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Normative Beliefs as a Mediator between Body Dissatisfaction and Disordered Eating

Antonia Jurkovic
Illinois Wesleyan University, ajurkovi@iwu.edu

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Antonia Jurkovic

Illinois Wesleyan University

Marie Nebel-Schwalm, PhD
Faculty Advisor

Abstract

The present study examined the relationship between body dissatisfaction and maladaptive behaviors related to disordered eating. Specifically, normative beliefs for these behaviors were hypothesized to mediate the relationship between body dissatisfaction and maladaptive behaviors. Fifty-one college females were surveyed regarding their body dissatisfaction (using the Photographic Figures Rating Scale), normative beliefs about eating, dieting, and other weight-loss strategies (using a newly created measure, the Disordered Eating Normative beliefs Scale, DENS), as well as disordered eating behaviors (using the EAT-26), BMI, and campus organization affiliations. Comparisons between sorority affiliation and athlete status revealed no significant differences of body dissatisfaction, disordered eating, or BMI values. The mediational model was not supported; however, normative beliefs (via the DENS) were significant independent predictors of maladaptive behaviors. Limitations and future directions are discussed.

Keywords: subclinical disordered eating, body dissatisfaction, normative beliefs, theory of planned behavior, EAT-26, Photographic Figure Rating Scale

Normative Beliefs as a Mediator between Body Dissatisfaction and Disordered Eating

Eating disorders such as anorexia nervosa and bulimia nervosa are associated with significant mental and physical distress that disproportionately affects women more than men. Individuals with an eating disorder may engage in severe restriction of calories, binge eating, purging, and maintain a dangerously low body weight (American Psychological Association, APA, 2000). The proportion of people suffering from these clinical disorders is approximately .5-3% of the population; however, many more experience subclinical levels of these disorders (APA, 2000). In some cases, the number of subclinical presentations has been reported to be twice that of clinical presentations (Shisslak, Crago, & Estes, 1995). These subclinical presentations are referred to in a number of ways including partial eating disorders, subthreshold eating disorders, disordered eating, and eating disturbances (Matthews, Zullig, Ward, Horn, & Huebner, 2012; Mintz & Betz, 1988; Shisslak, Crago, & Estes, 1995; Thompson & Stice, 2001). College women are considered to be especially at increased risk; for example, up to 61% of this age-group report to engage in chronic dieting, binging, purging, or other bulimic behaviors at subclinical levels (Mintz & Betz, 1988).

Although women who are in the subclinical range engage in these behaviors at lower levels of intensity, frequency, and duration than those who meet diagnostic criteria for an eating disorder (Scarano & Kalodner-Martin, 1994), they remain at risk for mental and physical consequences. For example, women who engaged in maladaptive eating practices are at risk for low self-esteem (Littleton & Ollendick, 2003), self-objectification, body shame (Noll & Fredrickson, 1998), low self-efficacy, and depression (Ackard, Croll, & Kearney-Cooke, 2002). These women are also more likely to engage in other risky behaviors such as substance abuse and sexual promiscuity (Fisher, Schneider, Pegler, & Napolitano, 1991). Therefore, despite not

meeting criteria for an eating disorder, efforts are needed to better understand factors related to subclinical levels of disordered eating.

Several factors associated with disordered eating have been identified. These include being female (APA, 2000), young (i.e., adolescence and young adulthood; Shisslak, Crago, & Estes, 1995), having a high BMI (Thompson & Stice, 2001), having perfectionistic tendencies (Stice, 2002; Tylka, 2004), having an internalized thin body ideal (Thompson & Stice, 2001; Thompson, Roehrig, Guarda, & Heinberg, 2004), knowing someone who has an eating disorder (Stice, 2002; Tylka, 2004), believing maladaptive weight loss techniques are safe and effective (Tylka & Subich, 2002), being dissatisfied with one's body (Cooley & Toray, 2001; Klemchuk, Hutchinson, & Frank, 1990; Mintz & Betz, 1988; Tylka, 2004; Stice, 2002), and believing disordered eating behaviors are normative among one's peers (i.e., normative beliefs; Clemens, Thombs, Olds, & Gordon, 2008). Of these risk factors, body dissatisfaction is one of the most well-established in the literature (e.g., Ghaderi & Scott, 2001; Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004), yet not much is known about what might explain the relationship between body dissatisfaction and disordered eating. Despite its strong correlation, not everyone who is dissatisfied with their body image develops disordered eating behaviors. Based on the theory of planned behavior, which states that behavior is preceded by cognitive factors such as positive beliefs about the behavior (Ajzen, 2012), the present study examines whether one's beliefs about the acceptability of maladaptive strategies mediates the relationship between body dissatisfaction and disordered eating. The following sections will review the literature on disordered eating, commonly reported risk factors, and normative beliefs. Lastly, key measurement issues related to normative beliefs are reviewed in the context of disordered eating behaviors.

Disordered Eating

Disordered Eating on a Spectrum

Being concerned with one's body has become relatively common among females in adolescence and young adulthood (Mintz & Betz, 1988: Shisslak et al., 1995: Striegel-Moore, Silberstein, & Rodin, 1989). Some researchers even suggest that disordered eating and related maladaptive weight control techniques are normative for the female college population (Striegel-Moore et al, 1989). This is best understood when placing eating disorders on a continuum rather than as discreet categories (Shisslak et al., 1995; Scarano & Kalodner-Martin, 1994). This dimensional spectrum perspective reflects a trend in the thinking of various psychopathologies as demonstrated by changes to the recently revised DSM-5 (e.g., autism spectrum disorders; APA, 2013). Although it is not a given, it is possible that correlates of these symptoms also vary in their degree of influence. Thus, the ability to assess, prevent, and/or intervene with any dimensionally distributed pathology will depend on research that addresses various points along the spectrum, including subclinical presentations. Although the present study focused on subclinical presentations, we used the literature on eating disorders as well as disordered eating for information about risk factors. Therefore, the following section will address key risk factors for both partial and full syndrome eating disorders.

Risk Factors for Disordered Eating and Eating Disorders

Demographic, weight, and dieting risk factors. There is strong support for age (youth) and gender (being female) as risk factors for disordered eating. Women outnumber men with eating disorders by a ten to one ratio (APA, 2000) and as previously mentioned, adolescent and college-aged women are especially at risk. Thus, it is no surprise that college-aged women have been identified as a key population for the study of eating disturbances, including the onset and

worsening of symptoms (Shisslak et al., 1995). Further, elevated body mass index (BMI) may result in added pressure from family and peers to be thinner and conform to society's ideals, (Stice, 2002; Striegel-Moore et al., 1989). Higher BMI is also associated with increased dieting in general (Thompson & Stice, 2001). Dieting, which is considered to be a risk factor in itself, was also extremely common. In a study of 643 non-eating disordered women, 28.3% of women reported that they engaged in dieting behavior more than once daily, and 54% reported that they engaged in dieting behavior once daily (Mintz & Betz, 1988). Dieting increases the chances of bulimic symptoms since women may begin to engage in binge-eating in order balance their chronic dieting (Thompson & Stice, 2001). One study reported that 82.1% of women wanted to lose at least 10 pounds, even though 67.5% were considered of average weight and 31.2% were considered to be underweight (Heatherton & Striepe, 1997). Thus, many women who engage in these maladaptive weight loss techniques are not dieting due to being at an unhealthy weight; rather, they are dieting because they are unhappy with their bodies.

Personality and emotion-based traits as risk factors. A personality trait that is associated with increased risk for disordered eating is perfectionism, which is associated with a strong drive for maintaining an ideal body by society's standards (Stice, 2002; Tylka, 2004). It is also considered a maintenance factor because this strong drive contributes to the maintenance of various problematic behaviors, such as the rigid binge-purge diet (Stice, 2002). Negative affect is also considered to be a risk factor for disordered eating because individuals may binge-eat in order to seek comfort or use compensatory behaviors in order to reduce anxiety (Stice, 2002). Obsessive-compulsive disorder is also found to be a strong predictor of disordered eating, as well as borderline personality symptoms (Lilenfeld, Jacobs, Woods, & Picot, 2008). Further, in a non-clinical student population, subclinical disordered eating behaviors were correlated with

obsessive-compulsive tendencies (Roberts, 2006) where one third of the sample found to have eating disturbances. Engaging in higher amounts of obsessive-compulsive tendencies was found among those who had higher rates of disordered eating behaviors.

Sociocultural risk factors. In recent years, thin-ideal internalization has been identified as a risk factor (Thompson & Stice, 2001; Thompson et al., 2004). Thompson and Stice (2001) define it as how much an individual believes in society's standards of attractiveness. They believe that it could be a causal factor in the onset of disordered eating, due to the individual attempting to modify their own body to match these standards. The Sociocultural Attitudes towards Appearance Questionnaire, 3rd edition (SATAQ-3) is a self-report measure that assesses these attitudes and beliefs (Thompson et al., 2004). The SATAQ-3 focuses on the internalization of society's standards through media, with internalization defined as "...the incorporation of specific values to the point that they become guiding principles…" Thompson et al. (2004, p. 294). The authors argue that people change their behaviors, due to cognitive beliefs about the norms of society on appearance and size, in order to match these norms (Thompson & Stice, 2001). This mirrors our study's aim in that body dissatisfaction occurs as a result of cognitive beliefs. A meta-analysis of 22 studies found thin-ideal internalization to be correlated with body dissatisfaction with a large effect size (Cafri, Yamamiya, Brannick, & Thompson, 2005). The internalization of a thin-ideal prospectively predicts the behavior rather than only being a consequence of it. Thin-ideal internalization has been found to be a risk factor for the onset of bulimic behaviors, while low thin-ideal internalization has been found as a predictor for the cessation of bulimic behaviors (Stice & Agras, 1998).

The modeling of body image disturbances and disordered eating by a friend or family member is a risk factor for the onset of bulimic symptoms (Stice, 2002). Additionally, Tylka

(2004) tested moderator variables in the body dissatisfaction and eating disorder relationship, and found that knowing someone with an eating disorder was a significant moderator that intensified this relationship.

