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The Eating Attitudes Test and healthy eating : an investigation of the relationships between pathological eating, healthy eating, and normal dieting

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Abstract

The purpose of this study was to investigate whether the Eating Attitudes Test (EAT), a measure originally designed to measure pathological eating in the 1970s, is related to healthy eating and/or normal dieting today. This study included the EAT, a measure of healthy/unhealthy eating, a measure of normal dieting, a measure of pathological eating, and a demographics form. These questionnaires were administered to 206 undergraduate women. Results indicated that most factors on the EAT are highly correlated with normal dieting and several factors are correlated with healthy eating. It may be that researchers have been questioning the validity of the EAT because it is measuring normal dieting and, to some extent, healthy eating. Future research should investigate this issue further.

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Chapter 1

Introduction

Changing Attitudes towards Eating

Over the years, society has become increasingly aware of the importance of healthy eating. The rise in overweight and obesity began in the 1970s, and accelerated sharply through the eighties and nineties (Flegal, Carroll, Ogden, & Johnson, 2002). In response, much attention turned toward encouraging nutrition awareness, healthy eating, and weight loss (French, Story, & Jeffery, 2001). In 1990, Congress passed the Nutrition Labeling and Education Act to heighten awareness of the nutritional content of foods, especially calorie and fat content ("Nutrition Labeling and Education Act," 1990). Although a definition of healthy eating is elusive, it seems to have been interpreted by the U.S. government to include eating a variety of foods, especially fruits and vegetables, and avoiding the consumption of large amounts of foods that are high in fat and sugar. In 1992, the U.S. Department of Health and Human Services and the U.S. Department of Agriculture adopted the food guide pyramid as a dietary guideline, which encouraged variety in the diet and recommended eating fatty foods and sweets sparingly (USDA and USDHHS, 2010). Also, the "5-A-Day for Better Health" campaign was initiated to promote increasing vegetable and fruit intake to five servings a day (USDA Center for Nutrition Policy and Promotion, 1996).

It appears that these government initiatives have had some positive effects, at least on awareness of healthy eating. For example, the percentage of adults who believed

it was important to eat five servings of fruits or vegetables a day rose from 8% in 1991 (Eisner, Loughrey, Sutton, Johnston, & Doner, 1992) to 38% in 1997 (National Cancer Institute, 1997). Self-reported levels of fruit and vegetable intake increased slowly but steadily over the course of the 1990s, and the average number of produce items offered in grocery stores almost doubled (Weimer, 1999). Americans voiced an increasing demand for produce when dining out too. Salads became the second most requested restaurant item (including at McDonalds) in 1994 (Weinstein & Straus, 1994). In terms of the demand for healthier meats, the amount of available high-fat meats decreased in grocery stores, and the amount of healthier meats (including lean red meat, poultry, fish, and shellfish) increased (Harnack, Jeffery, & Boutelle, 2000; Nielsen, Siega-Riz, & Popkin, 2002). Additionally, grocery store availability of whole milk and butter dropped, and quantities of low-fat milk and cooking oils that were lower in saturated fat increased precipitously (Harnack, Jeffery, et al., 2000). Together these statistics demonstrate that general interest in and awareness of health and nutrition in the U.S. has increased over the last few decades.

In addition to a heightened awareness of healthy eating, the increase in obesity in the U.S. was also followed by a dieting movement. Initiatives to promote weight loss and prevent weight gain, once nonexistent, multiplied (Abelson & Kennedy, 2004). Dieting in general became extremely common; current studies estimate that up to 50% of adults in the U.S. are dieting at any given time (Kruger, Galuska, Serdula, & Jones, 2004; Neumark-Sztainer et al., 2006). Additionally, over half of Americans report that they eat "diet" foods, which includes reduced fat, fat-free, or reduced calorie products (Frazao &

Allshouse, 1996; Kruger et al., 2004). In summary, both dieting and an awareness of healthy eating have increased over the past several decades.

Disordered Eating

Although information on healthy eating is sparse, partly due to its recency, researchers have been studying eating disorders for over half a century. The first eating disorder to receive empirical attention was anorexia nervosa (AN) when it was included in the Feighner criteria for psychiatric disorders. The Feighner criteria defined AN as a disorder occurring in females under age 25 who demonstrated an unwillingness to eat which resulted in weight loss of at least 25% of her original body weight (Feighner et al., 1972). Subsequently, AN was incorporated into the Diagnostic and Statistical Manual for Mental Disorders (DSM)-3rd edition, where it was operationalized as an intense fear of weight gain and feeling fat despite being significantly underweight (American Psychiatric Association, 1980). The current criteria for AN as defined by the DSM- 4th edition (DSM-IV) include: 1) refusal to maintain a weight at least 85% of that expected for one's height; 2) intense fear of gaining weight; 3) feeling fat despite being underweight *or* needing to be very thin to feel good about oneself *or* denying the seriousness of being underweight; and 4) amenorrhea for at least three consecutive months (American Psychiatric Association, 2000). Clearly, the diagnostic criteria for AN have changed significantly over the years.

The Eating Attitudes Test

The Eating Attitudes Test (EAT), one of the earlier measures developed to assess eating disorders, was based on the Feighner (1972) criteria for AN. Over the decades it has become the most widely used self-report measure of eating disorders (Koslowsky,

Scheinberg, Bleich, & Mark, 1992; Patton & King, 1991; Raciti & Norcross, 1987). It has been translated into several different languages, including Spanish (Castro, Toro, Salamero, & Guimerá, 1991), Bulgarian (Boyadjieva & Steinhausen, 1996), Japanese (Nakai, 1997), Urdu (Choudry & Mumford, 1992), Portuguese (Nunes, Bagatini, Abuchaim, & Kunz, 1994), Korean (Ko & Cohen, 1998), Zulu (Szabo & Allwood, 2004), and Arabic (al-Subaie et al., 1996). More than 250 articles have been published on the EAT, and its psychometric properties have been studied in many different populations (Garfinkel & Newman, 2001). These include minority groups in the U.S., such as Asian American women (Ko & Cohen, 1998), Mexican American women (Rutt & Coleman, 2001), and African American women (Pumariega, Gustavson, Gustavson, & Motes, 1994).

The EAT was developed in 1979 in response to an increasing interest in AN and a desire on the part of researchers to screen for the disorder. The authors administered the questionnaire to women diagnosed with AN and to a sample of normal controls. The original 40-item instrument had seven factors. When the EAT-40 was tested on a larger sample and revised in 1982, three factors emerged: Dieting, Bulimia and Food Preoccupation, and Oral Control (Garner, Olmsted, Bohr, & Garfinkel, 1982; See Appendix A). The first factor, Dieting, contains items that relate to drive for thinness and dieting behaviors, such as avoiding high-calorie foods. The second factor, Bulimia and Food Preoccupation, includes items relating to thoughts about food as well as bulimic behaviors. The third and final factor, Oral Control, relates to control over eating and the perceived pressure from others to gain weight (Garner, Olmsted, Bohr, & Garfinkel, 1982). Additionally, 14 of the 40 items did not load onto any of these factors and were

therefore eliminated from the measure to produce the EAT-26. The 26-item version of the EAT was very highly correlated with the longer, original version (Garner, Olmsted, Bohr, & Garfinkel, 1982).

It has been several decades since the EAT has been revised. The primary purpose of the current study was to investigate the extent to which EAT scores are now associated with healthy eating as opposed to pathological eating behaviors and attitudes.

The Validity of the EAT

When investigating the validity of the EAT, it is important to note that there are many different aspects of measurement validity. One approach is to investigate the factor structure of a measure (Briggs & Cheek, 1986). Although the EAT-26 was found to have a three-factor structure in its original study, researchers have reported difficulty replicating this factor structure. For example, Koslowsky et al. (1992) administered the EAT-26 to a large sample of Israeli men and women reporting for mandatory military service. The authors performed an exploratory factor analysis (EFA) and found four factors rather than the original three factors reported by Garner and colleagues (Garner et al., 1982). Rutt and Coleman (2001) administered the EAT-26 to a sample of Hispanic women and performed a confirmatory factor analysis (CFA) of the original, three-factor structure of the EAT-26. When the authors found that this structure provided a poor fit to the data, they performed an EFA, which resulted in a 17-item, five factor instrument (Rutt & Coleman, 2001). Doninger, Enders, and Burnett (2005) administered the EAT-26 to a sample of female college athletes and performed a CFA of the EAT-26's original factor structure. The authors found that this structure provided a poor fit to the data; additionally, five of the items failed to load significantly on their theorized factors. After

failing to replicate the factor structures found by Koslowsky et al. (1992) and Rutt and Coleman (2001), Doninger et al. (2005) performed an EFA, finding instead a 20-item, five-factor structure.

Ocker and colleagues also attempted a CFA of the original EAT-26 factor structure, and again this resulted in a poor fit. An EFA produced a 16-item, four-factor structure (Ocker, Lam, Jensen, & Zhang, 2007). Recently, this 16-item, four-factor structure was independently replicated using CFA in both a Caucasian and Hispanic undergraduate female sample (Belon, Smith, Bryan, Lash, & Winn, 2011). The results indicated that a 16-item EAT with four factors seemed to be a more appropriate measure. Given that this particular adapted version of the EAT appeared to be the only one that had been independently replicated, it was examined further in the current study.

Ocker and colleagues had named the EAT-16's four factors the following: Dieting, Self-Perception of Body Shape, Food Preoccupation, and Awareness of Food Contents (See Appendix B). The first factor, Dieting, relates to restriction of food intake. For example, one of the items on this factor states "I engage in dieting behavior." The EAT-16's second factor, Self-Perception of Body Shape relates to drive for thinness. For example, one item is "I am preoccupied with a desire to be thinner." The EAT-16's Food Preoccupation factor includes items related to the importance placed on food, such as "I feel that food controls my life." Finally, Awareness of Food Contents includes items related to specific types of foods, such as "I avoid foods with sugar in them."

