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Differences in anti-fat attitudes among healthcare providers and general students

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Differences in Anti-fat Attitudes among

Healthcare Providers and General Students

By

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MASTER'S THESIS

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Differences in Anti-fat Attitudes among Healthcare Providers and General Students

A Thesis

Presented to the Faculty of

Western Washington University

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Abstract

Weight bias is prevalent, detrimental, and resistant to change. This study provided a general student sample and a healthcare provider sample with information about behavioral, environmental, or biogenetic causes of obesity to compare resulting anti-fat attitudes. Across conditions, the healthcare providers were less likely to agree that obesity is personally controlled, and demonstrated more positive implicit attitudes than did the general students. Among general students, implicit anti-fat attitudes were impervious to reduction efforts across article conditions. Among healthcare providers, implicit anti-fat attitudes improved with biogenetic explanations and did not worsen with behavioral explanations relative to the control group. No such condition differences were apparent among explicit anti-fat attitudes, which were generally less negative than implicit attitudes. These results highlight potentially important differences between people with varied investment in health related information. While reminders of causes of obesity may not make attitudes toward obese people better among the general population, and can even make them worse, biogenetic explanations may be especially suited to improve negative associations held by healthcare practitioners. The implications of these findings include applications that could improve healthcare conditions for a growing physically and socially vulnerable population.

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Table of Contents

List of Tables

Introduction

Public awareness often focuses on the causes, health consequences, and collective burden of obesity, but tends to overlook weight-based prejudice (Brownell, Puhl, Schwartz, & Rudd, 2005). For instance, while the media routinely highlights costs of rising obesity rates on healthcare, weight-based wage disparity and biased treatment of obese patients by healthcare providers rarely make news. Stigmatization in employment, healthcare, education, media, and interpersonal settings is associated with a variety of negative physical, economic, social, and psychological outcomes for obese people (Puhl & Heuer, 2009). While physicians and family members are the most commonly reported source of weight stigmatization, obese people also hold anti-fat attitudes (Puhl & Brownell, 2006; Schwartz, Vartanian, Nosek, & Brownell, 2006). Despite growing obesity rates and increased prevalence of weight-based discrimination, effective reduction and prevention methods have yet to be widely established (Andreyeva, Puhl, & Brownell, 2008; Puhl & Heuer, 2009).

When excess weight is attributed to controllable causes originating within the individual, such as behavior or values, common fat stereotypes (e.g. lazy, indulgent, or ignorant) are reinforced (Puhl & Brownell, 2001). Weight controllability beliefs have been associated with negative attitudes, evaluations, and social distancing from obese people, as well as greater acceptance of weight-based discrimination (Allison, Basile, & Yuker, 1991; Crandall, 1994; Crandall & Moriarty, 1995; DeJong, 1980; Rodin, Price, Sanchez, & McElligot, 1989). However, manipulating these perceptions in an effort to reduce bias, particularly using biogenetic explanations (e.g. metabolism and genes), has

not produced consistent results (Anesbury & Tiggemann, 2000; Bell & Morgan, 2000; Hegarty & Golden, 2008; Lewis, Cash, Jacobi, & Bubb-Lewis, 1997; Rodin et al. 1989; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003). While biogenetic factors may be more difficult for obese individuals to control than behavioral factors, they originate similarly within the individual. Alternatively, environmental factors (e.g. food availability and marketing) are externally based and only somewhat controllable by obese individuals. Perhaps an environmental message would be more effective in changing perceptions and attitudes among obese people, their doctors, and the broader public. Few studies have examined the effects of a message about obesity causes with an external locus and mixed degree of controllability.

Attributions

Attribution theory is the most widely applied framework guiding weight stigma research. It posits that people search for explanations in the face of uncertainty, and the nature of these attributions informs or determines reactions (Weiner, 1985). In the case of stigma, including obesity, causal attributions for a condition influence affect, expectancies, and intended actions toward the stigmatized target such that stigmas with internal, controllable causes elicit less pity, more anger and blame, less optimism, and less willingness to help than do those with external, uncontrollable causes (Menec & Perry, 1998; Rush, 1998; Weiner, Perry, & Magnusson, 1988). More often than not, the causal factors of any given person's weight are not readily available to an observer. Evidently, the default has been to assume that obese people are responsible for their fatness (Maddox, Back, & Liederman, 1968; Ross, Shivy, & Mazzeo, 2009).

While eating and physical activity do play a limited role in determining body weight, biogenetic and environmental factors (e.g. metabolism and food environment) greatly influence adiposity and body shape (Allison et al., 1991; Crandall, Nierman, & Hebl, 2009). People may realize the burgeoning „obesity epidemic' is the result of more than an outbreak of personal irresponsibility or disregard for appearance. Current public conceptions of obesity have adjusted somewhat to include fatness as a reflection of manipulation by corporate interests, food addiction, or a toxic food and lifestyle environment (Barry, Brescoll, Brownell, & Schlesinger, 2009). Attribution theory has been used to support the hypothesis that attitudes toward obese people should improve as people are informed about (or convinced of) the importance of less controllable causes of weight.

However, even as attitudes toward other stigmatized groups have improved and conceptions of obesity progress, attitudes toward obese people have not improved over the last decade (Andreyeva et al., 2008). Many studies testing the relationship between causal attribution and weight bias merely revealed correlations, and can not imply causality. It is possible therefore that existing prejudice affects how (or whether) attribution takes place. For instance, more highly prejudiced people spontaneously produced more thoughts about the controllability of a stigmatized condition than less prejudiced people in one study, suggesting that prejudice simply directs more attention to a search for causes (Hegarty & Golden, 2008). Attributions of personal responsibility may then be interpreted as an excuse to express existing prejudice, as in the justification-suppression model of prejudice (Crandall & Eshleman, 2003).

Changing Beliefs to Change Attitudes

Other studies have empirically tested the prediction that belief manipulation can reduce bias with varied methods, outcome variables, and results. Participants are usually presented with some form of information to indicate that an individual's obesity, or obesity as a condition in general, is caused by more controllable or less controllable factors. Interventions have been as elaborate as multifaceted group programs with videos and role-play activities or as simple as a few written lines of description in personnel files (DeJong, 1980; Wiese, Wilson, Jones, & Neises, 1992). Manipulations are then checked and results are compared to examine differences in attitudes (explicit and/or implicit), evaluations, or intended behaviors among conditions and control groups. A number of these studies indeed showed that anti-fat bias can be reduced with causal perception manipulation alone (Crandall, 1994; DeJong, 1980; Menec & Perry, 1998; Puhl, Schwartz, & Brownell, 2005; Rush, 1998; Weiner et al., 1988).

However, not all of these studies produced clearly positive results (Anesbury & Tiggemann, 2000; Bell & Morgan, 2000; Hegarty & Golden, 2008; Lewis, et al., 1997; Teachman et al., 2003; Wiese et al., 1992). For instance, among grade school children, controllability beliefs were reduced using biological explanations, yet stereotyping and adjective ratings did not improve for all age groups, nor were children more likely to want to share activities with an obese peer as a result (Anesbury & Tiggemann, 2000; Bell & Morgan, 2000). Hegarty and Golden (2008) manipulated controllability beliefs among adults with information that supported or refuted biological determinism, but found no effect on liking of obese people. Lewis et al. (1997) found that although

participants reported being positively influenced by information about the biogenetic factors of obesity and blamed obese people less than participants who read about behavioral factors, they reported no better attitudes about attractiveness or character disparagement than a control group.

Limitations

In some cases, manipulation checks revealed ineffective causal belief manipulations (Bannon, Hunter-Reel, Wilson, & Karlin, 2009; Rodin et al., 1989; Teachman et al., 2003). Teachman et al. (2003) found that after reading information that described the primary causes of obesity as genetic, controllability beliefs were no different than those of a control group, while both controllability beliefs and anti-fat attitudes were easily exacerbated with information about the primacy of behavioral causes. Likewise, although Rodin et al. (1989) saw differences in perceptions about hiring discrimination among participants who read of a man with differently caused obesity, the researchers discontinued using the same stigma stimuli for subsequent studies because participants reported discounting the validity of the medical report's hormone imbalance explanation. These findings correspond with recent reports that people view obesity primarily as a personal failing and not as a result of genetic factors, despite growing knowledge of the multiple causes of obesity (Barry et al., 2009; Oliver & Lee, 2005). Therefore, it may be easier to intensify bias by strengthening controllability beliefs than it is to reduce bias by making people believe in biological causes of obesity.

Weight bias is often considered more socially acceptable than other prejudices, so the use of explicit methods of measurement may be effective on their own, however

implicit measures reveal distinctive cognitive and affective outcomes (Danielsdottir, O'Brien, & Ciao, 2010; Latner, O'Brien, Durso, Brinkman, & MacDonald, 2008). In one study where physical distancing was examined, implicit (unconscious) measures of anti-fat attitudes were predictive of discrimination while explicit attitudes were not (Bessenoff & Sherman, 2000). There is often a discrepancy between explicit and implicit attitude measures such that explicit measures reveal more positive attitudes (Teachman & Brownell, 2001). This discrepancy has been revealed among obese participants as well as healthcare providers specializing in obesity (Teachman & Brownell, 2001; Wang, Brownell, & Wadden, 2004). Implicit attitude measures, while not as common, may evade the downfalls of self-report and better predict behavior (Greenwald, Poehlman, Uhlmann, & Banaji, 2009).

A final limitation of the past literature is that most of the research on causal attributions and weight-based prejudice used only gland disorders, set-point theory, or other biogenetic explanations as a contrast to overeating and under-exercising explanations. These factors represent classically diametric behavioral (more controllable) and biological (less controllable) attributions. However, both causes are internal to obese people, and neither factor alone adequately or reasonably explains the growing incidence of obesity. Environmental influences on obesity offer an interesting counterpoint by being partially controllable and mostly external. Obesogenic environmental factors, such as growing portion size norms and increased availability of high-calorie low-nutrient foods, have been on a similar trajectory as obesity rates, whereas large-scale genetic changes occur too slowly to fully explain an epidemic (Cohen, 2008). Few studies have

directly incorporated environmental reasons for obesity into the attribution theory framework to test their believability and effect on prejudice.

Of this handful of studies, two are correlational and offer little clarification on the matter (Hilbert, Rief, & Braehler, 2008; Klaczynski, Daniel, & Keller, 2009). Klaczynski et al. (2009) measured beliefs among 10-16 year olds about physical (medical or genetic), internal (behavioral choice), and social (familial or peer) influences on weight. Higher socially caused obesity beliefs, which approximate beliefs in an environmental cause, were associated with lower fear of fat and dislike of fat people. However, blaming attitudes were not assessed and the scale for social cause beliefs lacked internal consistency. Hillbert et al. (2008) measured the perceived importance of environmental (obesogenic food and activity environment), behavioral (eating and physical activity), and hereditary (genetic inheritance) risk factors for obesity among German participants. Environmental attributions were slightly associated with more stigmatizing attitudes and significantly associated with behavioral attributions. Few conclusions may be drawn from this study because the measure of attitudes only accounted for blaming and not dislike, character disparagement, or any other attribute ratings.

To my knowledge, there is only one experimental study that explicitly used information about environmental causes of obesity, though in combination with genetic causes, to manipulate causal perceptions and anti-fat attitudes. O'Brien, Puhl, Latner, Mir, and Hunter (2010) implemented an elaborate tutorial for pre-service health professionals that incorporated discussion and research assignments about genetic and socio-environmental factors or diet and physical activity factors of obesity (or an

unrelated topic). The gene/environment condition showed decreases in both explicit dislike of fat people and implicit associations of fat people with badness and laziness. The effects on causal beliefs were less clear given that one of the measures of belief in controllability increased for the gene/environment and control condition post-treatment.

Health professionals are uniquely poised as both common sources of weight bias and knowledgeable practitioners who might work with obese patients to avoid the health consequences of obesity (O'Brien et al., 2010). Healthcare providers (and healthcare providers in training) also have a presumably greater awareness of the factors involved in weight and weight loss than the general public. Indeed, Harvey and Hill (2001) found that healthcare professionals reported a mix of both more and less controllable causal beliefs about obesity including physical inactivity, genetics, depression, and mood changes. It is notable, however, that all of these causes are internally, and not externally, based.

Biogenetic causes of obesity are not as controllable as behavioral causes. However, doctors and family members of obese people have little control over any cause of obesity that is internal to the obese person (i.e. biogenetics and behavior). A message of obesity as less controllable may prove frustrating or disempowering to those most directly and indirectly affected by obesity. Healthcare providers' vested interest in the outcomes of obesity and their lack of control over patients' behavior might enhance negative effects of behavior information relative to the general population.

