Internalized Weight Bias and its Association with Short-Term Weight Loss Outcomes In Adults Utilizing an Online Weight Loss Platform

by

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ABSTRACT

There are multivariate factors that not only play a role in an individual's ability to lose weight, but may create barriers to his or her success. One such factor is internalized weight bias (IWB), which is inversely associated with weight loss outcomes and body satisfaction, and directly associated with psychosocial maladjustments such as depression and binge eating. This study examined the relationship between internalized weight bias and weight loss outcomes using a coding scheme developed for an online weight loss forum to see whether results would be consistent with self-administered surveys that measure IWB. The coding scheme was developed using an exploratory factor analysis of a survey composed of existing measures of IWB. Participants' posts within an online weight loss forum were coded and participants given a weekly IWB score that was compared to weekly weight loss using mixed model analysis. No significance was found between IWB and weight loss outcomes in this study, however, the coding scheme developed is a novel approach to measuring IWB, and the categories identified from latent constructs of IWB may be used in the future to determine the dimensions that exist within it. Ultimately, a better understanding of IWB could lead to the development of targeted weight loss interventions that address the beliefs and attitudes held by individuals who experience it.

DEDICATION

This thesis is dedicated to everyone who encouraged me in my pursuit of knowledge and learning. My parents and husband who keep me focused on my goals, my extended family and friends who take interest in what I am doing and are willing to listen, and my teachers and thesis committee who gave me the tools to pursue this dream come true.

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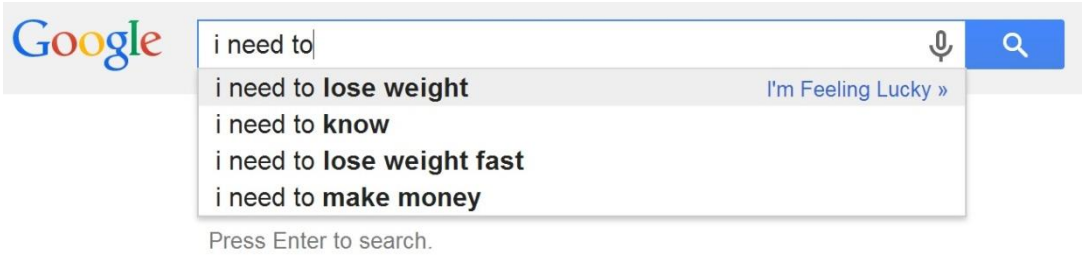
INTRODUCTION

Background

Type the words “I need to” into a web search engine and one of the first auto-complete suggestions is, “I need to lose weight” (Figure 1).

Figure 1. Screenshot, Google Search Auto-Complete Suggestions for “I Need To.”



Screenshot taken on November 18, 2013.

With such prevalent interest in weight loss, it is not surprising that almost 35% of the US population is classified as obese,[1] and less than 10% of the population is satisfied with their current shape and size.[2,3] This dissatisfaction is present in both men and women across the life cycle. There are many genetic factors that play a role in the development of obesity, and these factors in combination with an obesogenic environment led to an increase in obesity in the 20 years leading to the turn of the century that has taken another 10 years to level off.[4,5] Obesity is not only prevalent but also costly, both financially and with an increased risk for poor health outcomes.[6] Its effects extend beyond the body and into the mind as well.[7] However, the interactions between patterns of behaviors and their corresponding psychological pathways can be difficult to elucidate and require time and effort to change. Effective weight loss strategies must take into account both the behaviors and the beliefs behind them.

As if the personal costs were not enough, obese individuals are a stigmatized group in society. As early as 1963, Goodman et al.[8] showed that even children will rank a

drawing of an obese child last in order of preference when shown with drawings of five other children, including four of whom have visible physical disabilities. Many individuals place blame on the obese individual for being overweight, and this is reflected in their attitudes toward the obese.[9,10] In fact, obese individuals report 40-50% more incidences of discrimination compared to the number of reports of discrimination against normal weight individuals.[11] This discrimination is an outward, explicit demonstration of an internal stigma.[12] These explicit anti-fat attitudes directed against the obese individual, though often rooted only in stereotype, come to be implicitly accepted by the obese individual and become the basis of the obese individual's self-image.[9,13] Rooted in negative weight-related characteristics, this type of self-image is called internalized weight bias (IWB).

This internalized bias has several consequences, primarily related to its strong correlation with psychosocial maladjustments such as mood disturbances, decreased self-esteem, and eating-related pathologies.[9,14] These individuals experience negative self-evaluation and shame, and their behaviors reflect a fear of experiencing discrimination, even in places like a physician's office or gym.[15] This fear may even lead individuals to avoid behaviors such as going to the doctor or exercising, which would otherwise improve both their health outcomes and their self-image.[12,16] This in turn leads to an association of IWB with poor weight loss outcomes.[13] And given that poor outcomes are neither an encouraging nor motivating prospect, it is likely that a large percentage of people who may benefit from losing weight may never even begin to try.

Research on IWB has shown that individuals who characterize or identify themselves more closely with obese individuals than with normal weight individuals experience greater IWB.[14] This process of identifying with either obese or normal weight individuals as a group is known as social identification; it is the development of self-

image within the context of the social group the individual identifies with. Since social identification with obese persons is associated with greater IWB, identifying oneself as a member of the obese population is by extension correlated with the same poor weight loss outcomes as IWB. One example of this is the fatspo movement, where individuals take pride in the curves on their body that result from greater fat mass. In this population, since the individual identifies with the obese population, it is unlikely that he or she would want to lose weight. Consequently, they are not likely to lose as much weight as someone who desires to lose weight.

Recently, social identification has been investigated as a factor in IWB. According to the National Library of Medicine, social identification is defined by the American Psychiatric Association as a "process by which an aspect of self-image is developed based on in-group preference or ethnocentrism and a perception of belonging to a social or cultural group."[17] Interestingly, while many individuals may experience IWB, there is generally very little empathy among obese individuals toward other obese individuals.[9,13] In a study among adults seeking weight loss treatment, individuals viewed both normal weight and overweight/obese individuals as possessing roughly an equal number of positive characteristics, yet viewed themselves and normal weight individuals as having fewer negative characteristics than other obese individuals.[14] This likely serves as a means of self-protection, and differs from social identification among other stigmatized social groups, which link their self-esteem to the perceived worthiness of their in-group and therefore attribute positive characteristics to their in-group social identity and exhibit bias against out-groups.[13,18] Two examples of stigmatized groups that have been shown to have positive in-group social identity are African Americans and homosexual males.[19]

Current Areas of Research

The roles of IWB and social identification in weight loss are not yet well studied. Plenty of research has been done on weight loss: a search on PubMed for the MeSH term "Weight Loss" returned 27,485 articles as of May 28, 2014 (Figure 2). However, once weight loss is viewed from the perspective of "Social Identification" as a secondary MeSH term, the number of articles returned dropped to five (Figure 3). Only one article was particularly related to the same area of study as this paper; it investigated an individual's weight bias and short-term weight loss outcomes.[20]

Figure 2. Screenshot, PubMed Search for MeSH Term "Weight Loss."

Screenshot taken on May 28, 2014.

Figure 3. Screenshot of PubMed Search for MeSH Terms "Weight Loss" and "Social Identification."

Screenshot taken on May 28, 2014.

All measures of IWB thus far have been quantitatively based on questionnaires such as the Weight Bias Internalization Scale.[9] However, no such measure exists for investigating IWB among individuals that participate in online social networks to lose weight without contacting the individuals directly. Studies have shown a range in willingness to share personal information online, depending on both the goals of the

individual and the nature of the website.[21,22] Research on online social networks as a medium for health behavior change is a relatively new area of exploration, but shows promising results.[23] In order to measure associations between IWB and short-term weight loss outcomes online, an appropriate methodology will have to be developed.

More research is necessary to identify what effects there are on weight loss in relation to an individual's self-identified social group and the associated characteristics that define that group for the individual. In other words, if an individual who is overweight or obese is willing to acknowledge that they fit into one of those categories, is he/she more or less likely to lose weight, and why? How does this identification affect weight loss outcomes? By examining the relationship between these constructs, there is the potential to gain understanding of how an individual's self-perception plays a role in his or her ability to lose weight, which would allow the development of tools to help an individual change his or her self-perception to something that will aid in weight loss, rather than hinder it. Additionally, conducting this research using online data could lead to the development of online weight loss tools that would be accessible to a larger audience.

Purpose of this Study

The purpose of this study was to investigate how to identify the presence of IWB online using secondary data analysis and examine the effects of IWB and social identification on short-term weight loss outcomes, with the goal to aid in the design of effective weight loss platforms. This was accomplished by developing a process for identifying a convenience sample of 25 individuals utilizing the forums of an online weight loss platform using a thread-level coding scheme. Concurrently, a factor analysis based on currently available measures was conducted to understand the conceptual

categories of IWB. This understanding identified categories to be used for coding. These codes were then used to classify all forum posts of the 25 individuals identified as reporting IWB. A coding scheme for social identification was also developed. Finally, the incidence of these coded posts was correlated with total weight lost within the online forums. The hypothesis to be tested was that individuals who had a higher rate of posts focused on IWB would have poorer weight loss outcomes than individuals with lower rates of posts focused on IWB. A second hypothesis to be tested was that individuals who had a greater number of posts in which they socially identified themselves as overweight or obese would have poorer weight loss outcomes than individuals with fewer posts socially identifying themselves as overweight or obese.

CHAPTER 2

REVIEW OF LITERATURE

Background

Between 2009-2010, 35.7% of the population in the United States was classified as obese according to The National Health and Nutrition Examination Survey conducted that year.[24] That is the equivalent of more than 78 million men and women and 12.5 million children and adolescents. An additional 15-25% of the population is classified as overweight, having a BMI greater than or equal to 25 kg/m^2, bringing the total of overweight and obese individuals up to over half the population.[11]

While there is not a significant difference between the prevalence of obesity in men and women, the prevalence of obesity among men has had a 29% increase over the last 10 years that lessened the gap between the two sexes.[24] Age is a factor as well, specifically among women: more women over 60 years old (42.3%) are likely to be classified as obese compared to younger women (31.9%).[24] Similar findings were seen in children and adolescents: the prevalence of obesity among boys has increased over the past 10 years from 14% to 18.6%.[24] However, the prevalence of obesity in boys is significantly higher than the prevalence of obesity in girls, whereas it does not differ significantly in men and women.

Though a significant portion of the population is classified as either overweight or obese, research has shown that this population continues to be surrounded by negative attitudes and stereotypes. Characteristics such as attractiveness, morality, emotions and likeability are attributed negatively among fat individuals, and blame is often placed on the individual for their weight even though the evidence shows genetic and metabolic factors to be the predominant determinants for weight over lifestyle habits.[11,25] These negative attributions concerning the obese population are made by both normal weight

and overweight/obese individuals, and the attitudes of the latter are not more favorable, despite being a member of the population themselves.[9] Additionally, an individual's beliefs about obese persons has a high correlation with their attitudes and actions toward obese persons.[10] These anti-fat attitudes exist in employment settings as well as in the context of education and health, and are associated with increased discrimination against individuals perceived as fat.[26,27]

According to a study by Carr and Friedman in 2005,[11] persons categorized as obese are between 40 and 50 percent more likely to report experiencing major discrimination compared to the number of reports from normal weight individuals. Reports of day-to-day interpersonal discrimination and job-related discrimination are 70% and 84% more likely to be reported, respectively, by severely obese individuals than by normal weight individuals. Likeliness to report experiences of discrimination varies by race, sex, age, education level and occupational status, but is consistently higher among obese individuals. This is in all probability a combination of both increased actual incidents of discrimination and a more sensitive perception of discrimination. In addition to all of this, individuals who perceived they were being discriminated against because of their weight reported lower levels of self-acceptance.

Study Purpose and Place in the Literature

In line with this association between increased discrimination and decreased self-acceptance, it is not surprising that some of these negative attitudes are taken to heart by these persons as being true about them individually. As articulated in the introduction, this is termed internalized weight bias (IWB). The purpose of this research was to examine the influence of IWB on short-term weight loss outcomes among treatment-seeking adults by analyzing qualitative data from an online weight loss forum. To date,

studies have only been conducted that measure IWB quantitatively. According to an analysis of the 2000 Behavioral Risk Factors Surveillance System data, 46% of women and 33% of men reported trying to lose weight; this was up from about 20% of the adult population seeking weight loss treatment four years prior.[28] This means that almost 40% of the adult population could benefit from knowledge of IWB resulting from this study that can be leveraged to improve their outcomes.

Performing a search on PubMed as of December 1, 2013, using the Medical Subject Heading (MeSH) term of "weight loss" returned 26,425 articles. For IWB, also referred to as internalized weight stigma or weight bias internalization, a search for "(("weight bias") OR "weight stigma") AND internal*" returned 24 articles. Combining the two searches reduced the number of articles to eight. Of those eight, one was seeking perspectives on desired weight loss treatments and noticed a difference in weight stigma internalization between white and African American women[29]; another was concerned with increasing weight bias awareness in order to increase weight loss[30]; and a third consisted of perspectives and suggestions from overweight and obese adults regarding weight stigma, noting that several respondents had internalized the bias that they experienced.[31] However, as these three did not examine the direct effects of IWB on weight loss outcomes, they were excluded, leaving only five articles in the literature related to this area of study.[13,14,20,32,33]

Therefore, there is still much to learn by examining this relationship and this study has the potential to add to the knowledge and understanding of the nature of IWB and its role in weight loss outcomes. In addition to reviewing the five pertinent articles from the above literature search and their related or cited articles, the concepts pertinent to this study include: theories related to weight loss and maintenance, IWB, and online social support as a medium for increasing the likelihood of weight loss.

Articles from the PubMed Search

The earliest article involving internalized weight bias (IWB) and adults seeking to lose weight was published in 2010.[13] In it, Carels et al. examined the relationship between implicit, explicit, and IWB among treatment-seeking adults in three areas: first, they wanted to see the amount of bias present in treatment seeking individuals; second, they wanted to correlate weight bias to psychosocial maladjustments such as depression and binge eating; and third, they wanted to see if there was any correlation between participation in the weight loss program and changes in weight status from baseline.

The analysis consisted of 49 participants with a BMI greater than or equal to 27 kg/m^2 that completed a randomized 14-week behavioral weight loss program.[13] The first program was a modified version of the LEARN program,[34] with Lifestyle, Exercise, Attitudes, Relationships, and Nutrition components. The second program was Transforming Your Life, developed to help individuals adopt healthy dietary and physical activity behaviors despite an obesogenic environment.[13] Participants met every week for group sessions and a weekly weigh in. Diet and physical activity were self-monitored per instructions, in addition to a provided accelerometer to measure energy expenditure, with a goal of a 500 kilocalorie deficit per day. Measures of weight bias- implicit, explicit, and internalized- were taken along with measures of body image, depression and binge eating. In analyzing the results of the two behavioral weight loss programs, there were no significant differences between any of the measured constructs, so the results of all participants were combined.

Implicit weight bias was measured using an implicit associations test,[35] with target (Fat People, Thin People) and attribute (Good, Bad) category labels paired together at the top of a page and participants asked to classify a list of words as quickly as possible into one column or the other. The pairings are then switched and the

participant asked to again classify a list of words as quickly as possible. Implicit weight bias is by definition subconscious, automatic. Carels et al. found that implicit weight bias (as evidenced by quicker associations between the "fat people" and "bad" attribute label pairing) is higher in Caucasians than non-Caucasians, and it was lower in older adults.[13]

Explicit weight bias was measured with the Obese Persons Trait Survey (OBTS), in which individuals estimate the percentage of obese persons that have a particular characteristic; the test consists of 10 negative and 10 positive characteristics.[27] For the study by Carel et al.,[13] participants were asked to complete the OBTS twice, with the second time estimating the percentage of normal weight individuals who possessed the given characteristics instead of obese individuals. From these results, it was determined that participants rated normal weight individuals as possessing more positive traits than negative traits overall, and less total negative traits than obese individuals. Obese individuals were estimated to have the same number of positive traits as normal weight individuals, but hand an equal number of positive and negative traits. Interestingly, post-treatment measurements showed that less positive traits were attributed to obese individuals than had been at baseline.