It is important to note that although several factors from the EAT-16 and EAT-26 have identical or similar names, they are different in terms of item makeup. EAT-26 Dieting is a large factor (13 items) that includes all the items from EAT-16 Dieting (five

items), EAT-16 Awareness of Food Contents (four items), *and* EAT-16 Self-Perception of Body Shape (three items). Thus, EAT-26 Dieting subsumes three of the four factors from the EAT-16, including EAT-16 Dieting. The fourth EAT-16 factor, Food Preoccupation, consists of four items, all of which are also contained within the second EAT-26 factor, Bulimia and Food Preoccupation. EAT-26 Bulimia and Food Preoccupation has two items in addition to the four items from EAT-16 Food Preoccupation, for a total of six items. None of the items from the third (and last) EAT-26 factor, Oral Control, are included in the EAT-16. For the factor structures of the two versions of the EAT, see Appendices A and B.

In summary, the factor structure of a measure is important for its construct validity, and the original factor structure of the EAT-26 has repeatedly proven difficult to replicate. As a result, researchers have employed exploratory analyses to propose alternative factor structures for the EAT-26. Only one of these alternative factor structures, the 16-item, four-factor structure proposed by Ocker and colleagues, has been independently replicated using CFA (Belon et al., 2011).

Another way of estimating a measure's validity is by looking at indices of its accuracy in categorizing individuals according to whether they qualify for a diagnosis. There are several different statistics that can be used to estimate diagnostic accuracy. The most commonly used are sensitivity and specificity. In brief, sensitivity is the probability that a test will correctly identify someone with a diagnosis, and specificity is the probability that those *without* the disorder will be categorized correctly by the test as not having the disorder. Sensitivity can be artificially inflated when a disorder is rare *and* the authors use a pre-selected population of women with the disorder (Williams, Hand, &

Tarnopolsky, 1982). Since AN is an extremely rare disorder with a base rate of only about 1% of the population (Hoek, 2006), AN researchers often use a pre-selected sample of individuals with AN and compare them to normal controls on the EAT (Garner & Garfinkel, 1979). Because sensitivity and specificity are directly related to the disorder's prevalence, these numbers will be highest when the prevalence of the disorder is closer to 50% in the sample. In essence, using a pre-selected sample of women with eating disorders to compare to normal controls artificially increases the prevalence of the disorder in the sample to approximately 50%, thereby causing estimates of sensitivity to be deceptively high (Williams, Hand, & Tarnopolsky, 1982). Consequently, it is recommended that researchers instead report on the positive and negative predictive power for a disorder, as these statistics are not functions of prevalence, and thus are more accurate representations of a test's validity (Shrout & Fleiss, 1981). In brief, it is important to focus on positive prediction when discussing the validity of the EAT-26.

One review of the EAT-26's diagnostic validity analyzed nine articles (published between 1981 and 1996) that used these statistics (Nunes, Camey, Olinto, & Mari, 2005). These nine studies were conducted in community settings and directly compared EAT-26 scores to standardized eating disorder diagnoses. Across these studies, positive prediction ranged from 4% to 55%. The authors did not report on negative prediction, but specificity ranged from 81% to 96%. Nunes and colleagues concluded that although specificity estimates were acceptable, the EAT-26 had weak positive predictive power, a conclusion which caused them to question the validity of the EAT-26 as a measure of AN. The authors postulated that the EAT-26's low validity indices could be due, in part, to the current cultural emphasis on thinness and the fact that many of the eating behaviors

listed on the EAT-26 had become quite common in the general population. This article also investigated the temporal stability of the EAT-26 over four years within a Brazilian sample and found very low agreement between the two time periods. In fact, for some of the items there was zero agreement between the two testing periods. This led the authors to conclude that some of the items were unclear and therefore were unlikely to measure that which they purported to measure (Nunes et al., 2005).

Other authors have voiced similar concerns about the EAT. It appears that although individuals scoring above the clinical cutoff on the EAT-26 sometimes *are* diagnosable with AN or can be characterized as having partial-syndrome eating disorders, in a substantial number of cases the cutoff seems to identify a preponderance of normal dieters (Mann, 1983; Meadows, Palmer, Newball, & Kenrick, 1986; Patton, Johnson-Sabine, Wood, & Mann, 1990; Williams et al., 1986). Several studies actually found that none of those individuals scoring above the EAT-26 cutoff had a diagnosable eating disorder, especially when the sample was an unselected sample of women (Button & Whitehouse, 1981, 1981; Choudry & Mumford, 1992; Garner & Garfinkel, 1980; Mann, 1983; Mumford, Whitehouse, & Choudry, 1992). However, many of these studies predated the advent of the DSM-IV and the new diagnostic criteria for eating disorders.

Recognizing that the EAT-26 had not been validated with the new criteria, one study compared EAT-26 scores to DSM-IV diagnoses for AN and bulimia nervosa (BN). This study was a notable exception to the studies mentioned above, as it found that the EAT-26 had acceptable positive predictive power and good negative predictive power for detecting eating disorders (Mintz & O'Halloran, 2000). Although this may seem to indicate that the changes in eating disorder criteria had the effect of the EAT-26

becoming a more accurate screening tool, this study used a pre-selected sample of women with EDs. The authors themselves noted the importance of replicating these results in an unselected sample. These findings, in conjunction with researchers' recent suggestion that a 16-item, four-factor EAT-26 may be more appropriate (Belon, Smith, Bryan, Lash, & Winn, 2011; Ocker et al., 2007), prompted the current study's investigation of whether the EAT-26 is now associated with healthy rather than pathological eating, and whether the EAT-16 has a similar relationship with healthy and pathological eating as the EAT-26.

The EAT, Healthy Eating, and Dieting

As noted, the EAT was originally designed in the 1970s, which was prior to these societal changes in health awareness. Conceivably this new awareness has altered the way individuals respond to items on the EAT, and some researchers have postulated that this changing attitude toward eating may affect the validity of the EAT (Nunes et al., 2005; Ocker et al., 2007). Indeed, many of the items on the EAT-26 seem to reflect attitudes or behaviors that might now be included in a definition of healthy eating. For example, item # 6 asks participants to report how often they are "Aware of the calorie content of foods that I eat" on a scale ranging from "Always" to "Never." As there is evidence that the increase in access to nutrition facts has led to an increased awareness of the calorie content of foods (Elbel, Gyamfi, & Kersh, 2011; Elbel, Kersh, Brescoll, & Dixon, 2009), it may be the case that this item is no longer indicative of pathological eating. Another example of an EAT item (# 16) that may be affected by changing societal attitudes and policies around eating is "Avoid foods with sugar in them." The

Food Guide Pyramid places fats and sweets at the top of the pyramid with the advice to "use sparingly" (USDA Center for Nutrition Policy and Promotion, 1996).

As several items on the EAT-26 revolve around dieting, it may be that the interpretation of these diet items is also affected by changing attitudes toward health and the increase in dieting in the population. However, the distinction between "dieting" and "healthy eating" is not particularly clear; furthermore the most effective weight loss strategy includes healthy eating as a part of overall lifestyle change, as temporary diets are ineffective in the long term (Lichtenstein et al., 2006). In the literature, dieting appears to be uniquely characterized by limiting food intake in order to lose weight. This is primarily achieved through calorie restriction, either by limiting food portions or by cutting back on high-fat or high- calorie foods (Malik & Hu, 2007; Seagle, Strain, Makris, & Reeves, 2009).

For the purposes of this study, it is also important to discuss how healthy eating and dieting may relate to disordered eating. Orthorexia nervosa, which is characterized by an extreme adherence to a healthy diet, is a new term that has received empirical attention. Some researchers are even calling for its inclusion in the DSM as an eating disorder (Donini, Marsili, Graziani, Imbriale, & Cannella, 2004; Mathieu, 2005). Thus, at its extreme, healthy eating can take on the characteristics of disordered eating. Similarly, there is evidence that some extreme forms of dieting (such as fasting) are considered pathological (American Psychiatric Association, 2000). Thus, both healthy eating and dieting, in their extreme forms, may approach disordered eating. However, distinctions between these constructs have not been well-defined in the literature.

One complication that arises when discussing the distinction between dieting, healthy eating, and disordered eating is that of characterizing the behavior of the *normal weight* dieter. Typically it is assumed that dieting to lose weight is the treatment of choice for overweight and obese individuals (Malik & Hu, 2007; USDA and USDHHS, 2010; Van Dorsten & Lindley, 2011), but that dieting among normal weight women may be a symptom of an eating disorder (Polivy & Herman, 1985; Wilson, 1993). Although research shows that women of normal weight who diet are not necessarily engaging in disordered eating (Biener & Heaton, 1995), dieting among normal weight women is considred a risk factor for developing an eating disorder (Stice, Marti, & Durant, 2011).

One explanation for why women of normal weight diet may lie in their perception of their weight status. Studies estimate that between 25-50% of normal-weight women incorrectly perceive themselves to be overweight (Chang & Christakis, 2003; Paeratakul, White, Williamson, Ryan, & Bray, 2002), and there is evidence that this misperception of weight status is associated with increased dieting in normal weight women (Strauss, 1999). Thus, it may be that normal weight dieters are motivated to diet by an incorrect belief that they are overweight. Alternatively, the increasing emphasis on thinness as a standard of beauty for women (McCarthy, 1990) may influence normal weight women to diet in an attempt to achieve a *lower* weight that more closely approximates this thin ideal (Homan, 2010).