Indeed one concern with raising awareness of less controllable causes for any health condition (e.g. the genetic components of attention deficit hyperactivity disorder), is that affected people may then rely solely on medication to treat symptoms rather than

address environmental and behavioral opportunities for prevention and treatment (Weiner et al., 1988). A similar contention about reducing weight bias through reducing controllability beliefs is that it would reduce obese people's motivation and efforts to lose weight. However, an environmental message – which is at once partially controllable (e.g. environment can be shaped and people may make choices within it) and partially uncontrollable (e.g. environment is largely dictated by powerful external sources) – may quell these issues to both reduce blame and still allow for belief in the possibility of weight reduction through empowerment among healthcare providers.

Present Study

This study examined and compared the effects of a causal belief manipulation on both explicit and implicit anti-fat attitudes among a general population and healthcare provider sample (following Puhl et al., 2005 and Teachman et al., 2003). The manipulation consisted of persuasive information about one of three ostensible causes of obesity: behavior, biogenetics, or environment. A fourth condition received no information as a control group.

In accordance with past research, we expected that implicit attitudes would reflect more negativity than explicit attitudes among all groups and that healthcare providers would have negative explicit and implicit attitudes similar to the general population. We predicted that information about behavioral causes of obesity would have the most negative impact on anti-fat attitudes compared to environmental and biogenetic information. We predicted that attitudes in the behavior condition would be more negative than the control group as well, in accordance with attribution theory. Because

information about biogenetic causes of obesity has been found to influence attitudes differently in a number of studies, it was uncertain how it would influence this sample. However, we hoped to find that information about environmental causes would be perceived as believable and would have a more consistently positive influence because environmental causes are only partially controllable and also externally based.

In light of healthcare providers' level of investment in reducing the health risks associated with obesity, their frequent exposure to scientific information, and the normative influence of nonbiased professionalism, we expected to find differences between this sample and a general population sample in the impact of information on attitudes. We predicted that behavioral information would have a more negative influence on healthcare providers than on the general population, as this message also highlights their own lack of control over obesity relative to that of their obese patients. Conversely, the external locus and mixed controllability message contained in the environmental explanation may improve attitudes more for healthcare providers than the general population because it provides an avenue for shared controllability and responsibility. We expected that healthcare providers might be more receptive to the veracity of biogenetic information and therefore be more positively influenced by it than would the general population. We also anticipated a greater possible disparity between explicitly and implicitly measured attitudes among healthcare providers than among a general population.

Pilot Test

To prime a different cause of obesity in each of the conditions, the experimenter

created three mock New York Times articles of similar length and structure (see Appendix A). Each article cited persuasive research evidence, expert commentary, and personal accounts of the primacy of one of three contributing factors of obesity: behavior (e.g. eating and physical activity), biogenetics (e.g. metabolism and genetics), or environment (e.g. socioeconomic factors and lifestyle norms). Following Teachman et al. (2003), in order to increase believability each article credited the other causes for some part in the variability of body weight while downplaying their overall importance.

To determine whether the articles would result in a strong enough manipulation for the main study, the experimenter ran a pilot test with students from the Western Washington University psychology subject pool. Data collection occurred over the 2010 fall quarter with groups of 4-20 students ($M = 11$). At each session, participants read one of the three articles highlighting the primacy of environmental, behavioral, or biological causes of obesity. Packets were arranged such that participants were randomly assigned to condition and the experimenter was blind to participants' condition.

Written instructions on a screen at the front of the room directed participants to read and sign the consent form and read the recently published news article completely and carefully enough to be able to evaluate it and answer simple questions about its content later without referring back to it. Participants then answered 14 true or false and Likert-like format questions to assess their attention to the article, perceived article quality, and effectiveness of persuasion (see Appendix B). Participants' recognition of facts contained in the articles assessed attention to material content (e.g. According to the article, over two thirds of Americans are overweight or obese: T or F?). Participants'

level of agreement with evaluative statements (e.g. The article is accessible (i.e. readable and understandable for most audiences)) assessed the perceived accessibility, credibility, balance, and persuasiveness of the articles. Finally, participants' level of agreement with statements endorsing the main causes of obesity presented in the article (e.g. The primary causes of obesity are behavioral (ex. eating and physical activity behavior).) assessed whether the manipulation influenced beliefs. The order in which questions about causes were presented was counterbalanced to prevent possible undue influence of considering particular causes before others. After returning their materials, participants received a written debriefing form.

Participants in the three article conditions (environment $n = 31$, biology $n = 31$, behavior $n = 31$), did not differ significantly in a number of important ways according to a series of one-way between-subjects ANOVAs (see Table 1). Age, BMI, and gender distribution was similar across conditions. There was no significant difference between conditions in participants' attention to general content. Participants in each condition were aware of the cause highlighted in their article as indicated by their responses to true/false questions about whether the primary cause of obesity reported in the article was environmental, biological, or behavioral. Participants were expected to choose true as a response to only one of these three questions and false to the others. However, some participants chose more than one reported primary cause (most noticeably in the environment and behavior conditions), indicating that the articles were sometimes seen as having multiple focuses. This is not surprising given the true interplay between environmental and behavioral factors (Cohen, 2008), however it appeared that the

manipulation might be improved by facilitating differentiation between the content of the behavior and environment articles.

Because environment influences obesity indirectly through behavior, the environment article necessarily contained behavioral information. The behavior article was therefore more amenable to adjustment. To make the behavioral article less environmentally focused, the experimenter changed three sentences of language in two paragraphs. For example, "works with schools and communities to instate obesity prevention initiatives" became "works regularly with adolescents to generate enthusiasm for lifelong fitness." See Appendix C for the revised article.

Data were collected from another sample of participants (n = 33) with the new behavior focused article. As with the first version, a number of participants reported that according to the article the primary causes of obesity are environmental, however this did not affect participants' tendency to also perceive the intended cause, behavior, as the article's primary focus. Because the new version of the article contained focused content and produced slightly higher mean ratings of agreement with the primacy of behavioral factors of obesity than the first version, only version two is reported in the following results and was used for the subsequent main study.

There were no significant differences between conditions in age, BMI, or gender distribution after data from the new behavior article sample replaced data from the original behavior article sample. Further, the articles were not rated significantly different on their degree of balance, credibility, accessibility, or convincingness, indicating equivalence of relevant manipulation material qualities across conditions. The

presentation order of questions about the recognition of and agreement with causes of obesity influenced responses in minor and not clearly interpretable ways. Most importantly, one way analyses of variance with post hoc Ryan's REGWQ comparisons ($\alpha = .05$) to test the simple effects of article condition on cause agreement indicated that, participants were indeed more likely to personally agree with the primacy of the causes of obesity highlighted in the article they read than were participants who read about other causes. See Table 1 for a display of means and standard deviations.

Method

The primary study tested the influence of receiving information about the causes of obesity on implicit and explicit attitudes toward obese people among two separate samples. Western Washington University undergraduate psychology students represented the general population. Students, faculty, and clinicians from Bastyr University (an institution for the study of science-based natural medicine) and Bastyr Center for Natural Health represented healthcare providers. Data collection occurred primarily in medium sized classroom settings on each respective campus, although some Bastyr participants were tested at their own office desks or at a table in a quiet hallway.

Participants

WWU sample. One hundred forty one students from Western Washington University's psychology subject pool were recruited through Sona Systems over the 2011 winter quarter. These participants received .5 course credits as compensation for their participation in the 20 to 30- minute study. For recruitment language, see Appendix D.

The WWU sample ranged in age from 18 to 26 ($M = 18.74$, $SD = 1.18$). As

expected given the gender makeup of the psychology undergraduate population, 73% of the sample identified as female, 23.4% as male, and 2.8% as unspecified or other. Approximately 68% of the sample identified as White or Caucasian, 13.5% as other, 9.2% as Asian or Pacific Islander, 5% as Black or African American, and 3.5% as Hispanic or Latin. Participants' reported last year of completed education ranged from 11th grade of high school to 4th year of college (85.7% were college freshman).

Body mass indices (BMIs) in the WWU student sample ranged from underweight to obese (range = 17.33 - 36.61, M = 23.37 (normal weight), SD = 4.24). Participants reported having gained or lost up to 45 pounds in the last two years (M = 10.61, SD = 8.89). Approximately 84% of the sample reported having at least one overweight friend (range = 0 - 25, M = 3.98, SD = 3.35) and approximately 76% reported at least one overweight family member (range = 0 - 15, M = 2.70, SD = 2.71). Participants reported having a full range of personal experience with weight based prejudice from none (0) to very much (7) (M = 2.55, SD = 2.12).

Healthcare provider sample. Forty two clinicians and healthcare professionals in training were recruited from Bastyr University and the Bastyr Center for Natural Health over the 2011 winter and spring quarters through emails, flyers, mailings, online bulletin boards, campus visits, and referrals through other participants. These participants received entry into two $50 drawings, an extended verbal debriefing, and referral to resources for improving their practices. For recruitment language, see Appendix D.

The healthcare provider sample ranged in age from 21 to 60 (M = 34.38, SD = 10.56). As expected given the gender makeup of Bastyr's student body, 88% of the

sample identified as female and 12% identified as male. Approximately 81% of the sample identified as White or Caucasian, 4.8% as other, 11.9% as Asian or Pacific Islander, and 2.4% as Black or African American. Students (and student clinicians) made up the majority of the sample, however approximately 25% were principally faculty and healthcare providers with an average of 7.3 years of clinical experience. The overall sample reported clinical experience ranging from 0 to 15 years (M = 3.46, SD = 4.24), with self-reported experience treating obese patients (on a scale from 0 to 7) ranging from 0 to 6 (M = 1.94, SD = 2.04), and self-reported knowledge of obesity issues (on a scale from 0 to 7) ranging from 1 to 7 (M =4.35, SD = 1.64).

Body mass indices (BMIs) in the healthcare provider sample ranged from underweight to obese (range = 16.30 – 39.10, M = 24.09 (normal weight), SD = 4.57). Participants reported having gained or lost up to 51 pounds in the last two years (M = 14.08, SD = 13.30). Approximately 79% of the sample reported having at least one overweight friend (range = 0 - 20, M = 3.98, SD = 3.35) and approximately 61% reported at least one overweight family member (range = 0 - 15, M = 3.06, SD = 3.27). Participants reported having a full range of personal experience with weight based prejudice from none (0) to very much (7) (M = 3.40, SD = 2.12).

Materials

Manipulation articles and manipulation check. Beliefs about the causes of obesity were manipulated using the mock New York Times articles honed in the pilot test. Participants read one of the three articles highlighting different causes of obesity (environment n = 46, biology n = 44, behavior n = 46) or no article (control n = 47).

Resultant beliefs were measured using the manipulation check materials used in the pilot test. Participants answered 14 true or false and Likert-like format questions to assess perceived article quality and effectiveness of persuasion. Participants' level of agreement with evaluative statements (e.g. The article is accessible (i.e. readable and understandable for most audiences)) assessed the perceived accessibility, credibility, balance, and persuasiveness of the articles. Participants' level of agreement with statements endorsing the main causes of obesity presented in the article (e.g. The primary causes of obesity are behavioral (ex. eating and physical activity behavior).) assessed whether the manipulation influenced beliefs. The order in which questions about causes were presented was counterbalanced to prevent possible undue influence of considering particular causes before others. Participants in the control group received only the questions assessing their own level of agreement with the primary cause of obesity statements. See Appendix A for the biology and environment focused articles, Appendix C for the behavior-focused article, and Appendix B for the manipulation check materials.

Implicit weight bias measure. Implicit weight bias was measured with Teachman and Brownell's (2001) weight-focused version of the Implicit Association Test (IAT; Appendix E). In situations where computer IAT data collection is problematic, Lemm, Lane, Sattler, Khan, and Nosek (2008) support the use of verbal-stimuli, paper-format IAT, such as the following. For this test, participants are directed to classify lists of target word stimuli (e.g. obese, slim, terrible, wonderful) into appropriate categories (e.g. fat, thin, bad, good). Each page of the test consists of a list of words that each belong in one of two dichotomous categories. Two-category headings on either side of the list

are paired such that words belonging to the different categories are classified into one group (e.g. words that mean fat and words that mean bad go to the right, and words that mean thin and words that mean good go to the left). When category pairings match commonly implicitly held associations between stimuli (e.g. fat/ bad and thin/good), classification tends to occur more quickly and more accurately than when there is a mismatch (e.g. fat/good and thin/bad).

The study included three IATs, associating fat and thin with the categories good/bad, motivated/lazy, and smart/stupid. Each IAT contained two pages, each with the category heading „fat people' on the left across from the category heading „thin people' on the right. Each of these headings was paired with stereotype congruent category labels (fat and unfavorable) on one page and non-stereotype congruent category labels (fat and favorable) on the other. The presentation order of each block of categories (i.e. good/bad, motivated/lazy, and smart/stupid) was counterbalanced across participants as was the order of congruent and non-congruent category pairings within each block.