Cognitions

Safe and effective. Specific cognitions regarding safety of weight loss strategies have also been identified as risk factors. In general, evidence from clinical and social psychological sources have shown that what a person thinks about, and the way a person thinks about something, affects his/her behavior (i.e., cognitive theory; Beck, 1991; theory of planned behavior; Ajzen, 2012). Therefore, it is possible that the attitudes and beliefs a person has about disordered eating practices, including whether they believe these practices to be safe or effective, will predict his/her use of these behaviors. Tylka and Subich (2002) asked women how safe or effective they believed various weight loss strategies were. Examples included skipping meals, taking appetite suppressants, eating less than 1200 calories a day, eliminating carbohydrates or fat, using diuretics, fasting, engaging in heavy exercise, using laxatives, and vomiting after eating. They found that women who participated more in these acts were also more likely to believe that these weight control techniques were safer and more effective than those who did not.

Body dissatisfaction. Body dissatisfaction is a frequently cited risk factor for disordered eating (Cooley & Toray, 2001; Klemchuk et al., 1990; Mintz & Betz, 1988; Tylka, 2004; Stice, 2002). Based on a meta-analytic review, body dissatisfaction was found to be a risk factor for dieting, negative affect, and eating pathology (Stice, 2002), as well as anxiety and a lower quality of life (Cash & Fleming, 2002). It is also thought to be risk factor for the onset of bulimic symptoms, as well as a maintenance factor for bulimic symptoms (Stice, 2002). Effect

sizes for studies regarding body dissatisfaction associated with dieting and eating pathology were medium, whereas effect sizes for body dissatisfaction associated with negative affect were small (Stice, 2002). When comparing groups of anorexic and bulimic women to normal controls, Williamson, Cubic, and Gleaves (1993) found that participants with eating disorders reported that they had larger current body sizes, and desired smaller ideal body sizes.

Normative beliefs. Normative beliefs have been defined differently by emphasizing either the behaviors of one's peers (Clemens et al., 2008) or one's own attitudes, whether it is the reported acceptability of behaviors (Huesmann & Guerra, 1997) or attitudes about eating in general (i.e., *EAT-26,* Garner & Garfinkel, 1979). The Theory of Planned Behavior (Ajzen, 2012) refers to similar constructs but provides alternate terms, where Subjective Norms are most closely related to the peer norms defined by Clemens et al. (2008), and attitudes being the positive or negative evaluation of behaviors as is discussed in Huesmann and Guerra (1997).

One of these definitions of "normative beliefs" reflects the degree to which an individual considers behaviors and attitudes to be acceptable or unacceptable (Huesmann & Guerra, 1997). For example, a study on child aggression showed that children who participated in aggressive behavior were more likely to rate aggressive behavior as more acceptable than children who were less aggressive (Huesmann & Guerra, 1997). How much an individual believes a behavior to be acceptable influences the individual's self-prescribed list of behaviors that are allowed versus those that are forbidden. Participants were given questionnaires assessing aggression by rating items on a scale that ranges from perfectly okay to really wrong ("perfectly okay," "sort of okay," "sort of wrong," and "really wrong"). This assessed whether or not the individual believed these specific behaviors to be acceptable. In the context of this study, the degree to which individuals approve of maladaptive weight loss behaviors and attitudes may influence

whether or not they engage in these behaviors. According to the previous model, a person who is more approving of maladaptive eating (like aggression), will have various maladaptive weight loss behaviors on their self-prescribed list of allowable behaviors.

Others have defined normative beliefs through the assessment of the participant's beliefs about their peer's behaviors. One study that identified peer-based normative beliefs as a risk factor for disordered eating, assessed beliefs via a 44-item questionnaire regarding participants' typical peers and close friends' unhealthy weight loss behaviors (Clemens et al., 2008). They found that perceived peer norms of close friends provided the highest indicator of personal involvement in unhealthy weight control behavior for participants. Therefore, knowing how people rate their close friend's behaviors is helpful in understanding their own risk for these behaviors.

The definition used in this study is closely related to the definition of subjective norms in the Theory of Planned Behavior (TPB; Ajzen, 2012). Subjective norms in TPB are defined as the social pressure perceived by the participant to engage in certain behaviors. In TPB, peer norms are defined by the participant's beliefs on the attitudes of their close friends regarding whether or not they find behaviors to be acceptable (Ajzen, 2012). Instead of asking how often the participant believes a peer engages in a behavior, they are asked whether or not a peer would find the behavior acceptable.

This theory addresses the relationship between attitudes and behaviors. It names three constructs as predictors of behavioral intention, which in turn is a predictor of behavior. The three constructs are attitudes, subjective norms, and perceived behavioral control. Attitudes are defined as an individual's evaluation of whether a behavior is positive or negative (Ajzen, 2012). This closely resembles how we define normative beliefs; that is, as an evaluation about whether a

behavior is acceptable or unacceptable. Although normative beliefs as a risk factor for disordered eating is a relatively new idea, in recent literature there have been studies that have looked at the three constructs of TPB to predict behaviors in eating. For example, one study found that out of the three constructs, attitudes were the strongest predictor of intention, and therefore behavior, in healthy eating behaviors among adolescents (Backman, Haddad, Lee, Johnston, & Hodgkin, 2002). Another study used TPB as a diagnostic screening tool for disordered eating (Pickett et al., 2012). Pickett and colleagues found that attitudes significantly predicted disordered eating and maladaptive weight loss strategies. Attitudes were assessed by items such as "I feel extremely guilty after eating."

Current Study

Key and commonly occurring risk factors for disordered eating and the closely-related literature of eating disorder etiology have been reviewed (Shisslak et al., 1995; Stice, 2002; Tylka, 2004). Factors include emotional distress (e.g., depression, anxiety, and stress), modeling by peers, sex (i.e., being female), and age (i.e., late adolescence). Cognitive factors, such as one's beliefs about whether certain behaviors are normative (Huesmann & Guerra, 1997) have also been shown to influence behaviors, but this has not been well-researched in the disordered eating and related literatures. As mentioned, normative beliefs has been defined differently. Some studies have looked at attitudes as it is defined in the TPB (Ajzen, 2012) as a predictor of eating behaviors, whether healthy (Backman et al., 2012) or unhealthy (Pickett et al., 2012). Clemens and colleagues (2008) defined normative beliefs by asking individuals how often they believed their peers engaged in unhealthy weight loss behaviors and therefore were assessing what the participant believed to be the norm. Although this was useful because peer perceived norms were expected to be highly correlated with individual assessment of norms, studies have

also shown that individual attitudes are a stronger predictor of eating behaviors over peer norms (Backman et al., 2012; Pickett et al., 2012). Further, Picket et al. (2012) looked at whether responses differed when individuals were asked about their own experiences or about how a fictitious character in a vignette would judge various behaviors. Although they expected to find a difference between the two styles such that people would be more inclined to disclose sensitive attitudes via a third-party character versus their own personal beliefs, this was not supported. These studies support the decision to use items that ask the participant directly whether or not they judge a behavior to be acceptable or not.

Although previous research has asked individuals whether or not they felt that maladaptive weight loss behaviors were safe and effective (Tylka & Subich, 2002) and how often they believed their peers engaged in the behavior (Clemens et al., 2008), examples were not found where individuals' attitudes about weight loss behaviors were assessed (i.e., whether they are acceptable or unacceptable). In fact, previously existing measures of this form of normative beliefs in the disordered eating literature were not available. However, a study on aggression did rate individual attitudes, not peer behaviors or the actual frequency of behaviors in question (Huesmann & Guerra, 1997). Normative beliefs were assessed (defined as perceived acceptability of maladaptive weight loss techniques) in an effort to determine whether it helped explain the relationship between body dissatisfaction and levels of disordered eating. By limiting the sample to college women between the ages of 18-22 years, a sample at heightened risk for disordered eating was targeted. The examination of body dissatisfaction was focused on because of its well-known role as a predictor of disordered eating. This study addressed a gap in the literature by using an acceptability-based individual attitudinal scale, and by its attempt to understand the mechanism of the role of body dissatisfaction on disordered eating. It is possible

that the relationship between body dissatisfaction and disordered eating is better understood as a function of the individual's acceptance of maladaptive techniques as normative or acceptable. Specifically, this study hypothesizes that one's normative beliefs about maladaptive practices will mediate the relationship between body dissatisfaction and disordered eating.

The primary goal of this study was to investigate whether the relationship between body dissatisfaction and disordered eating could be better explained in a mediational model. The concept of normative beliefs has not often been applied to issues of disordered eating. When it has been applied to this literature, normative beliefs have sometimes been measured via peer behaviors rather than individual ratings of acceptability (e.g., Clemens et al., 2008). Although constructs similar to normative beliefs have been applied to issues of disordered eating (TPB; Ajzen, 2012), our definition of normative beliefs has not. Normative Beliefs as defined by Huesmann and Guerra (1997) may provide additional information on how college women view maladaptive weight loss techniques through a more direct manner. Thus, the goal of the present study was to determine whether normative beliefs, as defined by Huesmann and Guerra (1997), mediate the relationship between body dissatisfaction and disordered eating behaviors.

Method

Participants

College women were recruited primarily through the introductory courses in psychology available on campus at an undergraduate university, as well as some advanced courses. Other college women were recruited through other campus organizations such as sororities or clubs. Posters and flyers were put up in different buildings on campus, as well as dormitories. Clubs and sororities were sent letters on the nature of the study as well as the importance. Participants recruited through introductory courses in psychology were given credit for participation in the

study, while participants who are members of a sorority were given volunteer hours towards their sororities' requirements, and all other students were entered into a raffle for one of six gift cards (four of which were valued at $10 and two of which were valued at $25). Various posters and flyers were used to recruit female participants.

Questionnaires were completed by 51 female students from Illinois Wesleyan University. Ages ranged from 18 to 22 years old (M = 19.14, SD = 1.15). See Table 1 for racial demographic information as well as sorority and sport-related involvement. The sample was primarily freshmen which comprised 56.9%. Of the remaining participants, 27.5% were sophomores, 5.9% were juniors, and 9.8% were seniors.