Regardless, the widespread practice of dieting could alter responses on the EAT. For example, item # 23 on the EAT is "Engage in dieting behavior," and item # 17 is "Eat diet foods." The dramatic increase of dieting and diet foods in the U.S. may mean that

some of the diet-related responses on the EAT that are currently scored in the clinical range may no longer necessarily represent disordered eating

In conclusion, the last several decades have brought significant changes in awareness of healthy eating in the U.S. These changes may affect individuals' responses on the EAT, causing them to be less valid indicators of disordered eating, and perhaps even indicative of healthy eating. The current study addressed this question by administering the following instruments to an unselected sample of undergraduate females: the EAT-26 (which contained the EAT-16 within it), a Demographics form, a relatively new eating disorders questionnaire known as the Eating Disorders Examination-Questionnaire (EDE-Q), and a food questionnaire. The Demographics form included questions on height and weight, from which Body Mass Index (weight in kg / height in m^2) was derived, as well as an item asking participants if they perceived themselves as overweight. The increasingly popular EDE-Q is a psychometrically strong instrument with items that closely mirror the diagnostic criteria for eating disorders (e.g., Luce & Crowther, 1999; Mond, Hay, Rodgers, Owen, & Beumont, 2004). For this study, both global scores on the EDE-Q were used (as a measure of overall eating pathology), and a revised version of the EDE-Q's Restraint scale (referred to as EDE-Q Normal Dieting) was used as a measure of normal dieting. The brief food questionnaire chosen for this study, the Block Rapid Food Screener (Block, Gillespie, Rosenbaum, & Jenson, 2000), categorizes individuals' healthy (fruit and vegetable intake) and unhealthy (fat intake) eating.

Hypotheses

We hypothesized that:

(1) Due to their high preponderance of items that relate to dieting and/or healthy eating, the Dieting factor of the EAT-26 and the Awareness of Food Contents factor from the EAT-16 would be positively correlated with both normal dieting (as measured by EDE-Q Normal Dieting) and *healthy* eating (as measured by the Fruit and Vegetable scale on the Block Screener), and negatively correlated with *unhealthy* eating (as measured by the Fat scale on the Block Screener);

(2) The remaining factors of the EAT-26 (Bulimia/Food Preoccupation and Oral Control) and EAT-16 (Self-Perception of Body Shape, Food Preoccupation, and Dieting) would not be correlated with dieting, healthy eating, or unhealthy eating;

(3) More variance in the Dieting factor of the EAT-26 and the Awareness of Food Contents factor from the EAT-16 would be explained by dieting on the EDE-Q Normal Dieting scale and by healthy eating (as measured by the Block Screener Fruit and Vegetable scale) than by pathological eating (as measured by global scores on the EDE-Q). BMI will be included in these analyses in order to control for its possible effect on eating.

(4) A high proportion of normal weight women would incorrectly perceive themselves as overweight;

(5) Women who perceived themselves as overweight, regardless of actual BMI, would score higher on the EAT-26 and EDE-Q Global than women who did not perceive themselves as overweight;

(6) EAT-26 and EDE-Q scores would not be correlated with BMI.

In the event that Hypothesis 1 was supported, ancillary analyses (specifically, Pearson's correlations) were planned to determine which items, if any, on the EAT-16

Awareness of Food Contents and EAT-26 Dieting factors were correlated with normal dieting on the EDE-Q and healthy eating on the Fruit and Vegetable scale. Additionally, if particular items were found to correlate with dieting or healthy eating, scores for the EAT-16 Awareness of Food Contents and EAT-26 Dieting scales were going to be calculated without these items, and supplementary analyses were going to be run to determine if eliminating those items caused the relationship between the scales and healthy eating to disappear.

Chapter 2

Method

Participants

As part of a larger ongoing study, 208 women from the University of New Mexico who were at least 18 years of age were recruited during the Spring and Fall of 2011 through announcements in upper-level psychology classes and through a web-based system that allowed introductory psychology students to register for studies online. Introductory psychology class students received course credit for participating in this study and upper-level students received extra credit. The study was approved by the university's Institutional Review Board.

The final sample was reduced to 206 participants, because two women failed to complete entire questionnaires. Of these 206 participants, 78 (37.9%) self-identified as Hispanic, 69 (33.5%) as Caucasian, 31 (15.0%) as mixed race, 13 (6.3%) as Native American, five (2.4%) as Asian American, five (2.4%) as "Other" race, and three (1.5%) as African American. Two individuals did not provide their race. Age ranged from 18 – 59 years, with a mean of 21.9 years (SD = 6.9). For marital status, 176 women (85.4%) indicated they had never married, 25 (12.1%) were married, and five (2.4%) were divorced. In terms of education, 86 of these college participants (41.7%) indicated being a high school graduate, 40 (19.4%) reported completing three years of college, 37 (18.0%) reported completing one year of college, 33 (16.0%) reported completing two years of college, six (2.9%) reported having completed a bachelor's degree, three (1.5%) reported another education status, and one (.5%) indicated having some graduate school training.

Self-reported height and weight resulted in BMIs that ranged from 15.6 - 41.5, with a mean of 23.4 (*SD* = 4.6). The majority of the women (136; 66.0%) had BMIs in the normal weight range (i.e., BMI = 18.5 - 25.0), 54 (26.2%) fell in the overweight category (BMI > 25), and sixteen (7.8%) of the women were in the underweight range (BMI < 18.5). When asked if they thought they were overweight, 115 participants (55.8%) responded "No" and 90 participants (43.7%) responded "Yes" (one individual failed to respond). When asked if they thought they were underweight, 188 participants (91.3%) responded "No" and 14 participants (6.8%) responded "Yes." Four individuals (1.9%) left this question blank. Finally, participants were asked if they had ever been diagnosed with an eating disorder and if they had ever received treatment for an eating disorder. Two hundred and one participants (97.6%) reported that they had never been diagnosed with an eating disorder, and five (2.4%) reported that they had. Again, 201 participants (97.6%) reported that they had never received treatment for an eating disorder and five (2.4%) reported that they had received treatment (see Table 1).

Materials

Demographics (Appendix C). Participants were asked to respond to a series of demographic questions regarding age, marital status, ethnicity, education level, student status (full or part-time), occupation, self-reported height and weight, and information about their significant other (if applicable). A scale was available for those who were unsure of their weight. Additionally, participants were asked whether they had ever been diagnosed with or received treatment for an eating disorder, and whether they thought they were overweight or underweight.

Block Rapid Food Screener (Block, Gillespie, Rosenbaum, & Jenson, 2000; Appendix B). This 24-item questionnaire includes both the Block Fat scale and the Block Fruit and Vegetable scale. The Fat scale section (17 items) includes food categories involving dietary fat. The remaining 7 items are from the Vegetable scale, which includes food categories relating to fruits and vegetables. The questionnaire lists the 24 different foods and asks participants to report how often in the past three months they have eaten food from each category on a scale from 0 (once a month or less) to 5 (two or more times a day). Sums from the items on the Fat scale are divided by the number of items on the scale (17) and entered into a regression equation which predicts grams of total fat, saturated fat, unsaturated fat, and cholesterol. The items from the Fruit and Vegetable scale are summed, divided by the number of items on the scale (7), and then entered into a separate regression equation to predict nutrient intake (including Vitamin C) and grams of fiber. Scores on the Fat scale and on the Fruit and Vegetable scale have a possible range of 0-5. Previous research in corporate employees found mean scores of 2.1 on the Fat scale and 2.6 on the Fruit and Vegetable scale (Block, Block, Wakimoto, & Block, 2004).

This 24-item version of the Block Rapid Food Screener was developed from a longer, 100-item food frequency questionnaire. In the validation study, there was a very high correlation between the brief questionnaire and the longer measure, indicating that the shorter measure is a good substitute for the longer measure (Block et al., 2000; see Appendix D). This shorter measure has been successfully used in subsequent research to estimate fruit, vegetable, and fat intake (Block, Block, Wakimoto, & Block, 2004; Gary et al., 2004). Eating at fast food restaurants was highly positively correlated with

responses on the Block Fat scale and negatively correlated with the Block Fruit and Vegetable scale (Arcan, Kubik, Fulkerson, Hannan, & Story, 2011). A modified version of the Block Rapid Food Screener was successfully validated in a sample of Mexican American participants, indicating that the scale could be used in diverse populations (Wakimoto, Block, Mandel, & Medina, 2006). Finally, the Block Rapid Food Screener overall demonstrated acceptable estimates of internal reliability and test-retest reliability in these samples (Arcan et al., 2011; Wakimoto et al., 2006).

For the purposes of this study, several items from the Fruit and Vegetable scale deemed less indicative of healthy eating were eliminated to create a revised version of the Fruit and Vegetable scale. Items eliminated included the first item, "fruit juice," because fruit juices are low in fiber and high in calories (Flood-Obbagy & Rolls, 2009), and thus are not comparable to fresh fruit. The next item that was eliminated was "vegetable juice" because vegetable juices tend to be high in sodium and low in fiber, unlike fresh vegetables (Zeratsky, 2010). Finally, "potatoes" was eliminated from the scale because it included French fries, which are very high in calories and saturated fat and are categorically considered unhealthy (Batis, Hernandez-Barrera, Barquera, Rivera, & Popkin, 2011). This left a total of four items assessing intake of fresh fruits and vegetables on the revised version of the Fruit and Vegetable scale. The possible range of scores on the revised Fruit and Vegetable scale was 0-5.

Analyses were run with both the original, seven-item Vegetable scale and this four-item, revised version to check on possible discrepancies between the two versions. However, since it was believed the revised version would more accurately measure healthy eating, the *a priori* plan was to focus on this version when interpreting results.

The Fat scale was not altered in any way for the purposes of this study. In this study, Cronbach's alpha for the original and revised versions of the Fruit and Vegetable scale was .55 and .58, respectively; for the Fat scale, it was .80.