The set of tasks pairing fat and thin category words (e.g. obese, slim) with good and bad category words (e.g. wonderful, terrible) was designed to assess implicit attitudes. The set pairing fat and thin category words with motivated and lazy category words (e.g. eager, sluggish) was designed to assess implicit stereotyping (i.e. that fat people are lazy). The set pairing fat and thin category words with smart and stupid category words (e.g. intelligent, dumb) was designed to assess implicit stereotyping (i.e. that fat people are stupid).

For each page, participants had 20 seconds to classify as many of the 48 words as

possible into the categories they belong to as listed at the top of the page. Participants were instructed to start at the top of the first column of words and work as quickly and asaccurately as possible through the list without backtracking or skipping words. Additionally, they were advised to only make a quick slash through the circle and to refer to the top of the page to be reminded of the category to which a word belongs as needed. Participants were familiarized with the test format by practicing with a good/bad, flowers/insects block of tasks before the critical trials.

Explicit weight bias measure. Explicit bias was measured with Crandall's (1994) Anti-fat Attitudes Questionnaire (AFA; Appendix F) in which participants rate their agreement with 13 weight related statements on a Likert scale from 0 (*strongly disagree*) to 9 (*strongly agree*). Items include "I really don't like fat people that much" (dislike subscale, α=.82), and "Fat people tend to be fat pretty much through their own fault" (willpower subscale, α=.76). Higher scores represent less favorable attitudes. The willpower subscale provided a measure of weight controllability beliefs.

Demographics questionnaire. Participants reported their age, gender, height, weight, ethnicity, and level of education in a primarily open-ended format questionnaire (Appendix G). To account for possible covariates, participants estimated their weight gain or loss over the past two years, how many overweight or obese friends and family members they have, and how much weight-based prejudice they personally have experienced. Healthcare providers additionally reported their number of years of clinical experience, their level of experience treating obese patients, and their level of knowledge about obesity issues. Some of these factors have been correlated with attitudes toward

obese people in past research (e.g. Schwartz et al., 2006; Teachman & Brownell, 2001).

Procedure

WWU sample. Participants were run in small groups of 3 to 13 ($M = 8$). Participants were randomly assigned to condition and packets were arranged such that the experimenter was blind to participants' condition (except for the control group, which was run separately). After participants read and signed consent forms, the experimenter verbally and visually led them through the practice IAT task (flowers/insects, good/bad). Participants were then instructed to read the following recently published news article. Those in the no prime condition simply continued on to the next task. In all conditions, the experimenter repeated the IAT instructions and led participants through the critical weight-related IAT tasks. The presentation order of each set of categories (i.e. good/bad, motivated/lazy, and smart/stupid) was counterbalanced across participants as was the order of congruent and non-congruent category pairings within each set. Lastly, participants completed the AFA, the manipulation check, and the demographics questionnaire.

Health care provider sample. Participants were run individually or in pairs. Assignment to condition was random and the experimenter was blind to participants' condition (except for the control group). One item was added to the AFA questions to assess participants' self-reported disgust toward obese people. The procedure was identical to that for the WWU student sample except that, in order to ease scheduling, instructions were not presented visually or repeated after the practice task unless

necessary. Also, healthcare provider participants were offered extra information upon debriefing about the topic's relevance to their practices.

Results

Data Treatment

Implicit Association Test (IAT) scores were computed using the "product square root of difference" approach recommended by Lemm et al. (2008) in which information about the difference in number of correct items between stereotype congruent and stereotype incongruent blocks of each IAT and the ratio of total items completed in each block are both taken into account. To avoid influence by scores that potentially occurred due to participant error, those reflecting too few correct responses on any one block within a trial (≤ 7) were excluded from that analysis, as were scores across all three IATs for those with an overall error rate > 20%. This resulted in the exclusion of IAT data from 19 participants in the student sample and 2 participants in the healthcare provider sample. Scores were computed for each block of the IAT separately (i.e. good/bad, motivated/lazy, and smart/stupid). All three IAT scores were correlated with each other ($rs > .40$, $ps < .001$), so a combined score was also computed for the mean of the three blocks to create an overall IAT combined score.

Data distributions for each outcome and demographic variable were checked to ensure relative normality. Independent t-tests between samples, and one-way ANOVAs within each sample, revealed a few notable demographic differences. The WWU sample was significantly younger ($M = 18.74$, $SD = 1.18$) than the Bastyr sample ($M = 34.38$, $SD = 10.56$), $t(41.31) = -9.58$, $p < .01$. Age was weakly, but significantly correlated with

combined IAT scores ($r(179) = -.199$, $p = .008$) such that greater age was associated with less negative associations. Forthcoming results comparing samples therefore report 2x4 ANOVA analyses in which age was included as a covariate. Significant differences remained statistically significant, however, when age related variance was partialed out.

In the WWU sample, gender distribution was not equivalent between article conditions, as there were a disproportionate number of men in the control condition, $\chi^2(6, n = 140) = 14.66$, $p = .023$, Cramer's v= .229. Independent samples t-tests indicated that in the WWU sample, similar to the overall sample, women had less belief in the controllability of obesity than did men, $t(134) = -2.31$, $p = .023$. All article condition comparisons within the general student sample included sex as a covariate. Important differences between conditions remained statistically significant, however, when gender related variance was partialed out.

Perceived Article Qualities and Manipulation Check

To check the perception of article equivalence across conditions and samples, two-way between subjects ANOVAs were run (with age as a covariate). Significant main effects of condition indicated that, unlike in the pilot test where articles were rated equivalently on all qualities, articles were not considered equally balanced ($F(2,122) = 14.56$, $MSE = 2.58$, $p < .001$, partial $\eta^2 = .193$), or convincing ($F(2,123) = 6.27$, $MSE = 2.12$, $p = .003$, partial $\eta^2 = .094$) for the full sample. The biology article was rated as less balanced than the behavior article, which was rated as less balanced than the environment article, according to post hoc Ryan's REGWQ tests ($\alpha = .05$). The biology article was also rated as less convincing than the environment or behavior articles, which did not differ.

Table 2 displays cell means and standard deviations for the full sample.

Despite perceived discrepancies in article qualities, participants across the full sample agreed with the importance of the cause described in their article more than did those who read most of the other articles, similar to the pilot study. A 4x3 mixed model ANOVA comparing article condition (between-subjects) and perceived importance of each the three causes (within-subjects) revealed a significant interaction, $F(6,348) = 4.78$, $MSE = 2.02$, $p < .001$, partial $\eta^2 = .076$ (results were obtained using a Huynh-Feldt adjustment because Mauchly's test indicated that the assumption of sphericity was not met). The simple effects of article condition within each cause, as indicated by follow-up one way ANOVAs with post-hoc Ryan's REGWQ comparisons ($\alpha = .05$), are described below and means and standard deviations are displayed in Table 2.

Environmental factors were rated as more important to obesity in the environment condition than they were in the biology or behavior condition, but not more than they were in the control condition ($F(3,178) = 4.33$, $MSE = 2.35$, $p = .006$, $\eta^2 = .068$). Biological factors were rated as more important to obesity in the biology condition than they were in the behavior or environment condition, but not more than they were in the control condition ($F(3,178) = 6.20$, $MSE = 2.38$, $p < .001$, $\eta^2 = .095$). Behavioral factors were rated as more important to obesity in the behavior condition than they were in the biology or control condition, but not more than they were in the environment condition ($F(3,178) = 8.07$, $MSE = 1.49$, $p < .001$, $\eta^2 = .120$). It seems, as in some past research, that it is easier to increase beliefs in behavioral aspects of weight than it is to increase beliefs in other causes among a general population.

We predicted that healthcare providers would be more receptive to biogenetic information than would general students, which was partly supported in the present sample. While there was no main effect of sample on perceived importance of biological causes, according to a 2x4 ANOVA with age as a covariate ($F(1,171) = 3.17$, $MSE = 1.50$, $p = .077$), a similar test indicated a significant sample by condition interaction for perceptions of article credibility ($F(2,122) = 4.88$, $MSE = 1.92$, $p = .009$, partial $\eta^2 = .074$). Post hoc independent t-tests within each condition indicated that Bastyr students found the biology article more credible and the behavior article less credible than did WWU students, ($t(42) = 4.79$, $p < .001$; $t(44) = 2.32$, $p = .025$). Tables 3 and 4 display means and standard deviations of perception of article qualities for each sample.

Consistent with previous research, participants across samples considered some causes of weight more important than other causes. Following up on the 4x3 mixed model ANOVA's main effect of the perceived importance of each cause ($F(2,348) = 29.44$, $MSE = 2.02$, $p < .001$, partial $\eta^2 = .145$), a one way ANOVA with post-hoc Tukey's comparisons ($\alpha = .05$) indicated that behavior causes were considered more important than environment causes, which were considered more important than biology causes. Separate one way ANOVAs for each sample (with sex as a covariate for the WWU sample) indicated that perceived importance of environment causes only differed significantly from each other cause in the WWU sample. For the Bastyr sample, environmental causes were considered similarly important as each other cause. See Tables 2, 3, and 4 for a display of marginal means and standard deviations.

Explicit and Implicit Attitudes Compared

As expected, explicit attitudes were generally correlated with implicit attitudes. Anti-fat Attitude Questionnaire (AFA) scores (M = 3.53, SD = 1.36), comprised of the willpower, dislike, and fear of fat subscales, were positively correlated with combined Implicit Association Tests (IAT) scores (M = 5.10, SD = 2.65) such that more negative overall explicit attitudes were associated with more negative implicit attitudes, $r(174) = .372$, $p < .001$. AFA dislike subscale scores (M = 2.13, SD = 1.45) and combined IAT scores were weakly, positively correlated, $r(177) = .232$, $p = .002$. Significant positive associations between combined IAT scores and AFA dislike scores were also evident within each sample (WWU: $r(135) = .238$, $p = .005$; Bastyr: $r(40) = .332$, $p = .032$). Moreover, AFA willpower subscale scores (M = 4.96, SD = 2.06) were positively correlated with AFA dislike subscale scores such that higher belief in controllability of weight was related to stronger explicit dislike of fat people, as in past research ($r(178) = .302$, $p < .001$).

To compare the relative negativity of implicit and explicit attitudes, the valence of scores for each type of measure was assessed by comparing scores obtained to those that would indicate neutral attitudes. Combined IAT scores reflected significantly negative implicit anti-fat attitudes in both samples, as evidenced by one sample t-tests comparing scores to 0 ($t(136) = 25.78$, $p < .001$, $t(41) = 8.86$, $p < .001$). AFA dislike subscale scores reflected significantly positive explicit attitudes toward obese people in both samples, as evidenced by one-sample t-tests comparing scores to the neutral scale midpoint of 4.5 ($t(139) = -19.68$, $p < .001$, $t(41) = -9.91$, $p < .001$). Therefore, as expected, implicit

associations were more negative than explicitly expressed attitudes within both groups. Tables 5 and 6 display AFA dislike subscale and combined IAT means and standard deviations for each sample.

Differences between samples. In support of the prediction that healthcare providers would hold similar attitudes as the general population, there was no main effect of sample on AFA dislike subscale across conditions, according to a 2x4 ANOVA with age as a covariate, indicating similar, if not overtly negative, attitudes, ($F(1,172) = 1.95$, $MSE = 2.13$, $p = .165$). The healthcare sample had less negative implicit attitudes than the WWU sample, however, as evidenced by a significant main effect of sample for combined IAT scores ($F(1,153) = 6.86$, $MSE = 5.59$, $p = .010$, partial $\eta^2 = .043$). See Tables 5 and 6 for a display of means and standard deviations. Contrary to prediction, these results suggest a smaller disparity between implicit and explicit attitudes for healthcare providers than for general students. The unexpected finding of less negative implicit attitudes among healthcare providers than general students might be interpreted as an artifact, however, of the beneficial effects of some articles on healthcare providers only, which are explained in the following section.

Article Effects

Explicit beliefs. Beliefs about the controllability of weight, as measured with the AFA willpower subscale, were predicted to be stronger for those who read about behavioral causes relative to the control group and to be weaker for those who read about biological causes relative to the control group. However, a 2x4 ANOVA with age as a covariate indicated that scores did not differ significantly between conditions ($F(3,172) =$

1.62, *MSE* = 4.13, *p* = .187), nor did this lack of differences vary by sample (*F*(3,172) = 3.76, *MSE* = 4.13, *p* = .549). While not anticipated, it is notable that the difference in beliefs about the personal controllability of weight between the WWU and Bastyr sample approached significance, such that healthcare providers believed weight is relatively less controllable (*F*(1,172) = 4.08, *MSE* = 3.76, *p* = .054, partial η^2= .021). See Table 7 for a display of means and standard deviations.