Measures

Participants completed several measures, including the *Photographic Figure Rating Scale (PFRS)*, which assesses body image and dissatisfaction (Swami, Salem, Furnham, & Tovee, 2008). In the PFRS, participants view ten images of real women in leotards with varying weights and BMI categories (See Figure 2). These ten images can be separated into 5 different BMI categories such as emaciated, underweight, normal weight, overweight, and obese. Faces are blurred out in the picture to obscure the identities of these women. Participants first pick an image that they feel corresponds to their current body, and then pick an image that is ideal to them. The images are each given a number value with the most emaciated body being a one, and the most overweight image given a 10. Their body image dissatisfaction is then calculated as the discrepancy between what they believe to be their body on the scale and what they wish their body looked like (Swami et al., 2008). The higher the discrepancy is, the higher the amount of body dissatisfaction. For example, if the participant rated their own body as an eight, but wished that their body was a two, this would yield a score of six which would mean high body

dissatisfaction. This measure has been shown to be strongly correlated with drive for thinness, body checking, body image avoidance, internalization of body ideals, and social physique anxiety (Swami et al., 2008). Participants are also asked which body they would like the least, which body they believe men find the most attractive, and which is typical for women their age.

Participants also completed the *EAT-26* as a measure of eating disorder symptomatology (i.e., EAT-26; Garfinkel & Garner, 1979). There are 26 items on this self-report questionnaire assessing disordered eating attitudes and behaviors (see Figure 3). The participant rates the frequency of how often they feel negative attitudes towards eating such as "I am terrified of being overweight" or "I feel that food controls my life." Possible ratings include "always," "usually," "often," "sometimes," "rarely," and "never." Although there are six possible ratings, "never," "rarely," and "sometimes" are typically scored as 0 points. The *EAT-26* has been valuable in assessing disordered eating in a college sample in a non-clinical population (Garner, Olmsted, Bohr, & Garfinkel, 1982). This means it is useful in assessing disordered eating in women who do not qualify for a diagnosable eating disorder, but still participate in abnormal eating behaviors. Because our study was focused on subclinical presentations, rather that adopt the typical scoring method which is important when determining clinically significant problems, we retained a typical Likert value where "never" is 0, "rarely" is 1, "sometimes" is 2, "often" is 3, "usually" is 4, and "always" is 5. Items on the *EAT-26* are divided into three different subscales: dieting, bulimia and food preoccupation, and oral control. The *EAT-26* allows us to see whether disordered eating behaviors are present in the participant, but it does not give answers to the possible psychopathology that gives reason to these behaviors (Garner et al., 1982). Internal consistency was evaluated and Cronbach's alpha was .862.

In addition to the 26 items, the *EAT-26* asks participants for their current height and weight (Garner et al., 1982). Using this information, researchers can calculate each participant's BMI. The *EAT-26* also asks each participant for their highest adult weight, lowest adult weight, and ideal adult weight.

Because no measures were found to assess an individual's normative beliefs of specific maladaptive weight-loss techniques, the *Disordered Eating Normative Scale (DENS)* was created by the authors to assess these cognitions. The *DENS*, a 68-item scale, lists a variety of common weight control techniques that were identified based on existing measures that assess these behaviors, such as the *EAT-26* (Garner et al., 1982), and questionnaires on effectiveness and safety of weight control techniques (Tylka & Subich, 2002; see Figure 4). In addition, unique items were developed that were not solely based on these measures. Behaviors viewed as related to healthy attitudes about food and weight, were included to create a less negatively skewed measure. In contrast to prior measures, the *DENS* asks participants to rate how appropriate or acceptable they believe the techniques are. Specifically, they are asked "Do you believe that it is okay or wrong to…?" This format was adapted from the *Normative Beliefs about Aggression Scale* (NOBAGS; Huesmann & Guerra, 1997). Instead of asking participants to rate these on a 4-point scale ("perfectly okay," "sort of okay," "sort of wrong," and "really wrong"), the *DENS* was expanded to include more options following the format of a 7-point Likert scale. Our measure includes the options, "totally okay," "really okay," "sort of okay," "neither okay nor wrong," "sort of wrong," "really wrong," and "totally wrong." Information regarding the internal consistencies of the various subscales is provided later.

The DENS was analyzed as a composite of unhealthy behaviors. This was comprised of three subscales that represented maladaptive techniques, dieting, and meal avoidance behaviors.

Healthy behaviors were omitted due to the lack of expected association between attitudes of healthy eating habits (e.g., eating vegetables daily) and disordered eating behaviors. Factor analysis requires a minimum sample size of at least 3 participants to every item (Velicer & Fava, 1998), which was not achieved in the present study. However, for exploratory purposes, the items were factor analyzed; please see the Appendix for these results. As a single composite of the three subscales, the Cronbach's alpha for the DENS was .879.

Procedures

Advertising and recruitment of participants proceeded following IRB review and approval of the study. Participants were asked to complete the questionnaires in small groups. Through the use of informed consent, they were given a brief explanation of the study, informed of the voluntary nature of the study, the risks and benefits, and told they could skip any items they wished. They were given a demographic survey that included questions about campus group involvement such as sororities and athletic teams. In addition to the previously mentioned measures, other measures regarding stress, anxiety, depressive symptoms, and substance use screeners were included the packet. However, they are not presented here as they were not directly relevant to this thesis. Participants were given the various measures in the following set order; the demographic questionnaire, the *DENS,* the *PFRS,* and the *EAT-26.* After they completed the survey, they were given a debriefing form as well as a copy of the informed consent to take with them. The debriefing form contained contact information for counseling services on campus, as well as local and national crisis hotline numbers: Providing Access to Help (PATH) and National Eating Disorders Association (NEDA).

Results

Preliminary Analyses

Campus group affiliation. Prior to completing our meditational analysis, we examined whether differences existed across different campus affiliations and rates of body dissatisfaction, disordered eating, and body mass index. Sorority membership status was analyzed regarding body dissatisfaction, disordered eating and BMI. Independent samples *t*-tests that examined body dissatisfaction t (48) = -1.02, p = .31, disordered eating t (49) = -.95, p = .35, and BMI t (48) = .04, p = .97 revealed no significant differences on any of these variables between women in sororities and those who are not. Similarly, athlete status was analyzed. Independent samples *t*-tests regarding body dissatisfaction t (48) = .79, p = .44, disordered eating t (49) = -1.24, p = .22, and BMI t (48) = .82, p= .42 also found no significant differences between athletes and those are not. Please see Table 2 for the means and standard deviations.

BMI, *PFRS* modal and descriptive statistics. Descriptive information regarding participants BMIs (which were calculated based on self-reported height, weight, and age) can be found in Table 3. Two participants (4%) had BMIs in the underweight category (which is 18.5 and below), nine participants (18%) were in the overweight category (25.0-29.9), and two (4%) were in the obese category (30.0 and above). The remaining 37 participants (74%) were in the normal weight category (one participant did not complete this information).

The modal rating for ideal body image on the *PFRS* was body image #3, which is considered underweight by the authors. The mode for the body women felt they currently had was body image #4, which is also considered to be underweight. In our sample 12% reported their ideal body desired to be image number 2 which is identified by the authors of the scale as belonging in the emaciated category (Swami et al., 2008). Regarding which body men most

likely were to desire, 20% of the participants reported image number 2 on the *PFRS*. Although body image 1 is severely emaciated, 80% of women report body image 10 as their least desired body which is considered by the authors as obese. Please see Table 3 for further results.

***EAT-26* descriptive statistics.** The *EAT-26* requested information on participant's current, ideal, lowest, and highest adult weights. A third of the sample (35%) reported their ideal weights to be lower than their lowest adult weight. These women were identified as a possible at risk group and additional analyses were performed. In an independent samples *t*-test, women who reported desiring a lower weight than the lowest weight in their adult lives reported having higher body dissatisfaction (M = 1.78, SD = 1.31) than those who did not (M = .82, SD = .67); t (44) = -3.27, p = .002. These women also engaged in disordered eating behaviors more frequently (M = 41.77, SD = 10.25) when compared to women who did not report this discrepancy (M = 32.21, SD = 14.41); t (45) = -2.44, p = .019. These women also reported higher BMIs (M = 24.24, SD = 3.49) than those who did not (M = 21.76, SD = 2.09); t (45) = -3.05, p = .004.

Mediation Analysis

Step 1. Mediation is normally conducted in the instance where the relationship between the predictor and the outcome variable is very strong (Baron & Kenny, 1986). Following an examination of the correlational relationship of the predictor, mediator and criterion variables (see Table 4), mediation was conducted in four steps with three simple regressions and one multiple regression. In the first regression, the predictor must significantly predict the outcome variable which forms path A (as shown in Figure 1). In our model, path A is the relationship between body dissatisfaction and disordered eating and is well supported in literature (Cooley & Toray, 2001; Klemchuk et al., 1990; Mintz & Betz, 1988; Tylka, 2004; Stice, 2002). In this

study, the *PFRS* was used to represent our construct of body dissatisfaction (Swami et al., 2008), while the *EAT-26* measured our construct of disordered eating (which is also referred to as maladaptive behaviors; Garner et al., 1982). As mentioned previously, the scoring of the *EAT-26* was modified to fit our current study and hypotheses on subclinical levels of disordered eating. Since the *EAT-26* can be used diagnostically, the original scoring reflects the criteria of a clinically significant level of an eating disorder (Garner et al., 1982) and conflates lower frequency responses. Instead, subclinical levels of maladaptive behaviors were represented and a 0-5 point scaled score was utilized (1 point given to those who reported "rarely"). Maladaptive behaviors regressed onto body dissatisfaction, so that higher body dissatisfaction predicted higher levels of engaging in maladaptive behaviors (please see Table 5). It is important to note that even when scoring was kept to the original scoring suggested by Garner et al. (1982), path A was still significant.