Eating Attitudes Test-26 (Berland, Thompson, & Linton, 1986; Appendix C). The original 40-item EAT, which was developed as a scale to measure symptoms related to anorexia nervosa (AN), was later shortened to 26 items. This 26-item version is highly correlated with the long form (r=0.98). Participants respond to each EAT item using a scale from Never to Always. For example, item # 10 states "Feel extremely guilty after eating." The first three responses: Never, Rarely, and Sometimes are scored 0 points, as they indicate non-anorexic responses. Responses suggesting anorexic-like symptoms: Often, Usually, and Always, are scored one, two, and three points, respectively. A score higher than 20 indicates high risk for AN (Garner & Garfinkel, 1979). To increase the possible variability of responses, researchers sometimes use a 1-6 scoring system instead, starting with a '1' being assigned to the lowest response (*Never*) and a '6' being assigned to the highest (*Always;* Doninger, Enders, & Burnett, 2005; Ocker et al., 2007; Wells, Coope, Gabb, & Pears, 1985). This 1-6 scoring system was used for most of the analyses this study.

During the original validation study, the authors performed an EFA and three factors emerged: Dieting, Bulimia and Food Preoccupation, and Oral Control. Both the EAT-26 as a whole and its three subscales have good internal reliability in college students, with Cronbach's alpha ranging from .70 to .88 (Doninger et al., 2005; Koslowsky et al., 1992). However, the original three-factor structure of the EAT-26 has never been replicated in the literature. In fact, several researchers have suggested that a

four-factor, 16-item EAT may provide a more satisfactory factor structure. In this study, the overall EAT-26 had a Cronbach's alpha of .89, the Dieting subscale had an alpha of .91, the Bulimia/Food Preoccupation subscale had an alpha of .69, and the Oral Control subscale had an alpha of .56.

The Eating Attitudes Test 16 (Berland et al., 1986; Appendix D). After failing to replicate the original factor structure of the EAT-26, Ocker et al. performed exploratory factor analyses to create this shorter version of the EAT. This version had four factors: Self-Perception of Body Shape, Dieting, Awareness of Food Contents, and Food Preoccupation. Self-Perception of Body Shape includes three items that relate to preoccupation with shape and weight. The Dieting factor has five items that revolve around food restriction and feelings of guilt after eating. The third factor, Awareness of Food Contents, consists of four items pertaining to avoidance of high-calorie foods. Finally, the fourth factor, Food Preoccupation, has four items about the extent to which food is the focus of one's energy and attention.

This 16-item, four-factor structure had better psychometric properties than the EAT-26, and cross-validation of the new factor structure within Ocker et al.'s sample was successful. Belon et al. replicated the factor structure of the EAT-16 and demonstrated measurement invariance across Caucasian and Hispanic college females. Altogether, these studies indicate that the EAT-16 may be psychometrically preferable to the EAT-26. In this study, Cronbach's alpha was .92 for the overall scale, .89 for the Self-perception of Body Shape scale, .80 for the Dieting scale, .84 for the Food Preoccupation scale, and .81 for the Awareness of Food Contents scale.

Eating Disorder Examination – Questionnaire (Fairburn & Bèglin, 1994;

Appendix E). This 28-item questionnaire was developed from a structured clinical interview, the Eating Disorders Examination (EDE; Fairburn & Cooper, 1993), which was designed to diagnose eating disorders. The first 21 questions ask participants to report on how many of the last 28 days they have engaged in different thoughts and behaviors related to eating disorders. For the first 12 questions, the options range from 0 (no days) to 6 (every day). Items # 13-18 ask participants to write in the number of times they have performed different eating behaviors over the past 28 days. Item # 19 asks how many times one has eaten in secret and has the same response options as the first 12 questions, and item # 20 asks the proportion of times one has felt guilty after eating, with responses ranging from 0 (none of the time) to 6 (every time). The next eight questions ask participants to rate from 0 (Not at all) to 6 (Markedly) the degree to which certain eating disorder symptoms affected them over the past 28 days.

The EDE-Q has four subscales known as Eating Concern, Weight Concern, Shape Concern, and Restraint. The Restraint scale consists of the first five items on the EDE-Q (See Appendix F). For this study, a measure of "normal" dieting was created by eliminating two items from the Restraint scale that appeared to represent pathological behavior. These items were # 2 and # 5, both of which relate to fasting (Croll, Neumark-Sztainer, Story, & Ireland, 2002; Peñas-Lledó, Loeb, Puerto, Hildebrandt, & Llerena, 2008). Item # 2 asks, "Have you gone for long periods of time (8 waking hours or more) without eating anything in order to influence your shape or weight?" and item # 5 asks "Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?" The remaining three items are more indicative of normal dieting and focus on limiting food intake in order to affect shape or weight. These items include

limiting food intake, following dietary rules, and avoiding certain foods in order to influence one's shape or weight. These three items were averaged in order to calculate the revised Restraint scale, which for the purposes of this study is referred to as the EDE-Q Normal Dieting scale. Additionally, a Global Score can be computed by averaging the four subscales of the EDE-Q. The Global Score is an indicator of overall eating pathology, with higher scores generally indicating higher levels of eating pathology (Fairburn, 2008). For this study, both the Global Score and EDE-Q Normal Dieting were used.

Both the EDE questionnaire and the structured clinical interview are widely used and respected (Allen, Byrne, Lampard, Watson, & Fursland, 2011) and have good test-retest and internal reliability in student samples (Luce & Crowther, 1999). Furthermore, the measure's convergent, concurrent, and discriminant validity have been demonstrated across different samples (Carter, Aimé, & Mills, 2001; Luce & Crowther, 1999; Mond, Hay, Rodgers, Owen, & Beumont, 2004; Mond et al., 2008). In this sample, Cronbach's alpha for the EDE-Q was .91, and Cronbach's alpha for EDE-Q Normal Dieting was .84.

Procedure

Students were recruited through an online research credits system to participate in a larger study that was described as one that included an interview and questionnaires related to body image and eating. At the scheduled appointment, students were provided basic information about the study and its methodology, consent forms were reviewed (see Appendix G), and questions were addressed. The study questionnaires were then distributed. Following completion of the study, all participants were debriefed and given

a debriefing form with more information about the study and resources regarding eating disorders (Appendix H).

Chapter 3

Results

Data Analysis

For Hypothesis #1 and #2, simple Pearson's correlations were employed to assess for significant relationships between the various EAT factors and healthy eating, unhealthy eating, dieting, and pathological eating. For Hypothesis #3, linear regressions were performed on those factors that significantly correlated with healthy eating to determine the amount of variance in those factors accounted for by healthy eating, dieting, and pathological eating. For these linear regressions, the EAT factors were included as dependent variables, and BMI was a covariate. The independent variables were healthy eating on the Fruit and Vegetable scale, normal dieting on EDE-Q Dieting, and pathological eating on EDE-Q Global. For each EAT factor, two sets of linear regressions were performed. The first regression included the original version of the Fruit and Vegetable scale, and the second regression included the revised version of the Fruit and Vegetable scale.

For Hypothesis #4, crosstabs were used to find the percent of normal weight women who responded that they believed they were overweight. For Hypothesis #5, independent samples t tests were employed to investigate whether women who believed they were overweight scored higher on the EAT-26 and EDE-Q Global than women who did not believe they were overweight. Finally, for Hypothesis #6, Pearson's correlations were used to test whether BMI was significantly correlated with the EAT-26 or EDE-Q Global.

Ancillary analyses were performed to explore which items on the EAT were significantly correlated with healthy eating; this was done using Pearson's correlations with a Bonferroni correction for multiple correlations. Finally, ancillary regressions were performed with EAT factors that were recalculated without those items that correlated significantly with healthy eating to determine if omitting those items eliminated healthy eating as a significant predictor of that EAT factor. These regressions were done in the same manner as described for Hypothesis #3, with BMI as a covariate, and with the revised Fruit and Vegetable scale, EDE-Q Dieting, and EDE-Q Global as independent variables.

Descriptive Statistics

Block Food Screener. Scores on the Block Fat scale ranged from 0.06 - 3.06 (out of a possible high of 5 once the items are summed and averaged), with a mean of 1.22 (*SD* = 0.55). For the Fruit and Vegetable scale, scores on the original, 7-item version ranged from 0.29 – 4.00 (*M* = 1.68; *SD* = 0.64) and scores on the revised, 4-item version ranged from 0 – 5.00 (*M* = 1.87; *SD* = 0.82) (See Table 2).

EAT-26. The mean for the EAT-26 was 8.63 (*SD* = 8.45) when using the clinical (0-3) scoring system, with scores ranging from 0 to 46 out of a possible high of 78. This mean is comparable to means reported by researchers using the EAT-26 in nonclinical samples (e.g., Doninger et al., 2005; Garner et al., 1982). There were 26 participants (12.6%) who scored above the clinical cutoff of 20. When using the research (1 – 6) scoring system, the mean EAT-26 score was 59.09 (*SD*= 17.43), with a range from 27 – 115. For the EAT-26 Dieting subscale, scores ranged from 13 - 69 with a mean of 31.92 (*SD* = 12.56). The EAT-26 Bulimia and Food Preoccupation scale ranged from 6 - 28;

the mean was 11.65 (*SD* = 4.29). The third EAT-26 factor, Oral Control, had a range from 7 – 30, and a mean of 15.51 (*SD* = 4.31) (see Table 2).

EAT-16. Scores on the EAT-16 (using the 1-6 research scoring system) ranged from 16 – 90, and the mean was 38.35 (*SD*= 14.97). The EAT-16 Self-Perception of Body Shape subscale ranged from 3 -18, with a mean of 9.05 (*SD*= 4.31). For the EAT-16 Dieting subscale, the scores ranged from 5 – 30 and had a mean of 12.19 (SD = 5.31). Next, scores on the EAT-16 Food Preoccupation subscale ranged from 4 – 23, with a mean of 7.62 (*SD* = 3.84). Finally, the EAT-16 Awareness of Food Contents scale ranged from 4 – 23, with a mean of 9.48 (SD = 4.27) (see Table 2).