Explicit attitudes. Contrary to prediction, explicit anti-fat attitudes were no more negative in the behavior condition than in the control condition, or the environment or biology condition, for the full sample. Likewise, explicit anti-fat attitudes were no more positive in the environment condition than in the biology condition . In fact, there were no differences in explicit anti-fat attitudes between conditions in the full sample according to 2x4 ANOVAs with age as a covariate, (*F*(3,172) = .50, *MSE* = 2.13, *p* = .686). Apparently, explicit attitudes were uninfluenced by the articles. See Table 5 for a display of means and standard deviations.

Implicit attitudes. Unlike explicit attitudes, implicit anti-fat associations varied by condition in the full sample, according to the significant main effect of condition indicated by a 2x4 ANOVA with age as a covariate, though not in the predicted ways (IAT combined: *F*(3,153) = 7.38, *MSE* = 5.59, *p* < .001, partial η^2 = .126). A follow up one way ANOVA with post hoc Ryan's REGWQ comparisons between conditions (α= .05) revealed that implicit anti-fat attitudes in the behavior condition were no more negative than those in the control condition, or the environment or biology condition. Additionally, implicit anti-fat attitudes in the environment condition were actually more

negative than those in the biology condition and the control condition. Information about behavioral causes of obesity did not increase implicit anti-fat attitudes, and information about environmental or biological causes did not decrease them. See Table 6 for a display of IAT score means and standard deviations with significant differences highlighted.

Differences between samples. As in the full sample, AFA dislike scores were undifferentiated between article conditions in both the WWU and Bastyr samples, as evidenced by the lack of a significant main effect of sample in the 2x4 ANOVA with sex as a covariate. Therefore, contrary to prediction, article information did not influence explicit anti-fat attitudes any differently between WWU participants and Bastyr participants, $F(3,172) = 3.29$, $MSE = 2.13$, $p = .205$. The prediction that article information would influence anti-fat attitudes differently between samples was supported, however, by a significant interaction in the case of implicit attitudes, though not in ways fully consistent with predictions, (IAT combined: $F(3,153) = 3.80$, $MSE = 5.59$, $p = .012$, partial $\eta^2 = .069$).

Follow-up independent t-tests were used to determine the simple effects of sample within each condition. Contrary to the prediction that a behavioral message would be more harmful to healthcare providers than the general population, implicit anti-fat associations in the behavior condition were less negative among Bastyr participants than among WWU participants (IAT combined: $t(43) = 2.03$, $p = .048$). There were no differences in IAT scores between samples in the environment condition, lending no support to the prediction that an environmental message might improve attitudes more

among healthcare providers than among students. In the biology condition, implicit anti-fat attitudes were indeed less negative among Bastyr participants than WWU participants, in accordance with the prediction that healthcare providers would be more positively influenced by the biology message than would general students (IAT combined: $t(41) = 4.99$, $p < .001$). See Table 6 for a display of means and standard deviations.

Discussion

The results of this study revealed differences between students and healthcare providers in their attitudes toward obese people, their beliefs about the controllability of weight, and how receiving information about specific causes of obesity may or may not shape these conceptions. Among the general student sample, implicit anti-fat attitudes were impervious to reduction efforts across conditions. In contrast, among the healthcare sample, implicit anti-fat attitudes were more positive given biogenetic explanations and were no more negative given behavioral explanations, relative to the control group. No such condition differences were apparent among explicit attitudes, which were similar between healthcare providers and students and did not differ according to the type of information people received. In the following section, the causes of all these effects are discussed, including some potential functions of beliefs and attitudes, and possible differences between the current sample and mainstream healthcare providers.

The Influence of Obesity Cause Information

Environment. One of the main objectives of this study was to test whether messages about environmental causes of obesity, which have gained in public attention,

would have a positive impact on attitudes in as much as they are potentially more believable than biological causes for why obesity has become so prevalent so quickly (Barry et al., 2009). We also thought people would consider environmental factors less personally controllable than behavioral factors, and more externally based than either biology or behavior. Indeed, the environment article was rated more balanced, convincing, and in some cases more credible than the biology article. Attributions of obesity to external causes were greater for those given environment information than those given biogenetics information. However, these judgments did not influence beliefs about the personal controllability of weight. In fact, informing people of the importance of environmental causes of obesity did not influence beliefs in the importance of those factors, though it did increase beliefs in the importance of behavioral factors relative to controls. People may recognize society's influence in shaping an obesegenic environment, but this does not appear to detract from their belief in people's ability to exert behavioral choice within that environment.

Information about environmental causes of obesity did not influence explicit attitudes. Moreover, implicit anti-fat attitudes were more negative given environment information relative to biogenetics information or no information. These results, along with pilot testing that indicated the enmeshment of environmental and behavioral causes of obesity, align with earlier findings in which environmental attributions for weight were related to behavioral attributions for weight (Hillbert et al., 2008). It seems that the past effectiveness of a biogenetic/socio-environmental intervention among pre-service health professionals may have stemmed mainly from the biogenetic component (O'Brien et al.,

2010). Indeed, results from the current study support the unique effectiveness of information about biological causes of obesity to improve attitudes among healthcare providers.

Biology. Information about the biological causes of obesity effectively reduced healthcare providers' implicit anti-fat attitudes relative to the control group and relative to general students who read the same article. However, it made no difference in attitudes among general students. This finding aligns with healthcare providers' presumed openness to biological and physiological science through training and experience, and with results from select prior intervention studies (Hegarty & Golden, 2008; Wiese et al., 1992). Healthcare providers in the current study indeed rated the biology article as more credible than did general students. This apparent receptivity may reflect healthcare providers' already relatively strong beliefs in the importance of biogenetic factors of obesity (at least compared to general students'), considering that this article did not strengthen beliefs in the importance of biological factors. Perhaps this lack of effect of article on beliefs is indicative of a ceiling effect rather than an ineffective manipulation.

The biology article had no effect on beliefs about the personal controllability of weight either. It is hard to pinpoint what elicited the positive influence on healthcare providers' implicit associations, if not the influence of attributions. In Wiese et al.'s study (1992), healthcare providers' attitudes similarly improved given an intervention including information about the biological causes of obesity, but strangely, impressions about the controllability of weight actually increased. Perhaps healthcare providers, trained to work within the physiological system, perceive biogenetics as a manageable entity, and are

somehow positively influenced. Future research might explore possible non-attribution related mechanisms behind this particular effect.

Recently researchers have been looking at the role of disgust in anti-fat attitudes (Vartanian, 2010). Indeed healthcare providers have cited disgust and disdain for the obese body as a possible reason behind their disparagement of obese individuals (Wear, Aultman, Varley, & Zarconi, 2006). Maybe reading about biogenetics does something to reduce disgust reactions in healthcare providers. For instance, biogenetic subject matter may prompt more objective, cognitive judgments as opposed to subjective, emotional judgments for healthcare providers, because they have been trained to understand the body this way. Amongst healthcare providers in the current study, the disgust item tacked onto the Anti-fat Attitudes Questionnaire was positively correlated with all explicit anti-fat attitude scores (including stronger belief in the personal controllability of weight), and with overall negative implicit associations. No differences in disgust were found between article conditions. The questionable reliability of a single, non-specific self-report measure severely limits any conclusions that might be drawn, however, and this remains an interesting avenue for investigation.

Behavior. Finally, information about the behavioral causes of obesity did not exacerbate anti-fat attitudes in the total sample, in contrast to past research (Puhl et al., 2005; Teachman et al., 2003). This finding is hopeful. However, given that the behavior article was the only manipulation that actually strengthened beliefs in the importance of the cause presented, the lack of influence on attitudes contradicted attribution theory based predictions. Healthcare providers also rated the behavior article as less credible

than did general students (whose overall implicit associations became more negative while those of healthcare providers did not). These mixed results reveal, if anything, that it is easier to strengthen people's already relatively strong beliefs in the importance of behavior's contribution to obesity than it is to strengthen beliefs about the importance of other causes. It is also possible that among healthcare providers in this study (who have been exposed to holistic, Eastern philosophies of medicine) behavior information is construed as a positive, empowering force rather than a negative, shaming force.

Manipulation issues. The extent to which anti-fat attitude improvement (or exacerbation) can be attributed to changes in beliefs about the causes of obesity, or even to changes in beliefs about personal controllability of weight, is restricted by the findings of no significant differences in these variables between conditions. Future studies exploring the effect of information about obesity causes on attitudes should take extra steps to ensure the persuasiveness of and the differentiation between the causes presented. The current study might have been improved had the pilot test included a control condition or been executed among healthcare providers in addition to general students. However, ineffective manipulations have not been uncommon in similar studies, and it is possible that this just means that beliefs about the causes of obesity are relatively inflexible (e.g. Bannon et al., 2009). Pretest-posttest measures of belief, while impractical for use in this study, could account for possible ceiling effects in future research.

It is also possible that beliefs about causes of obesity resist change because they

serve some important function. Researchers speculated that controllability beliefs or attributions to personally controllable causes serve as justifications for existing prejudice (Crandall & Eshleman, 2003; Hegarty & Golden, 2008). Maybe like other explicit self-reports, obesity attributions are subject to pressure for socially desirable responding such that society promotes belief in behavioral causes and personal controllability. These possibilities are testable. However, the fact remains that the experimental design of the current study left little else other than information differences to contribute to the differences found in implicit attitudes between article conditions and samples. We suggest that, despite inadequate manipulation check results, it is still critically important to determine what made particular information effective for reducing particular biases.

Explicit and Implicit Attitudes Compared

As anticipated, most aspects of implicit and explicit attitudes were weakly, positively correlated, as they have been in past research indicating the appropriateness of multi-method measurement (e.g. Bessenoff & Sherman, 2000; Teachman & Brownell, 2001). The prediction that social desirability concerns would lead to more positive self-reported than implicitly measured anti-fat attitudes, was also supported. In both the general student and healthcare provider samples, similar to past research, explicit measures indicated relatively positive attitudes while implicit measures indicated significant anti-fat attitudes (e.g. O'Brien et al., 2010; Teachman & Brownell, 2001). These findings suggest that weight biases may not be considered as socially acceptable (in comparison to other less socially tolerated prejudices) as previously suspected (Latner et al., 2008). However, pressure to appear non-biased may vary by situation, and the

social context of psychology studies may be quite different from that of everyday situations.

Healthcare providers. We predicted that healthcare providers' attitudes toward obese people would be similarly negative to or more negative than, those of general students, given that healthcare providers are a commonly cited source of weight bias and have exhibited negative attitudes in past research (Puhl & Brownell, 2006; Schwartz, Chambliss, Brownell, Blair, & Billington, 2003). In this study, healthcare providers' attitudes were similar to, but not more negative than, those of the general students.

Given healthcare providers' exposure to societal preferences for thinness and their potentially amplified focus on physicality and the health risks related to obesity, we expected their implicit associations would be negative, and they were (O'Brien et al., 2010). Because healthcare providers are presumably motivated toward normative professional tenets of beneficence, we expected that self-presentation concerns would lower the negativity of their explicit attitude scores relative to their implicit attitude scores, and they apparently did (Hebl & Xu, 2001). The lack of explicit negativity among healthcare providers in the current study is not compatible, however, with prior research in which medical students reported obese patients to be the most common targets of derogatory humor among their advisors and peers (Wear et al., 2006). If healthcare providers feel free to express these negative attitudes amongst colleagues, then the pressure to appear non-biased about obesity publicly may indeed depend on context.

It is especially notable, that while explicit attitudes remained apparently unaffected by an informational intervention, implicit attitudes improved for some

conditions of the healthcare sample, replicating a similar finding among pre-service health students in a recent intervention study (O'Brien et al., 2010). This difference in malleability between differently measured attitudes might be attributable to any of a number of differences between explicit and implicit attitudes, some of which may differ between healthcare providers and general people. For instance, explicit anti-fat attitudes may serve functions that implicit attitudes do not, and these functions may be related to one's level of involvement with obesity and, in some respects, one's responsibility for managing it.

Possible explicit attitude functions. Because explicit attitudes are public expressions, perhaps they function to communicate something beyond private dislike of fat people. It has been posited that people who care about the wellbeing of overweight individuals may perpetuate weight stigma because they believe it will promote behavior change and improved health (Puhl, Moss-Racusin, Schwartz, & Brownell, 2008). This supposition is consistent with commonly found correlations between beliefs in personal controllability of weight and explicit anti-fat attitudes (e.g. Crandall, 1994). It is also one motive that could help explain the rigidity of explicit attitudes toward obese people amongst healthcare providers hoping to reduce obesity related health complications.