Step 2. Path B represents the pathway between body dissatisfaction and normative beliefs, and the second step in our mediational analysis. Normative beliefs as a construct was represented by the composite score of three subscales of the *DENS*: maladaptive techniques, dieting behaviors, and meal avoidance. Healthy habits were not included due to not being highly correlated with the three other subscales (see Table A2). In a mediation model, path B must show the mediator variable regressing onto the predictor variable (Holmbeck, 1997). Lower composite scores on the *DENS* reflect greater dysfunction due to participants rating maladaptive items as more "okay". However, normative beliefs did not regress onto body dissatisfaction.

Step 3. In the third step of the mediation model, the outcome variable regresses onto the mediator variable (Holmbeck, 1997). Path C represents this pathway between the mediator variable (normative beliefs) and the outcome variable (maladaptive behaviors). When we

regressed maladaptive behaviors onto normative beliefs, results were significant. Participants that rated maladaptive techniques as "okay" via normative beliefs were more likely to report engaging in these techniques.

Step 4. In the final step, both predictor and mediator variables are entered into the model to see whether the mediator significantly predicts the criterion variable while controlling for the original predictor variable (Holmbeck, 1997). Thus, in the present study, normative beliefs must significantly predict maladaptive behaviors even when body dissatisfaction is included as a predictor, while the relationship between body dissatisfaction and the criterion variable becomes non-significant. Referring to Figure 1, the relationship in path A must become non-significant, while paths B and C remain significant. Because path B did not achieve significance, and path A did not become non-significant, mediation cannot be claimed.

Discussion

Our hypothesis that normative beliefs would mediate the relationship between body dissatisfaction and maladaptive behaviors was not supported. However, normative beliefs did significantly predict maladaptive behaviors; as did body dissatisfaction. There are many possible reasons for this finding. One is that the mediation relationship does not exist; however, it is possible that this relationship does exist, but was not able to be observed in the present study. This could be due to small sample size and the fact that a newly created measure of normative beliefs (i.e., *DENS*) was utilized rather than a well-established measure. Another possible explanation for the lack of mediation was the way in which normative beliefs was assessed. We opted for a direct assessment of individual attitudes, whereas other researchers have asked about peers and close friends. Perhaps when someone is asked about their own opinions directly, issues of social desirability or demand characteristics play a role in the responses. For example, maybe

it is easier to admit that one's friends think it is okay to restrict calories than one's own views on this behavior. Future studies could include both types of questions to assess whether framing the questions less directly yields different information.

Additionally, there were no differences among student sorority affiliation and athlete status among body dissatisfaction, disordered eating, or body mass index. This is contrary to previous findings regarding sorority women that report higher levels of disordered eating and risk factors associated with not only those within sororities, but those who planned on joining sororities as well (Basow, Foran, & Bookwala, 2007). Also, the longer women lived in sorority houses, the longer they participated in bulimic behaviors. A review of the literature regarding athletes has been inconsistent (Klasey, 2009), with some studies reporting athletes as an at risk population and other studies finding no differences**.** It is possible that we did not see significant differences in athlete status because all sports affiliations were analyzed together. Some athletes may be more at risk for disordered eating than others due to demands of the sport they are involved in. Greenleaf, Petrie, Carter, & Reel (2009) found that although percentages of clinical eating disorders were low, one-third of their sample were symptomatic at a subclinical level. This did not differ from the non-athlete college population. Both samples of athletes and sorority women did not differ from those who did not participant in these activities, but this could be due to a lack of adequate power. It is possible that with a larger sample size, alternate trends could emerge.

Limitations. Due to an insufficient number of participants, this study lacked enough power for factor analyses to be carried out in a manner consistent with "best practices" (Velicer & Fava, 1998). Therefore, results of factor analysis may differ greatly following analysis with a more appropriate sample size. Another limitation is the use of self-report in reporting the

frequency of maladaptive behaviors. Since all of the measures were self-reported, there is the possibility that responses across all three measures were not objectively accurate. Although self-report has been cited in the disordered eating literature as an accurate manner in which to measure weight (Roth, Allshouse, Lesh, Polotsky, & Santoro, 2013; Brener, McManus, Galuska, Lowry, & Wechsler; 2003), it is possible that the sensitivity of the subject matter created reasons for participants to not answer questions honestly. Due to secrecy being a key feature of eating disorders when regarding symptoms, people are less likely to self-disclose personal information about this topic (Perry et al., 2002). Obtaining additional informants or objective measures would help assess this issue. Also, in general, denial may play a role in how people respond to questions about risky behaviors and attitudes. For example, women may engage in maladaptive eating disordered behaviors (as measured by the *EAT-26*) but not connect their own behavior with the behaviors being asked about on that questionnaire. Garner et al. (1982) reported denial being a possible limitation in the *EAT-26.* Further, there could be a lack of synchronicity between having a negative view of a maladaptive behavior (i.e., as rated on the *DENS*) and engaging in the behavior none-the-less (as measured with the *EAT-26*). This could play into similarly related limitations of the Theory of Planned Behavior as outlined by Ajzen (2011). Participants' perceived behavioral intentions can be poor predictors of behavior, such that participants report that they will behave in one manner, but behave in another. This can be explained by low behavioral control, or the ability of a person to overcome impulses (Ajzen, 2011). In relation to our study, participants may rate that they know certain maladaptive techniques are unhealthy and/or risky, but be unable to overcome the desire to perform them.

Body dissatisfaction did not significantly predict normative beliefs, but this could be due either to the previously discussed limitations of the *DENS* and to our use of the *PFRS* to define

our construct of body dissatisfaction. It is possible that there are better ways to examine body dissatisfaction. For example, our measure did not assess dissatisfaction with specific body parts, but rather with body shape as a whole. Also when viewing our preliminary analyses, it is possible that women who report desiring to be a weight that they had never achieved as an adult (i.e., ideal weight being lower than their lowest adult weight), may be especially at risk for disordered eating. Further, when asked which body image women felt that men most desired, 20% chose an emaciated body. Another study found that both women and men had incorrect perceptions of what body shape was ideal for the opposite sex (Fallon & Rozin, 1988). Tylka and Subich (2002) proposed that this could be another measure of body dissatisfaction because female participants who felt that women "should diet" could be at higher risk for disordered eating.

Although the *EAT-26* is one of the most widely used measures in diagnosing eating disorders in a non-clinical setting, limitations have been reported (Ocker, Lam, Jensen, & Zhang, (2007). The *EAT-26* combines many theoretical constructs in one measure. For example, food consumption behaviors (i.e., vomiting, feeling guilty after eating) are presented with perception of body shape (i.e., preoccupied with being thin). The *EAT-26* was cited as being useful in subclinical populations (Garner et al., 1982), but scoring of the measure did not reflect this. In an attempt to correct for this limitation, scoring was modified to reflect more subclinical populations; however, this new scoring technique has not been validated in other studies and may be considered a limitation. Similar to the *EAT-26,* the *DENS* may present too many constructs in one measure due to maladaptive behaviors being presented alongside with healthy habits. Although it could be considered a limitation, this was intentionally done in an attempt to create a balance between negative and positive items. Due to the nature of measuring normative

beliefs, too many negative items being placed together was avoided in an attempt to prevent priming each participant to rate certain items as "wrong" simply due to association. Instead, negative and positive items were mixed in order to increase the likelihood that participants would carefully read each item before responding to them along the 7-point likert scale.

Strengths. This study examined an area of the literature not well-understood and targeted an appropriate demographic (i.e., female college students) given the increased risk among this age-group. Should additional studies be conducted that correct the limitations of the newly created measure, the role of normative beliefs may be shown to play an important role in the relationship between body dissatisfaction and disordered eating. This could have important implications on current counseling prevention and treatment programs. For example, Dotson, Matsuda, and Cohen (2011) found that disordered eating was not highly correlated with a strong recognition of need for seeking professional help. They found that college women who engaged in risky behaviors did not think their problem was serious enough to require professional help. Thus, women who are more accepting or approving of these maladaptive strategies underestimated the severity of their symptoms. These authors recommended that counseling programs target this normalization of eating disordered cognitions in treatment. Attempting to change these beliefs could improve appropriate treatment-seeking behavior for individuals at risk.

Future Studies. Future studies should explore the psychometric properties of the *DENS* using a larger sample size. Ideally, the factor analysis would need to be completed with a ratio of at least three participants for every item to examine the factor structure (or a higher ratio). Also, evidence of validity could be examined by comparing the *DENS* with closely related measures, such as the peer-rating measure of normative beliefs.

Additional measures other than the *EAT-26* could be utilized, particularly ones that are specific to subclinical populations. If these cannot be found, measures should be modified to include less extreme maladaptive behaviors such as skipping meals or dieting before events that may be uniquely associated with subclinical presentations. Future studies could also attempt to measure body dissatisfaction by other methods by viewing discrepancies between current and ideal weights, ideal weights and lowest adult weights, as well as gender role expectations. As previously mentioned, comparing peer norms with individual norms would generate important information regarding the best way to assess normative beliefs on disordered eating and related maladaptive behaviors. It is possible that a peer norms approach, as is outlined by Ajzen (2012), may provide more information on the participant's habits. Also, reducing the reliance of self-report in future studies is recommended. One example is to objectively measure one's BMI. Also, perhaps obtaining informants other than the participant, such as a close friend or family member, would be an important contribution. Clearly, more is needed in order to help accurately identify, and potentially intervene with women who show signs of disordered eating. The risk of these women developing more severe maladaptive behaviors, including clinically significant eating disorders, is a real concern. If we can accurately identify individuals at risk, but who have yet to develop an eating disorder, the opportunity for early intervention exists and could potentially prevent the onset of a severe clinical disorder.

References

Ackard, D., Croll, J., & Kearney-Cooke, A. (2002). Dieting frequency among college females: Association with disordered eating, body image, and related psychological problems. Journal of Psychosomatic Research, 52(3), 129-136.

Ajzen, I. (2011). The theory of planned behavior: Reactions and reflections. *Psychology & Health*, *26*(9), 1113-1127. doi:10.1080/08870446.2011.613995

Ajzen, I. (2012). The theory of planned behavior. In P. A. M. Lange, A. W. Kruglanski & E. T. Higgins (Eds.), *Handbook of theories of social psychology*, *1,* 438-459.