EDE-Q. The mean EDE-Q Global score was 1.68 (*SD*= 1.19) and the scores ranged from 0 – 5, which is very similar to reported norms for young women and college women (Luce & Crowther, 1999; Mond, Hay, Rodgers, & Owen, 2006) (see Table 2). The mean score on the EDE-Q Normal Dieting scale was 2.06 (*SD* = 1.84), with a range from 0 – 6. Thus, on average, participants reported that they dieted 6 – 12 days out of the last 28 days.

Hypothesis # 1

It was predicted that the Dieting factor of the EAT-26 and the Awareness of Food Contents factor from the EAT-16 would be positively correlated with normal dieting (as measured by EDE-Q Normal Dieting) and *healthy* eating (as measured by the Fruit and Vegetable scale on the Block Screener), and negatively correlated with *unhealthy* eating (as measured by the Fat scale on the Block Screener). In order to test this hypothesis, Pearson's correlations were used to correlate EAT-26 Dieting and EAT-16 Awareness of

Food Contents with these measures of dieting, healthy eating, and unhealthy eating (See Table 3).

EAT-26 Dieting. The EAT-26 Dieting factor was indeed related positively to dieting on the EDE-Q Normal Dieting scale, r (206) = .73, p = .000. Additionally, EAT-26 Dieting was positively correlated with healthy eating, but only on the *revised* Fruit and Vegetable scale, r (206) = .21, p = .003. Finally, as hypothesized, EAT-26 Dieting was negatively related to unhealthy eating on the Fat scale, r (206) = .29, p = .000.

EAT-16 Awareness of Food Contents. For the EAT-16 Awareness of Food Contents scale, in accordance with Hypothesis 1, there was a significant positive correlation with EDE-Q Normal Dieting, r (206) = .69, p = .000. EAT-16 Awareness of Food Contents was also positively correlated with healthy eating on both the original version of the Fruit and Vegetable scale, r (206) = .18, p = .009, and on the revised version of the Fruit and Vegetable scale, r (206) = .32, p = .000. Finally, as expected, EAT-16 Awareness of Food Contents was negatively correlated with unhealthy eating as measured by the Fat scale, r (206) = -.25, p = .000.

In summary, in support of Hypothesis # 1, women who scored higher on EAT-26 Dieting and EAT-16 Awareness of Food Contents scales also tended to score higher on a measure of normal dieting (EDE-Q Normal Dieting) and healthy eating (the Fruit and Vegetable scale), and lower on a measure of unhealthy eating (the Fat scale).

Hypothesis # 2

The second hypothesis was that the remaining factors of the EAT-26 (Bulimia/Food Preoccupation and Oral Control) and EAT-16 (Dieting, Self-Perception of Body Shape, and Food Preoccupation) would not be correlated with normal dieting,

healthy eating, or unhealthy eating. To test this prediction, Pearson's correlations were used to correlate EDE-Q Normal Dieting, the Fruit and Vegetable scale, and the Fat scale from the Block Food Screener with the aforementioned EAT-26 and EAT-16 scales (see Table 3).

EAT-26 Oral Control. As predicted, EAT-26 Oral Control was not related to EDE-Q Normal Dieting, the Fruit and Vegetable scale, or the Fat scale.

EAT-26 Bulimia/Food Preoccupation. In accordance with Hypothesis # 2, EAT-26 Bulimia/Food Preoccupation was not related to healthy eating as measured by either version of the Fruit and Vegetable scale. However, EAT-26 Bulimia/Food Preoccupation was significantly positively correlated with EDE-Q Normal Dieting, r (206) = .47, p = .000 and significantly negatively correlated with the Fat scale, r (206) = -.21, p = .003. In other words, women who scored higher on the EAT-26 Bulimia/Food Preoccupation scale tended to score higher on a measure of normal dieting and lower on a measure of unhealthy eating as measured by the Fat scale.

EAT-16 Dieting. Contrary to Hypothesis # 2, EAT-16 Dieting was positively correlated with EDE-Q Normal Dieting (r [206] = .69, p = .000) and with the revised version of the Fruit and Vegetable scale (r [206] = .19, p = .007), and negatively correlated with the Fat scale (r [206] = -.27, p = .000). This suggests that women who scored higher on EAT-16 Dieting also tended to report more dieting on the EDE-Q Normal Dieting scale, healthier eating on the Fruit and Vegetable revised scale, and less unhealthy eating on the Fat scale.

EAT-16 Self-Perception of Body Shape. Although it was hypothesized that EAT-16 Self-Perception of Body Shape would not be related to dieting, healthy eating, or

unhealthy eating, the scale did in fact show a significant positive correlation with EDE-Q Normal Dieting, r (206) = .54, p = .000, and a significant negative correlation with the Fat scale, and r (206) = -.25, p = .000, respectively. Specifically, contrary to Hypothesis #2, women who scored higher on EAT-16 Self-Perception of Body Shape scales also tended to report more dieting on EDE-Q Normal Dieting and eating less fat on the Fat scale.

EAT-16 Food Preoccupation. Finally, it was hypothesized that EAT-16 Food Preoccupation would not be correlated with dieting, healthy eating, or unhealthy eating. In accordance with this hypothesis, EAT-16 Food Preoccupation was not correlated with either version of the Fruit and Vegetable scale or with the Fat scale. However, EAT-16 Food Preoccupation was significantly correlated with EDE-Q Normal Dieting, r = .45, p = .000. Thus, women scoring higher on EAT-16 Food Preoccupation also tended to score higher on EDE-Q Normal Dieting.

Hypothesis # 3

The third hypothesis was that more variance in the Dieting factor of the EAT-26 and the Awareness of Food Contents factor of the EAT-16 would be explained by dieting and healthy eating (as measured by the EDE-Q Normal Dieting scale and the Fruit and Vegetable scale) than by pathological eating (as measured by global scores on the EDE-Q). In addition to these two EAT factors, regressions with an additional EAT factor, EAT-16 Dieting, were also performed because this factor was significantly correlated with healthy eating in Hypothesis #2. This hypothesis was tested through linear regression analyses (See Table 4). BMI was included as a covariate in these linear regressions in order to control for the possible effect that BMI might have on eating.

Additionally, each regression was performed twice, once with the original Fruit and Vegetable scale and once with the revised version.

EAT-26 Dieting. For the first regression, the EAT-26 Dieting scale was entered as the dependent variable. For the independent variables, BMI was first entered as a covariate, and then the original Fruit and Vegetable scale, EDE-Q Normal Dieting, and the EDE-Q Global Score were entered as predictors. The original version of the Fruit and Vegetable scale was not a significant predictor of EAT-26 Dieting, but EDE-Q Normal Dieting and EDE-Q Global Scores were, $b = .31$, $t = 5.66$, $p = .000$ and $b = .60$, $t = 10.35$, $p = .000$, respectively. For the second regression, BMI was again entered as a covariate, followed by the *revised* Fruit and Vegetable scale, EDE-Q Normal Dieting, and EDE-Q Global Score as predictors. This revised version of the Fruit and Vegetable scale was not a significant predictor of EAT-26 Dieting. However, EDE-Q Normal Dieting $b = .29$, $t = 5.16$, $p = .000$ and EDE-Q Global Scores remained a significant predictor of EAT-26 Dieting, $b = .61$, $t = 10.48$, $p = .000$. Inspection of the semipartial correlation coefficients indicated that EDE-Q Normal Dieting uniquely accounted for only 3.8% of the variance in EAT-26 Dieting, whereas EDE-Q Global Scores uniquely accounted for 15.8% of the variance in EAT-26 Dieting. This suggests that, contrary to the hypothesis, EDE-Q Global Scores accounted for more unique variance in EAT-26 Dieting than did EDE-Q Normal Dieting and the revised Fruit and Vegetable scale.

EAT-16 Awareness of Food Contents. The next set of regressions included the EAT-16 Awareness of Food Contents scale as the dependent variable, with BMI entered as a covariate and the Fruit and Vegetable scale, EDE-Q Normal Dieting, and EDE-Q Global Scores entered as predictors. The first of these regressions used the original

version of the Fruit and Vegetable scale. This scale was a significant predictor of EAT-16 Awareness of Food Contents, (b = .14, t = 2.88, p = .004), as was EDE-Q Normal Dieting (b = .54, t = 7.72, p = .000) and EDE-Q Global Scores, b = .17, t = 2.30, p = .022. The second regression was identical, with the exception that the revised version of the Fruit and Vegetable scale was used instead of the original Fruit and Vegetable scale. This revised version of the scale was also a significant predictor of EAT-16 Awareness of Food Contents, b = .17, t = 3.26, p = .001. In this regression EDE-Q Normal Dieting (b = .50, t = 6.95, p = .000) and EDE-Q Global Scores (b = .18, t = 2.44, p = .015) remained significant predictors of EAT-16 Awareness of Food Contents. The revised Fruit and Vegetable scale uniquely accounted for 2.6% of the variance in EAT-16 Awareness of Food Contents, whereas EDE-Q Normal Dieting accounted for 11.6% and EDE-Q Global Scores accounted for 1.4% of the variance in EAT-16 Awareness of Food Contents.

In summary, across both of these regressions (the first with the original version of the Fruit and Vegetable scale and the second with the revised version), EDE-Q Normal Dieting accounted for the largest proportion of unique variance in EAT-16 Awareness of Food Contents (11.6%), followed by healthy eating (2.6% of the variance) and then by EDE-Q Global Scores (1.4% of the variance). Thus, Hypothesis # 3 was supported in that normal dieting (EDE-Q Normal Dieting) and healthy eating (Fruit and Vegetable scale) accounted for more variance in EAT-16 Awareness of Food Contents than pathological eating (EDE-Q Global Scores).