Presumably, healthcare providers' concerns about patients' obesity increase with the magnitude of health risks involved. Just as the risks associated with obesity increase with the severity of the condition, healthcare providers' explicit anti-fat attitudes became more negative as the severity of the weight condition described increased in one past study (Harvey & Hill, 2001). Therefore, it seems possible that concern over health risks

could be related to explicit anti-fat attitudes. Obesity is an increasingly common condition that is notoriously difficult to manage. Most physicians think obesity is an important issue, yet many do not feel competent to effectively treat it and even believe treatment to be futile (Epstein & Ogden, 2005). Meanwhile they reported that obese patients expect doctors to take most of the responsibility for the solutions (Block, DeSalvo, & Fisher, 2003; Davis, Shishodia, Taqui, Dumfeh, & Wylie-Rosett, 2007).

In as much as humor can alleviate pressure or serve as a defense mechanism, fat jokes in the operating room may communicate frustration about the problems posed by obesity and the relative lack of power healthcare providers feel to fix them (Wear et al., 2006). If healthcare providers consider positive explicit attitudes toward obesity an expression of tacit acceptance of a condition that presents serious health risks, one could reasonably expect explicit attitudes to be more resistant to improvement than implicit attitudes. Whatever the possible function of explicit anti-fat attitudes amongst healthcare providers, results of this study point to alternatives to attribution theory based explanations worth future exploration.

Healthcare Sample Anomalies

The current study offers an interesting counterpoint to a prior study that compared the anti-fat attitudes of healthcare providers and a general population. Teachman and Brownell (2001) found that implicit attitudes between their healthcare sample and the general population sample were similarly negative, but they found less evidence of negative explicit attitudes across the samples. We found that implicit attitudes were less negative in the healthcare sample than in the general student sample, but also found little

evidence of negative implicit attitudes across samples. These divergent results could be due to a number of differences between the studies, however they could also be due to differences in the sampled populations.

Teachman and Brownell (2001) cited that different data collection methods between groups limited the certainty of the conclusions they drew. In the current study, data collection occurred in a similar manner, in similar environments, and among participants who were more or less similar besides their occupational path. The Bastyr healthcare provider sample in the current study was younger and composed of more females than the mainly male, middle-aged sample in the prior study, which might also help explain the different findings. However, in another study of health professionals, being younger and female was actually associated with greater negativity of implicit anti-fat attitudes (Schwartz et al., 2003). Therefore, it may be more likely that the differences are due to Bastyr being a natural health sciences institution with an East meets West philosophy that encourages alternative therapies, holistic approaches, and personal empowerment in comparison to the traditional therapies, medical approaches, and hierarchical nature of health science institutions with Western philosophies from which many healthcare providers graduate.

Differences between these philosophies may be akin to differences along the continuum of conservatism and social dominance orientation in their influence on anti-fat attitudes. In a number of past studies, such beliefs were associated with more negative anti-fat attitudes and greater controllability beliefs (e.g. Crandall, 1994). Though none of those predictor variables were measured in the current study, researchers might

investigate whether there are indeed differences between traditional and alternative healthcare professionals that might be informative for the creation of future bias reduction methods.

Anecdotally, healthcare sample participants in the current study routinely presented more intense reactions to the procedures than did general students. This may only be an apparent difference resulting from the more intimate circumstances of smaller group testing. However, not one general student provided feedback outside of the standard response options, while nearly half of the healthcare provider sample expressed some kind of verbal reaction. A number of participants acknowledged noticing differences in their IAT reaction times and some expressed disappointment. Others remarked about how interesting they found the articles or offered their own views about the causes of obesity (or more specifically the contributors to chronic obesity). Many participants expressed interest in knowing the results of the study and gratitude for the referral to Rudd Center for Obesity Policy resources. This apparent heightened concern about obesity related topics indicates a potential area of biases ripe for intervention.

In Conclusion

Even though explicit attitudes and blaming beliefs were not improved across conditions and samples, the significant reduction of healthcare providers' negative implicit associations is a hopeful and important finding. For one, it shows that biogenetic information, while possibly ineffective for improving attitudes among a general population, is a worthwhile focus for interventions among healthcare providers; a group who is both enlisted in the care obese people and who hold significant and potentially

harmful anti-fat associations. Secondly, a method that reduces negative implicit associations, which have more impact on negative behavior toward obese people than do explicit attitudes, is more beneficially applicable than methods that change explicit attitudes only (Bessenoff & Sherman, 2000). Healthcare providers' treatment of obese people has implications for a growing population of patients seeking medical care. The current findings highlight important avenues for future targeted bias reduction methods (Puhl & Brownell, 2001).

The objective is clear. We may have a way to go, but with adequate research, prevention, and intervention, the time may come when surgeons no longer play „the pannus game' in which they place bets on the weight of an abdominal fold of fat removed to perform an obese woman's hysterectomy (Wear et al., 2006). Likewise, obese women might no longer cite disrespectful treatment, inadequately equipped doctor's offices, and unsolicited weight advice unrelated to their presenting problem, as barriers to seeking lifesaving screening tests and other routine medical care (Amy, Aalborg, Lyons, & Keranen, 2006).

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Appendix A

Manipulation Materials: Mock New York Times Articles

The New York Times
http://www.nytimes.com/2010/06/23/health/19brody.html?_r=1&ref=health

June 23, 2010

The Behavioral Basis of Obesity

By JANE E. BRODY

Two-thirds of Americans are overweight or obese. For most, research shows, excessive caloric intake and lack of physical activity are the main causes as well as the most promising avenues for change toward a solution.

In Brief:

Genetic and environmental explanations for obesity overlook the crucial role of personal responsibility for health behaviors.

Eating habits that lead to weight gain, a failure to lose weight, or an inability to maintain weight loss are as much a matter of mind as of body.

Sound eating and exercising behaviors can be established through knowledge, experience, and conscious choice.

Today, more than 66 percent of Americans are overweight or obese, according to the federal Centers for Disease Control and Prevention in Atlanta. Americans have been getting increasingly fat since the late 1970's. Between 2000 and 2005 alone, the number of severely obese jumped 75%. With the increase in waistlines has come a surplus of conventional wisdom about the probable causes for and solutions to obesity.

Some say it is our genetic and biological makeup that determines our weight. Indeed scientists have established the existence of a number of genetic markers that dictate weight range and other weight related bodily functions. Yet, there have certainly not been any large scale genetic mutations, metabolic changes, or physiologic alterations over the last few decades to explain the widespread nature of increasing obesity rates.

People also point to changes in society, like the rise of fast food and sedentary lifestyles, as a culprit. These factors have been proven to play a small role. But the notion that Americans *ever* ate very well and or stayed very active is suspect. The typical meal had plenty of fat and calories, and we drove to work and watched TV well before we got collectively fat.
It is not primarily the environment or our biology, but instead our behavior that has made us fat. "While there are more unhealthy options available than ever, they are just that- *options*," says Dr. Judith Beck, a psychologist and the director of the Beck Institute for Cognitive Therapy and Research in Philadelphia. "What you do with your body is ultimately a choice," she continued. Dr. Beck has spent many years helping patients achieve weight-loss goals by learning how to think and behave differently with regard to food and eating.

Dr. Beck teaches practical strategies to raise awareness of harmful habits and make better decisions. For instance, many people gain weight in response to eating prompted by emotions and stress. The most common 'fixes' are often salty, sweet, or fatty 'comfort' foods which may be harmless on an occasional basis, when the body can make up for a glut with small cut-backs the rest of the week. But when repeated, this unregulated pattern can actually dampen taste buds and satiety signals. "When people can learn to recognize this issue and select alternative responses in times of stress, such as calling a friend or choosing a healthier snack in reasonable portions, they are able to maintain a more normal weight over time" says Dr. Beck.

Self-awareness is not the only knowledge that affects obesity. "Nutrition know-how is a powerful tool" says Dr. Susan B. Roberts, professor of nutrition and psychiatry at Tufts University in Boston and author of nearly 200 articles published in peer-reviewed research journals. She insists nutrition is not complicated- that for all our proselytizing about one diet or another, we talk skinny but continue to think fat. "Eating less is one thing- that will always help to some extent, but caring about what goes into your body and feeling confident in your ability to carry out informed decisions about your health is another," she remarks. Indeed the science backs this up. The more experience one has applying basic nutrition knowledge in the kitchen, the less likely one is to be obese.

In our fad-diet crazed society, where recommended nutrient ratios fluctuate every few years, staying current with what's best to can be tough. However, the benefits of cooking are not about strict adherence to a specific diet. The payoff is in avoiding overprocessed foods and prioritizing self-care. Spending time with one's food ultimately promotes a respectful and appreciative relationship. Those with burnt out taste buds learn the delicious flavors of fresh foods and spices. Those with trouble reading their bodies' fullness signals have time to get back in tune.

Timothy Pallance, 39, of Dearborn, Michigan dropped to 187 pounds from 310 using Dr. Roberts' books. He lost his weight over three years, first by stocking his kitchen with supplies, then introducing whole foods to his diet, and finally adding exercise. Pallance said that when he started, he was repulsed by vegetables and "wouldn't eat a string bean that wasn't smothered in bacon and cream sauce." Now he takes time out from every day to make his own meals using healthy ingredients and says he enjoys food more than ever before. He strives for balance and moderation. In his view, weight loss depends on a deep motivation to take care of oneself, plus the sense of accomplishment that comes with reaching goals.

Of course most health behaviors are established early in life and repeated over a lifetime. Ending emotional eating or convenience food diets can be difficult changes to maintain for many people. Someone who has never exercised a day in their life will have trouble breaking through inertia. However, regular physical activity is a major component of weight maintenance.

To battle the childhood obesity epidemic, Stephen Virgilio, chairman of the department of health and physical education at Adelphi University and a member of the board of the National Association for Sport and Physical Education, is working with schools and communities to instate obesity prevention initiatives. "We know that the traditional team sports are not always appealing to 'non athletes' or sustainable activity options for these children once they become busy adults" says Virgilio. With his help, a number of school districts have revised their physical education curriculums to include bicycling, lifeguarding, yoga, Pilates, and even Dance,Dance Revolution, a blood-pumping video game; moving away from skills mastery toward activities that can generate enthusiasm for lifelong fitness.

So, the answer to the question of what causes excess weight is still as simple as it was in 1918 when the first calorie-centric weight-loss guide was published to great acclaim. The formula: don't eat too much but especially don't eat in excess of what your body will burn in any given day. How we go about getting back to basics may be a bit more complex as we consider the ways our food environment and mentality have changed. But as long as we have free-will, eating reasonably, cooking for ourselves, and exercising, remain viable choices for all individuals and society at large.

Note. This is the original version of the behavior focused article which was revised during pilot testing. The final article is displayed in Appendix D.

The New York Times
http://www.nytimes.com/2010/06/23/health/19brody.html?_r=1&ref=health

June 23, 2010

The Biological Basis of Obesity

By JANE E. BRODY

Two-thirds of Americans are overweight or obese. For most, research shows, biogenetics are the main cause as well as the most promising avenue for change toward a solution.

In Brief:

Weight is more strongly inherited than nearly any other condition, including mental illness, breast cancer or heart disease.

Since the discovery of the first obesity gene in 1994, scientists have found about 50 genes involved in obesity.

Body composition is partially set by DNA and highly monitored by the brain to resist weight loss, and bypassing these physical systems is not just a matter of willpower.

Today, more than 66 percent of Americans are overweight or obese, according to the federal Centers for Disease Control and Prevention in Atlanta. Americans have been getting increasingly fat since the late 1970's. Between 2000 and 2005 alone, the number of severely obese jumped 75%. With the increase in waistlines has come a surplus of conventional wisdom on the probable causes of and solutions for obesity.

Some say it is a matter of self-control. The equation is simple: when calories-in exceed calories-out, weight increases. However, it does not appear that the growing trend of obesity stemmed from a change within people. It is hard to argue that Americans have collectively become less responsible in the last 35 years as murder and divorce rates have fallen and the work week has increased.

People also point to changes in society, like the rise of fast food and sedentary lifestyles, as a culprit. These factors have been proven to play a small role. But the notion that Americans *ever* ate very well and or stayed very active is suspect. The typical meal had plenty of fat and calories, we drove to work and watched TV, well before we got collectively fat.

It is not primarily our behavior or environment, but instead our biology that has made us fat. Diet and exercise matter, scientists know, but these influences alone do not determine an individual's weight. Many of the so-called facts about obesity amount to oversimplification of the medical evidence. Body composition is dictated by DNA and monitored by the brain. Bypassing these physical systems is not just a matter of willpower.