Ajzen, I., & Fishbein, M. (1972). Attitudes and normative beliefs as factors influencing behavioral intentions. *Journal of Personality & Social Psychology*, *21*(1), 1-9.

American Psychiatric Association, (2000). Diagnostic and statistical manual of mental disorders (4th ed., text rev.). Washington, DC: American Psychiatric Publishing.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.

Backman, D., Haddad, E., Lee, J., Johnston, P., & Hodgkin, G. (2002). Psychosocial predictors of healthful dietary behavior in adolescents. *Journal of Nutrition Education & Behavior*, *34*(4), 184-193.

Baron, R. M., & Kenny, D. A. (1986). The Moderator -- Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality & Social Psychology, 51(6),* 1173-1182.

Basow, S.A., Foran, K. A., & Bookwala, J. (2007). Body objectification, social pressure, and disordered eating behavior in college women: The role of sorority membership. *Psychology of Women Quarterly, 31*(4), 394-400.

Beck, A. (1991). Cognitive therapy: A 30- year retrospective. *American Psychologist, 46,* 368-375.

Brener, N. D., McManus, T., Galuska, D. A., Lowry, R., & Wechsler, H. (2003). Reliability and validity of self-reported height and weight among high school students. *Journal of Adolescent Health, 23*, 281-287.

Cafri, G., Yamamiya, Y., Brannick, M., & Thompson, J. K. (2005). The influence of sociocultural factors on body image: A meta-analysis. *Clinical Psychology: Science and Practice, 12,* 421-433.

Cash, T. F., & Fleming, E. C., (2002). The impact of body-image experiences: Development of the Body Images Quality of Life Inventory. *International Journal of Eating Disorders, 31,* 455-460.

Clemens, H., Thombs, D., Olds, R., & Gordon, K. (2008). Normative beliefs as risk factors for involvement in unhealthy weight control behavior. *Journal of American College Health*, *56*(6), 635-641.

Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology, 28*, 1429-1464.

Cooley, E., & Toray, T. (2001). Body image and personality predictors of eating disorder symptoms during the college years. *International Journal of Eating Disorders*, *30*(1), 28-36.

DeVillis, R. (2012). *Scale Development: Theory and Applications* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Dotson, K. B., Masuda, A., & Cohen, L. L. (2011). Disordered eating cognitions as predictors of attitudes toward seeking professional psychological services. *International Journal for the Advancement of Counseling*, *33*(4), 225-234.

Fallon, A., & Rozin, P. (1988). Body image, attitudes to weight, and misperceptions of figure preferences of the opposite sex: A comparison of men and women in two generations. *Journal of Abnormal Psychology, 97,* 342-345.

Fisher, M., Schneider, M., Pegler, C, & Napolitano, B. (1991). Eating attitudes, health-risk behaviors, self-esteem, and anxiety among adolescent females in a suburban high school. Journal of Adolescent Health, *12,* 377-384.

Floyd, F. J., & Widaman, K. F., (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7,* 286-299.

Garner, D.M. & Garfinkel, P.E., 1979, *Psychological Medicine*, *9*, 273-279.

Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The eating attitudes test: Psychometric features and clinical correlates. *Psychological Medicine, 12,* 871-878.

Ghaderi, A., & Scott, B. (2001). Prevalence, incidence, and prospective risk factors for eating disorders. *Acta Psychiatrica Scandinavica*, *104*(2), 122.

Gorsuch, R. L. (1983). *Factor analysis* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

Greenleaf, C., Petrie, T. A., Carter, J., & Reel, J.J. (2009). Female collegiate athletes: Prevalence of eating disorders and disordered eating behaviors. *Journal of American College Health, 57*(5), 489-496.

Guadagnoli, E., & Velicer, W. F. (1988). Relation to sample size to the stability of component patterns. *Psychological Bulletin, 103,* 265-275.

Heatherton, T. F., & Striepe, M. (1997). A 10-year longitudinal study of body weight, dieting, and eating disorder symptoms. *Journal of Abnormal Psychology*, *106*(1), 117.

Holmbeck, G. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Examples from the child-clinical and pediatric psychology literatures. *Journal of Consulting and Clinical Psychology*, *65*(4), 599-610.

Huesmann, L., & Guerra, N. G. (1997). Children's normative beliefs about aggression and aggressive behavior. *Journal of Personality & Social Psychology*, *72*(2), 408-419.

Jacobi, C., Hayward, C., de Zwaan, M., Kraemer, H. C., & Agras, W. (2004). Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychological Bulletin, 130*(1), 19-65. doi:10.1037/0033-2909.130.1.19

Klasey, N. (2009). Review of the literature regarding female collegiate athletes with eating disorders and disordered eating. *Online Submission.*

Klemchuk, H. P., Hutchinson, C. B., & Frank, R. I. (1990). Body dissatisfaction and eating-related problems on the college campus: Usefulness of the Eating Disorder Inventory with a nonclinical population. *Journal of Counseling Psychology, 37,* 297-305.

Likert, R. (1932). A Technique for the Measurement of Attitudes. *Archives of Psychology*, 140, 1–55.

Lilenfeld, L., Jacobs, C., Woods, A., & Picot, A. (2008). A prospective study of obsessive-compulsive and borderline personality traits, race and disordered eating. *European Eating Disorders Review*, *16*(2), 124-132.

Littleton, H.L., & Ollendick, T. (2003). Negative body image and disordered eating behavior in children and adolescents: What places youth at risk and how can these problems be prevented? *Clinical Child and Family Psychology Review, 6(1),* 51-66.

Matthews, M., Zullig, K. J., Ward, R., Horn, T., & Huebner, E. (2012). An Analysis of Specific Life Satisfaction Domains and Disordered Eating among College Students. *Social Indicators Research*, *107*(1), 55-69.

Mintz, L. B., & Betz, N. E. (1988). Prevalence and correlates of eating disordered behaviors among undergraduate women. *Journal of Counseling Psychology*, *35*(4), 463-71.

Noll, S. M., & Fredrickson, B.L. (1998). A mediational model linking self-objectification, body shame, and disordered eating. *Psychology of Women Quarterly, 22,* 623-636.

Ocker, L. B., Lam, E. C., Jensen, B. E., & Zhang, J. J. (2007). Psychometric properties of the Eating Attitudes Test. *Measurement in Physical Education & Exercise Science*, *11*(1), 25-48.

Perry, L., Morgan, J., Reid, F., Brunton, J., O'Brien, A., Luck, A., & Lacey, H. (2002). Screening for symptoms of eating disorders: Reliability of the SCOFF screening tool with written compared to oral delivery. *Wiley Interscience, 32,* 466-472.

Pickett, L. L., Ginsburg, H. J., Mendez, R. V., Lim, D. E., Blankenship, K. R., Foster, L. E…& Sheffield, S. B. (2012). Ajzen's theory of planned behavior as it relates to eating disorders and body satisfaction. *North American Journal of Psychology, 14*(2), 339-354.

Roberts, M. E. (2006). Disordered eating and obsessive-compulsive symptoms in a sub-clinical student population. *New Zealand Journal of Psychology*, *35*(1), 45-54.

Roth, L., Allshouse, A., Lesh, J., Polotsky, A., & Santoro, N. (2013). The correlation between self-reported and measured height, weight, and BMI in reproductive age women. *Maturitas*, *76*(2), 185-188. doi:10.1016/j.maturitas.2013.07.010

Scarano, G. M., & Kalodner-Martin, C. R. (1994). A description of the continuum of eating disorders: Implications for intervention and research. *Journal of Counseling & Development*, *72*(4), 356-361.

Shisslak, C. M., Crago, M., & Estes, L. S. (1995). The spectrum of eating disturbances. *International Journal of Eating Disorders*, *18*(3), 209-219.

Stice, E. (2002). Risk and maintenance factors for eating pathology: a meta-analytic review. *Psychological Bulletin*, *128*(5), 825-848.

Stice, E., & Agras, W. S. (1998). Predicting onset and cessation bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy*, 29 (2), 257–276.

Striegel-Moore, R. H., Silberstein, L. R., Frensch, P., & Rodin, J. (1989). A Prospective Study of Disordered eating among College Students. *International Journal of Eating Disorders*, *8*(5), 499-509.

Swami, V., Salem, N., Furnham, A., & Tovee, M. J. (2008). Initial examination of the validity and reliability of the female Photographic Figure Rating Scale for body image assessment. *Personality and Individual Differences, 44,* 1752-1761.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using Multivariate Statistics* (4th ed.). Needham Heights, MA: Allyn & Bacon.

Thompson, J., & Stice, E. (2001). Thin-Ideal Internalization: Mounting Evidence for a New Risk Factor for Body-Image Disturbance and Eating Pathology. *Current Directions in Psychological Science (Wiley-Blackwell)*, *10*(5), 181.

Thompson, J., P, Roehrig, M., Guarda, A., & Heinberg, L. (2004). The sociocultural attitudes towards appearance scale-3 (SATAQ-3): development and validation. *International Journal of Eating Disorders*, *35*(3), 293-304.

Tylka, T. L., & Subich, L. (2002). Exploring young women's perceptions of the effectiveness and safety of maladaptive weight control techniques. *Journal of Counseling & Development*, *80*(1), 101.

Tylka, T. L. (2004). The relation between body dissatisfaction and eating disorder symptomatology: An analysis of moderating variables. *Journal of Counseling Psychology*, *51*(2), 178-191.

Velicer, W. F., & Fava, J. L. (1998). Effects of variable and subject sampling on factor pattern recovery. *Psychological Methods, 3,* 231-251.

Williamson, D. A., Cubic, B. A. & Gleaves, D. H. (1993). Equivalence of body image disturbances in anorexia and bulimia nervosa. *Journal of Abnormal Psychology, 102*, 177-180.

Zwick, W. R., & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin, 99,* 432-442.