IWB was measured using the Weight Bias Internalization Scale developed by Durso and Lautner, discussed later in this review.[9] Based on the research by Carels et al.,[13] those with a higher BMI at baseline demonstrated higher IWB. There was not a strong association between implicit, explicit, and internalized weight biases, however, greater negative explicit weight bias was associated with an increased IWB. Additionally, IWB was shown to decrease after treatment.

Body image was measured using the Appearance Evaluation and Appearance Orientation subscales of the Multidimentional Body Self-Relations Questionnaire developed by Cash in 2000.[36] Appearance evaluation is related to attractiveness and an

individual's satisfaction with their appearance (higher scores equal higher satisfaction and attractiveness), while appearance orientation is related to the amount of investment in the individual's appearance (higher scores indicate greater importance of appearance, presentation and grooming). A study by Rusticus and Hubley[37] showed that the Appearance Evaluation measure for middle-aged adults does not have metric invariance among middle-aged adults, indicating that comparisons between men and women may not be appropriate (the mean age of the participants in the Carels et al.[13] study was 47.4 years); however, for the measures concerning IWB this is not an issue as comparison between genders is not the focus. In terms of IWB, greater IWB was associated with lower appearance evaluation and higher appearance orientation.[13] Overall, appearance orientation decreased and appearance evaluation increased post-treatment. This strongest correlation was between changes in appearance evaluation and changes in IWB, which were inversely related.

The Binge Eating Scale developed by Gormally, Black, Dastin and Rardin[38] was used to assess binge eating behaviors among participants. Depression was measured using the Center for Epidemiological Studies-Depression scale.[39] Both binge eating and depression decreased post-treatment.[13] This suggests that binge eating and depressive behaviors may be used as indicators of the likely presence of IWB.

Associations that can be made between weight bias and psychosocial maladjustments are important because maladjustments have the potential to prevent an individual from attaining optimal health and well-being. By understanding the factors that are associated with these maladjustments, it may be possible to alter these factors with the hope of helping to decrease these harmful maladjustments. According to Carels et al.,[13] this would suggest that examining ways to decrease IWB may show associated increases in appearance evaluation.

The second article returned in the PubMed search was published in 2011, again by Carels et al.[32] Motivated by the costs associated with the negative social stigma of weight bias, they wanted to investigate the etiology of weight stigma through ideological correlates. In this study, participants completed four separate surveys in order to identify implicit weight bias, explicit weight bias, and two measures of beliefs. The first of these was the Protestant Ethic Scale (PES), which measures the belief that people get what they deserve ("just world" beliefs); the second was the Beliefs About Obese Persons Scale (BAOP), which measures beliefs about the controllability of obesity. Similar to prior research, they found that implicit anti-fat bias exists even among the overweight and obese. Explicit bias against overweight/obese individuals also exists, but only when compared in relation to beliefs about normal weight individuals. Though obese individuals were estimated to possess more positive traits than negative traits (even higher than the number of positive traits that normal weight individuals are estimated to have), they are also estimated to possess more negative traits than normal weight individuals. Furthermore, this negative bias between overweight/obese and normal individuals is much greater than the positive bias. A relationship was not shown to exist between implicit and explicit bias.

Carels et al. then investigated the relationship between implicit and explicit bias and the ideological and etiological beliefs measured in the PES and BAOPS.[32] When the ideological beliefs about success being the result of hard work and determination were measured, they correlated strongly with measures of implicit bias. Individuals with strong beliefs in a just world were also more likely to estimate overweight/obese individuals as possessing more negative personality traits. Similar findings came from the relationship between etiological beliefs about the controllability of obesity and implicit bias, furthered by the attribution of more negative personality traits to

overweight/obese persons when the participant believed that obesity is under the control of the individual. Neither the PES or BAOP was related to the attribution of positive personality traits. Overall, this results of this study suggest that individuals who hold just world beliefs or believe that obesity is controllable are more likely to experience implicit bias against overweight/obese individuals. However, it did not show whether these attitudes extended to the individual's perception of himself/herself. This concept was investigated further in the following study by Carels et al,[20] examined below.

The third article resulting from the PubMed search was also published in 2011 by Carels et al, this time concerning the tendency of individuals to self-enhance for the sake of preserving self-worth.[20] The researchers wondered if overweight and obese individuals would self-enhance general traits such as goodness or attractiveness, and whether these individuals would also self-enhance on traits opposite of what is normally associated with the overweight or obese population. For example, laziness and lack of self-discipline are typically associated with overweight or obesity, so in a demonstration of self-enhancement would they rate themselves as disciplined and active? The idea for this research came from the fact that unlike other stigmatized groups, overweight and obese individuals do not demonstrate positive in group social identity.[40] Additionally, while the previous study by Carels et al. had shown that certain beliefs are associated with greater implicit weight bias, it had not been able to show if or how these attitudes were applied by the individual to himself/herself.[32]

This article also used the Implicit Associations Test (IAT) developed by Greenwald.[35] Related to self-enhancement, research by Karpinski has shown that results on an IAT will vary depending on how an individual views themselves compared to others.[41] Target category labels of the self and an unspecified "other" were paired with attribute labels of pleasant and unpleasant words. After categorizing a list of words

under one pair or the other as quickly as possible, the pairs were switched and the test repeated. After this, participants again completed an IAT as just described, with the only difference being that the other was specified as either a best friend, a boyfriend or a girlfriend. Results were significantly different between the two tests, suggesting that when an individual is presented with an unspecified other, they will automatically envision an "other" toward whom they are far superior on a given particular trait. This is self-protective.

For this reason, in addition to looking at implicit weight bias, Carels et al.[20] also had participants complete the IAT to look at implicit identity: target category labels of the self and an unspecified "other" were paired with general attribute labels (good, thin, attractive) and attribute labels opposite of what is typically associated with overweight or obese populations (disciplined, active, healthy eater). Explicit and internalized weight biases were also measured using the Obese Person Trait Survey[27] and the Weight Bias Internalization Scale,[9] respectively.

Demographically speaking, the only significant results were that IWB decreased with increased education, and the number of positive traits attributed to obese individuals decreased as income increased.[20] There was no association between BMI and weight bias in this study. However, consistent with research on self-enhancement,[42] participants did rate themselves implicitly as better, more attractive, more disciplined, more active, a healthier eater, and thinner than an unspecified other. Interestingly, implicit associations of the self as more attractive, active and a healthy eater were stronger than associations of the self as good, thin, and disciplined.

The fourth and fifth articles returned in the PubMed search were published in 2013. The former is yet another article by Carels et al. in which they propose an alternative method for measuring IWB; it is discussed later in this review.[14] The latter is

an article by Burmeister et al. on food addiction and short-term weight loss outcomes, in which weight bias is one of the outcome measures.[33] The researchers felt that this understanding could lead to the development of food addiction and weight-loss treatment interventions that focus on reducing stigma to improve outcomes.

In order to measure food addiction and proposed psychosocial health correlates, participants completed the Yale Food Addiction Scale (YFAS), which examines symptoms of substance dependence; they then completed measures of psychological distress, maladaptive eating behaviors, weight biased attitudes, and body image and body satisfaction.[33] Participants with increased food addiction symptoms were more likely to experience psychological distress, practice maladaptive eating behaviors, and demonstrate greater internalized and explicit weight bias. Similar to internalized weight bias research, food addiction is surrounded by stigmatizing beliefs that can be internalized by the "addict." Higher YFAS scores were also negatively related to weight loss outcomes at seven weeks, which is consistent with the correlation between internalized weight bias and poor weight loss outcomes found in other studies.

Theories Related to Weight Loss and Maintenance

Several theories related to health behavior change have been shown to include constructs predictive of short- and long-term weight loss outcomes. Four in particular were analyzed by Palmeira et al. in 2007 to determine which constructs from these theories had the strongest predictive power.[43] Each model will be discussed individually, and then Palmeira et al.'s results examined as a whole. These models include: social cognitive theory, the transtheoretical model, the theory of planned behavior, and self-determination theory.

Social cognitive theory was proposed by Albert Bandura in 1986.[44] In his 1989 article in *American Psychologist*, he explains the role of human agency in social cognitive theory.[45] There are three ways of looking at human agency: the first is that human actions are entirely self-determined independent of the environment, and this is referred to as autonomous agency; the second is that human actions are determined entirely by the environment with no influence from self-cognition, and this is referred to as mechanical agency; the third holds that human actions are determined by both the environment and the self-interacting with each other, and this is called emergent interactive agency. This final form of human agency in which there is reciprocal determinism in human actions is the foundation of social cognitive theory. This theory provides a perspective on the relationship between an individual and their environment in the development of IWB.

The transtheoretical model (TTM) was proposed by Prochaska and Velicer in their 1997 article in the *American Journal of Health Promotion*.[46] Central to the TTM is the idea of stages of change through which an individual progresses as they replace an undesirable behavior with a desirable one. These stages include: precontemplation (not thinking about making a change), contemplation (considering making a change), preparation (taking steps to prepare for making a change), action (making the change), maintenance (have continued making the change for a period of time), and termination (the change is the new norm). In terms of health interventions, this model can be used to determine strategies tailored to the stage of change in which the individual finds themselves. Hopefully by better understanding IWB, strategies can be tailored to it as well; one example would be making participants aware of their internalized biases, moving them from a stage of precontemplation due to ignorance into a place of change.

In 2011, a Cochrane review was published on the TTM and dietary and physical activity modification interventions in relation to weight loss.[47] In terms of weight loss outcomes, individuals who were in the action stage had greater weight loss than individuals in pre-action stages. Additionally, groups receiving interventions that combined TTM with dietary and physical activity modifications showed greater weight loss than groups receiving a control treatment. Secondary outcomes in reviewed trials included progression through the stages of change, increase in healthy eating behaviors, increased fruit and vegetable intake, and exercise outcomes. Progression to the action and maintenance stages of change was greater in the intervention groups than in the control. Healthy eating behaviors, defined as a decrease of 500 kilocalories per day and a fat intake less than 30% of kilocalories, were also greater in the intervention groups as compared to the control. Fruit and vegetable intake increased in intervention groups over control groups as well. Finally, exercise outcomes of physical activity frequency and duration, but not exercise intensity, were increased in intervention groups over the control. Progression through the stages of change was documented for decreased fat consumption, physical activity, self-monitored blood glucose, exercise outcomes, healthy eating behaviors, and fruit and vegetable intake. However, long-term outcomes were more significant concerning fruit and vegetable intake and exercise outcomes than weight loss.

The theory of planned behavior developed out of the theory of reasoned action in the mid-1980's and is discussed cohesively in Icek Ajzen's 1991 article in *Organizational Behavior and Human Decision Processes*.[48] This theory holds that the likelihood of a behavior being performed can be predicted from the individual's intention to perform it. Intention can in turn be predicted based on three categories of beliefs: beliefs and attitudes toward the behavior, beliefs about social norms, and beliefs about control over

the behavior. Attitudes toward a behavior include considerations about the perceived costs and benefits of performing the behavior. Social norms encompass the social pressures to either perform or not perform the behavior in question. Perceived control reflects an individual's confidence in their ability to perform a behavior, as well as their expectation for success. It is dependent upon the necessary opportunities and resources to perform the behavior, and is compatible with Bandura's concurrent work on self-efficacy.[48,49] Individuals with greater IWB will hold attitudes and beliefs that may decrease their likelihood of performing a behavior, such as regular physical activity.

When the theory of planned behavior was applied to predict weight loss in a group of women desiring to lose weight,[50] measures of each of the three types of beliefs described in the theory (behavior, normative, and control) were taken along with measures of the individuals' intentions regarding weight loss and any detailed plans they had made for that purpose. As expected, individuals' intentions were both reflective of their beliefs and predictive of actual weight lost. Plans made contributed to perceived control, and were also predictive of increased weight lost.

The final theory examined by Palmeira et al.[43] was self-determination theory (SDT), proposed by Ryan and Deci in 1985 and discussed in their article "Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well Being."[51] As the article title suggests, there are three ideas that contribute to the explanation of SDT: intrinsic motivation, social development, and well-being. At its core, SDT attempts to explain how humans reach their potential for performance and well-being as a responsible, active member of society. What factors separate this type of individual from one who approaches life passively, with a lack of initiative and penchant for distress and psychopathological suffering? The answer lies in the process of social development: whether or not that individual's psychological needs were met to allow for

growth. These needs include feelings of competence, autonomy, and relatedness or connectedness. In many ways, the social context determines the development of an individual's personality and functioning in society. Social development includes the extrinsic motivators that regulate behavior. Ideally, these behaviors will be internalized, turning into intrinsic motivators. In the case of IWB, needs for social development may not be met, negatively impacting the individual's intrinsic motivation for change.

The spectrum from amotivation to extrinsic motivation and finally intrinsic motivation is modeled by Organismic Integration Theory.[51] Amotivation is non-regulated and has an impersonal locus of causality; extrinsic motivation is externally regulated but can vary in locus of causality (internal or external); intrinsic motivation is self-regulated and has an internal locus of causality. A locus of causality is the place, internal or external, from which the a behavior is initiated and determined, as opposed to a locus of control- the place which has the control or ability to change outcomes. Self-regulation helps meet the psychological need for autonomy, and intrinsic motivation comprehends the feelings of both autonomy and competence, meeting two out of the three psychological needs. Meeting the final need of relatedness or connectedness comes from satisfying one last piece of the puzzle related to a human's potential: their aspirations. Extrinsic aspirations such as the pursuit of wealth or fame do not fully satisfy the need for relatedness. Rather, intrinsic aspirations such as the pursuit of personal growth, relationships and community directly satisfy this need and lead to feelings of well-being and self-esteem.

In relation to weight maintenance, there is a 1996 article to which both Ryan and Deci contributed with Williams et al. in the *Journal of Personality and Social Psychology* that addresses motivations as predictors of weight loss.[52] As previously discussed, intrinsic or autonomous motivation is preferable to extrinsic motivation, and

not only for overall well-being. Studies have also shown an association between intrinsic motivation and mental health, such as a decrease in anxiety and depression; creativity and cognitive flexibility, which are beneficial in the development of personality and social functioning; and better adjustment, which allows for greater connectedness and personal growth.[51,52] These associations make intrinsic motivation useful for predicting engagement in desired behaviors and continued maintenance of these behaviors without an external structure for their performance. Therefore, in the study by Williams et al.,[52] behavior change was examined through the lens of intrinsic motivation as a predictor of participation in a weight loss program as well as maintenance of behavior changes after program completion. Increased measures of intrinsic motivation were not only predictive of program attendance and weight loss during the program, but also long-term (23 month) weight maintenance. Additionally, an increase in measures of autonomous orientation, or an internal locus of causality, and in perceptions of the degree to which the environment was autonomous supportive were predictive of greater intrinsic motivation. Therefore an increasingly autonomous supportive social context and greater intrinsic reasons and motivations for beginning a weight loss program are predictive of how affective the program will be, both in the short- and long- term. Since IWB is associated with behaviors such as depression, this makes it inversely correlated with intrinsic motivation and may suggest why IWB is associated with poor weight loss outcomes.

In analyzing these four theories. Palmeira et al. wanted to see the predictive power of the psychosocial variables encompassed within them.[43] For example, constructs of Social Cognitive Theory such as self-efficacy, perceived barriers, and expected outcomes were measured. Constructs measured for the Theory of Planned Behavior

included intentions to perform the behavior as well as beliefs concerning the behavior, beliefs about social norms, and perceived control over the behavior.