Dr. Albert Stunkard of the University of Pennsylvania found the first evidence of genetic influence with his study of the Danish registry of adoptees. The conclusions, published in The New England Journal of Medicine in 1986, were unequivocal. Eighty percent of the offspring of two obese parents became obese, while no more than 14 percent of the offspring of two normal weight parents became obese. Further, there was no relation between the body-mass index of adoptive parents and the weight of adoptees, suggesting that childhood family environment alone has little or no effect on weight.

A few years later, Dr. Stunkard published another study in The New England Journal of Medicine, using another classic method of geneticists: investigating twins. This time he used the Swedish Twin Registry of approximately 800 pairs of identical and fraternal twins. The identical twins had nearly identical body mass indexes, whether they had been reared apart or together. There was more variation in the body mass indexes of fraternal twins, who, like any siblings, share some, but not all, genes. The researchers concluded that 70 percent of the variation in peoples' weights is accounted for by inheritance, a figure that means that weight is more strongly inherited than nearly any other condition, including mental illness, breast cancer or heart disease.

Since the discovery of the first obesity gene in 1994, scientists have found over 50 genes involved in obesity. Some determine how individuals lay down fat and metabolize energy stores. Others regulate how much people want to eat, how they know when they've had enough, and how likely they are to use up calories through activities ranging from fidgeting to running marathons.

The 'thrifty gene' was passed down from our ancestors who survived unpredictable cycles of food catastrophe by laying down fat stores when food was plentiful and using up the stores slowly when food was scarce. Once upon a time, there was an adaptive advantage to being able to get fat. However the ability to slow down metabolism during periods of reduced eating (i.e. dieting) is hardly a benefit in modern times.

A biological factor that affects us all is our 'set point'. Each individual has a genetically determined weight range to which the body gravitates throughout the lifespan. The range may span 15 or 20 pounds and shift upward gradually; however moving outside the natural set point in the short term is difficult. Those who force their weight below nature's preassigned levels face innate obstacles. "Studies show that metabolism can slow to as little as half-speed as the body tries

to conserve energy and regain weight" explains Rudolph Leibel, an obesity researcher at Columbia University. So instead of resulting in a normal state for obese patients, weight reduction results in an abnormal metabolic state resembling that of starved nonobese individuals.

The body's determination to maintain its composition is why a person can skip a meal, or even fast for short periods, without losing weight. It is also why burning an extra 100 calories a day will not readily alter the verdict on the bathroom scales. Struggling against the brain's innate calorie counters, even strong-willed dieters make up for calories lost on one day with a few extra bites on the next and never realize it. "The system operates with 99.6 percent precision," says Dr. Jeffrey Friedman, an obesity researcher and molecular geneticist at Rockefeller University.

The biological perspective on obesity need not be cause for discouragement. Evadnie Rampersaud, research professor at the Miami Institute for Human Genomics, found that despite high incidence of a gene variation making people susceptible to obesity among the Amish, high levels of physical activity buffered obesity rates. Further, she says, "prospects opened up by new techniques in biology have really raised my spirits. We are now cloning the gene that makes mice obese. In less than 5 years, we should know precisely how the obesity gene acts, whether people are different from mice and whether there are multiple types of obesity. I think, too, that we will better understand the biological factors that regulate body fat and find ways to manipulate them."

The New York Times
http://www.nytimes.com/2010/06/23/health/19brody.html?_r=1&ref=health

June 23, 2010

The Environmental Basis of Obesity

By JANE E. BRODY

Two-thirds of Americans are overweight or obese. For most, research shows, an 'obesegenic' food and activity environment is the main cause as well as the most promising avenue for change toward a solution.

In Brief:

Advancements in technology, reduction of manual labor, and changes in the built environment increasingly encourage sedentary lifestyles.

Economic and social factors support larger portion sizes, and greater availability and more sophisticated marketing of calorie dense, nutrient poor food.

Excess eating and reduced physical activity is more the result of automatic and largely uncontrollable responses to unappreciated environmental cues than a conscious choice.

Today, more than 66 percent of Americans are overweight or obese, according to the federal Centers for Disease Control and Prevention in Atlanta. Americans have been getting increasingly fat since the late 1970's. Between 2000 and 2005 alone, the number of severely obese jumped 75%. With the increase in waistlines has come a surplus of conventional wisdom about the probable causes of and solutions to obesity.

Some say it is a matter of self-control. The equation is simple: when calories-in exceed calories-out, weight increases. However, it does not appear that the growing trend of obesity stemmed from a change within people. It is hard to argue that Americans have collectively become less responsible in the last 35 years as murder and divorce rates have fallen and the work week has increased.

Others point to how our genetic and biological makeup determines our weight. Indeed scientists have established the existence of a number of genetic markers

that dictate weight range and other weight related bodily functions. Yet, there have certainly not been any large scale genetic mutations, metabolic changes, or physiologic alterations over the last few decades to explain the widespread nature of increasing obesity rates.

It is not primarily our behavior or our biology, but instead our environment that has made us fat. Multiple social and economic influences have increasingly contributed to a modern "obesogenic" environment that encourages sedentary lifestyles and provides easy access to unhealthy food. “We have created a biology–environment mismatch, such that human weight regulation mechanisms are unable to evolve fast enough to keep pace with the environmental change” says Dr. Yung Seng Lee of the National University of Singapore. Moreover, environmental factors often subvert personal choice by bypassing conscious thought and decision making.

Advancements in technology and reduction of manual labor are one such influence. Jobs were sedentary before the obesity epidemic accelerated, of course. However, since the mid- 1980s with the growing availability of personal computers and the transition toward the internet age of information and communication, people have become even less active. Riding lawn mowers, leaf blowers, and remote control devices for garages and televisions decrease everyday labor. As well, technological entertainment options increasingly compete for what was once physically active recreation time. In many schools, gym has been cut in favor of test prep. These small differences in physical activity may only save a few calories here and there, but cumulatively contribute to substantial weight gain over years.

Changes in the built environment have also decreased opportunity for healthy lifestyle activity levels. “The current state of land use design and neighborhood safety and walkability has led to people getting out and moving less” says New York State Health Commissioner, Richard F. Daines. Even food distribution has changed to influence our weight. Between 1986 and 1996, the number of commercial food establishments increased by 78%, while food stores decreased. Retail outlets that do not sell food as their primary business now have food available, either in vending machines or as ‘impulse buys’ at the cash register. Chocolate, candies, chips and soda can be bought in gas stations, hardware stores, book stores, and office buildings.

“We often eat too much because calorie-dense foods are convenient and cheap and portioned to encourage overeating” says professor of nutrition, Richard J. Decklebaum of Columbia University. The price of soda has fallen 33 percent over the last three decades, while the price of fruit and vegetables, dairy, and fish has risen. Beverages in 6 oz and 8 oz sizes are no longer sold in favor of 12, 16, 20 oz sizes. The typical restaurant now serves portions that are 2–5 times in excess of what individuals typically require to stay in energy balance. A study comparing

eating habits across time found that even at home people pour themselves more cornflakes and milk than twenty years ago.

Significant marketing and advertising advances especially contribute to excessive consumption for children. While cereals with the poorest ranked nutritional values are the most heavily marketed, Saturday morning ads are only the tip of the iceberg. Schools contract with sugared beverage companies, product placement is rampant in popular entertainment, and interactive internet campaigns target receptive audiences. Guerrilla, stealth, and viral are a few of the terms used by the industry to describe marketing designed to bypass conscious defenses. The amount of money spent by the food marketing industry to advertise just junk food, just to kids, in four days (100 million dollars) is equal to the entire yearly budget of the top international source of funding for tackling childhood obesity.

Research shows that the ubiquitous accessibility of food and the omnipresence of food advertising trigger people to unconsciously and artificially feel hungry on a regular basis. Neuroimaging studies of the brain have shown that images of food influence blood sugar and cause dopamine secretion which stimulates the desire to eat. People can chose not to eat of course, but only if they are aware of the artificial stimulus toward hunger. Unfortunately, people have little awareness of these cues and only perceive the internal need.

As the late Dr. Donald H. Gemson of the Mailman School of Public Health at Columbia put it, “the causes of the obesity epidemic are environmental, and the answers will be as well.” Rather than simply urging people to eat better and exercise more, experts like Dr. Gemson have increasingly argued that society has to facilitate such changes by reducing the availability of high-calorie foods, advertisements of junk food to children and reliance on automobiles, while increasing access to healthy foods and exercise. In other words, the real solution may be to control and reduce those forces that unconsciously influence us to behave unhealthily. Only by changing the cues we are exposed to on a daily basis or even just by making the cues we cannot change more explicit, will people truly be able to bring themselves into energy balance according to choice.

Appendix B

Manipulation Check Materials

Please indicate whether the following statements are true or false *according to the article*.

1) Over two thirds of Americans are overweight or obese. T F

2) Obesity rates have been on the rise since the early 1940's. T F

3) The primary causes of obesity are behavioral (ex. eating and physical activity behavior). T F

4) The primary causes of obesity are environmental (ex. availability of inexpensive and unhealthy food). T F

5) The primary causes of obesity are biogenetic (ex. genetics and metabolism). T F

Please rate *your own agreement* with the following statements from (0= strongly disagree ---------- 7= strongly agree).

6) The article is well balanced.

   0 1 2 3 4 5 6 7

7) The article is credible.

   0 1 2 3 4 5 6 7

8) The article is accessible (i.e. readable and understandable for most audiences).

   0 1 2 3 4 5 6 7

9) The article is convincing.

   0 1 2 3 4 5 6 7

10) Society can influence obesity.

   0 1 2 3 4 5 6 7

11) Individuals can avoid obesity.

   0 1 2 3 4 5 6 7

12) The primary causes of obesity are behavioral (ex. eating and physical activity behavior).

   0 1 2 3 4 5 6 7

13) The primary causes of obesity are environmental (ex. availability of inexpensive and unhealthy food).

0 1 2 3 4 5 6 7

14) The primary causes of obesity are biogenetic (ex. Genetics and metabolism).

0 1 2 3 4 5 6 7

Note. Questions 3-5 and 12-14 were presented in counterbalanced order. The control condition only received questions 6-14.

Appendix C

Revised Behavior Article

The New York Times
http://www.nytimes.com/2010/06/23/health/19brody.html?_r=1&ref=health

June 23, 2010

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By JANE E. BRODY

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Sound eating and exercising behaviors can be established through knowledge, experience, and conscious choice.

Today, more than 66 percent of Americans are overweight or obese, according to the federal Centers for Disease Control and Prevention in Atlanta. Americans have been getting increasingly fat since the late 1970's. Between 2000 and 2005 alone, the number of severely obese jumped 75%. With the increase in waistlines has come a surplus of conventional wisdom about the probable causes for and solutions to obesity.

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People also point to changes in society, like the rise of fast food and sedentary lifestyles, as a culprit. These factors have been proven to play a small role. But the notion that Americans *ever* ate very well and or stayed very active is suspect. The typical meal had plenty of fat and calories, and we drove to work and watched TV well before we got collectively fat.
It is not primarily the environment or our biology, but instead our behavior that has made us fat. "While there are more unhealthy options available than ever, they are just that- *options*," says Dr. Judith Beck, a psychologist and the director of the Beck Institute for Cognitive Therapy and Research in Philadelphia. "What you do with your body is ultimately a choice," she continued. Dr. Beck has spent many years helping patients achieve weight-loss goals by learning how to think and behave differently with regard to food and eating.

Dr. Beck teaches practical strategies to raise awareness of harmful habits and make better decisions. For instance, many people eat when they feel sad or stressed. The most common 'fixes' are often salty, sweet, or fatty 'comfort' foods which may be harmless on an occasional basis, when the body can make up for a glut with small cut-backs the rest of the week. But when repeated, this unregulated pattern can actually dampen taste buds and satiety signals. "When people can learn to recognize this issue and select alternative responses in times of stress, such as calling a friend or choosing a healthier snack in reasonable portions, they are able to maintain a more normal weight over time" says Dr. Beck.

Self-awareness is not the only knowledge that affects obesity. "Nutrition know-how is a powerful tool" says Dr. Susan B. Roberts, professor of nutrition and psychiatry at Tufts University in Boston and author of nearly 200 articles published in peer-reviewed research journals. She insists nutrition is not complicated- that for all our proselytizing about one diet or another, we talk skinny but continue to think fat. "Eating less is one thing- that will always help to some extent, but caring about what goes into your body and feeling confident in your ability to carry out informed decisions about your health is another," she remarks. Indeed the science backs this up. The more experience one has applying basic nutrition knowledge in the kitchen, the less likely one is to be obese.