Table 1

Demographic Information and Campus Involvement

	N	%
Race		
African-American	0	0.0
Asian-American	3	5.9
Caucasian	41	80.4
Hispanic	4	7.8
Other	2	3.9
Sorority affiliation		
Yes	24	47.1
No	27	52.9
Sports affiliation		
Yes	17	33.3
No	34	66.7

Note. Women who said that they had at some point in time been involved in a sorority or a sport were categorized similarly to women who are currently involved in a sorority or sport.

Table 2

Means and Standard Deviations of Key Variables among Sorority Affiliation and Athlete Status

	Body Dissatisfaction	Disordered Eating Behaviors	BMI
Sorority Affiliation			
Yes	1.37 (1.17)	38.04 (14.09)	22.86 (3.53)
No	1.07 (0.89)	34.52 (12.48)	22.90 (2.48)
Athlete Status			
Yes	1.06 (0.83)	39.41 (14.60)	23.14 (3.03)
No	1.30 (1.13)	34.56 (12.43)	22.40 (2.90)

Note. All results were not significant, $p > .05$. Body dissatisfaction was measured using the Photographic Figure Ratings Scale (PFRS). The PFRS has been reproduced with permission. Swami, V., Salem., Furnham, A., & Tovee, M. J. (2008). Initial examination of the validity and reliability of the female Photographic Figure Rating Scale for body image assessment. *Personality and Individual Differences, 44,* 1752-1761. Disordered eating behaviors were measured using the EAT-26. The EAT-26 has been reproduced with permission, Garner et al., (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. *Psychological Medicine*, 12, 871-878. BMI was calculated with information obtained in the EAT-26.

Table 3

Descriptive Statistics for BMI and the Photographic Figures Rating Scales

	Mean (SD)	Mode	Minimum	Maximum
BMI	22.89 (2.98)	18.79	16.64	31.61
PFRS				
Current body figure	4.47 (1.45)	4	2	9
Ideal body figure	3.28 (.73)	3	2	5
Least desired body figure	8.94 (2.72)	10	1	10
Most likely to appeal to men	3.20 (.80)	3	2	5
Typical for women my age	4.39 (1.10)	4	1	7

Note. The PFRS numbers refer to pictures of body shapes ranging from underweight (1) to overweight (10).

Table 4

Correlation of variables

	Body Dissatisfaction	DENS composite
EAT-26		
Pearson Correlation	.44**	-.30*
DENS composite		
Pearson Correlation	-.01	

** p < .01 (2-tailed).

* p < .05 (2-tailed).

Table 5

Mediation Results

	Predictor	DV	Adjusted R^2	β	*p*-value
Step 1	Body Dissatisfaction	Maladaptive Behaviors	.178	0.441	.001
Step 2	Body Dissatisfaction	Normative Beliefs	-.019	-0.042	.772
Step 3	Normative Beliefs	Maladaptive Behaviors	.066	-0.291	.038
Step 4	Body Dissatisfaction	Maladaptive Behaviors	.236	0.430	.001
	Normative Beliefs			-0.269	.036

Note. High scores on Body Dissatisfaction indicate a person is more dissatisfied with their body image. It was measured with the Photographic Figures Rating Scale. High scores on Maladaptive Behaviors indicate the individual is more likely to report using unhealthy strategies regarding food intake and related behaviors. This was measured with the EAT-26. High scores on Normative Beliefs indicate disapproval of maladaptive behaviors and are measured by the DENS composite score.

Figure 1. Paths A, B, and C shown in a mediational model.

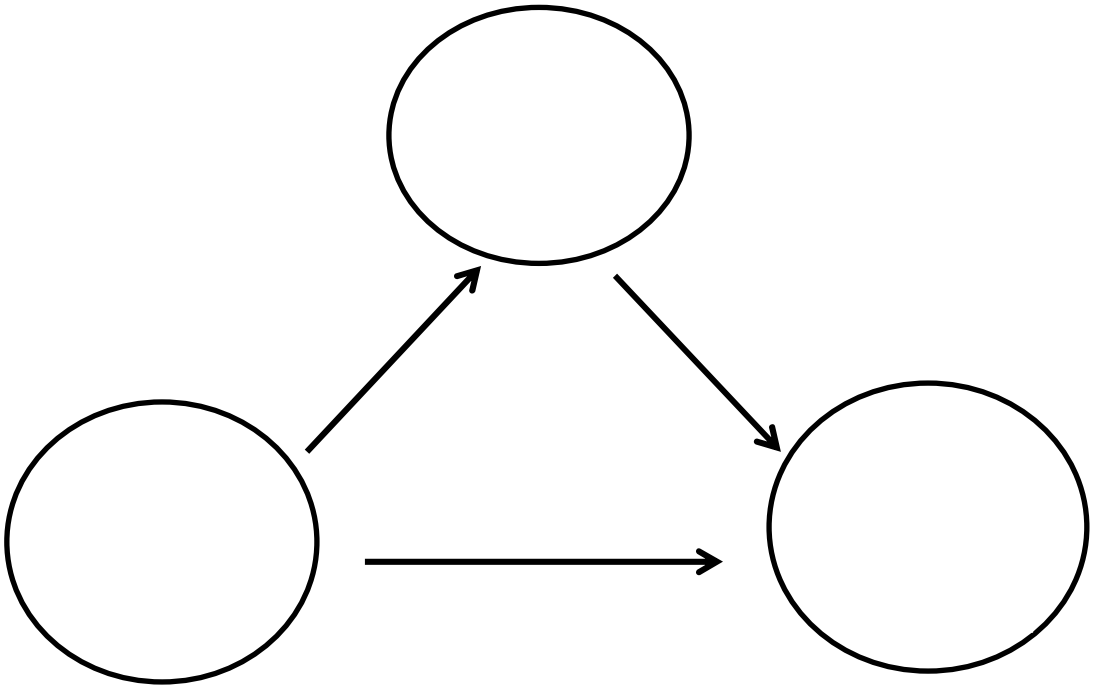


Figure 2. Photographic Figures Rating Scale (PFRS)

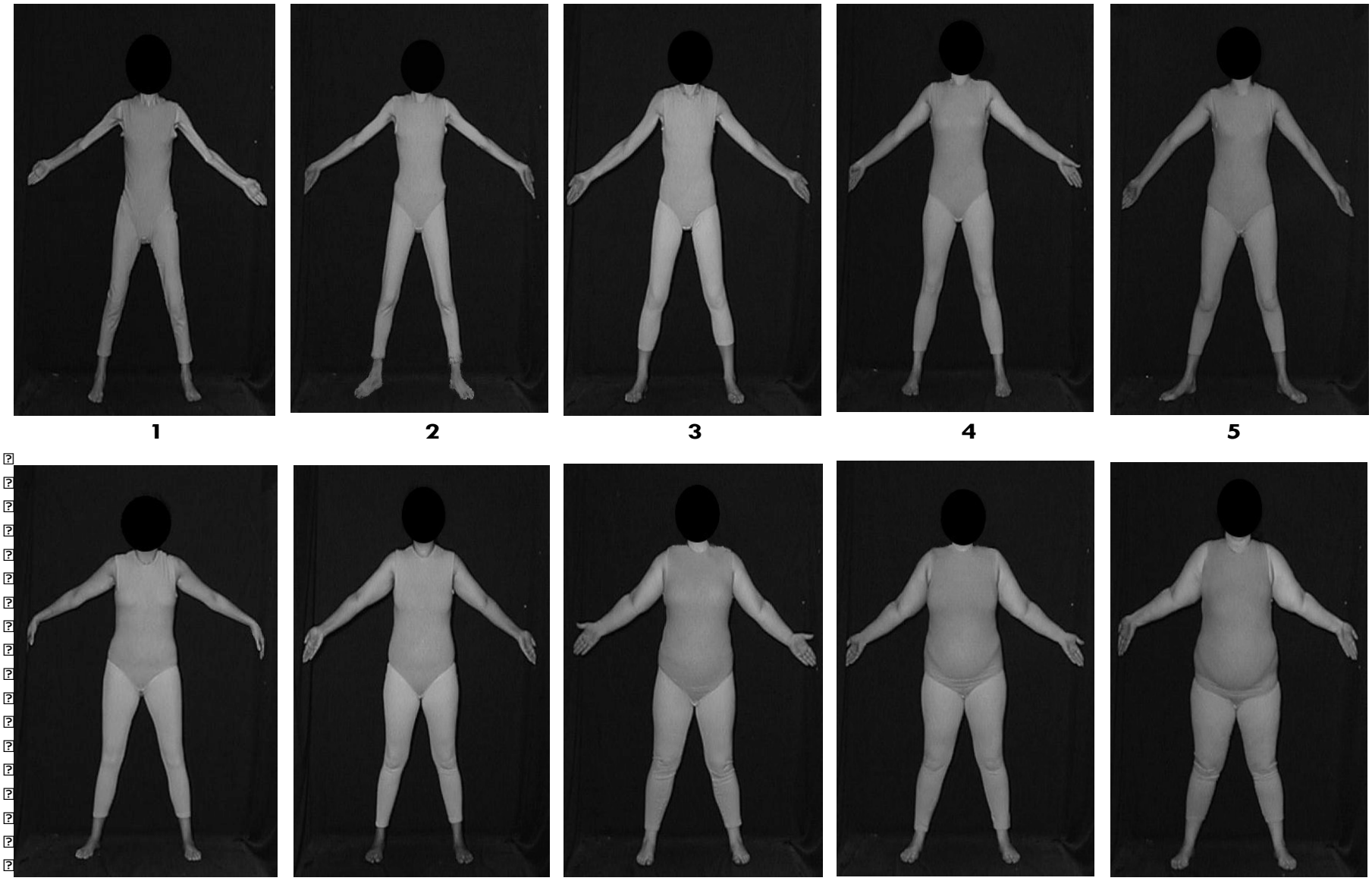
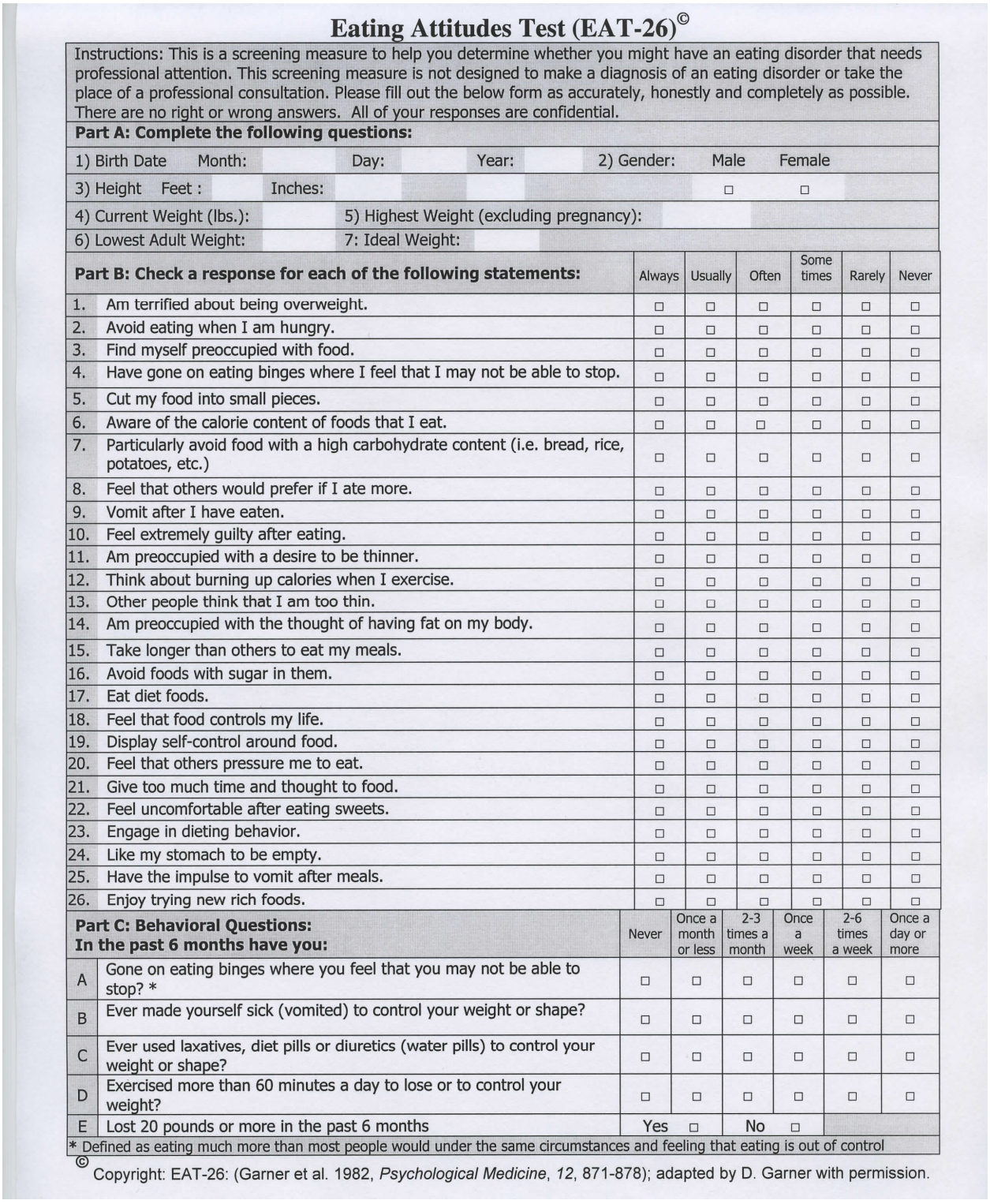