EAT-16 Dieting. The final set of regressions used the EAT-16 Dieting factor as the dependent variable, since this scale was also found to relate to normal dieting, healthy eating, and unhealthy eating. Again, both regressions included BMI as a covariate. For

the regression which included the original version of the Fruit and Vegetable scale as a predictor, the Fruit and Vegetable scale was not a significant predictor of EAT-16 Dieting. EDE-Q Normal Dieting and EDE-Q Global Scores were, however, significant predictors of EAT-16 Dieting, $b = .29$, $t = 4.78$, $p = .000$ and $b = .58$, $t = 9.01$, $p = .000$, respectively. Finally, the second regression determined that the revised Fruit and Vegetable scale also was not a significant predictor of EAT-16 Dieting. EDE-Q Normal Dieting and EDE-Q Global Scores remained significant predictors, $b = .27$, $t = 4.40$, $p = .000$ and $b = .59$, $t = 9.08$, $p = .000$. Semipartial correlation coefficients indicated that EDE-Q Normal Dieting accounted for 3.4% of the variance in EAT-16 Dieting; EDE-Q Global Scores accounted for 14.7% of the variance in EAT-16 Dieting. These findings indicate that EDE-Q global scores predicted more variance in EAT-16 Dieting than did EDE-Q Normal Dieting or the Fruit and Vegetable scale.

Hypothesis #4

The fourth hypothesis was that a high proportion of women would incorrectly perceive themselves as overweight. Crosstabs indicated that 41 of the 135 women (30.37%) who had BMIs in the normal weight range incorrectly believed that they were overweight. In contrast, none of the 16 underweight women thought they were overweight, and 49 of the 54 overweight women (90.74%) correctly believed they were overweight. Thus, almost a third of women who were normal weight incorrectly believed themselves to be overweight, but underweight and overweight women were relatively accurate in their self-perceptions of weight status.

Hypothesis #5

The fifth hypothesis was that women who perceived themselves as overweight would score higher on the EAT-26 and EDE-Q Global regardless of their BMI. Using the 1-6 scoring method, the mean EAT-26 score for women who believed they were overweight was higher (M = 65.88, SD = 17.52) than the mean score for women who did not believe they were overweight (M = 53.50, SD = 15.17). An independent samples t test indicated that this difference was significant, t (203) = -5.41, p = .000. Using the 0-3 scoring, the mean for the women who believed they were overweight was 11.29 (SD = 9.81) and the mean for women who did not believe they were overweight was 6.45 (SD = 6.46). Similarly, the mean EDE-Q Global score for women who perceived themselves as overweight was higher (M = 2.37, SD = 1.18) than for women who did not perceive themselves as overweight (M = 1.13, SD = 0.87). Again, an independent samples t test indicated this difference was significant, t (203) = -8.64, p = .000. In other words, women who perceived themselves as overweight scored higher on the EAT-26 and EDE-Q Global than women who did not perceive themselves as overweight.

Hypothesis #6

The sixth hypothesis was that EAT-26 and EDE-Q Global scores would not significantly correlate with BMI. Pearson's correlations indicated that there was a significant correlation between BMI and EAT-26 score, r (206) = .21, p = .003 and between BMI and EDE-Q Global score, r = .41, p = .000. Thus, contrary to Hypothesis #6, both the EAT-26 and EDE-Q Global scores were significantly correlated with BMI.

Ancillary Analyses

Item-level analyses. As almost all of the EAT factors were significantly correlated with EDE-Q Normal Dieting, item-level analyses between EAT items and

EDE-Q Normal Dieting scores were not performed. However, as only the EAT-26 Dieting scale, the EAT-16 Awareness of Food contents, and EAT-16 Dieting scales were found to correlate positively with healthy eating on the Fruit and Vegetable scale, it was deemed appropriate to correlate the individual items on these scales with total scores on the Fruit and Vegetable scale to explore which items are driving the factor correlations (See Table 5).

Because the EAT-26 Dieting scale contains the items from the EAT-16 Awareness of Food Contents and EAT-16 Dieting within it, item-level analyses on the two EAT-16 factors were performed first to prevent redundancy. To begin, the four items from the EAT-16 Awareness of Food Contents factor were correlated with both versions of the Fruit and Vegetable scale. A Bonferroni correction was used, resulting in alpha = .05/8 = .006. Using this criterion, only item # 6 was significantly correlated with the original version of the Fruit and Vegetable scale, r (206) = .20, p = .003. However, items # 6 (r [206] = .32, p = .000), # 7 (r [206] = .27, p = .000), and # 16 (r [206] = .30, p = .000) were all significantly correlated with the revised version of the Fruit and Vegetable scale (See Appendix B for the items). Thus, although only one EAT-16 Awareness of Food Contents item was correlated with the original Fruit and Vegetable scale, three of the four EAT-16 Awareness of Food Contents items were significantly correlated with the revised Fruit and Vegetable scale.

Next, the five items on the EAT-16 Dieting scale were correlated with both versions of the Fruit and Vegetable scale. None of the items were significantly correlated with the original version of the Fruit and Vegetable scale with the Bonferroni correction

of .05/10 = .005. However, item #23 was significantly correlated with the revised Fruit and Vegetable scale, r (206) = .21, p = .003.

All four items on EAT-16 Awareness scale and three of the five items on the EAT-16 Dieting scale are also on the EAT-26 Dieting scale. Beyond these items, the EAT-26 Dieting scale has four additional items. Correlations were performed between these four items and both versions of the Fruit and Vegetable scale. A Bonferroni correction was used to correct for multiple analyses (.05/8 = .006). Using this criterion, none of these four remaining items from EAT-26 Dieting were significantly correlated with either version of the Fruit and Vegetable scale.

In summary, three of the four items from the EAT-16 Awareness of Food Contents scale and one item from the EAT-16 Dieting scale were significantly correlated with the revised version of the Fruit and Vegetable scale.

Regression with the revised EAT-16 and EAT-26 scales. As individual items on the EAT-16 Awareness and Dieting scales and EAT-26 Dieting scale were identified as significantly correlated with healthy eating, ancillary regressions were performed with revised versions of these scales in which the identified items were *deleted* from the scale. The objective was to determine whether deleting these items would eliminate the relationship between these EAT factors and healthy eating, as this might potentially improve the EAT's validity. For the EAT-26 Dieting factor, the items that were significantly correlated with healthy eating were removed to produce a revised scale. As only the revised version of the Fruit and Vegetable scale was a significant predictor of EAT-26 Dieting in Hypothesis # 3, this same regression was run again but with the revised version of EAT-26 Dieting as the dependent variable. In this regression, the

revised Fruit and Vegetable scale was no longer a significant predictor of the revised EAT-26 Dieting factor, *b*=.049, *p*=*n.s.*

For the EAT-16 Awareness scale, three of the four items correlated significantly with healthy eating, leaving only one item remaining. For this reason, regressions were not done with a revised version of this factor. For the EAT-16 Dieting factor, item #23 (which was found to correlate significantly with healthy eating) was removed from the scale and the regressions were re-run with BMI as a covariate, and the revised Fruit and Vegetable scale and EDE-Q as predictors. (The original version of the Fruit and Vegetable scale did not significantly predict EAT-16 Dieting in Hypothesis # 3, so it was not repeated here). Results showed that the revised Fruit and Vegetable scale was no longer a significant predictor of the revised EAT-16 Dieting factor, $b = .08$, $p = n.s.$ Thus, revising the scales by deleting the items that significantly correlated with healthy eating rendered the Fruit and Vegetable scale an insignificant predictor of the EAT scales. This indicates that removing certain items on the EAT may eliminate the EAT's relationship with healthy eating.

Chapter 4

Discussion

Hypothesis # 1

The purpose of this study was to investigate whether certain factors on the EAT, an instrument originally developed to screen for AN, are now related to normal dieting and/or healthy eating. Overall, many of the hypotheses were supported. Evidence was found for the first hypothesis, which proposed that certain factors of the EAT deemed likely to relate to normative behaviors would be positively correlated with dieting (as measured by EDE-Q Normal Dieting) and healthy eating (as measured by the Fruit and Vegetable scale), and negatively correlated with unhealthy eating (as measured by the Fat scale). Specifically, the EAT-26 Dieting factor and the EAT-16 Awareness of Food Contents and Dieting factors were significantly (positively) correlated with dieting and healthy eating and significantly (negatively) correlated with unhealthy eating. As the EAT is meant to measure disordered eating (Garner & Garfinkel, 1979), it may be problematic for the EAT's validity that some of its factors were also found to correlate with normal dieting and healthy eating. Previous researchers have raised similar questions regarding the validity of the EAT (Button & Whitehouse, 1981; Nunes et al., 2005).

Hypothesis # 2

Hypothesis # 2 predicted that the remaining EAT factors would not be related to dieting, healthy eating, and unhealthy eating. However, several unexpected correlations between other EAT factors and these variables were found. Specifically, a factor on the EAT thought to measure *pathological* dieting (EAT-16 Dieting) due to its emphasis on

seemingly more extreme behaviors (e.g., having the impulse to vomit after meals; extreme guilt after eating certain foods) also correlated with normal dieting and healthy eating. This finding is consistent with research that indicates dieting is a risk factor for disordered eating, and that the eating disorders exist on a continuum with dieting (Ackard, Croll, & Kearney-Cooke, 2002; Neumark-Sztainer et al., 2006; Stice, 2001; Sundgot-Borgen & Torstveit, 2010). In considering the correlation between pathological dieting and the measure of healthy eating, one might reasonably assume that women who are dieting, regardless of whether it is pathological in nature or not, do so in part by increasing their fruit and vegetable intake. This would be in accordance with general recommendations for weight loss (Rolls, Ello-Martin, & Tohill, 2004), especially as fruits and vegetables are known to be low in calories (Freedman, King, & Kennedy, 2001).