In our fad-diet crazed society, where recommended nutrient ratios fluctuate every few years, staying current with what's best to can be tough. However, the benefits of cooking are not about strict adherence to a specific diet. The payoff is in avoiding overprocessed foods and prioritizing self-care. Spending time with one's food ultimately promotes a respectful and appreciative relationship. Those with burnt out taste buds learn the delicious flavors of fresh foods and spices. Those with trouble reading their bodies' fullness signals have time to get back in tune.

Timothy Pallance, 39, of Dearborn, Michigan dropped to 187 pounds from 310 using Dr. Roberts' books. He lost his weight over three years, first by stocking his kitchen with supplies, then introducing whole foods to his diet, and finally adding exercise. Pallance said that when he started, he was repulsed by vegetables and "wouldn't eat a string bean that wasn't smothered in bacon and cream sauce." Now he takes time out from every day to make his own meals using healthy ingredients and says he enjoys food more than ever before. He strives for balance and moderation. In his view, weight loss depends on a deep motivation to take care of oneself, plus the sense of accomplishment that comes with reaching goals.

Of course most health behaviors are established early in life and repeated over a lifetime. Ending emotional eating or convenience food diets can be difficult changes to maintain for many people. Likewise, someone who has never exercised a day in their life will have trouble breaking through inertia. However, regular physical activity is a major component of weight maintenance.

To help battle the obesity epidemic, Stephen Virgilio, chairman of the department of health and physical education at Adelphi University and member of the board of the National Association for Sport and Physical Education, works regularly with adolescents to generate enthusiasm for lifelong fitness. "When I first meet these kids," he says, "many of them are winded just walking two flights of stairs to get to my office." After three months of progressively challenging, fun, and loosely scheduled exercise- be it yoga, basketball, or even Dance, Dance Revolution, a blood-pumping video game- students gain the initial stamina and more importantly the physical experience to make healthy choices and deter obesity down the road.

So, the answer to the question of what causes excess weight is still as simple as it was in 1918 when the first calorie-centric weight-loss guide was published to great acclaim. The formula: don't eat too much but especially don't eat in excess of what your body will burn in any given day. How we go about getting back to basics may be a bit more complex as we consider the ways our behaviors and mentality have changed over time. But as long as we have free-will, eating reasonably, cooking for ourselves, and exercising, remain viable choices for all individuals and society at large.

Appendix D

Recruitment Language

Study Name	Evaluating Social/Health Information
Abstract	Respond to questions and complete tasks related to social and/or health topics.
Description	This study involves reading, sorting, and evaluating information and filling out questionnaires related to social and/or health topics.
Duration	30 minutes
Credits	0.5 Credits

Figure 1. WWU student sample recruitment language.

Hello,

- Are you a healthcare provider (student or other)?
- Would you like the chance to win $50?
- Are you interested in exploring your beliefs and attitudes?

I'm a Bastyr alum working on my master's thesis at WWU in Bellingham and I'm in great need of participants for a **15-25 minute social psychology study** with important healthcare implications!

The study involves reading and evaluating a news article about a health related topic and completing a series of word association tasks. **In return for participation, you will be entered into two $50 drawings.**

If you are interested, please email me to arrange a timeslot and location that works for you March through June.

Thank you for your consideration!

-Jessica Silks
silksj@students.wwu.edu

Figure 2. Healthcare provider sample recruitment language.

Appendix E

Implicit Association Test Materials

Insects	Flowers
bugs	daffodil
mosquito	daisy
roach	tulip
Good	**Bad**
wonderful	terrible
joyful	nasty
excellent	horrible

Insects	Flowers
bugs	daffodil
mosquito	daisy
roach	tulip
Good	**Bad**
wonderful	terrible
joyful	nasty
excellent	horrible

Insects		Flowers
Good		**Bad**
O	mosquito	O
O	horrible	O
O	daffodil	O
O	excellent	O
O	roach	O
O	nasty	O
O	bugs	O
O	joyful	O
O	daisy	O
O	wonderful	O
O	tulip	O
O	terrible	O
O	mosquito	O
O	horrible	O
O	daffodil	O
O	joyful	O
O	daisy	O
O	terrible	O
O	tulip	O
O	excellent	O
O	roach	O
O	nasty	O
O	bugs	O
O	wonderful	O

Insects		Flowers
Good		**Bad**
O	terrible	O
O	daisy	O
O	wonderful	O
O	bugs	O
O	nasty	O
O	daffodil	O
O	excellent	O
O	roach	O
O	horrible	O
O	mosquito	O
O	joyful	O
O	tulip	O
O	horrible	O
O	bugs	O
O	joyful	O
O	daffodil	O
O	nasty	O
O	mosquito	O
O	wonderful	O
O	tulip	O
O	excellent	O
O	roach	O
O	terrible	O
O	daisy	O

Insects		Flowers
bugs		daffodil
mosquito		daisy
roach		tulip
Bad		**Good**
terrible		wonderful
nasty		joyful
horrible		excellent

Insects		Flowers
bugs		daffodil
mosquito		daisy
roach		tulip
Bad		**Good**
terrible		wonderful
nasty		joyful
horrible		excellent

Insects		Flowers
Bad		**Good**
O	mosquito	O
O	horrible	O
O	daffodil	O
O	excellent	O
O	roach	O
O	nasty	O
O	bugs	O
O	joyful	O
O	daisy	O
O	wonderful	O
O	tulip	O
O	terrible	O
O	mosquito	O
O	horrible	O
O	daffodil	O
O	joyful	O
O	daisy	O
O	terrible	O
O	tulip	O
O	excellent	O
O	roach	O
O	nasty	O
O	bugs	O
O	wonderful	O

Insects		Flowers
Bad		**Good**
O	terrible	O
O	daisy	O
O	wonderful	O
O	bugs	O
O	nasty	O
O	daffodil	O
O	excellent	O
O	roach	O
O	horrible	O
O	mosquito	O
O	joyful	O
O	tulip	O
O	horrible	O
O	bugs	O
O	joyful	O
O	daffodil	O
O	nasty	O
O	mosquito	O
O	wonderful	O
O	tulip	O
O	excellent	O
O	roach	O
O	terrible	O
O	daisy	O

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Good	**Bad**
wonderful	terrible
joyful	nasty
excellent	horrible

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Good	**Bad**
wonderful	terrible
joyful	nasty
excellent	horrible

Fat People		Thin People
Good		Bad
O	obese	O
O	horrible	O
O	slim	O
O	excellent	O
O	large	O
O	nasty	O
O	fat	O
O	joyful	O
O	thin	O
O	wonderful	O
O	skinny	O
O	terrible	O
O	obese	O
O	horrible	O
O	slim	O
O	joyful	O
O	thin	O
O	terrible	O
O	skinny	O
O	excellent	O
O	large	O
O	nasty	O
O	fat	O
O	wonderful	O

Fat People		Thin People
Good		Bad
O	terrible	O
O	thin	O
O	wonderful	O
O	fat	O
O	nasty	O
O	slim	O
O	excellent	O
O	large	O
O	horrible	O
O	obese	O
O	joyful	O
O	skinny	O
O	horrible	O
O	fat	O
O	joyful	O
O	slim	O
O	nasty	O
O	obese	O
O	wonderful	O
O	skinny	O
O	excellent	O
O	large	O
O	terrible	O
O	thin	O

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Bad	**Good**
terrible	wonderful
nasty	joyful
horrible	excellent

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Bad	**Good**
terrible	wonderful
nasty	joyful
horrible	excellent

Fat People		Thin People
Bad		**Good**
O	obese	O
O	horrible	O
O	slim	O
O	excellent	O
O	large	O
O	nasty	O
O	fat	O
O	joyful	O
O	thin	O
O	wonderful	O
O	skinny	O
O	terrible	O
O	obese	O
O	horrible	O
O	slim	O
O	joyful	O
O	thin	O
O	terrible	O
O	skinny	O
O	excellent	O
O	large	O
O	nasty	O
O	fat	O
O	wonderful	O

Fat People		Thin People
Bad		**Good**
O	terrible	O
O	thin	O
O	wonderful	O
O	fat	O
O	nasty	O
O	slim	O
O	excellent	O
O	large	O
O	horrible	O
O	obese	O
O	joyful	O
O	skinny	O
O	horrible	O
O	fat	O
O	joyful	O
O	slim	O
O	nasty	O
O	obese	O
O	wonderful	O
O	skinny	O
O	excellent	O
O	large	O
O	terrible	O
O	thin	O

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Motivated	**Lazy**
determined	slow
motivated	lazy
eager	sluggish

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Motivated	**Lazy**
determined	slow
motivated	lazy
eager	sluggish

Fat People		Thin People
Motivated		**Lazy**
O	obese	O
O	sluggish	O
O	slim	O
O	eager	O
O	large	O
O	lazy	O
O	fat	O
O	motivated	O
O	thin	O
O	determined	O
O	skinny	O
O	slow	O
O	obese	O
O	sluggish	O
O	slim	O
O	motivated	O
O	thin	O
O	slow	O
O	skinny	O
O	eager	O
O	large	O
O	lazy	O
O	fat	O
O	determined	O

Fat People		Thin People
Motivated		**Lazy**
O	slow	O
O	thin	O
O	determined	O
O	fat	O
O	lazy	O
O	slim	O
O	eager	O
O	large	O
O	sluggish	O
O	obese	O
O	motivated	O
O	skinny	O
O	sluggish	O
O	fat	O
O	motivated	O
O	slim	O
O	lazy	O
O	obese	O
O	determined	O
O	skinny	O
O	eager	O
O	large	O
O	slow	O
O	thin	O

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Lazy	**Motivated**
slow	determined
lazy	motivated
sluggish	eager

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Lazy	**Motivated**
slow	determined
lazy	motivated
sluggish	eager

Fat People Lazy		Thin People Motivated
O	obese	O
O	sluggish	O
O	slim	O
O	eager	O
O	large	O
O	lazy	O
O	fat	O
O	motivated	O
O	thin	O
O	determined	O
O	skinny	O
O	slow	O
O	obese	O
O	sluggish	O
O	slim	O
O	motivated	O
O	thin	O
O	slow	O
O	skinny	O
O	eager	O
O	large	O
O	lazy	O
O	fat	O
O	determined	O

Fat People Lazy		Thin People Motivated
O	slow	O
O	thin	O
O	determined	O
O	fat	O
O	lazy	O
O	slim	O
O	eager	O
O	large	O
O	sluggish	O
O	obese	O
O	motivated	O
O	skinny	O
O	sluggish	O
O	fat	O
O	motivated	O
O	slim	O
O	lazy	O
O	obese	O
O	determined	O
O	skinny	O
O	eager	O
O	large	O
O	slow	O
O	thin	O

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Smart	**Stupid**
intelligent	dumb
smart	stupid
bright	dense

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Smart	**Stupid**
intelligent	dumb
smart	stupid
bright	dense

Fat People		Thin People
Smart		Stupid
O	obese	O
O	dense	O
O	slim	O
O	bright	O
O	large	O
O	stupid	O
O	fat	O
O	smart	O
O	thin	O
O	intelligent	O
O	skinny	O
O	dumb	O
O	obese	O
O	dense	O
O	slim	O
O	smart	O
O	thin	O
O	dumb	O
O	skinny	O
O	bright	O
O	large	O
O	stupid	O
O	fat	O
O	intelligent	O

Fat People		Thin People
Smart		Stupid
O	dumb	O
O	thin	O
O	intelligent	O
O	fat	O
O	stupid	O
O	slim	O
O	bright	O
O	large	O
O	dense	O
O	obese	O
O	smart	O
O	skinny	O
O	dense	O
O	fat	O
O	smart	O
O	slim	O
O	stupid	O
O	obese	O
O	intelligent	O
O	skinny	O
O	bright	O
O	large	O
O	dumb	O
O	thin	O

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Stupid	**Smart**
dumb	intelligent
stupid	smart
dense	bright

Fat People	Thin People
fat	slim
obese	thin
large	skinny
Stupid	**Smart**
dumb	intelligent
stupid	smart
dense	bright

Fat People		Thin People
Stupid		Smart
O	obese	O
O	dense	O
O	slim	O
O	bright	O
O	large	O
O	stupid	O
O	fat	O
O	smart	O
O	thin	O
O	intelligent	O
O	skinny	O
O	dumb	O
O	obese	O
O	dense	O
O	slim	O
O	smart	O
O	thin	O
O	dumb	O
O	skinny	O
O	bright	O
O	large	O
O	stupid	O
O	fat	O
O	intelligent	O