Figure 3. Eating Attitudes Test (EAT-26).



Eating Attitudes Test (EAT-26)©

Instructions: This is a screening measure to help you determine whether you might have an eating disorder that needs professional attention. This screening measure is not designed to make a diagnosis of an eating disorder or take the place of a professional consultation. Please fill out the below form as accurately, honestly and completely as possible. There are no right or wrong answers. All of your responses are confidential.

Part A: Complete the following questions:

1) Birth Date	Month:		Day:		Year:	2) Gender:	Male ☐ Female ☐
3) Height	Feet :		Inches:				
4) Current Weight (lbs.):			5) Highest Weight (excluding pregnancy):				
6) Lowest Adult Weight:			7: Ideal Weight:				

	Part B: Check a response for each of the following statements:	Always	Usually	Often	Some times	Rarely	Never
1.	Am terrified about being overweight.	☐	☐	☐	☐	☐	☐
2.	Avoid eating when I am hungry.	☐	☐	☐	☐	☐	☐
3.	Find myself preoccupied with food.	☐	☐	☐	☐	☐	☐
4.	Have gone on eating binges where I feel that I may not be able to stop.	☐	☐	☐	☐	☐	☐
5.	Cut my food into small pieces.	☐	☐	☐	☐	☐	☐
6.	Aware of the calorie content of foods that I eat.	☐	☐	☐	☐	☐	☐
7.	Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	☐	☐	☐	☐	☐	☐
8.	Feel that others would prefer if I ate more.	☐	☐	☐	☐	☐	☐
9.	Vomit after I have eaten.	☐	☐	☐	☐	☐	☐
10.	Feel extremely guilty after eating.	☐	☐	☐	☐	☐	☐
11.	Am preoccupied with a desire to be thinner.	☐	☐	☐	☐	☐	☐
12.	Think about burning up calories when I exercise.	☐	☐	☐	☐	☐	☐
13.	Other people think that I am too thin.	☐	☐	☐	☐	☐	☐
14.	Am preoccupied with the thought of having fat on my body.	☐	☐	☐	☐	☐	☐
15.	Take longer than others to eat my meals.	☐	☐	☐	☐	☐	☐
16.	Avoid foods with sugar in them.	☐	☐	☐	☐	☐	☐
17.	Eat diet foods.	☐	☐	☐	☐	☐	☐
18.	Feel that food controls my life.	☐	☐	☐	☐	☐	☐
19.	Display self-control around food.	☐	☐	☐	☐	☐	☐
20.	Feel that others pressure me to eat.	☐	☐	☐	☐	☐	☐
21.	Give too much time and thought to food.	☐	☐	☐	☐	☐	☐
22.	Feel uncomfortable after eating sweets.	☐	☐	☐	☐	☐	☐
23.	Engage in dieting behavior.	☐	☐	☐	☐	☐	☐
24.	Like my stomach to be empty.	☐	☐	☐	☐	☐	☐
25.	Have the impulse to vomit after meals.	☐	☐	☐	☐	☐	☐
26.	Enjoy trying new rich foods.	☐	☐	☐	☐	☐	☐

	Part C: Behavioral Questions: In the past 6 months have you:	Never	Once a month or less	2-3 times a month	Once a week	2-6 times a week	Once a day or more
A	Gone on eating binges where you feel that you may not be able to stop? *	☐	☐	☐	☐	☐	☐
B	Ever made yourself sick (vomited) to control your weight or shape?	☐	☐	☐	☐	☐	☐
C	Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?	☐	☐	☐	☐	☐	☐
D	Exercised more than 60 minutes a day to lose or to control your weight?	☐	☐	☐	☐	☐	☐
E	Lost 20 pounds or more in the past 6 months	Yes ☐		No ☐			

* Defined as eating much more than most people would under the same circumstances and feeling that eating is out of control

Note. Despite its name, the EAT-26 is primarily a measure of behaviors.

Figure 4. Disordered Eating Normative Beliefs Scale (DENS)

	Do you think it is okay or wrong to…	Totally Okay	Really Okay	Sort of Okay	Neither Okay nor Wrong	Sort of Wrong	Really Wrong	Totally Wrong
1	feel terrified about being overweight	1	2	3	4	5	6	7
2	take long time to eat meals	1	2	3	4	5	6	7
3	go on a diet	1	2	3	4	5	6	7
4	do cardio 6 times a week for several hours each time	1	2	3	4	5	6	7
5	eat vegetables on a daily basis	1	2	3	4	5	6	7
6	enjoy trying new rich foods	1	2	3	4	5	6	7
7	vomit after eating	1	2	3	4	5	6	7
8	tell someone they look like they've lost weight	1	2	3	4	5	6	7
9	like the empty feeling of my stomach	1	2	3	4	5	6	7
10	feel happy after eating	1	2	3	4	5	6	7
11	avoid carbs	1	2	3	4	5	6	7
12	feel terrified about being underweight	1	2	3	4	5	6	7
13	substitute a protein bar for a meal	1	2	3	4	5	6	7
14	avoid eating when you are hungry	1	2	3	4	5	6	7
15	enjoy trying new desserts	1	2	3	4	5	6	7
16	feel content after eating	1	2	3	4	5	6	7
17	not make time for a meal	1	2	3	4	5	6	7
18	take longer than others to eat meals	1	2	3	4	5	6	7
19	eat fruits on a daily basis	1	2	3	4	5	6	7
20	feel uncomfortable after eating	1	2	3	4	5	6	7
21	eliminate sugars	1	2	3	4	5	6	7
22	use food supplements (e.g., Slimfast)	1	2	3	4	5	6	7
23	skip a meal	1	2	3	4	5	6	7
24	eat the same foods every day	1	2	3	4	5	6	7
25	be preoccupied with being thinner	1	2	3	4	5	6	7
26	use energy drinks as an appetite suppressant	1	2	3	4	5	6	7
27	think about food most of the time	1	2	3	4	5	6	7
28	enjoy feeling full after a meal	1	2	3	4	5	6	7
29	count calories	1	2	3	4	5	6	7
30	feel that food controls my life	1	2	3	4	5	6	7
31	use a stimulant as an appetite suppressant (e.g., Adderall)	1	2	3	4	5	6	7
32	eat a lot of food in a short amount of time	1	2	3	4	5	6	7
33	feel the urge to vomit after meals	1	2	3	4	5	6	7
34	too busy to eat	1	2	3	4	5	6	7
35	feel guilty after eating	1	2	3	4	5	6	7
36	cut food into small pieces	1	2	3	4	5	6	7
37	fast for 24 hours	1	2	3	4	5	6	7