More EAT factors than hypothesized were significantly positively correlated with normal dieting and negatively correlated with unhealthy eating. The correlations between the EAT factors and normal dieting were medium to strong, ranging from .45 to .73, whereas the correlations between the EAT factors and unhealthy eating were small (-.24 to -.29). As one of the most common dieting methods is to cut back on fatty foods (Malinauskas, Raedeke, Aeby, Smith, & Dallas, 2006), one possible explanation for this finding is that, as proposed by previous researchers (e.g., Meadows et al., 1986; Patton & King, 1991), the EAT indexes normal dieting rather than disordered eating *per se*, and the small inverse relationships between unhealthy eating and the EAT factors are driven by normal dieting. Thus, rather than a single factor on the EAT, it appears that several factors on the EAT are consistently associated with normal dieting. This finding is consistent with other researchers' hypotheses that the EAT was measuring dieting when

they discovered that the majority of individuals scoring above the EAT's clinical cutoff were normal dieters (e.g., Button & Whitehouse, 1981; Mann, 1983).

Hypothesis # 3

Hypothesis #3 was that the portion of the EAT related to a drive for thinness (EAT-26 Dieting) and the factor on the EAT related to an awareness of the nutrition content of foods (EAT-16 Awareness of Food Contents) would be more strongly related to normal dieting and healthy eating than to pathological eating (EDE-Q Global score). The reason for this hypothesis was that many items on these factors, such as being aware of the calorie content of foods, are not necessarily pathological, but may even represent healthy eating in today's weight conscious society. This hypothesis was only supported in the case of the EAT factor related to awareness of the nutrition content of foods. Semipartial correlation coefficients from regression analyses showed that normal dieting accounted for 11.6% of the variance in awareness of the nutrition content of foods, followed by healthy eating (about 2% of the variance) and then by pathological eating (about 1.5% of the variance). In contrast, more variance in drive for thinness (EAT-26 Dieting) and pathological dieting (EAT-16 Dieting) on the EAT was accounted for by pathological eating than by healthy eating or normal dieting.

The finding that drive for thinness and pathological dieting on the EAT are more closely related to pathological eating than to healthy eating or normal dieting provides partial support for the EAT's construct validity, as the EAT was designed to measure pathological eating (Garner & Garfinkel, 1979). However, pathological eating accounted for less than 20% of the variance in these factors, which is less than one might expect given that this is what the EAT is purportedly measuring. Additionally, the results found

for the EAT's factor relating to awareness of the nutrition content of foods are problematic for the validity of the EAT, as both normal dieting and healthy eating accounted for more variance in this factor than did pathological eating. This finding may be due to the changing attitudes toward eating, specifically the rise in the prevalence of dieting and awareness of healthy eating (e.g., Eisner et al., 1992; Kruger et al., 2004). Future studies might test whether eliminating this factor from the EAT would improve its validity as a measure of disordered eating.

As the EAT-16 has been shown to have superior psychometric properties to the EAT-26, given that the 16-item, 4-factor structure provides a significantly better model fit (Belon et al., 2011; Ocker et al., 2007), it was somewhat surprising that two of the EAT-16 factors and only one of the EAT-26 factors correlated with healthy eating. Similarly, all of the EAT-16 factors correlated with normal dieting, whereas only two of the three EAT-26 factors correlated with normal dieting. It is conceivable that the EAT-26 has somewhat superior construct validity to the EAT-16 inasmuch as it has fewer factors that are correlated with non-pathological eating variables (dieting and healthy eating). However, this may also be explained by the fact that the single EAT-26 factor that was *not* related to either healthy eating or normal dieting is the only EAT-26 factor that was completely eliminated from the EAT to produce the EAT-16. It may simply be the case that this factor is no longer relevant to pathological eating (note also that Cronbach's alpha for this subscale was low at .56). Therefore, it may be that the factor structure of the EAT-16 is a more accurate representation of the factors on the EAT as they relate to modern forms of pathological eating.

Hypotheses # 4 - 6

The fourth hypothesis, that a large proportion of women would be inaccurate in their perceptions of their own weight status, was supported. The finding that almost a third of normal weight women mistakenly believed themselves to be overweight in the current study was consistent with previous findings of 25% - 50% of women holding that belief (Chang & Christakis, 2003; Paeratakul et al., 2002). The fifth hypothesis was also supported: regardless of BMI, women who perceived themselves as overweight scored higher on the EAT-26 and EDE-Q. As very few women in this sample reported ever being diagnosed with an eating disorder, and women who believe they are overweight are likely to diet (Strauss, 1999), this finding lends additional support to the idea that to some extent the EAT-26 may be measuring normal dieting (Mann, 1983; Meadows et al., 1986; Patton et al., 1990; Williams et al., 1986). Finally, the sixth hypothesis, that BMI would not be correlated with EAT-26 or EDE-Q Global scores, was not supported. Women with higher BMIs scored higher on both the EAT and the EDE-Q, indicating that they demonstrated higher levels of eating pathology. This finding seems to contradict the previous finding that women did not have accurate perceptions of their own BMI status; however, this was mostly true for normal weight women. Overweight and underweight women were more accurate, in that most overweight women knew they were overweight, and all of the underweight women knew they were not overweight. The correlation between BMI and scores on the EAT and EDE-Q may have been driven by the fact that although one third of normal weight women incorrectly perceived their BMI status, the majority of women in this study overall were accurate in their perception of their BMI. In conclusion, normal weight women are not particularly accurate in their perceptions of weight status, *and* perceiving oneself as overweight is linked with dieting (Strauss, 1999);

additionally, having a heavier BMI is linked with higher levels of pathological eating. As the EAT is related to normal dieting, this finding could help explain why perceived weight and actual BMI are related to EAT-26 scores.

Ancillary analyses

Ancillary analyses followed up on the finding that EAT factors related to pathological dieting, drive for thinness, and awareness of the nutrition contents of foods were correlated with healthy eating. These items (which are taken from the EAT-26 measure rather than the EAT-16, as the EAT-26 is the version of the EAT currently in use) included #s 6, 7, 16, and 23. Three of these four items appear on both the drive for thinness factor (EAT-26 Dieting) and the awareness of the nutrition content of foods (EAT-16 Awareness of Food Contents) factor. Item # 6 asks the extent to which one is "aware of the calorie content of foods that I eat." This may have represented pathological eating in 1979 when the EAT was developed, but recent developments in nutrition labeling and health consciousness have made awareness of calorie content of foods much more widespread (Elbel et al., 2009; 2011). Item # 7 states "Particularly avoid foods with a high carbohydrate content (e.g., bread, rice, potatoes, etc.)." Given the popularity of low-carbohydrate diets (such as the Atkins diet) (Yancy, Olsen, Guyton, Bakst, & Westman, 2004), this is a relatively common current dieting behavior (Kruger et al., 2004). Item # 16 states "Avoid foods with sugar in them." New government initiatives such as the Food Guide Pyramid recommend eating high-sugar foods sparingly, so conceivably this may now be a normative behavior for individuals who are attempting to eat a healthy diet (USDA Center for Nutrition Policy and Promotion, 1996). Finally, item # 23 (which appears on EAT-16 Dieting) states "Engage in dieting behavior."

Likely in response to the obesity epidemic, dieting has significantly increased in prevalence over the years. Currently almost half of all adults in the U.S. are dieting at any given time (e.g., Jeffery, Adlis, & Forster, 1991; Malinauskas et al., 2006). As discussed previously, individuals who diet may be attempting to increase fruit and vegetable intake in order to decrease calories, and this could account for why an item relating to dieting would be correlated with healthy eating in the current study.

The finding that these four items are correlated with healthy eating suggests that they might be candidates for removal from the EAT. In fact, ancillary regressions performed on revised versions of the EAT's drive for thinness and awareness of nutrition contents of foods factors in which these items were *removed* showed no significant relationship between these modified sections of the EAT and healthy eating. This indicates that removing these few items may eliminate any relationship between the EAT factors and healthy eating, thereby potentially increasing the EAT's ability to identify individuals with eating disorders.

Limitations

One limitation of this study was the use of the Block Fruit and Vegetable scale as a measure of healthy eating. The Block Food Screener was developed primarily as a measure of nutrient intake (Block, Gillespie, Rosenbaum, & Jenson, 2000). Therefore, several items on the Fruit and Vegetable portion of the scale are items that may be useful for estimating nutrient intake, but are not necessarily items indicative of healthy eating (such as item #7, "potatoes," which includes fried potatoes). When these items were eliminated as part of the current study, it appeared to improve its validity as a measure of healthy eating, as evidenced by the many instances in which only the revised version (but

not the original version) correlated with study variables. Nevertheless, one could easily argue that healthy eating is not defined solely in terms of fruit and vegetable intake (Strachan & Brawley, 2009; Weimer, 1999). Additionally, this revised version of the Fruit and Vegetable scale has not been validated, and the estimates of internal reliability for both versions of the Fruit and Vegetable scale in this study were unacceptably low. Future research should develop and validate a more multifaceted instrument – perhaps one that includes items assessing more than food *content* – to measure healthy eating.

For the purposes of this study, a revised version of the EDE-Q Restraint scale was created in an attempt to measure normal dieting. Although the three items on this scale appear to be face-valid indicators of dieting, and internal reliability for the scale was acceptable, it would be preferable to use a validated measure of dieting. Future research could replicate this work using a measure such as the Cognitive Behavioral Dieting Scale, which shows good construct and predictive validity and differentiates between normal dieting and disordered eating (Martz, Sturgis, & Gustafson, 1996; Pinkston et al., 2001).