The data came from 133 overweight and obese women who completed the first 4 months of a 2-year long weight management program designed to affect the desired constructs. All of participants were at least 25 years old, with a BMI above 24.9 kg/m^2, free from major diseases, premenopausal and not pregnant. Subjects met weekly in groups of 32-35 women for 2 hours to receive education on behavior modification curriculum and practical help with things like exercise and nutrition. In addition to weighings at baseline and 4-months, participants completed measures of the psychosocial variables pertaining to each of the four theories.

Mean weight decreased significantly from baseline to four months ($p<0.001$).[43] In terms of stages of change as described in the Transtheoretical Model, about 75% of the participants were in the first three stages of change at baseline, but by four months the majority of participants were in the action and maintenance stages (58.6% and 18%, respectively). Attitudes and perceived behavior control toward weight management, constructs associated with the Theory of Planned Behavior, showed increases that correlated with weight lost. However, the construct that had the strongest predictive power for the amount of weight loss was by far self-efficacy, a component comment to Social Cognitive Theory, the Transtheoretical Model, and the Theory of Planned Behavior (in the form of perceived behavior control). Alternatively, the Self Determination Theory was more effective as a predictor of long-term weight maintenance and exercise behaviors as opposed to predicting short-term weight loss. Therefore, in future interventions targeted at IWB, an emphasis on self-efficacy would be a strong foundation for change in the form of weight lost in the short-term.

In total, these health behavior models predicted between 20% and 30% of weight change.[43] In the context of the Transtheoretical Model, which was the strongest model in terms of predictive power, self-efficacy predicted 19.4% of the variance in weight change. Overall, the Transtheoretical Model predicted 26.8% of weight change variance. The second strongest model was Social Cognitive Theory, predicting 20.9% of weight change variance; self-efficacy contributed to 20.5% of the total variance as explained by Social Cognitive Theory, with the remaining 0.4% explained by variables other than self-efficacy. For the Theory of Planned Behavior, 17.6% of weight change variance was explained, about 4% of the variance from attitude and 4% from perceived behavior control. However, when looking at self-efficacy it is unclear whether this association is strictly predictive or if it mirrors the process of losing weight.

In summary, theories related to weight loss and maintenance can be helpful for understanding the relationship between the psychological and the physical. Social Cognitive Theory sees influences of both the self and the environment at work on each other to determine behavior. The Transtheoretical Model draws a picture of the progression through the stages of change from one behavior to another and how the individual changes in the process. The Theory of Planned Behavior states that by intending to do something the likelihood of it happening increases. These intentions are impacted by the beliefs of the individual concerning the desirability of the behavior, the pressures from societal norms, and the perception of control over the behavior. Finally, Self Determination Theory shows that the needs for connectedness, competence and autonomy direct the development of an individual from extrinsic motivations controlled and determined externally to the self-determined, intrinsic motivations that lead to greater well-being and social-functioning.

Clearly, psychosocial variables play a key role in the performance of health behaviors, and these behaviors in turn greatly impact the efficacy of weight loss methods and total weight lost in treatment. Self-efficacy, a construct common to several of the theories examined in this review, is one of the strongest correlates of short-term weight loss, however, it is not the only one. IWB is another psychosocial variable that has yet to be fully fleshed out in the understanding of its contributions to weight loss.

Internalized Weight Bias

In 2008, Durso and Latner developed the Weight Bias Internalization Scale (WBIS) to measure this self-directed stigma related to one's weight, called internalized weight bias (IWB).[9] Users of online obesity-related discussion groups were recruited through email to complete the proposed WBIS questionnaire via an online survey. Demographic information was collected first via an additional questionnaire, and weight was self-reported on a 7-point Likert scale from "extremely underweight" to "extremely overweight." The WBIS questionnaire was only presented to individuals who self-identified as "slightly overweight," "overweight," or "extremely overweight" in the demographic questionnaire. The final sample of participants included 164 women and 34 men between 18 and 67 years old (mean age = 30.53) with BMIs ranging from 25.02 to 79.71 (mean BMI = 33.21). Participants were predominantly white (75.4%) or African American (14.7%), and 14 participants were from outside of North America.

The WBIS originally consisted of 19 items covering the following content areas: weight status items addressing the acceptance or rejection of a person's current weight status as well as the affect their perceived weight status had on their mood; personal value and ease of life items; social interaction and items concerning public appearance; desire for change; and recognizing the existence and unfairness of weight stigma.[9]

Responses ranged from “strongly disagree” to “strongly agree” in the form of a 7-point Likert scale with the goal being to measure the extent to which overweight and obese persons believe that negative stereotypes about overweight and obese persons and weight-related negative self-statements apply to them personally, thus getting at IWB and not just anti-fat attitudes. In order to show construct validity, participants also completed a validated measure of antifat bias, the Antifat Attitudes Questionnaire.[25] Measures of self-esteem (the Rosenberg Self-Esteem Scale, or RSE) and mood disturbance (the Depression Anxiety Stress Scale) were also collected to show convergent validity. Finally, several measures on eating-related pathologies were used to examine their relationship to IWB as measured by the WBIS. These included the Short Version of the Body Shape Questionnaire (BSQ), the Eating Disorder Diagnostic Scale (EDDS), and the Drive for Thinness subscale of the Eating Disorders Inventory (DFT).

Of the original 19 items included in the WBIS, 13 items had an internal consistency estimated at 0.90; the remaining six were removed from the questionnaire.[9] An additional two items were removed due to low-to-moderate factor loadings and the remaining 11 items that made up the final WBIS were represented using a single factor. Upon Pearson product-moment correlation analysis, the WBIS significantly correlated with the Dislike subscale of the AAQ as well as the measures from the DFT, BSQ and RSE. WBIS scores did not, however, correlate with BMI, suggesting that IWB is independent of actual weight status. WBIS scores also contributed to variance in the measures of self-esteem and psychopathology more than either BMI or AAQ scores. This supported the hypothesis that IWB is a construct that is unique from antifat attitudes, yet there is still the possibility that IWB itself has distinct components that relate differently to measures of psychological functioning.[9]

Four years after the development of the WBIS, Carels et al. proposed an alternative measures to IWB that takes into account social identity and the process of social comparisons[14]; this was the fourth article that appeared in the PubMed search discussed earlier. Building on the work of Durso and Lautner[9] and the Weight Self-Stigma questionnaire developed by Lillis et al. in 2010,[15] they hypothesized that whether an individual identifies more strongly with normal weight or with overweight/obese persons would determine if they experience either more or less psychological adjustment, respectively. Participants ranging from 18 to 65 years old (mean age = 43.7) and from a BMI of 27.7 to 58.1 (mean BMI = 38.3) completed various assessments before beginning a weight loss program. They consisted primarily of Caucasians (85.5%) and females (79.1%) who were married or living with a partner (64.5%).[15]

In addition to the WBIS, participants completed the Obese Persons Trait Survey (OPTS) developed by Puhl, Schwartz and Brownell.[27] The OPTS includes 10 positive and 10 negative characteristics for which users are asked to estimate the percentage of obese persons who match the described characteristic, demonstrating explicit weight bias. Carels et al. asked participants to complete the survey once estimating the percentage of obese persons matching the described characteristics, then a second time estimating the percentage of normal weight persons who match the described characteristics, and finally a third time estimating the percentage of how closely the characteristics described themselves.[14] Similar to Durso and Launter in the development of the WBIS,[9] measures of several eating-related pathologies were taken using various validated questionnaires, including measures of depression, binge eating, and body image.[14]

As a result of their study, Carels et al. found that there was no significant difference between the estimation of positive traits in both normal weight and obese persons.[14] However, participants estimated that they had more negative traits than

normal weight people (whom they rated as having the least negative traits), less negative traits than obese people (whom they rated as the having the most negative traits), and more positive traits than both normal weight and obese persons. This suggests that though the participants held a negative bias against being overweight, they viewed themselves with more positively in comparison to both normal weight and obese persons in terms of the amount of positive traits they possessed, and compared to obese persons in terms of the amount of negative traits they possessed. This information led Carels et al. to further suggest that social comparisons that increase negative traits in obese persons or decrease positive personality traits in normal weight individuals build up the self. Only the participants' ratings on negative traits about themselves correlated with scores from the WBIS, however, measures of psychological adjustment correlated with both the negative ratings on the OPTS and the WBIS scores.

Based on the above findings, variables were created that related the discrepancy between participant-rated measures of maladjustment for the following groups: between normal weight and obese populations, between normal weight individuals and the participant's self-score, and between obese persons and the participant's self-score. While negative ratings of the self were predictive of more depression and binge eating and less body satisfaction independent of the discrepancy variables, participants who rated themselves with more positive and fewer negative traits than normal weight and/or obese persons were also less likely to have depression or experience binge eating, and in the case of rating themselves with fewer negative traits they were more likely to express body satisfaction.[14] The gap between the self and obese persons was greater than double the gap between the self and normal weight persons, with more comparable ratings suggesting that participants identified themselves more closely with normal weight individuals than with obese persons. When participants identified more closely with

obese persons, against whom anti-fat bias and discrimination are prevalent, psychological maladjustment was more likely to occur.[14] Therefore using these comparisons of the self to both normal weight and obese persons is a valid alternative method that can be used to assess IWB, with the added benefit of taking into consideration the additional perspectives of social identity and comparisons.

In summary, weight bias and anti-fat attitudes are prevalent, resulting in discrimination and an unhealthy internalization of these attitudes that is associated with psychosocial maladjustments such as low self-esteem and depression. The first measurement tool for IWB, the Weight Bias Internalization Scale (WBIS), was developed by Durso and Lautner in 2008.[9] In 2013, Carels et al. took the current understanding of IWB a step further by measuring it in relation to an individual's social identification with either the normal weight or obese populations.[14] They showed that stronger identification with the obese population (as measured by completion of the Obese Persons Trait Survey looking at normal weight individuals, obese individuals, and then themselves and correlating those results) was associated with greater maladjustments as well as the WBIS, suggesting that social comparison could serve as a possible alternative measure of IWB.

For this study, the intent was to analyze online weight loss forums for indications of an individual's self-perceptions or social comparisons, in order to detect the presence of IWB and examine its role in weight loss outcomes. This understanding could then be used to develop more targeted weight loss interventions that can identify individuals with greater IWB, with the goal of addressing their unique attitudes and beliefs and ultimately improving weight loss outcomes for those individuals.

Online Social Support

According to Teoh et al.,[53] social support is tied to better health outcomes, but previous studies have focused on face-to-face support groups, and the role of social support in an online environment is not yet known. Out of the four main types of social support (informational, emotional, instrumental, appraisal),[54] online support groups most frequently give and receive informational and emotional support.[55] In 2011, Ballantine et al. investigated different types of interactions in online social networks and found three types of users[21]: Passive Recipient, Active Supporter, and Casual Browser. Passive Recipients receive the most informational support, followed by Active Supporters, and both of those groups receive fairly equal amounts of emotional support, though they differ in communication style (active vs. passive.) Casual Browsers receive little information and emotional support and are passive communicators. Similar to Kozinets distinction between devotees and tourists,[56] Passive Recipients fell into the role of devotees who show interest in the activity being discussed but little interest in the other users, while Casual Browsers fell into the role of tourists who have only passing interest in the activities and people. All in all, Passive Recipients received social support primarily informationally, as well as emotionally, even though they were passive users.

In this study, participants were active on an online forum, and those posts were used to investigate IWB. This makes those included in the sample the equivalent of Active Supporters, receiving both informational and emotional support from the online platform. It is unknown whether the identification of IWB in these participants is more strongly correlated with stronger IWB attitudes and therefore more likely poor weight loss outcomes, or whether the greater amount of social support these individuals are receiving would lead them to greater weight loss.

Summary

Based on a review of the current literature, not much is yet known on internalized weight bias (IWB) and the role that it plays in the weight loss outcomes of adults seeking treatment. Of the eight results from a PubMed search on weight loss and IWB, only five analyzed weight loss outcomes in association with measures of weight bias, showing that greater IWB is associated with poor weight loss outcomes.

Health behavior theories have been shown to be predictive of weight loss outcomes, predominantly through an analysis of their component psychosocial constructs such as self-efficacy. IWB is itself a psychosocial variable that has been shown to be correlated with poor weight loss outcomes as bias increases. Part of the thought behind this is that IWB increases as an individual more strongly identifies themselves as overweight or obese, increasing the internalization of the perceived negative characteristic traits associated with that population.

However, studies have also shown that there is a self-protective function in self-identity that tends to view the self more favorably than reality would suggest. This is protective of the individual's self-worth. The more the individual views himself/herself as thin, the less weight they will lose. Conceptually this makes sense, as someone who sees himself/herself as thin may not feel as strong of a need to lose weight and therefore will not be motivated to do so. However, as IWB is associated with identification as overweight or obese and poor weight loss outcomes, it is interesting to note that identification of the self as thin also leads to decreased weight loss.

Therefore, this study will be looking at IWB in the context of short-term weight loss among treatment seeking adults. The hypothesis is that there will be an inverse association between indirect, qualitative measures of IWB (as found in online weight loss

forums) and short-term weight loss outcomes. Associations between these qualitative measures of IWB will also be investigated.

CHAPTER 3

METHODS

Overview

A mixed model analysis was conducted to examine the relationship between a participant's individual posts related to internalized weight bias (IWB) per week (independent variable, IV) to the individual's weight that week (dependent variable, DV) controlling for time. During a previous, unrelated coding effort within the DropPounds[1] dataset, a body image coding scheme was developed that brought to light posts in the DropPounds user forums related to IWB (see Appendix A). Information gleaned from these posts and from existing validated scales of weight bias[9,15,25] were then used to create a weight bias coding scheme to identify IWB within participants' individual posts that were used to conduct the mixed model analysis.

Three key validated measures of weight bias[9,15,25] were gathered into a "Weight, Morality and Food" survey conducted outside of the DropPounds community (see Appendix B). The results from a convenience sample of individuals filling out these scales were used to conduct an exploratory factor analysis to better understand latent constructs related to IWB within the existing measures. These latent constructs were used as the basis for developing the coding scheme for individual posts voicing IWB, which will be described further on in this paper.

A targeted sample of twenty-five DropPounds users was selected who posted in the forums over a period of at least twelve weeks. Users with clear signs of an eating disorder, such as very low weight and continued weight concerns, were excluded. All posts of the 25 participants identified within the forums were then coded based on the weight bias coding scheme. The next sections detail participant selection from the

[1] Name anonymized to maintain confidentiality.

DropPounds dataset, the development of the individual post coding scheme, a description of the procedures for coding the individual posts, and finally a section describing data preparation and statistical analyses.

Inclusion/Exclusion Criteria

Users had to have self-reported their weight on DropPounds over a period of at least three months to provide enough information for analysis of weight loss outcomes. Though the DropPounds community also includes users who are trying to gain or maintain weight, only those who were trying to lose weight were included in this study. Users with extremely low body weight, such as a BMI less than 18.5, or who revealed that medical conditions or medications were affecting their ability to lose weight, were excluded from participation. The specific methods used to identify participants are described in the next section.

Participants within DropPounds Dataset

Participants were selected from the online community, DropPounds. The online community, DropPounds, is an online/smartphone application tool for tracking a user's dietary and physical activity behaviors as well as weight status. In addition, users have access to an online forum to interact and discuss their weight loss experiences. This secondary data analysis used a correlational study design to explore the relationship between IWB, social identification, and weight loss outcomes. Anonymized data were provided to us from FitNow Inc., the makers of DropPounds, which included online social interactions and data related to diet, physical activity and weight between November 2009 and October 2011. Study materials were reviewed and approved by the ASU IRB (see Appendix C).