Figure 4. Continued. Disordered Eating Normative Beliefs Scale (DENS)

	Do you think it is okay or wrong to…	Totally Okay	Really Okay	Sort of Okay	Neither Okay nor Wrong	Sort of Wrong	Really Wrong	Totally Wrong
38	eat diet foods (e.g., lean cuisine)	1	2	3	4	5	6	7
39	classify foods as good or bad	1	2	3	4	5	6	7
40	be preoccupied with the fat on my body	1	2	3	4	5	6	7
41	eat without feeling control	1	2	3	4	5	6	7
42	weigh yourself once a week	1	2	3	4	5	6	7
43	go out of your way to make time for a meal	1	2	3	4	5	6	7
44	be focused on the calorie content of my food	1	2	3	4	5	6	7
45	use laxatives	1	2	3	4	5	6	7
46	desire to be skinny	1	2	3	4	5	6	7
47	use diuretics	1	2	3	4	5	6	7
48	use caffeine as an appetite suppressant	1	2	3	4	5	6	7
49	exercise regularly	1	2	3	4	5	6	7
50	feel comfortable looking at your body	1	2	3	4	5	6	7
51	want to be underweight	1	2	3	4	5	6	7
52	weigh yourself daily	1	2	3	4	5	6	7
53	eat 1200 calories or less per day	1	2	3	4	5	6	7
54	stand while eating	1	2	3	4	5	6	7
55	limit the variety of foods to eat	1	2	3	4	5	6	7
56	be fixated on burning calories while exercising	1	2	3	4	5	6	7
57	to use cigarettes as an appetite suppressant	1	2	3	4	5	6	7
58	eat carbohydrates for energy	1	2	3	4	5	6	7
59	buy clothes specifically for your body type	1	2	3	4	5	6	7
60	avoid fats	1	2	3	4	5	6	7
61	compliment a woman on how skinny she looks	1	2	3	4	5	6	7
62	weigh yourself multiple times a day	1	2	3	4	5	6	7
63	have self-control around foods	1	2	3	4	5	6	7
64	use appetite suppressants	1	2	3	4	5	6	7
66	You finish a meal and feel sick afterwards. Do you think it is okay or wrong to vomit to make yourself feel better?	1	2	3	4	5	6	7
67	You are going to an event on Friday and know that you will be dressing up for the occasion. Do you think it is okay or wrong to diet the week before?	1	2	3	4	5	6	7
68	You are trying to get to class on time, but have not eaten breakfast. Do you think it is okay or wrong to make time for breakfast and be late for class?	1	2	3	4	5	6	7

Appendix

Factor Analysis of the *DENS*

It has been suggested that adequate power for a factor analysis can be achieved if the ratio of participants to items on the measure is at least 3 to 1 (Velicer & Fava, 1998) or if the sample size is at least 150 (Guadagnoli & Velicer, 1988). Other authors suggest even higher ratios and sample sizes (e.g., Gorsuch, 1983; Comrey & Lee, 1992; Tabachnick & Fidell, 2001). The following analyses did not achieve adequate power for robust results of the factor analysis by either of these suggestions. Therefore the results must be viewed in light of this significant statistical limitation. The decision to proceed despite not meeting this criterion was done for exploratory and educational purposes. Because factor analysis was used to develop the mediator variable for the subsequent mediation analysis, results of that analysis must also be interpreted with extreme caution and were similarly carried out for purposes of exploration regarding the newly developed measure (i.e., the *DENS*).

Factor extraction. There are several methods available for factor extraction, including eigenvalues greater than 1 and scree plot analysis. Using eigenvalues greater than 1 can overestimate the number of factors (Zwick & Velicer, 1986), whereas scree plots can be ambiguous to interpret (DeVillis, 2012). Following factor analysis, the total number of factors with an eigenvalue greater than 1 was 21, which far exceeded the number of meaningfully interpretable factors that were anticipated. The scree plot (please see Figure A1) has a sharp elbow after 3 factors and a somewhat ambiguous 2nd elbow after 5 factors. Therefore, relying on the scree plot, we narrowed the likely number of factors to 3, 4, or 5 factors.

Factor rotation. Because the loadings of the initial factor analysis are not meaningful for interpretation of the content of the factors, factor rotation is necessary. Although many researchers opt for an orthogonal rotation, many times the most appropriate rotation is oblique.

Oblique rotations allow for the factors to be correlated (Floyd & Widaman, 1995). Given that we anticipated the factors of the *DENS* to be correlated, we used an oblique rotation (i.e., promax) in the analysis. Oblique rotation yields both pattern and structure matrices, however, pattern matrices are typically chosen for interpretation of factor loadings.

Factor retention. We analyzed the pattern matrices for a 3-factor, 4-factor, and 5-factor solution beginning with the factor loadings. In each solution, some of the items did not significantly load onto any factor (e.g., item #3). Items were retained on factors that loaded at least .40 or higher, whether positively or negatively (Norman & Striener, 1994). Each factor was also examined for conceptual consistency. Comparing the 3-, 4-, and 5- factor solutions, the 4-factor solution appeared to be the most consistent with our a priori understanding of the intended underlying constructs of the *DENS* and was thus retained as the final solution. Items that double-loaded on factors were further examined regarding their loading and conceptual fit and decisions were made whether to retain the item and/or which factor the item should be placed. Each item was only allowed to load onto one factor. The final solution can be seen in Table 4.

Factor naming. Names were selected based on identified common themes of the items that comprised each factors. Factor 1 was named Maladaptive Techniques, factor 2 was named Dieting Behaviors, factor 3 was named Healthy Habits, and factor 4 was named Meal Avoidance. Following this decision, internal consistency was evaluated using Cronbach's alpha for each factor. The alpha scores for factors 1, 2, 3, and 4, were .866, .773, .742, and .808 respectively.

Correlation of factors. Once the four factors were extracted and investigated for conceptual conformity, intercorrelations were examined between the *DENS* subscales (see Table A2). Correlations show that the Dieting subscale is significantly correlated with Maladaptive

Techniques and Meal Avoidance. Meal Avoidance was also significantly correlated with Maladaptive Techniques. Healthy Habits was not correlated with any of the other subscales as was expected due to the items being dissimilar from other items in the other factors. To simplify subsequent mediation analyses, a composite score for attitudes that endorsed unhealthy or risky behaviors was created. This composite of normative beliefs is comprised of scores from Maladaptive Techniques, Dieting Behaviors, and Meal Avoidance. Healthy habits were excluded due to the focus of this study being mainly on normative beliefs about maladaptive weight loss behaviors. Low scores on this composite mean that a person has rated these risky behaviors as more “okay”.

Table A1

Factor names and factor loadings on DENS

Item #		Maladaptive Techniques	Dieting Behaviors	Healthy Habits	Meal Avoidance
7	vomit after eating	**.418**	.106	.135	.311
13	protein bar for a meal	**.427**	.027	.079	.198
24	eat the same foods every day	**.515**	.376	.243	-.173
26	energy drinks as suppressant	**.599**	-.083	-.273	.251
27	think about food most time	**.654**	-.111	-.007	-.151
30	feel that food controls my life	**.642**	-.244	-.003	-.275
31	stimulant as app. suppressant	**.570**	-.147	-.256	.300
41	eat without feeling control	**.603**	-.069	.182	.149
48	caffeine as appetite suppressant	**.740**	-.079	.145	.237
51	want to be underweight	**.499**	.244	-.195	-.056
55	limit variety of foods	**.507**	.008	.026	.219
57	cigarettes as app. suppressant	**.602**	-.224	.048	.257
64	use appetite suppressants	**.490**	.138	.062	.233
8	give compliment for lost weight	-.113	**.450**	.023	-.097
29	count calories	.239	**.530**	.079	-.026
39	classify foods as good or bad	-.251	**.580**	-.029	.135
42	weigh yourself once a week	-.189	**.746**	.084	-.019
44	focus on calorie content of food	-.263	**.587**	-.040	.061
46	desire to be skinny	-.153	**.539**	-.027	**.447**
47	use diuretics	.220	**.464**	-.022	-.364
52	weigh yourself daily	-.139	**.587**	-.050	.079
53	eat 1200 calories or less per day	.019	**.491**	-.276	.074
63	have self-control around food	-.106	**.426**	.177	.200
1	terrified about being overweight	-.346	.039	**.493**	.224
2	take long time at meals	-.072	.109	**.438**	.158
5	eat vegetables on a daily basis	-.172	.079	**.461**	.284
10	feel happy after eating	.101	-.173	**.532**	-.159
14rev	avoid eating when hungry	.012	-.003	**-.417**	.255
15	enjoy trying new desserts	-.080	-.244	**.555**	.333
16	feel content after eating	.173	-.123	**.464**	-.014
18	take longer to eat meals	-.161	.166	**.415**	-.057
19	eat fruits on a daily basis	-.249	.145	**.453**	.305
28	enjoy feeling full after a meal	.048	.144	**.441**	.160
43	to make time for a meal	-.060	**.424**	**.418**	-.022

Table A1 (continued)

Factor names and item information on DENS

	Item #	Maladaptive Techniques	Dieting Behaviors	Healthy Habits	Meal Avoidance
9	like empty feeling of stomach	.008	-.068	-.182	**.446**
17	not make time for a meal	.097	-.094	.097	**.782**
20	feel uncomfortable after eating	.134	-.171	.159	**.547**
23	skip a meal	.154	.110	.086	**.587**
34	too busy to eat	.006	.138	.201	**.741**
35	feel guilty after eating	.106	.029	-.017	**.602**
60	avoid fats	.257	-.067	-.116	**.440**

Note. Factor Loadings > .40 are in bold. Items on the left are grouped by factor.

Table A2

Correlation of DENS subscales

	Dieting	Maladaptive Techniques	Healthy Habits
Meal Avoidance			
Pearson Correlation	.29*	.49**	-.07
Healthy Habits			
Pearson Correlation	.12	-.14	
Maladaptive Techniques			
Pearson Correlation	.25		

** $p < .01$ (2-tailed).

* $p < .05$ (2-tailed).

Figure A1. Scree plot of DENS items