiv. resp. max, external max	Gov resp max	School resp. max	Corp. resp. max	Gov, schools, corp max & ext max	Ind resp max, other 3 resp min	Ind resp max, other 3 min & Ext max	Healthy lifestyle impt. max
Ads 2004	S. opp.	6.4	-7.2	-6.6	-3.7	-9.0	-22.0	31.9	14.7	-3.3
	Oppose	0.7	-2.9	-2.2	-1.1	-3.4	-14.8	-4.0	-0.2	-1.0
	Support	-2.1	1.3	1.5	1.0	1.9	-4.0	-10.9	-5.0	0.9
	S. supp.	-5.1	8.8	7.3	3.9	10.6	40.8	-17.0	-9.5	3.4
Tax 2004	S. opp.	0.9	-16.0	-6.9	-1.5	-6.8	-24.3	18.8	-3.1	-5.2
	Oppose	0.0	-5.9	-1.6	-0.3	-1.5	-12.2	-1.1	-1.2	-1.1
	Support	-0.3	2.4	2.1	0.5	2.0	-2.1	-7.4	0.6	1.6
	S. supp.	-0.5	19.5	6.5	1.3	6.3	38.6	-10.4	3.6	4.6

TABLE D2. Predicted values of support for lifestyle causes based on changes in predispositions, 2001.

2001	Lifestyle – external distance: -3.5 to 4		Lifestyle genetic distance: -3 to 4	
	value	Change as % of distance min-max	value	Change as % of distance
Baseline	-0.189	n/a	0.234	n/a
Age to 75 (30 yrs)	-0.180	0.12	0.558	4.63
Gender male	0.003	2.56	0.232	0.03
Race African Am.	0.260	5.98	0.700	6.65
Income and educ.	0.021	2.79	0.590	5.08
Equal chance min/max	-0.381 / -0.090	3.87	0.216 / 0.360	2.06
Blame min/max	-0.600 / 0.760	18.13	-0.124 / 1.244	19.54
Obesity min/max	0.109 / -0.363	3.39	0.100 / 0.451	5.02
Eat prep min/max liberal	-0.128 / -0.301	0.21	0.381 / 0.077	4.35
Underweight	-0.398	2.79	0.102	1.89
	-0.252	0.84	-0.210	6.34

Baseline: A 45 year-old Caucasian female who makes over \$35,000 a year, has a college education, does not have children, is of a normal weight, and has medium values for all other variables except blame and prejudice for which she has mean values.

TABLE D3. Predicted values of support for lifestyle causes based on changes in predispositions, 2004.

2004	Lifestyle – external distance: -1.733 to 3		Lifestyle - genetic distance: -3 to 3	
	value	Change as % of distance	value	Change as % of distance
Baseline	0.912	n/a	0.600	n/a
Age to 75 (30 yrs)	0.958	0.97	0.648	0.80
Gender	1.042	2.76	0.703	1.70
Race African Am.	0.574	7.14	0.203	6.62
Income and educ.	0.558	7.47	0.467	2.22
Eating fast-food min/max	0.898 / 1.057	3.35	0.641 / 0.624	0.29
Faced discrimination	0.896	0.35	0.478	2.05
Underweight	0.709	4.28	0.291	5.16
Obesity min/max	1.014 / 0.886	2.72	0.456 / 0.748	4.87

Baseline: A 45 year-old Caucasian female who makes over \$35,000 a year, has a college education, does not have children, is of a normal weight, and has medium values for all other variables

Appendix E: Regression with Interaction Terms to Test the Sophistication Hypothesis.

TABLE E. OLS regression predicting support for lifestyle causes of obesity. Interaction terms test the sophistication hypothesis.

Independent Variable		Lifestyle - external	Lifestyle - genetic
Demographic	Age	0.004 (0.003)X	0.011 (0.003)*
	Female	-0.326 (0.092)*	0.025 (0.091)X
	African American	0.389 (0.111)*	0.398 (0.110)*
	Less than highschool	0.565 (0.549)X	1.117 (0.543)***
	Some college	-0.139 (0.274)X	-0.144 (0.271)X
	Finished college	-0.548 (0.291)****	-0.362 (0.287)X
	Graduate Degree	-0.383 (0.347)X	-0.431 (0.339)X
	Annual income under \$35,000	0.133 (0.097)X	0.053 (0.095)X
	Children	-0.023 (0.094)X	0.106 (0.093)X
BMI	BMI1	-0.061 (0.228)X	-0.381 (0.226)****
	BMI3	-0.079 (0.102)X	0.149 (0.101)X
	BMI4	-0.120 (0.117)X	-0.078 (0.116)X
Blame and prejudice	Tendency to Blame	0.087 (0.037)***	0.117 (0.036)**
	Prejudice	-0.001 (0.020)X	-0.044 (0.019)***
Interaction terms	Less than HS * Blame	-0.065 (0.089)X	-0.169 (0.088)****
	Some college * Blame	0.056 (0.053)X	0.012 (0.053)X
	College * Blame	0.108 (0.059)****	0.037 (0.058)X
	Grad. Degree * Blame	0.011 (0.072)X	0.022 (0.070)X
	Constant	-0.491 (0.279)	-0.184 (0.275)
	n	751	753
	R2	0.11090	0.1261

Baseline: A 45 year-old Caucasian woman with an income over \$35,000, children, a normal BMI, and a mean level of prejudice.