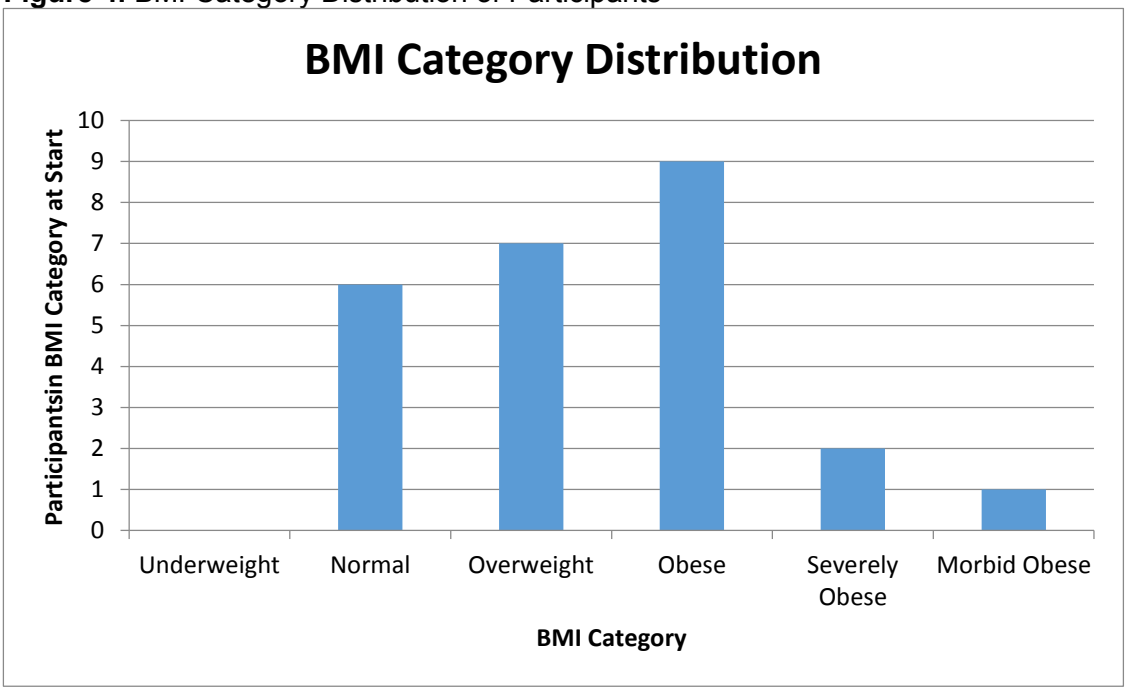
All subjects were identified within the DropPounds forums. Specifically, two processes were used to identify participants. 1) As a separate part of this project, approximately 10% of the total number of forums were reviewed in detail by a team of researchers focused on coding the overall topic matter of the thread (i.e., a collection of individual posts around a given topic matter). An initial sample of nine individuals was identified by the research team during this initial review exercise. These individuals were identified based on a supplemental coding schema developed by Janessa Escajeda to identify individuals who likely exhibited body image concerns (Appendix A). These users were then screened for inclusion/exclusion criteria to insure adequate data for analysis. 2) The second method for identifying participants was based on the sampling frame developed as explained in the following paragraph; this method did not take into account whether any of the user's posts had previously been identified as related to IWB.

To determine a sample frame that would insure adequate data for analysis, a spreadsheet with user data was screened for number of posts per week and number of weeks active within the DropPounds system. For each week that a user was active within the DropPounds system, a row appeared with their user identification number, the week number, the user's self-reported weight for the week, and the number of posts that the user made during that week. Weeks in which a user made less than two posts within the forums were removed, leaving only the weeks for which a percentage of posts related to IWB could be calculated (the IV). From here, weeks in which a user did not self-report their weight were eliminated, leaving only the weeks for which analysis could be conducted in relation to weight (the DV). Next, users who had less than five weeks of data were excluded. Users with greater than a ten week gap between usable data points were also excluded, unless they had sufficient usable data posts after that ten week gap for their inclusion to be justified due to continued participation in the forums beyond the

initial twelve weeks minimum. The remaining users were then selected for convenience and feasibility of analysis.

The final set of 25 participants consisted of 21 females and 4 males. Participants had a mean age of 36.88 ±11.19 years (range: 22-64 years) and a mean height of 65.76 ±4.01 inches (range: 59-76 inches). Starting BMI ranged from 20.8-40.8 kg/m², with a mean of 29.1 ±5.5 kg/m², which falls into the overweight BMI category. The distribution of participants' starting BMI is shown in Figure 4.

Figure 4. BMI Category Distribution of Participants



Generalizability

Within the convenience sample for this study, the selection for which relied heavily on the number of forum posts and weight data rather than on current weight, nine participants (36%) had a BMI that classified them as obese. This is similar to the prevalence of obesity in the United States, which is 35.7%.[1,5,24] Unlike the US population, there were no underweight individuals represented in this convenience sample; though

underweight individuals participate in the online forums, they were excluded. In addition to the nine participants who were obese, seven participants (28%) were classified as overweight. This is slightly higher than the national average of 15-25% of individuals who are classified as overweight.[11] This is likely due to the fact that the sample was pulled from a weight-loss platform, which is a not representative of the national population. The remaining nine participants were classified as normal weight.

Individual Post Coding Scheme Creation

In order to identify underlying dimensions of IWB that could be used in the coding scheme, an anonymous survey was put together using Qualtrics Research Suite online (Qualtrics, LLC. Provo, UT). The survey included questions related to current height and weight status and three validated measures of IWB and anti-fat attitudes. Two unrelated measures related to morality and food choices were included to distract participants from the true intention of the survey, which was to gain information on correlating items measured on the weight bias scales. The survey was conducted as a continuation of prior research on the relationship between morality and food, with exempt approval from the Internal Review Board (IRB) of Arizona State University (ASU) (see Appendix D).

The final survey (Appendix B) included the following items: a selection of questions from a Survey on Students' Attitudes Towards Animals[57]; questions related to height and weight status; the Weight Self-Stigma Questionnaire[15]; the Protestant Ethic Scale developed by Katz and Hass[58]; the Weight Bias Internalization Scale,[9] which was modified by the authors to address items to participants of any weight status rather than just overweight or obese individuals, in accordance with research by Pearl and Puhl[59]; and the Anti-fat Attitudes Questionnaire.[25]

Once the survey was created, recruitment was conducted through posts to Facebook and Twitter by the research team with links to the survey, as well as an email sent to various college or school list-serves at Arizona State University (see Appendix E). The email was written in such a way as to persuade recipients to participate in the survey based on Cialdini's principles of persuasion.[60] The survey was active from February 19 – March 1, 2014 and received 740 responses.

The results were downloaded into a spreadsheet and the data from the three validated weight bias scales were analyzed individually with exploratory factor analyses in Statistical Analysis Software (SAS Institute Inc. Cary, NC) by Dr. Chong Lee at ASU. Varimax rotation was used to adjust data for orthoganality. The Weight Self-Stigma Questionnaire[15] data with varimax rotation revealed two distinct latent constructs. Items that correlated on these factors were grouped together and used as the seeds for an individual category within the coding scheme being developed. Analysis of the modified Weight Bias Internalization Scale[9,59] revealed two factors both with and without varimax rotation. Finally, the Anti-fat Attitudes Questionnaire[25] data showed two distinct factors after varimax rotation that were used to create the framework for two additional categories to be incorporated into the coding scheme, for a total of six categories related to IWB. The final coding scheme, with each code accompanied by a short description of the category, followed by several exemplary posts to serve as examples, is included in Appendix F.

Based on the above described factor analysis as a guiding framework, posts that could be related to IWB were noted and given a category in the coding scheme. However, the development of the social identification coding scheme followed a less defined process. Building on the work of Carels et al.,[14] categories were developed based on several dimensions of self comparison: whether the comparison being made was positive

(in favor of) or negative toward a social group; whether the trait or characteristic was attributed to a normal weight or overweight/obese individual or the self; and whether that attribution would be interpreted as an indication of a closer self-association of the participant with either normal weight or overweight/obese individuals. Due to the overlapping nature of these dimensions, the resulting categories from the combinations thereof were grouped together into three grand categories, one of which was defined by a closer association of the participant with normal weight individuals socially (whether positive or negative), another in which the participant more closely associated himself or herself as belonging to an overweight/obese social group through negative traits or characteristics, and a third in which the participant more closely associated himself or herself as belonging to an overweight/obese social group through positive negative traits or characteristics. Having the third category separate from the second was intended to serve as a method of identifying individuals with potentially poor weight loss outcomes due to positive associations with being overweight/obese that would prevent them from losing weight, and therefore place them outside of the desired population for this project.

However, this coding scheme for social identification was complex and not well defined for the purposes of this project, and there was little agreement among coders of what should or should not be coded as indicating social identification in any direction, let alone which category was most appropriate. The coding of posts for social identification was intended as a means of better defining IWB, however the scheme that resulted from the exploratory factor analysis proved itself already reasonably well defined through satisfactory inter-rater reliability. Therefore it was determined that developing a coding scheme for social identification had become a separate project in itself, and it was eliminated as a point of analysis.

Coding Procedures

Once the final 25 participants were identified, all the individual posts by each participant were read and coded by Janessa Escajeda using the individual post coding scheme described above. While the initial purpose of this coding scheme was to be able to identify the single category that best described an individual post, inter-rater reliability of the first two participants varied significantly between 20% and 78%, and it was determined that the weight bias coding scheme would be more effective if used within a binary coding system. That is, posts in which no IWB was identified (as defined by the coding scheme) received a code of zero (0); posts that fit into any one of the six categories was given a code of one (1). This brought the inter-reliability up to 85% agreement, with two or more out of the four raters identifying IWB within the same posts. For the remaining 15% of posts where only one rater identified IWB, the posts were coded as a zero, or no IWB present, according to the three raters who did not identify IWB within the post. After determining the inter-rater reliability of the first two participants under the binary coding scheme to be adequate, a random screen with 10% of coded posts for the other 23 participants was reviewed by the research mentors.

Statistical Analysis

Data preparation consisted of calculating a summary score of posts each week based on the weight bias coding scheme. This was then controlled for by accounting for the number of posts made by the user that week. Due to the small sample size, normality tests were not considered necessary.

Several variables were important for this analysis. Subjects were identified by Data_ID. Since the IWB coding scheme was in terms of zero for no IWB present and one for IWB was present, IWB scores were calculated by summing a user's IWB scores for the

week, which were then analyzed in relation to the total number of posts made by the user that week as a control. In order to account for the difference in start times for each user, post time data were centered so that a user's first week posting was defined as week zero.[61] Data were also centered based on starting BMI to determine if that was a factor in IWB scores and weight loss outcomes. Gender and age were included as covariates.

Statistical analyses were conducted using the SPSS Statistical Software package (SPSS, Version 22.0. Armonk, NY). The statistical tests run for this project consisted of mixed model analysis. It is called a "mixed" model because it is meant to predict fixed effects while accounting for random effects, therefore it models "mixed" effects. In this case, the fixed effects are those of IWB (the IV) on weight loss outcomes (the DV), and the random effects are subject related (within-subject variations that are accounted for over time as well as differences in starting weights). Multiple models were built, each one adding factors to the previous to examine improved goodness of fit which would indicate that the added independent factor improves prediction of the dependent factor. Descriptive statistics included frequencies, means, and ranges were generated. Significance was calculated at $p<0.05$, and the results are discussed later in this paper.

CHAPTER 4

RESULTS

Data for over 10,000 users of the DropPounds application and forums were available for analysis. After filtering for weeks in which users posted two or more times, this decreased to 1013. Weeks in which no weight was self-reported were removed, leaving 939 weeks of data in which weight and at least two posts were available for a user. Going down this list, if a user had at least 10 weeks of data available, they were included in the sample; this was continued until 25 participants were chosen, with outlying gaps of greater than 10 weeks between usable data points excluded from analysis.

Between these 25 participants, a total of 2167 posts were coded, with a mean of 86.7 ± 32.5 posts per participant (range: 31-166 posts). Participants actively posted in the DropPounds forums for an average of 49.28 ± 23.21 weeks (range: 11-83). After coding all of the posts, 209 were coded for IWB present (9.6% of total posts). When examined at the level of individual participants, a mean of 9.4% of posts per participant had IWB present (SD: 7.4%, range: 0%-31%). Though a coding scheme for social identification was also developed, only two participants had their posts coded to test for inter-rater reliability and there was virtually no agreement between coders. Therefore, no other participants had their posts coded under that coding scheme, and there are no results to report in this paper for social identification.

First, an unconditional means model was run looking at mean weight by week when only Data ID is entered (Figure 5). This baseline model was run to determine the extent of the variance from random effects. The significance of the intercept for this initial model was $p<0.001$, indicating significant variance from random effects. This suggests that there is significant variance within the model that could be plausibly

explained via other variables. Information criteria tests, for which a smaller number indicated a better fitting model, were as follows: -2 Restricted Log Likelihood (-2 log) was 5331.805, Akaike's Information Criterion (AIC) was 5333.805, and Schwarz's Bayesian Criterion (BIC) was 5338.096. Though these numbers in themselves do not divulge much information, they served as a point of comparison as additional factors were included in the model. In order to show improved model fit for subsequent models, all three numbers had to decrease.

Figure 5. Unconditional Means Model Information Criteria and Fixed Effects

Information Criteria[a]

-2 Restricted Log Likelihood	5331.805
Akaike's Information Criterion (AIC)	5333.805
Hurvich and Tsai's Criterion (AICC)	5333.812
Bozdogan's Criterion (CAIC)	5339.096
Schwarz's Bayesian Criterion (BIC)	5338.096

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: weight_mean.

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	540	13228.904	.000

a. Dependent Variable: weight_mean.

The second model run was an unconditional growth model (Figure 6), which added the repeated factor of week_c, or centered week based on the first week that a user began posting in the weight loss forums. This model showed a better fit than the unconditional means model, as indicated by information criteria of 2092.590 for -2 log, 2096.590 for AIC, and 2104.844 for BIC. Therefore, including centered week as a repeated factor successfully improved model fit when predicting weight loss and

suggested significant weight loss over time, p<0.001. Age and gender were then added as covariates (Figure 7), bringing the Information Criteria to 2078.213 (-2 log), 2082.213 (AIC), and 2090.458 (BIC), with a p value of 0.034 for gender and 0.932 for age. Next, starting BMI category as a fixed factor was included (Figure 8). With this, the information criteria decreased to 2028.043, 2032.043, and 2040.271, respectively (p<0.001). Gender and starting BMI, then, were significant predictors of weight loss, while age did not have a significant effect on weight loss outcomes.

Figure 6. Unconditional Growth Model Information Criteria and Fixed Effects

Information Criteria[a]

-2 Restricted Log Likelihood	2092.590
Akaike's Information Criterion (AIC)	2096.590
Hurvich and Tsai's Criterion (AICC)	2096.616
Bozdogan's Criterion (CAIC)	2106.844
Schwarz's Bayesian Criterion (BIC)	2104.844

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: weight_mean.

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	24.336	532.358	.000
week_c	82	433.571	2.755	.000

a. Dependent Variable: weight_mean.

Figure 7. Information Criteria and Fixed Effects with Covariates

Information Criteria[a]

-2 Restricted Log Likelihood	2078.213
Akaike's Information Criterion (AIC)	2082.213
Hurvich and Tsai's Criterion (AICC)	2082.239
Bozdogan's Criterion (CAIC)	2092.458
Schwarz's Bayesian Criterion (BIC)	2090.458

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: weight_mean.

Fixed Effects

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	22.084	41.610	.000
week_c	82	433.587	2.758	.000
gender	1	22.038	5.090	.034
age	1	22.101	.007	.932

a. Dependent Variable: weight_mean.

Figure 8. Information Criteria and Fixed Effects with Starting BMI

Information Criteria[a]

-2 Restricted Log Likelihood	2028.043
Akaike's Information Criterion (AIC)	2032.043
Hurvich and Tsai's Criterion (AICC)	2032.070
Bozdogan's Criterion (CAIC)	2042.271
Schwarz's Bayesian Criterion (BIC)	2040.271

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: weight_mean.