Fat People		Thin People
Stupid		Smart
O	dumb	O
O	thin	O
O	intelligent	O
O	fat	O
O	stupid	O
O	slim	O
O	bright	O
O	large	O
O	dense	O
O	obese	O
O	smart	O
O	skinny	O
O	dense	O
O	fat	O
O	smart	O
O	slim	O
O	stupid	O
O	obese	O
O	intelligent	O
O	skinny	O
O	bright	O
O	large	O
O	dumb	O
O	thin	O

Appendix F

Anti-Fat Attitudes Test

For the following questions, circle a number between 0 and 9 to indicate how much you agree or disagree with each of the following statements.
0= strongly disagree……9= strongly agree

1. I feel disgusted with myself when I gain weight.	0	1	2	3	4	5	6	7	8	9
2. I have a hard time taking fat people too seriously.	0	1	2	3	4	5	6	7	8	9
3. Fat people tend to be fat pretty much through their own fault.	0	1	2	3	4	5	6	7	8	9
4. I tend to think that people who are overweight are a little untrustworthy.	0	1	2	3	4	5	6	7	8	9
5. I worry about becoming fat.	0	1	2	3	4	5	6	7	8	9
6. Fat people make me feel somewhat uncomfortable.	0	1	2	3	4	5	6	7	8	9
7. People who weigh too much could lose at least some part of their weight through a little exercise.	0	1	2	3	4	5	6	7	8	9
8. I don't have many friends that are fat.	0	1	2	3	4	5	6	7	8	9
9. I really don't like fat people that much.	0	1	2	3	4	5	6	7	8	9

10. One of the worst things that could happen to me would be if I gained 25 pounds.	0	1	2	3	4	5	6	7	8	9
11. If I were an employer looking to hire, I might avoid hiring a fat person.	0	1	2	3	4	5	6	7	8	9
12. Some people are fat because they have no willpower.	0	1	2	3	4	5	6	7	8	9
13. Although some fat people are surely smart, in general, I think they tend not to be quite as bright as normal weight people.	0	1	2	3	4	5	6	7	8	9
14. I find fat people disgusting	0	1	2	3	4	5	6	7	8	9

Note. Question 14 was presented to the healthcare provider sample participants only.

Appendix G

Demographics Collection Form

Please provide information about yourself for the following:

Gender_____

Age_____

Height_____

Weight_____

Race/Ethnicity _____

Have you gained and/or lost weight within the last two years? About how much?

gained: lost:

_____

About how many overweight friends do you have?

_____

About how many overweight family members do you have?

_____

What is your current profession/ job position?

_____

How much weight based prejudice have you personally experienced, from 0 (none) to 7 (very much)?

_____

Note. The following was an addition for the healthcare provider sample only.

continues on next page

How long have you worked in a clinical setting?

_____

What is you educational background/ years of healthcare education?

_____

How much experience do you have treating obese patients, from 0 (none) to 7 (very)?

_____

How knowledgeable are you of obesity issues, from 0 (not at all) to 7 (very)?

_____

Table 1

Comparison of Demographic and Manipulation Check Data for Pilot Test Article Conditions

Article Condition	*n*	Age *M* (*SD*)	BMI *M* (*SD*)	% female	Perceived article qualities[a] *M* (*SD*)			
					Balanced	Credible	Accessible	Convincing
Environment	31	19.48 (1.52)	23.40 (3.30)	58%	4.26 (1.60)	5.39 (1.23)	6.03(1.22)	5.32 (1.51)
Biology	31	19.71 (2.60)	22.98 (3.56)	58%	3.97 (1.62)	4.68 (1.58)	5.87 (.88)	5.29 (1.27)
Original Behavior	31	19.94 (3.22)	22.83 (2.25)	55%	4.84 (1.19)	5.10 (1.30)	6.23 (.80)	5.61 (.99)
Revised Behavior	33	19.61 (1.37)	22.52 (2.98)	52%	4.85 (1.33)	5.27 (1.23)	6.36 (.78)	5.48 (1.20)

Article Condition	% of sample reporting cause as primary focus of article			Agreement with primacy of cause[b] *M* (*SD*)		
	Environmental	Biological	Behavioral	Environmental	Biological	Behavioral
Environment	90%	6%	42%	5.65 (1.11)^{b}	3.03 (1.70)^{a}	5.24 (1.33)^{a}
Biology	10%	94%	10%	4.00 (1.59)^{a}	5.13 (1.20)^{b}	4.61 (1.58)^{a}
Original Behavior	23%	10%	90%	4.26 (1.41)	2.97 (1.58)	6.00 (.97)
Revised Behavior	30%	12%	97%	3.83 (1.47)^{a}	2.94 (1.71)^{a}	6.18 (.85)^{b}

Note.

[a] Possible responses ranged from 0 to 7, with higher numbers indicating more agreement that article possessed each quality. [b] Possible responses ranged from 0 to 7, with higher numbers indicating more agreement with the primacy of this cause for obesity. Significant differences between conditions (excluding the original behavior article) are indicated by italicized superscript letter differences (p <.05).

Table 2

Comparison of Demographic and Manipulation Check Data for Full Sample by Article Condition

Article Condition	*n*	Age *M* (*SD*)	BMI *M* (*SD*)	% female	Perceived article qualities[a] *M* (*SD*)			
					Balanced	Credible	Accessible	Convincing
Environment	46	22.33 (7.23)	23.60 (4.05)	83%	4.81 (1.45)^{c}	4.95 (1.43)	6.29(1.01)	5.48 (1.31)^{b}
Biology	44	22.43 (9.08)	23.48 (4.11)	86%	3.08 (1.73)^{a}	4.43 (1.78)	6.16 (.96)	4.48 (1.58)^{a}
Behavior	46	21.67 (7.12)	22.87 (4.35)	76%	4.09 (1.65)^{b}	4.91 (1.31)	6.02 (.88)	4.91 (1.53)^{b}
Control	47	23.02 (9.93)	24.14 (4.76)	64%				

Article Condition	% of sample reporting cause as primary focus of article			Agreement with primacy of cause[b] *M* (*SD*)		
	Environmental	Biological	Behavioral	Environmental	Biological	Behavioral
Environment	98%	17%	67%	5.24 (1.72)^{b}	3.74 (1.74)^{a}	5.63 (1.20)^{bc}
Biology	9%	95%	9%	4.41 (1.70)^{a}	4.57 (1.40)^{b}	4.75 (1.49)^{a}
Behavior	36%	11%	96%	4.48 (1.55)^{a}	3.17 (1.68)^{a}	5.96 (.94)^{c}
Control	-	-	-	5.28 (1.09)^{b}	3.87 (1.29)^{ab}	5.26 (1.20)^{ab}
Total				4.86 (1.57)	3.83 (1.61)	5.41 (1.29)

Note.

[a] Possible responses ranged from 0 to 7, with higher numbers indicating more agreement that article possessed each quality. [b] Possible responses ranged from 0 to 7, with higher numbers indicating more agreement with the primacy of this cause for obesity. Significant differences between conditions are indicated by italicized superscript letter differences ($p < .05$).

Table 3

Comparison of Demographic and Manipulation Check Data for the WWU Sample

Article Condition	*n*	Age *M* (*SD*)	BMI *M* (*SD*)	% female	Perceived article qualities[a] *M* (*SD*)			
					Balanced	Credible	Accessible	Convincing
Environment	35	18.91 (1.80)	23.65 (4.46)	80%	4.67 (1.30)	5.07 (1.20)	6.08 (.94)	5.55 (1.34)
Biology	34	18.68 (.77)	22.98 (3.56)	88%	3.35 (1.56)	5.00 (1.46)	6.32 (.81)	4.79 (1.23)
Behavior	36	18.86 (1.14)	22.83 (2.25)	71%	4.28 (1.56)	5.14 (1.15)	6.08 (.94)	5.06 (1.37)
Control	36	18.53 (.70)	24.03 (4.32)	56%				

Article Condition	% of sample reporting cause as primary focus of article			Agreement with primacy of cause[b] *M* (*SD*)		
	Environmental	Biological	Behavioral	Environmental	Biological	Behavioral
Environment	97%	19%	71%	5.43 (1.75)	3.66 (1.75)	5.74 (1.22)
Biology	12%	94%	12%	4.24 (1.67)	4.50 (1.50)	4.74 (1.52)
Behavior	36%	14%	94%	4.39 (1.54)	3.17 (1.68)	6.11 (.89)
Control	-	-	-	4.84 (1.62)	3.67 (1.17)	5.39 (1.20)
Total				4.84 (1.62)	3.72 (1.60)	5.50 (1.32)

Note.
[a] Possible responses ranged from 0 to 7, with higher numbers indicating more agreement that article possessed each quality. [b] Possible responses ranged from 0 to 7, with higher numbers indicating more agreement with the primacy of this cause for obesity.

Table 4

Comparison of Demographic and Manipulation Check Data for Healthcare Provider Sample by Article Condition

Article condition	*n*	Age *M* (*SD*)	BMI *M* (*SD*)	% female	Perceived article qualities[a] *M* (*SD*)			
					Balanced	Credible	Accessible	Convincing
Environment	11	32.90 (7.50)	23.45 (2.47)	91%	5.18 (1.83)	4.64 (1.96)	5.91 (1.58)	5.27 (1.27)
Biology	10	35.20 (12.55)	24.22 (2.79)	80%	2.15 (1.49)	2.50 (1.43)	5.60 (1.26)	3.40 (2.12)
Behavior	10	31.50 (12.55)	24.24 (6.23)	90%	3.33 (1.87)	4.10 (1.59)	5.80 (.63)	4.40 (2.01)
Control	11	37.73 (11.88)	24.49 (6.22)	91%				

Article condition	% of sample reporting cause as primary focus of article			Agreement with primacy of cause[b] *M* (*SD*)		
	Environmental	Biological	Behavioral	Environmental	Biological	Behavioral
Environment	100%	9%	55%	4.64 (1.62)	4.00 (1.79)	5.27 (1.10)
Biology	0%	100%	0%	5.00 (1.76)	4.80 (1.03)	4.80 (1.48)
Behavior	33%	0%	100%	4.80 (1.62)	3.20 (1.75)	5.40 (.97)
Control	-	-	-	5.30 (.82)	4.60 (1.51)	4.80 (1.14)
Total				4.93 (1.44)	4.15 (1.62)	5.07 (1.17)

Note.
[a] Possible responses ranged from 0 to 7, with higher numbers indicating more agreement that article possessed each quality. [b] Possible responses ranged from 0 to 7, with higher numbers indicating more agreement with the primacy of this cause for obesity.

Table 5

Mean AFA Dislike Scores for Healthcare Provider and WWU Samples as a Function of Article Condition

	Healthcare Provider Sample		WWU Sample	
Condition	*n*	*M* (*SD*)	*n*	*M* (*SD*)
Environment	11	2.31 (.91)	34	2.17 (1.67)
Biology	10	1.71 (1.50)	34	2.14 (1.31)
Behavior	10	2.46 (1.53)	36	2.15 (1.42)
Control	11	2.86 (1.57)	36	1.80 (1.48)
Total	42	2.35 (1.41)	140	2.06 (1.47)

Note. Higher scores reflect greater dislike of obese people..

Table 6

Mean Combined IAT Scores for Healthcare Provider and WWU Samples as a Function of Article Condition

	Healthcare Provider Sample		WWU Sample		Full Sample	
Condition	*n*	*M* (*SD*)	*n*	*M* (*SD*)	*n*	*M* (*SD*)
Environment	11	5.83 (3.30) ^{b}	33	6.42 (2.85) ^{d}	44	6.28 (2.94) ^{f}
Biology	10	1.51 (2.50) ^{a}	33	5.23 (1.92) ^{cd}	43	4.36 (2.58) ^{e}
Behavior	10	3.90 (1.81) ^{ab}	34	5.84 (2.81) ^{d}	44	5.38 (2.70) ^{ef}
Control	11	4.31 (2.17) ^{b}	36	4.43 (1.83) ^{c}	47	4.40 (1.89) ^{e}
Total	42	3.94 (2.89)	136	5.45 (2.47)	178	5.10 (2.65)

Note. Higher scores reflect greater negative associations. Significant differences between conditions within each sample are indicated by superscript letter differences (p <.05).

Table 7

Mean AFA Willpower Scores for Healthcare Provider and WWU Samples as a Function of Article Condition

	Healthcare Provider Sample		WWU Sample	
Condition	*n*	*M* (*SD*)	*n*	*M* (*SD*)
Environment	11	5.18 (1.92)	35	5.07 (1.69)
Biology	10	3.90 (2.34)	34	4.57 (2.23)
Behavior	10	4.50 (2.13)	36	5.64 (2.01)
Control	11	3.97 (2.07)	36	5.19 (2.10)
Total	42	4.40 (2.10)	141	5.12 (2.03)

Note. Higher scores reflect greater belief in the personal controllability of weight.