Fixed Effects

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	22.088	41.111	.000
week_c	82	429.627	2.528	.000
gender	1	22.026	4.982	.036
age	1	22.087	.001	.978
bmi_cat_c	3	430.394	14.073	.000

a. Dependent Variable: weight_mean.

The fifth model added the control for number of posts each week, which decreased the information criteria to a -2 log of 2002.027, an AIC of 2006.027, and a BIC of 2014.196, however, even though all values decreased this was not a significant improvement in prediction power (p=0.172) (Figure 9). Finally, the sum of IWB scores was included as the final factor in the last model run (Figure 10). This was the model that actually showed if IWB score was able to significantly predict weight loss outcomes in treatment seeking adults. The information criteria decreased to 2001.954 (-2 log), 2005.954 (AIC), and 2014.077 (BIC) in this final run suggesting improved model fit. The individual-level item prediction however had a p value of 0.862, suggesting that while model fit improved, the individual IWB score was not a significant independent predictor.

Figure 9. Information Criteria and Fixed Effects Controlling for Number of Posts each Week

Information Criteria[a]

-2 Restricted Log Likelihood	2002.027
Akaike's Information Criterion (AIC)	2006.027
Hurvich and Tsai's Criterion (AICC)	2006.055
Bozdogan's Criterion (CAIC)	2016.169
Schwarz's Bayesian Criterion (BIC)	2014.169

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: weight_mean.

Fixed Effects

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	22.086	40.856	.000
week_c	82	410.610	2.506	.000
gender	1	22.023	4.934	.037
age	1	22.083	.000	.983
bmi_cat_c	3	411.351	14.367	.000
Code_clt	19	410.103	1.309	.172

a. Dependent Variable: weight_mean.

Figure 10. Information Criteria and Fixed Effects with IWB Scores

Information Criteria[a]

-2 Restricted Log Likelihood	2001.954
Akaike's Information Criterion (AIC)	2005.954
Hurvich and Tsai's Criterion (AICC)	2005.982
Bozdogan's Criterion (CAIC)	2016.077
Schwarz's Bayesian Criterion (BIC)	2014.077

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: weight_mean.

Fixed Effects

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	22.093	40.733	.000
week_c	82	406.603	2.497	.000
gender	1	22.023	4.919	.037
age	1	22.085	.000	.988
bmi_cat_c	3	407.344	14.132	.000
Code_clt	19	406.099	1.311	.171
Code_sum	4	406.132	.324	.862

a. Dependent Variable: weight_mean.

CHAPTER 5

DISCUSSION

Results of this study suggested that it was possible to identify internalized weight bias (IWB) within the DropPounds forums, however, there was not a significant association of the weight bias score with the short-term weight loss outcomes of a convenience sample of 25 adult users of the online food and activity tracker and mobile app, DropPounds. This was the first study to look at IWB, a relatively new topic of research, in an online context. Furthermore, research to this point has been limited to surveys completed by participants at a specific point in time, while this investigation retroactively analyzed self-reported information from participants of online forums within the DropPounds site. Future studies will be able to build on the methods used in this study to expand current understanding of the role of IWB in weight loss outcomes, both short- and long- term, which will aid in the design of effective weight loss platforms.

Existing validated measures of IWB have shown that it is associated with weight loss outcomes and psychosocial maladjustments.[9,13,14] This study took a novel approach to measuring IWB in an effort to investigate its presence using retrospective data in online forums, and to investigate possible latent factors within IWB as a whole; to date, no studies have attempted to look for IWB retrospectively and it has almost exclusively been investigated as a single construct. A factor analysis of the Weight, Morality and Food Survey (Appendix B) identified six latent factors within existing IWB scales. While the coding scheme that was developed based on those findings was not able to differentiate these factors with adequate precision to be used as originally intended (there was insufficient inter-rater reliability using the existing data set to justify coding of individual latent factors), it provided a new perspective on IWB that combined existing measures and opens the possibility of a new direction for future investigations

into the dimensions that exist within IWB. By combining data from multiple existing measures of IWB, correlations between individual items on each of the scales could be measured, giving a more nuanced view of IWB that was not possible before. Future studies can build on this nuanced perspective to tease out the dimensions that exist within IWB but for which there were not sufficient data previously to identify.

Though the coding scheme did not identify latent constructs of IWB with sufficient precision, the identification of the presence or absence of IWB within a post did have significant inter-rater reliability. As this is the first study of its kind, future studies will be needed to determine if these results are typical for a similar group of participants. Past studies have focused on taking pre- and post-measures of attitudes indicative of IWB among participants.[13,20] This study provides a new way of looking at the level of IWB present, that is, within an individual's written postings within an online forum. Follow-up investigations will be needed to determine if this method of measuring IWB is a reliable and valid method for assessing IWB.

The original intent of this study was to include a description of social-comparison in the coding scheme along with the latent factors within IWB, in order to determine if a correlation could be measured between the two constructs. After several attempts to redefine how social-comparison would be identified within the forums posts, we were unable to develop a reliable coding strategy for assessing social-comparison within our dataset. More research is needed to determine a more appropriate method for identifying social-comparison within existing data in order to continue the investigation of the role that it plays in IWB and weight loss outcomes.

Though IWB did not show a significant association with short-term weight loss outcomes, there were several items associated with weight. Not surprisingly, there was a significant association between starting BMI and the short-term weight loss of

participants. This is consistent with existing research on weight loss outcomes, as those who weigh more have a natural tendency towards exhibiting regression towards the mean. BMI has not been shown to be associated with IWB.[14] In line with previous studies on IWB, this investigation held gender and age as covariates when looking at the association of IWB with weight loss outcomes due to their association with IWB.[13,14] Gender did show a significant association with participant weight loss outcomes; however, this investigation did not provide support for an association between age and weight loss outcomes. This may suggest that age is a stronger correlate of IWB than of weight loss outcomes.

One strength of this study was the use of an existing validated measure of IWB to establish the conceptual underpinnings for our coding strategy. The use of these validated measures of IWB increase confidence in the construct validity of the coding strategy developed. Further, utilizing a coding scheme for assessing IWB within an online form represents a novel approach to identifying IWB as a whole. It provides a potentially complementary strategy for better articulating and representing the construct of IWB that goes beyond self-report only. Before this can be done in its current state, though, further research will have to be done to validate the association between IWB scores from the coding scheme and IWB as identified in previously validated measures. This could be accomplished with a pre- and post-measure of IWB using existing measures among a group of adults seeking weight loss treatment, who complete a journal during the interim which will then be coded for an IWB score using the scheme developed in this study.

There were also several weaknesses to this study. The first is that the sample size was small and not necessarily representative of the DropPounds or US populations. Therefore, the generalizability of these results is uncertain. Weight was self-reported, as

was height, and BMI was calculated from these self-reported values. This introduces a certain amount of doubt as to the validity of the data analyzed. Furthermore, this study did not investigate the causality of any of the associations that were significant. There are still questions to be answered about the relationship between IWB and weight loss outcomes that future studies will have to examine, including the role that self-identification plays in IWB and weight loss outcomes. One of the difficulties that came with the analysis of existing data was that it was not initially collected with an analysis of this kind in mind. However, this does not mean that the methods used in this study are unusable for future studies in which new data are collected.

One great difference in measuring IWB with narrative data instead of surveys is that the information is a reflection of written dialogue within an online forum rather than a measurement of inner cognitions and attitudes held by participants. It is not yet known how attitudes of IWB translate into written dialogues, online or otherwise. On one hand, it is possible that those with stronger attitudes of IWB will be more likely to voice these cognitions. On the other hand, those with stronger attitudes of IWB may be more insecure and unwilling to voice such attitudes, particularly within an online public forum. Previous studies in social media have shown that posts are not always a reflection of what the individual actually feels; rather, it is a projection of what he or she wants people to think about him/her.[22] If this is the case, then it could be assumed that the latter hand is more likely: in order to prevent the impression that they are dissatisfied with their appearance, those that have greater IWB will avoid the topic as much as possible. This would lead to a negative association between the IWB scores in this study and existing measures of IWB. Based on this point, it might be more fruitful to examine the development of a coding scheme for IWB but with the focus of examination on

written texts that are more personal such as diaries. This may allow the sorts of inner attitudes to be monitored and assessed more appropriately.

CHAPTER 6

CONCLUSION

The current study's results demonstrate that it is possible to develop a coding scheme designed to represent IWB within an online forum and in narrative data. Furthermore, results also indicate that is was possible to observe instances of IWB based on this coding scheme. In contrast to previous studies on IWB, participants in this investigation did not respond to a survey in which their attitudes toward themselves and others were measured. Instead, their posts in an online weight loss forum were coded for whether or not aspects of IWB could be identified in their comments. These statements were taken as a reflection on participant attitudes and used in place of more direct measurement of participant attitudes. This is the first study to use coding as a measurement of IWB, and showing the relationship between these two methods of attitude measurement could provide more support for the use of coding as an alternative to surveys in the examination of IWB and its correlates.

These results also provide an initial response to the question of what factors exist within the construct of IWB. To date, IWB has been researched primarily as a single construct. In this investigation, six factors were identified and defined, but there was insufficient precision to identify these factors using indirect measures of IWB through coding. Subsequent research in the area of IWB may be able to further differentiate between the factors identified using more direct measures of IWB in order to strengthen these findings and further the understanding of not only IWB but also its correlates.

There are many reasons that individuals have for wanting to lose weight, and even something as simple as a Google search reveals how widespread the desire to lose weight is (Figure 1). By expanding the current understanding of IWB and its defining factors, it will be possible to develop ways to modify these factors and alter the outcomes

of adults seeking weight loss treatment by creating more effective weight loss platforms, both in person and online. Though this study may not have even scratched the surface of the questions surrounding IWB, the results will allow future researchers to refine their questions and guide future research.

REFERENCES

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity among adults: United States, 2011-2012. *NCHS Data Brief*. 2013;(131):1–8. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24152742.

2. Frederick DA, Buchanan GM, Sadehgi-Azar L, et al. Desiring the muscular ideal: Men's body satisfaction in the United States, Ukraine, and Ghana. *Psychol Men Masc*. 2007;8(2):103–117. doi:10.1037/1524-9220.8.2.103.

3. Runfola CD, Von Holle A, Trace SE, et al. Body dissatisfaction in women across the lifespan: results of the UNC-SELF and Gender and Body Image (GABI) studies. *Eur Eat Disord Rev*. 2013;21(1):52–9. doi:10.1002/erv.2201.

4. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *JAMA*. 2012;307(5):483–90. doi:10.1001/jama.2012.40.

5. Flegal KM, Carroll MD, Kit BK, Ogden CL. Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999-2010. *JAMA*. 2012;307(5):491–7. doi:10.1001/jama.2012.39.

6. Avenell A, Broom J, Brown TJ, et al. Systematic review of the long-term effects and economic consequences of treatments for obesity and implications for health improvement. *Health Technol Assess*. 2004;8(21):iii–iv, 1–182. Available at: https://www.pubmedcentral.nih.gov/pubmedhealth/PMH0015087/. Accessed October 15, 2013.

7. Karatsoreos IN, Thaler JP, Borgland SL, Champagne FA, Hurd YL, Hill MN. Food for thought: Hormonal, experiential, and neural influences on feeding and obesity. *J Neurosci*. 2013;33(45):17610–17616. doi:10.1523/JNEUROSCI.3452-13.2013.

8. Goodman N, Dornbusch SM, Richardson SA, Hastorf AH. Variant reactions to physical disabilities. *Am Sociol Assoc*. 2013;28(3):429–435.

9. Durso LE, Latner JD. Understanding self-directed stigma: Development of the weight bias internalization scale. *Obesity (Silver Spring)*. 2008;16 Suppl 2:S80–6. doi:10.1038/oby.2008.448.

10. Allison DB, Basile VC, Yuker HE. The measurement of attitudes toward and beliefs about obese persons. *Int J Eat Disord*. 1991;10(5):599–607.

11. Carr D, Friedman M. Is obesity stigmatizing? Body weight, perceived discrimination, and psychological well-being in the United States. *J Health Soc Behav*. 2005;46(3):244–259. doi:10.1177/002214650504600303.

12. Vartanian LR, Novak SA. Internalized societal attitudes moderate the impact of weight stigma on avoidance of exercise. *Obesity (Silver Spring)*. 2011;19(4):757–62. doi:10.1038/oby.2010.234.

13. Carels RA, Wott CB, Young KM, Gumble A, Koball A, Oehlhof MW. Implicit, explicit, and internalized weight bias and psychosocial maladjustment among treatment-seeking adults. *Eat Behav*. 2010;11(3):180–5. doi:10.1016/j.eatbeh.2010.03.002.

14. Carels RA, Burmeister J, Oehlhof MW, et al. Internalized weight bias: ratings of the self, normal weight, and obese individuals and psychological maladjustment. *J Behav Med*. 2013;36(1):86–94. doi:10.1007/s10865-012-9402-8.

15. Lillis J, Luoma JB, Levin ME, Hayes SC. Measuring weight self-stigma: the weight self-stigma questionnaire. *Obesity (Silver Spring)*. 2010;18:971–976. doi:10.1038/oby.2009.353.

16. Hatzenbuehler ML, Phelan JC, Link BG. Stigma as a fundamental cause of population health inequalities. *Am J Public Health*. 2013;103(5):813–821. doi:10.2105/AJPH.2012.301069.Stigma.

17. National Library of Medicine. 2014 MeSH descriptor data: Social identification. 2014. Available at: http://www.nlm.nih.gov/cgi/mesh/2014/MB_cgi?mode=&index=12376. Accessed May 29, 2014.

18. Dasgupta N. Implicit ingroup favoritism, outgroup favoritism, and their behavioral manifestations. *Soc Justice Res*. 2004;17(2):143–169. Available at: http://link.springer.com/article/10.1023/B:SORE.0000027407.70241.15. Accessed November 1, 2014.

19. Olson M a., Crawford MT, Devlin W. Evidence for the underestimation of implicit in-group favoritism among low-status groups. *J Exp Soc Psychol*. 2009;45(5):1111–1116. doi:10.1016/j.jesp.2009.06.021.

20. Carels RA, Hinman N, Koball A, Oehlhof MW, Gumble A, Young KM. The self-protective nature of implicit identity and its relationship to weight bias and short-term weight loss. *Obes Facts*. 2011;4(4):278–83. doi:10.1159/000330809.

21. Ballantine PW, Stephenson RJ. Help me, I'm fat! Social support in online weight loss networks. *J Consum Behav*. 2011;10:332–337. doi:10.1002/cb.374.

22. Schwämmlein E, Wodzicki K. What to tell about me? Self-presentation in online communities. *J Comput Commun*. 2012;17(4):387–407. doi:10.1111/j.1083-6101.2012.01582.x.

23. Maher C, Lewis L, Ferrar K. Are health behavior change interventions that use online social networks effective? A systematic review. *J Med Internet Res*. 2014;16(2). doi:10.2196/jmir.2952.

24. Prevalence of obesity in the United States, 2009-2010. *Med Benefits*. 2012;29(5):3–4. Available at: http://search.proquest.com.ezproxy1.lib.asu.edu/docview/928953910?accountid=4485. Accessed October 27, 2013.

25. Crandall CS. Prejudice against fat people: ideology and self-interest. *J Pers Soc Psychol*. 1994;66(5):882–94. doi:10.1037//0022-3514.66.5.882.

26. O'Brien KS, Latner JD, Ebneter D, Hunter JA. Obesity discrimination: the role of physical appearance, personal ideology, and anti-fat prejudice. *Int J Obes (Lond)*. 2013;37(3):455–60. doi:10.1038/ijo.2012.52.

27. Puhl RM, Schwartz MB, Brownell KD. Impact of perceived consensus on stereotypes about obese people: a new approach for reducing bias. *Health Psychol*. 2005;24(5):517–25. doi:10.1037/0278-6133.24.5.517.

28. Bish CL, Blanck HM, Serdula MK, Marcus M, Kohl HW, Khan LK. Diet and physical activity behaviors among Americans trying to lose weight: 2000 Behavioral Risk Factor Surveillance System. *Obes Res*. 2005;13(3):596–607. doi:10.1038/oby.2005.64.

29. Chugh M, Friedman AM, Clemow LP, Ferrante JM. Women weigh in: obese African American and White women's perspectives on physicians' roles in weight management. *J Am Board Fam Med*. 2013;26(4):421–8. doi:10.3122/jabfm.2013.04.120350.

30. McVey GL, Walker KS, Beyers J, Harrison HL, Simkins SW, Russell-Mayhew S. Integrating weight bias awareness and mental health promotion into obesity prevention delivery: a public health pilot study. *Prev Chronic Dis*. 2013;10(3):E46. doi:10.5888/pcd10.120185.

31. Puhl RM, Moss-Racusin CA, Schwartz MB, Brownell KD. Weight stigmatization and bias reduction: perspectives of overweight and obese adults. *Health Educ Res*. 2008;23(2):347–58. doi:10.1093/her/cym052.

32. Carels RA, Young KM, Wott CB, et al. Internalized weight stigma and its ideological correlates among weight loss treatment seeking adults. *Eat Weight Disord*. 2011;14(2-3):e92–7. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3165020&tool=pmcentrez&rendertype=abstract. Accessed December 2, 2013.

33. Burmeister JM, Hinman N, Koball A, Hoffmann DA, Carels RA. Food addiction in adults seeking weight loss treatment. Implications for psychosocial health and weight loss. *Appetite*. 2013;60(1):103–10. doi:10.1016/j.appet.2012.09.013.

34. Brownell K. *The LEARN Program for weight management*. 10th ed. Dallas, TX: American Health Publishing Company; 2004.

35. Greenwald AG, Poehlman TA, Uhlmann EL, Banaji MR. Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *J Pers Soc Psychol*. 2009;97(1):17–41. doi:10.1037/a0015575.

36. Cash T. *Users' manual for the multidimensional body-self relationsh questionnaire*. Norfolk, VA: Old Dominion University; 2000.

37. Rusticus S a., Hubley AM. Measurement Invariance of the Multidimensional Body-Self Relations Questionnaire: Can We Compare Across Age and Gender? *Sex Roles*. 2006;55(11-12):827–842. doi:10.1007/s11199-006-9135-7.

38. Gormally J, Black S, Daston S, Rardin D. The assessment of binge eating severity among obese persons. *Addict Behav*. 1982;7(1):47–55. Available at: http://www.ncbi.nlm.nih.gov/pubmed/7080884.

39. Radloff LS. The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. *Appl Psychol Meas*. 1977;1(3):385–401. doi:10.1177/014662167700100306.

40. Puhl RM, Heuer C a. The stigma of obesity: a review and update. *Obesity (Silver Spring)*. 2009;17(5):941–64. doi:10.1038/oby.2008.636.

41. Karpinski A. Measuring self-esteem using the implicit association test: the role of the other. *Pers Soc Psychol Bull*. 2004;30(1):22–34. doi:10.1177/0146167203258835.

42. Taylor SE, Brown JD. Illusion and well-being: A social psychological perspective on mental health. *Psychol Bull*. 1988;103:193–210. doi:10.1037/0033-2909.103.2.193.

43. Palmeira AL, Teixeira PJ, Branco TL, et al. Predicting short-term weight loss using four leading health behavior change theories. *Int J Behav Nutr Phys Act*. 2007;4:14. doi:10.1186/1479-5868-4-14.

44. Bandura A. *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall; 1986. Available at: http://books.google.de/books?hl=de&lr=&id=rcnJB7Wkr9YC&oi=fnd&pg=PA94&dq=the+social+foundations+of+thought+and+action&ots=DYNNnRPwhK&sig=ajTjjUIM2PPvAz2Qvjm4Wch-gEc.

45. Bandura A. Human agency in social cognitive theory. *Am Psychol*. 1989;44(9):1175–84. Available at: http://www.ncbi.nlm.nih.gov/pubmed/2782727.

46. Prochaska JO, Redding CA, Evers KE. The Transtheoretical Model and Stages of Change. In: *Health Behavior and Health Education*.; 2002:99–120.

47. Tuah NA, Amiel C, Qureshi S, Car J, Kaur B, Majeed A. Transtheoretical model for dietary and physical exercise modification in weight loss management for overweight and obese adults. *Cochrane database Syst Rev*. 2011;(10):CD008066. doi:10.1002/14651858.CD008066.pub2.

48. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis ….* 1991;50:179–211. doi:10.1016/0749-5978(91)90020-T.

49. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1977;84:191–215. doi:10.1037/0033-295X.84.2.191.

50. Schifter DE, Ajzen I. Intention, perceived control, and weight loss: an application of the theory of planned behavior. *J Pers Soc Psychol*. 1985;49(3):843–51. Available at: http://www.ncbi.nlm.nih.gov/pubmed/4045706.

51. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*. 2000;55(1):68–78. doi:10.1037/0003-066X.55.1.68.

52. Williams GC, Grow VM, Freedman ZR, Ryan RM, Deci EL. Motivational predictors of weight loss and weight-loss maintenance. *J Pers Soc Psychol*. 1996;70(1):115–26. Available at: http://www.ncbi.nlm.nih.gov/pubmed/8558405.

53. Teoh AN, Chia MSC, Mohanraj V. The Comparison Between Active and Passive Types of Social Support: The Emotional Responses1. *J Appl Biobehav Res*. 2009;14:90–102. doi:10.1111/j.1751-9861.2009.00042.x.

54. Hwang KO, Ottenbacher AJ, Green AP, et al. Social support in an Internet weight loss community. *Int J Med Inform*. 2010;79:5–13. doi:10.1016/j.ijmedinf.2009.10.003.

55. Buchanan H, Coulson NS. Accessing dental anxiety online support groups: An exploratory qualitative study of motives and experiences. *Patient Educ Couns*. 2007;66:263–269. doi:10.1016/j.pec.2006.12.011.

56. Kozinets R V. E-tribalized marketing?: the strategic implications of virtual communities of consumption. *Eur Manag J*. 1999;17:252–264. doi:10.1016/S0263-2373(99)00004-3.

57. Bennett R, Blaney R. Social consensus, moral intensity and willingness to pay to address a farm animal welfare issue. *J Econ Psychol*. 2002;23(4):501–520. doi:10.1016/S0167-4870(02)00098-3.

58. Katz I, Hass R. Racial ambivalence and American value conflict: Correlational and priming studies of dual cognitive structures. *J Pers Soc Psychol*. 1988:10–11. doi:10.1037/t14265-000.

59. Pearl RL, Puhl RM. Measuring internalized weight attitudes across body weight categories: Validation of the Modified Weight Bias Internalization Scale. *Body Image*. 2014;11(1):89–92. doi:10.1016/j.bodyim.2013.09.005.

60. Cialdini RB. *Influence: the Psychology of Persuasion*. Revised. New York City: Collins Publishers; 2006.

61. Singer JD, Willett JB. *Applied longitudinal data analysis: modeling change and event occurrence*. New York: Oxford University Press; 2003.

APPENDIX A

BODY IMAGE CODING SCHEME

Body Image **BIM**

Discussions about how users perceive themselves regarding their body size or shape and/or their feelings associated with that image (particularly in relation to other people in some way). Includes the interactions that result from what the user reveals about these feelings. This may also lead into discussions about compensatory behaviors that users engage in to feel better about themselves, such as excessive diet restrictions (eating disorders) or exercise dependence.

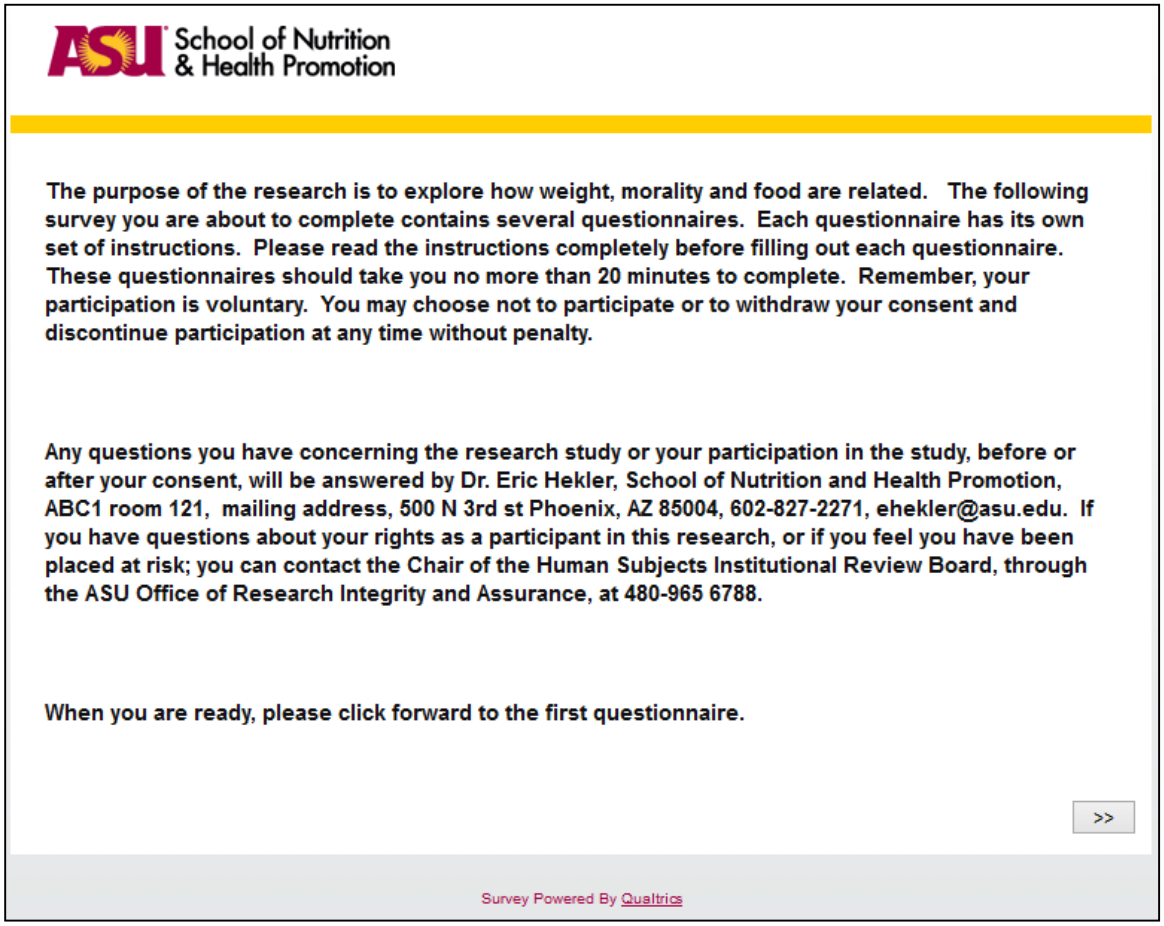
Post Excerpt:

"I know that one of the hardest things I've had to deal with is feeling like a love interest has rejected me because of my looks, specifically, my weight. I'm trying to **fight feeling that rejection is always due to my weight**.... I've spent the past year **building up my self-esteem with things other than food**, and I'm not about to let it break down - not when I've come this far and done all of this for me, myself, and I.... Back in the day, when I felt like I did this afternoon/early evening, I would eat and eat and eat until I felt sick. Once I reached that stage, I would come to believe the things that were swirling around in my head (e.g., "**If only I were skinnier, he'd date me**," among others)." [**emphasis mine**: believing that her weight makes her unattractive, and that her self-esteem was tied up with food and her weight]

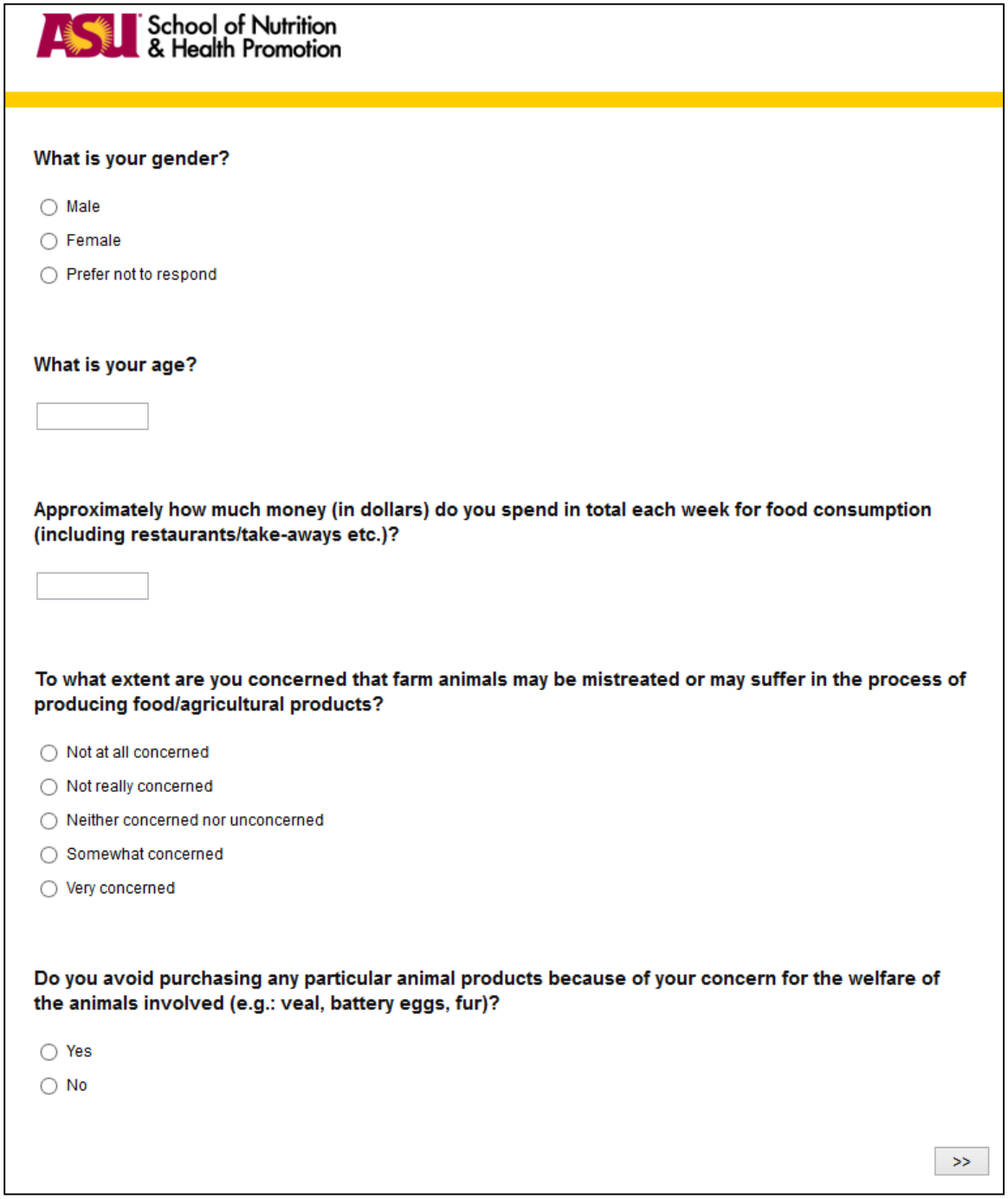
APPENDIX B

WEIGHT, MORALITY AND FOOD SURVEY

Introduction Text



Survey on Students' Attitudes Toward Animals



ASU School of Nutrition & Health Promotion

What is your gender?

- ○ Male
- ○ Female
- ○ Prefer not to respond

What is your age?

Approximately how much money (in dollars) do you spend in total each week for food consumption (including restaurants/take-aways etc.)?

To what extent are you concerned that farm animals may be mistreated or may suffer in the process of producing food/agricultural products?

- ○ Not at all concerned
- ○ Not really concerned
- ○ Neither concerned nor unconcerned
- ○ Somewhat concerned
- ○ Very concerned

Do you avoid purchasing any particular animal products because of your concern for the welfare of the animals involved (e.g.: veal, battery eggs, fur)?

- ○ Yes
- ○ No

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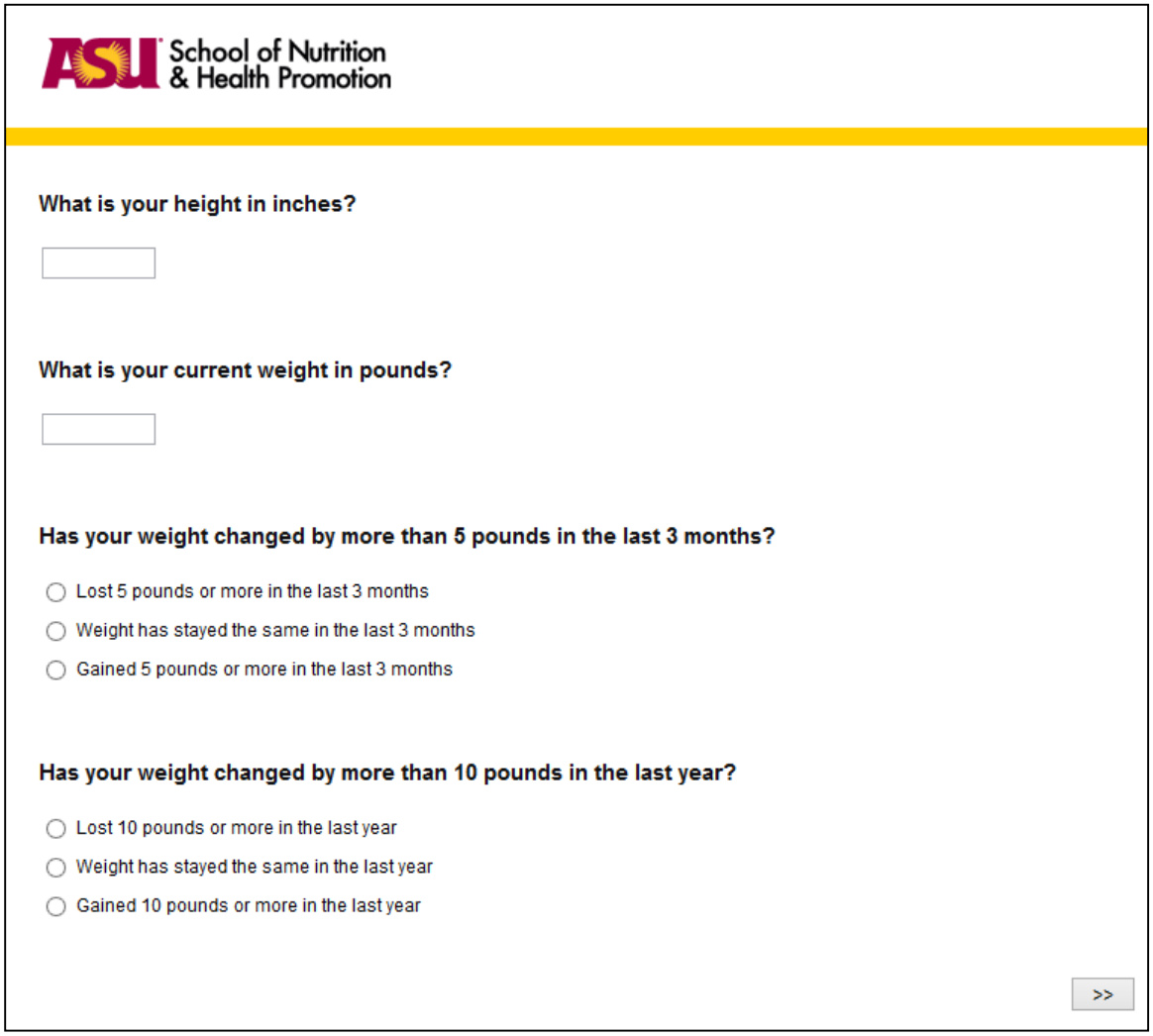
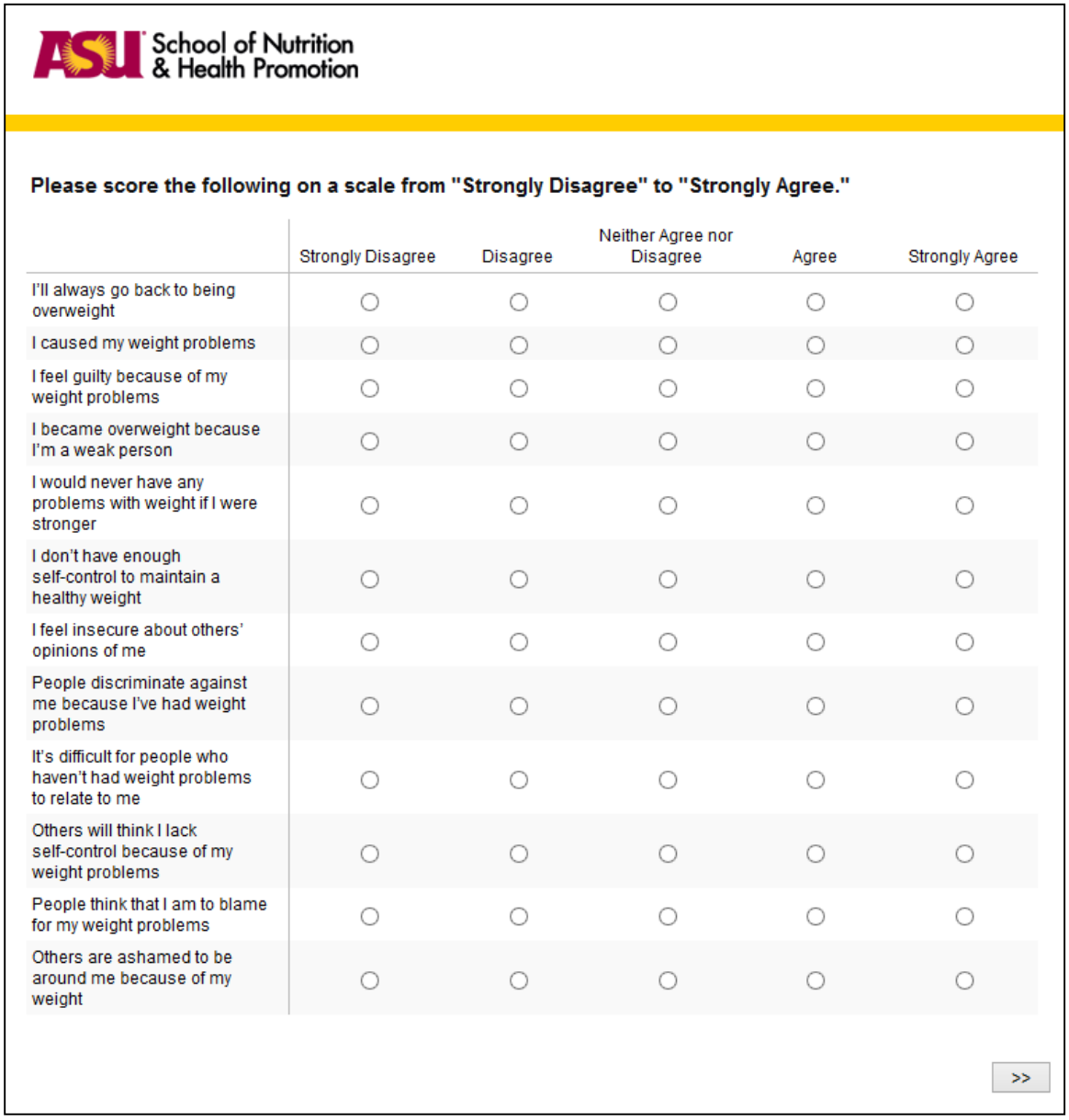
Current Height and Weight Status



Weight Self-Stigma Questionnaire



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Please score the following on a scale from "Strongly Disagree" to "Strongly Agree."

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I'll always go back to being overweight	○	○	○	○	○
I caused my weight problems	○	○	○	○	○
I feel guilty because of my weight problems	○	○	○	○	○
I became overweight because I'm a weak person	○	○	○	○	○
I would never have any problems with weight if I were stronger	○	○	○	○	○
I don't have enough self-control to maintain a healthy weight	○	○	○	○	○
I feel insecure about others' opinions of me	○	○	○	○	○
People discriminate against me because I've had weight problems	○	○	○	○	○
It's difficult for people who haven't had weight problems to relate to me	○	○	○	○	○
Others will think I lack self-control because of my weight problems	○	○	○	○	○
People think that I am to blame for my weight problems	○	○	○	○	○
Others are ashamed to be around me because of my weight	○	○	○	○	○

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Protestant Ethic Scale

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Please score the following on a scale from "Strongly Disagree" to "Strongly Agree."

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Most people spend too much time in unprofitable amusements.	○	○	○	○	○	○	○
Our society would have fewer problems if people had less leisure time.	○	○	○	○	○	○	○
Money acquired easily (e.g., through gambling or speculation) is usually spent unwisely.	○	○	○	○	○	○	○
There are few satisfactions equal to the realization that one has done his best at a job.	○	○	○	○	○	○	○
The most difficult college courses usually turn out to be the most rewarding.	○	○	○	○	○	○	○
Most people who don't succeed in life are just plain lazy.	○	○	○	○	○	○	○
The self-made man is likely to be more ethical than the man born to wealth.	○	○	○	○	○	○	○
I often feel I would be more successful if I sacrificed certain pleasures.	○	○	○	○	○	○	○
People should have more lesiure time to spend in relaxation.	○	○	○	○	○	○	○
Any man who is able and willing to work hard has a good chance of succeeding.	○	○	○	○	○	○	○
People who fail at a job have usually not tried hard enough.	○	○	○	○	○	○	○
Life would have very little meaning if we never had to suffer.	○	○	○	○	○	○	○
Hard work offers little guarantee of success.	○	○	○	○	○	○	○
The credit card is a ticket to careless spending.	○	○	○	○	○	○	○
Life would be more meaningful if we had more leisure time.	○	○	○	○	○	○	○
The man who can approach an unpleasant task with enthusiasm is the man who gets ahead.	○	○	○	○	○	○	○
If one works hard enough he is likely to make a good life for himself.	○	○	○	○	○	○	○
I feel uneasy when there is little work for me to do.	○	○	○	○	○	○	○
A distaste for hard work usually reflects a weakness of character.	○	○	○	○	○	○	○

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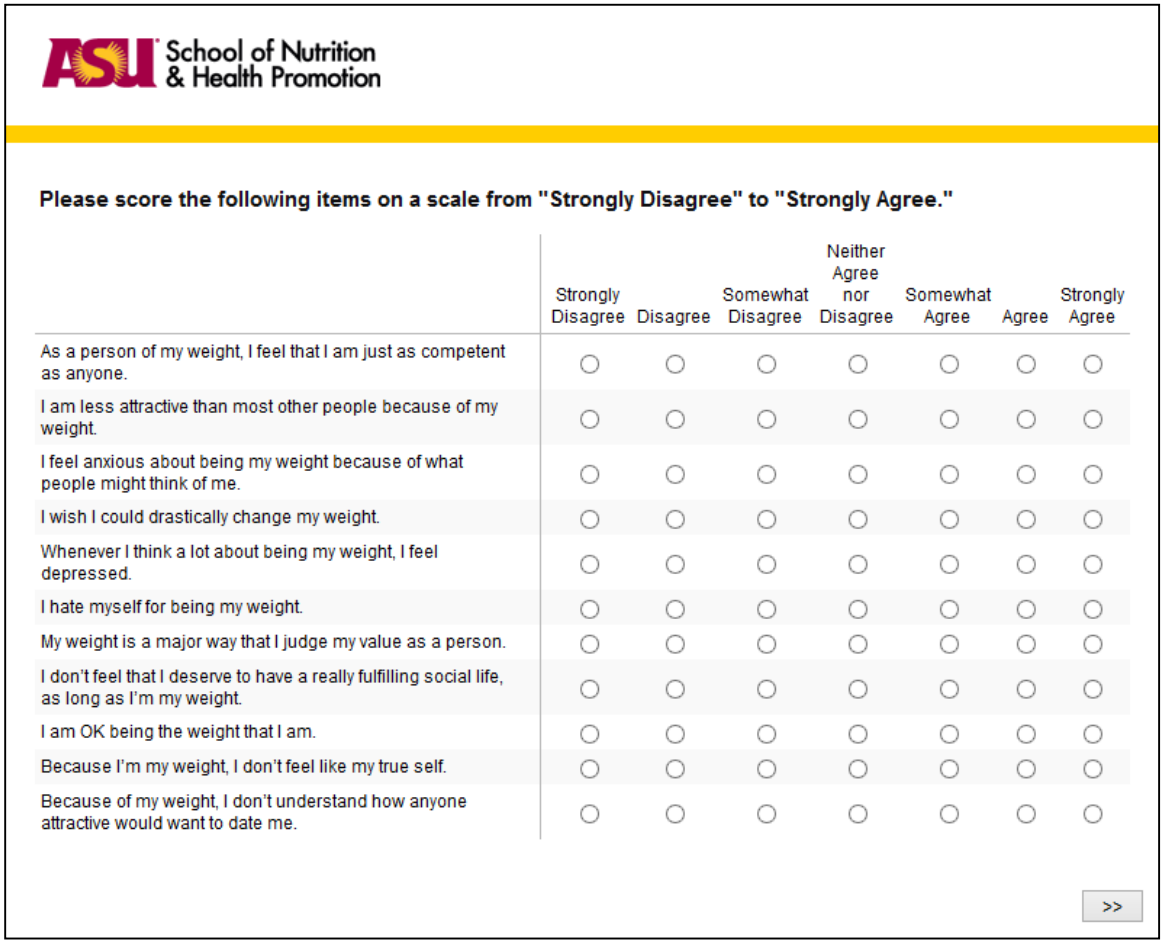
Weight Bias Internalization Scale, modified



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Please score the following items on a scale from "Strongly Disagree" to "Strongly Agree."

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
As a person of my weight, I feel that I am just as competent as anyone.	○	○	○	○	○	○	○
I am less attractive than most other people because of my weight.	○	○	○	○	○	○	○
I feel anxious about being my weight because of what people might think of me.	○	○	○	○	○	○	○
I wish I could drastically change my weight.	○	○	○	○	○	○	○
Whenever I think a lot about being my weight, I feel depressed.	○	○	○	○	○	○	○
I hate myself for being my weight.	○	○	○	○	○	○	○
My weight is a major way that I judge my value as a person.	○	○	○	○	○	○	○
I don't feel that I deserve to have a really fulfilling social life, as long as I'm my weight.	○	○	○	○	○	○	○
I am OK being the weight that I am.	○	○	○	○	○	○	○
Because I'm my weight, I don't feel like my true self.	○	○	○	○	○	○	○
Because of my weight, I don't understand how anyone attractive would want to date me.	○	○	○	○	○	○	○

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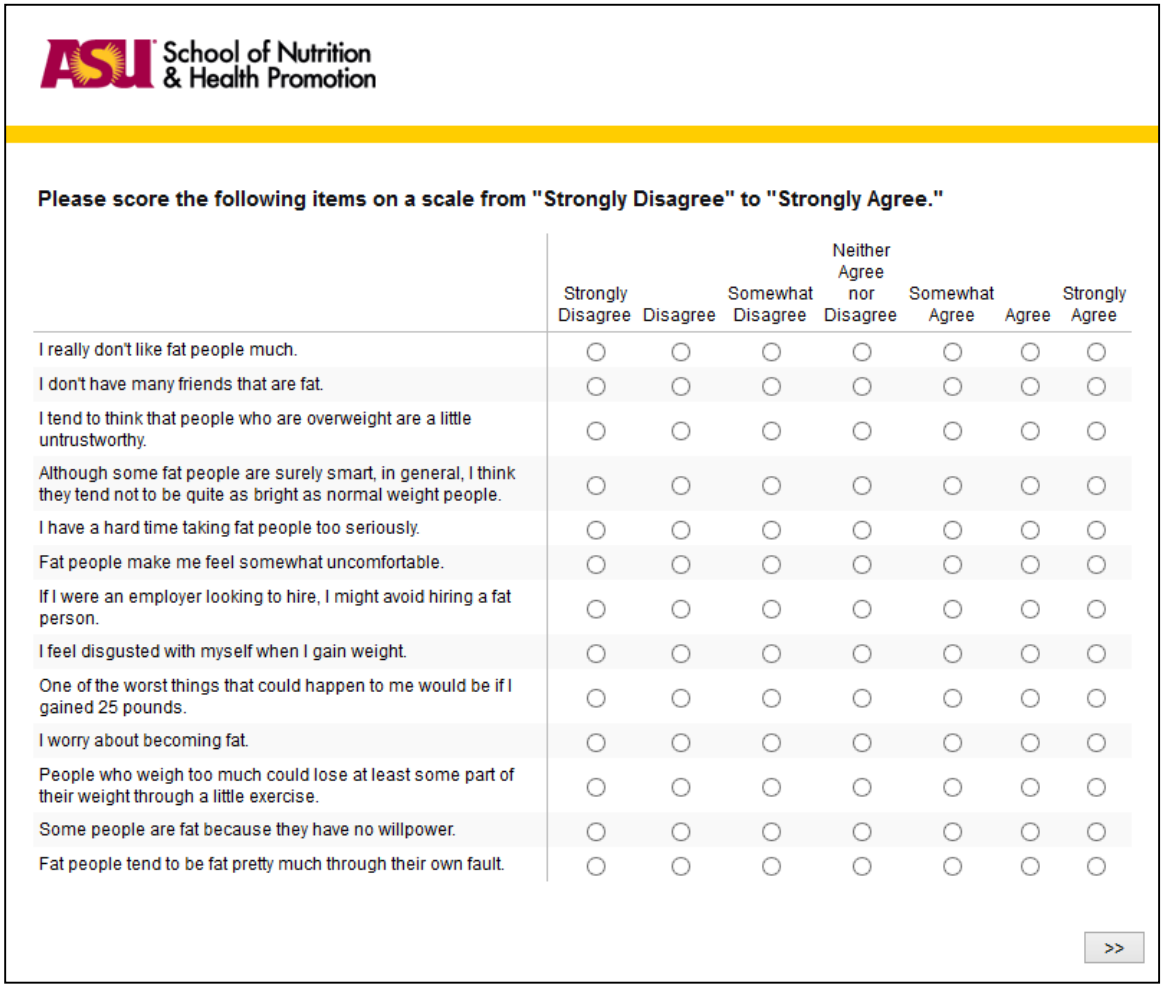
Anti-Fat Attitudes Questionnaire



School of Nutrition & Health Promotion

Please score the following items on a scale from "Strongly Disagree" to "Strongly Agree."

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I really don't like fat people much.	○	○	○	○	○	○	○
I don't have many friends that are fat.	○	○	○	○	○	○	○
I tend to think that people who are overweight are a little untrustworthy.	○	○	○	○	○	○	○
Although some fat people are surely smart, in general, I think they tend not to be quite as bright as normal weight people.	○	○	○	○	○	○	○
I have a hard time taking fat people too seriously.	○	○	○	○	○	○	○
Fat people make me feel somewhat uncomfortable.	○	○	○	○	○	○	○
If I were an employer looking to hire, I might avoid hiring a fat person.	○	○	○	○	○	○	○
I feel disgusted with myself when I gain weight.	○	○	○	○	○	○	○
One of the worst things that could happen to me would be if I gained 25 pounds.	○	○	○	○	○	○	○
I worry about becoming fat.	○	○	○	○	○	○	○
People who weigh too much could lose at least some part of their weight through a little exercise.	○	○	○	○	○	○	○
Some people are fat because they have no willpower.	○	○	○	○	○	○	○
Fat people tend to be fat pretty much through their own fault.	○	○	○	○	○	○	○

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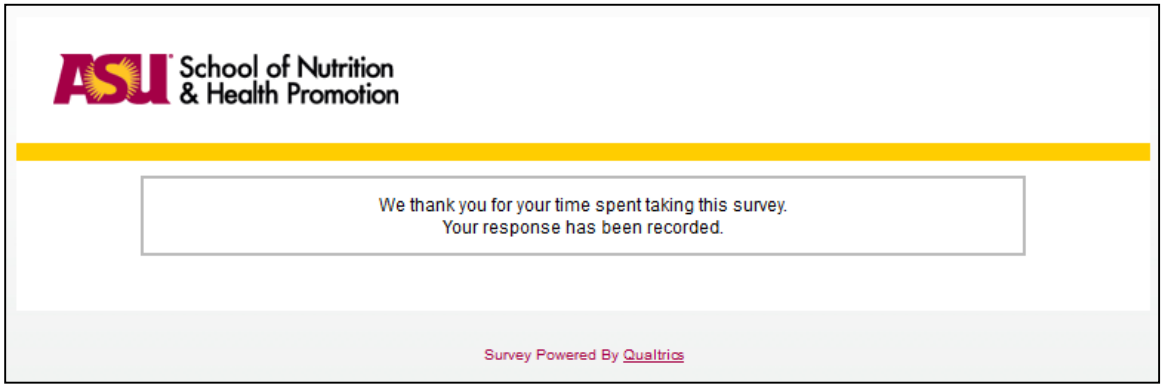
Survey Completion Text



APPENDIX C

IRB APPROVAL ONLINE COMMUNITY PARTICIPATION ANALYSIS

ASU Knowledge Enterprise Development

Office of Research Integrity and Assurance

To:	Eric Hekler
From:	Mark Roosa, Chair Soc Beh IRB
Date:	07/08/2013
Committee Action:	**Renewal**
Renewal Date:	07/08/2013
Review Type:	Expedited F7
IRB Protocol #:	1207008005
Study Title:	[redacted].com Community Participation Analysis
Expiration Date:	08/30/2014

The above-referenced protocol was given renewed approval following Expedited Review by the Institutional Review Board.

It is the Principal Investigator's responsibility to obtain review and continued approval of ongoing research before the expiration noted above. Please allow sufficient time for reapproval. Research activity of any sort may not continue beyond the expiration date without committee approval. Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol on the expiration date. Information collected following suspension is unapproved research and cannot be reported or published as research data. If you do not wish continued approval, please notify the Committee of the study termination.

This approval by the Soc Beh IRB does not replace or supersede any departmental or oversight committee review that may be required by institutional policy.

Adverse Reactions: If any untoward incidents or severe reactions should develop as a result of this study, you are required to notify the Soc Beh IRB immediately. If necessary a member of the IRB will be assigned to look into the matter. If the problem is serious, approval may be withdrawn pending IRB review.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, or the investigators, please communicate your requested changes to the Soc Beh IRB. The new procedure is not to be initiated until the IRB approval has been given.

Please retain a copy of this letter with your approved protocol.

APPENDIX D

IRB APPROVAL FOOD AND MORALITY STUDY

ASU Knowledge Enterprise Development

Office of Research Integrity and Assurance

To:	Eric Hekler
From:	Mark Roosa, Chair Soc Beh IRB
Date:	10/31/2011
Committee Action:	**Exemption Granted**
IRB Action Date:	10/31/2011
IRB Protocol #:	1110007008
Study Title:	Food and morality study

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.

APPENDIX E

PERSUASIVE TACTICS EMAIL

Help out a fellow student!

My name is Janessa, a student like you, working hard to graduate. I am working with professors at ASU on research to better understand **weight, morality, and eating behavior** and I need your help. To help me out, all you need to do is fill out a simple online survey. My friends and I filled it out and it only took us 10-15 minutes and we all found it interesting.

All you need to do is click on the link below and fill out the survey when you have some free time. For example:

- Between classes
- Before you go home for the day
- On your smartphone riding the light rail home
- First thing in the morning
- During your lunch break
- While checking your email

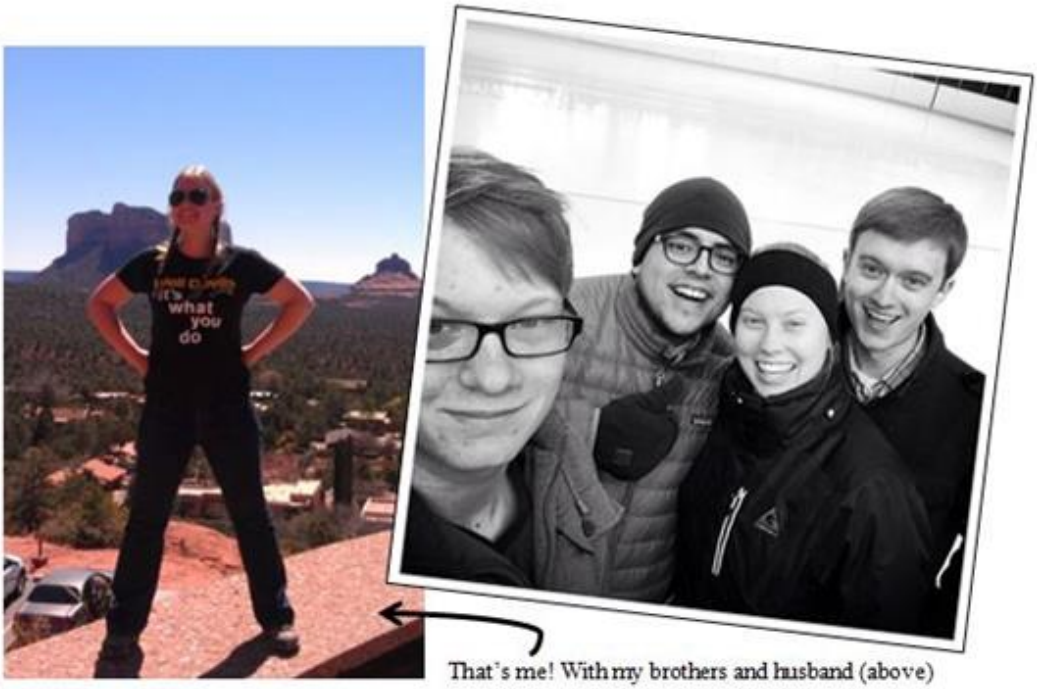
I really need these data to graduate. If possible, please fill this out by **Friday, Feb 28**.

As a thank you for your participation, you will also have my eternal gratitude AND I will send good karma your way.

Here is the link: http://bit.ly/1bm57mZ

Thanks again,

Janessa



That's me! With my brothers and husband (above)

APPENDIX F

IWB INDIVIDUAL POST CODING SCHEME

Coding Scheme Development and Procedures

The development of this coding scheme involved a factor analysis of existing tools used to identify internalized weight bias (IWB). From this, six categories were developed to define IWB for this study.

While the initial purpose of this coding scheme was to be able to identify the single category that best described an individual post, inter-rater reliability was poor and it was determined that this coding scheme would be more effective if used within a binary coding system:

- Posts in which no IWB was identified (as defined in the categories below) received a code of zero (0).
- Posts that fit into any of the six categories below were given a code of one (1).

Description of IWB Categories

1. Personal Failings

Posts that fall into this category consist of statements voicing the individual's perceived personal shortcomings or failings that have led to their weight problems. These inadequacies are blamed for the individual's weight problems and the individual feels shame for these shortcomings. This can be giving in to temptations to eat poorly.

On the other hand, posts that emphasize weight lost as a result of overcoming these personal failings shows that that individual holds these beliefs as well.

Examples:

- I **caused** my weight problems
- I would never have any problems with weight **if I were stronger**
- I became overweight because **I'm a weak person**
- I **don't have enough self-control** to maintain a healthy weight

- I **feel guilty** because of my weight problems

2. What Others Think

Posts within this category focus outward on how the individual perceives that others view or react to his or her struggles related to weight status. These perceptions define whether or not the individual believes that others can/will relate to or empathize with him or her.

On the other hand, posts that voice the idea of others thinking better of the individual after losing weight also show that the individual holds these beliefs.

Examples:

- **People discriminate** against me because I've had weight problems
- **Others are ashamed** to be around me because of my weight
- It's difficult for people who haven't had weight problems **to relate to me**
- **Others will think** I lack self-control because of my weight problems
- **People think** that I am to blame for my weight problems

3. Satisfaction with Current Weight or Appearance

These posts are concerned with the individual's attitudes toward his or her current weight status or physical appearance. It can be a voiced desire to be a different weight, or negative feelings or beliefs these individuals hold either about themselves or that are associated with their weight problems. Posts related to how individuals feel about what others think about them should go here and not in "What Others Think."

Note: for the purposes of this paper, feeling OK with the weight that the individual is at belongs in this category when the individual is at a lower weight than he or she started at, which in the context of individuals seeking weight loss implies that they

were dissatisfied with their original weight.

Examples:

- I wish I could drastically **change my weight**.
- **I feel anxious about** being my weight because of what people might think of me.
- **I am OK** being the weight that I am.
- **I am less attractive** than most other people because of my weight.
- Whenever I think a lot about being my weight, **I feel depressed**.
- Because I'm my weight, I don't feel like **my true self**.
- Because of my weight, I don't understand how **anyone attractive** would want to date me.
- **I hate myself** for being my weight.
- My weight is a major way that I judge **my value as a person**.

4. Personal Abilities, Identity or Potential

Posts that describe the individual's beliefs about his or her chances of fulfilling innate potential or putting their abilities to full use as related to their weight status or physical appearance belong in this category. This includes feeling inspired by other's stories of success. Viewed conversely, statements about ways in which current weight status or physical appearance limit what the individual is capable or deserving of fit here. As opposed to "Personal Failings," which are viewed as the root of the weight problems, these are the larger consequences the individual feels they experience as a result of their specific failings.

On the other hand, posts describing increased opportunities as a result of weight loss also reveal these beliefs.

Examples:

- As a person of my weight, I feel that I am just as **competent** as anyone.
- I don't feel that I deserve to have a really **fulfilling social life**, as long as I'm my weight.

5. Impressions About Others

Posts in this category are related to explicit instead of internalized weight bias. They are the expressed attitudes that in individual holds about people other than themselves whom they see as overweight or obese. As compared to the category "What Others Think," which is what the individual thinks others believe about him or her, this category encompasses statements from the perspective of the individual making judgments about another person based on the other's weight status or physical appearance.

Examples:

- Although some fat people are surely smart, in general, I think they **tend not to be quite as bright** as normal weight people.
- I tend to think that people who are overweight are a little **untrustworthy**.
- I have a hard time taking fat people too **seriously**.
- I really **don't like fat people** much.
- Fat people make me feel somewhat **uncomfortable**.
- If I were an employer looking to hire, I **might avoid hiring** a fat person.
- I don't have many **friends that are fat**.

6. Negative Attitudes About Fat

These posts are specifically about gaining weight or the possibility of gaining weight and how the individual would feel if or when that happens. Compared to "Satisfaction with Current Weight," which is attitudes about the individual's current weight or perceived physical appearance, this category is concerned with more attitudes about more concrete measures of weight status, i.e. gaining weight.

Examples:

- I **worry** about **becoming fat**.
- I **feel disgusted** with myself **when I gain weight**.
- One of the **worst things that could happen** to me would be **if I gained 25 pounds**.

BIOGRAPHICAL SKETCH

Janessa Escajeda grew up in Spokane, WA. She met her husband, Adam, as a freshman at Arizona State University, where she received her Bachelors in Nutrition (Dietetics) with a Minor in French in 2009. She will be receiving her Masters in Human Nutrition, also from Arizona State University, in May 2015.