The main limitation of this study was the lack of diagnostic interview information for the participants. Future research should compare clinical diagnoses with EAT scores to determine if eliminating the EAT items that were correlated with healthy eating improves the EAT's diagnostic ability. Additionally, future research should determine if the EAT-16 is more accurate than the EAT-26 at identifying individuals with eating disorders. It is now fairly well established that the EAT-16 has acceptable psychometric properties and even demonstrates measurement invariance across Caucasian and Hispanic women (Belon et al., 2011; Ocker et al., 2007). Still, further exploration of the factors of

the EAT-16, such as by examining their correlates, may provide additional insight that could potentially open up possibilities for using the four factors separately.

Directions for Future Research and Conclusion

The EAT was developed in 1979 to identify women that may be at risk for an eating disorder. As discussed, since the 1970s there have been many societal changes regarding attitudes toward eating, including increases in dieting and awareness of healthy eating. Since this study demonstrated that the portions of the EAT relating to awareness of the nutrition content of foods, dieting, food preoccupation, and drive for thinness are related to normal dieting and healthy eating, questions were raised about the EAT's validity as a measure of eating pathology. Other researchers have likewise determined that the EAT mistakenly identifies normal dieters as disordered (e.g., Button & Whitehouse, 1981; Mann, 1983). This may indicate that the EAT could benefit from revision. In this study, several specific items were identified that relate strongly with healthy eating; these items may be candidates for removal. However, the EAT's relationship with normal dieting was more diffuse, and thus it may be more difficult to address.

Future research should clarify the distinction between dieting and pathological eating, including whether these two constructs lie on the same continuum (Ackard et al., 2002; Sundgot-Borgen & Torstveit, 2010**)**. Conceivably those individuals who respond in an extreme fashion on the EAT are demonstrating the perfectionistic, inflexible characteristics of disordered eating (Anderluh, Tchanturia, Rabe-Hesketh, Collier, & Treasure, 2009), but individuals who respond in the "clinical range" but not consistently in the extreme are exhibiting normal dieting behaviors. Once these constructs are

differentiated, ways of improving the EAT to better distinguish between the two constructs may become clear. Specifically, it may prove possible to use EAT scores to distinguish between dieters who are at risk for developing an eating disorder and those who are modifying their food intake and choices in a healthy manner.

Increasing societal preoccupation with thinness and weight loss may be reactions to the steep increase in obesity since the 1970s (Flegal et al., 2002). In this study, this preoccupation was reflected in the relatively high proportion of normal-weight women who believed they were overweight, as well as the fact that almost all of the overweight participants knew they were overweight. Even women who know they are at a healthy weight may still desire to lose weight in an attempt to achieve the thin-ideal widely accepted as a symbol of feminine beauty (Homan, 2010; McCarthy, 1990). Thus, attempts to eat a healthy diet and to restrict food intake to lose weight may be normative behaviors, even among normal weight women. This may help explain why the EAT, which once measured pathological eating, is now correlated with non-pathological variables such as normal dieting and healthy eating. It may be that the EAT could be revised to more purely measure pathological eating by rewording the items in a more extreme fashion so that they no longer index normative behaviors. Alternatively, it may be that the EAT measures something different in a clinical sample, on which the EAT was developed, than in a non-clinical sample. Future research could investigate this idea by performing measurement invariance analyses comparing a nonclinical sample to a clinical sample to determine whether the factor structure is comparable.

In conclusion, this study found an interesting pattern of correlations between the various factors of the EAT-16 and the EAT-26 and dieting, healthy eating, and unhealthy

eating. Most of these correlations supported the idea that the EAT is related to normal dieting, although the factors on the EAT relating to drive for thinness and pathological dieting were more strongly related to pathological eating. This may reflect the conflicting pressures placed on individuals in modern society, namely, the initiatives to prevent obesity *and* the movement against disordered eating (Hill, 2007). Additionally, certain factors on the EAT are correlated with healthy eating, whereas others are not. The correlations between EAT factors and healthy eating appear to be driven by a few specific items; items that revolved around dieting behaviors and awareness of the content of foods. It is possible that eliminating these items could improve the EAT's validity, and future research could readily address this issue. Finally, as this study was correlational, it is impossible to derive causal conclusions, but future research should investigate the idea that this newfound relationship between the EAT and healthy eating is due to the societal changes in awareness of healthy eating seen over the past several decades.

Table 1

Demographics of the Sample (N = 206)

	Mean	SD	N	%
Ethnicity				
Hispanic			78	37.9
Caucasian			69	33.5
Mixed			31	15.0
Native American			13	6.3
Asian American			5	2.4
Other			5	2.4
African American			3	1.5
Age	21.89	6.95		
Marital Status				
Never married			176	85.4
Married			25	12.1
Divorced			5	2.4

Table 1 (continued)

Demographics of the Sample (N = 206)

	Mean	SD	N	%
Education				
High school graduate/GED			86	41.7
1 year of college			37	18.0
2 years of college/associate's			33	16.0
3 years of college			40	19.4
4 years of college/bachelor's			6	2.9
Some graduate school			1	0.5
Other			3	1.5
BMI	23.42	4.64		
Normal weight			136	66.0
Overweight			54	26.2
Underweight			16	7.8
Do you think you are overweight?				
No			115	55.8
Yes			90	43.7
Do you think you are underweight?				
No			188	91.3
Yes			14	6.8

Table 1 (continued)

Demographics of the Sample (N = 206)

	Mean	SD	N	%
Have you ever been diagnosed with an eating disorder?				
No			201	97.6
Yes			5	2.4
Have you ever received treatment for an eating disorder?				
No			201	97.6
Yes			5	2.4

Note. Two (1.0%) individuals failed to provide their race, one (0.5%) individual did not answer whether she thought she was overweight, and four (1.9%) did not answer whether they thought they were underweight.

Table 2

Means and Standard Deviations for the Eating Attitudes Test, Eating Disorders Examination - Questionnaire, and Fruit and Vegetable and Fat scales (N=206)

	M	SD
EAT-26		
Total score (0-3 scoring)	8.63	8.45
Total Score (1-6 scoring)	59.09	17.43
Dieting	31.92	12.56
Bulimia and Food Preoccupation	11.65	4.29
Oral Control	15.51	4.31
EAT-16		
Total Score	38.34	14.97
Self Perception	9.05	4.31
Dieting	12.19	5.31
Preoccupation	7.62	3.84
Awareness of Food Contents	9.48	4.27
EDE-Q Global Score	1.68	1.19
EDE-Q Normal Dieting	2.06	1.84
Fruit and Vegetable scale (original)	1.68	0.64
Fruit and Vegetable scale (revised)	1.87	0.82
Fat scale	1.22	0.55

Note. All Eating Attitudes Test (EAT) factor means and standard deviations are reported using the 1-6 scoring. The Eating Disorders Examination - Questionnaire (EDE-Q)

Global Score, a measure of overall eating pathology, was calculated by summing the four EDE-Q subscales and dividing by the number of subscales. The EDE-Q Normal Dieting scale is a revised version of the EDE-Q Restraint scale in which the items deemed indicative of pathological eating were removed. The Fruit and Vegetable scale is a measure taken from the Block Rapid Food Screener that measures fruit and vegetable intake. The revised Fruit and Vegetable scale eliminated three items from the original Fruit and Vegetable scale because they appeared less relevant to healthy eating.

Table 3

Pearson's Correlations between Eating Attitudes Test-26 factors, Eating Attitudes Test-16 factors, and Fruit and Vegetable, Fat, and Eating Disorders Examination - Questionnaire Normal Dieting scales

	Fruit and Vegetable	Fruit and Vegetable Revised	Fat	EDE-Q Normal Dieting
EAT-26				
Dieting	.054	.207**	-.294**	.729**
Bulimia/Food Preoccupation	-.018	.092	-.208**	.472**
Oral Control	.130	.100	-.078	.123
EAT-16				
Awareness of Food Contents	.182**	.320**	-.254**	.686**
Dieting	.052	.187**	-.267**	.692**
Food Preoccupation	-.017	.106	-.134	.450**
Self–Perception of Body Shape	-.087	.037	-.249**	.540**

Note. The Eating Disorders Examination – Questionnaire (EDE-Q) Normal Dieting scale is a revised version of the EDE-Q Restraint scale in which the items deemed indicative of pathological eating were removed. The Fruit and Vegetable scale is a measure taken from the Block Rapid Food Screener that measures fruit and vegetable intake. The revised Fruit and Vegetable scale eliminated three items from the original Fruit and Vegetable scale because they appeared less relevant to healthy eating.

**$p<.01$

Table 4

Linear Regression Analyses with Eating Attitudes Test (EAT) factors as Dependent Variables, BMI as covariate, and Fruit and Vegetable scales, Eating Disorders Examination – Questionnaire (EDE-Q) Normal Dieting, and EDE-Q Global Scores as Independent Variables

Dependent	Predictors	B	SE(B)	β	R^2	F
1. EAT-26 Dieting					.708	
121.719						
	BMI	-.049	.115	-.018	.000	
	Fruit/Veg Original	.624	.759	.032	.000	
	EDE-Q Normal Dieting	.700	.124	.308**	.047	
	EDE-Q Global Scores	6.342	.613	.602**	.156	
2. EAT-26 Dieting					.711	
123.449						
	BMI	-.042	.114	-.016	.000	
	Fruit/Veg Revised	1.002	.609	.065	.004	
	EDE-Q Normal Dieting	.655	.127	.288**	.038	
	EDE-Q Global Scores	6.404	.611	.608**	.158	
3. EAT-16 Awareness of Food Contents					.509	52.149
	BMI	.045	.051	.048	.002	
	Fruit/Veg Original	.965	.335	.144**	.020	
	EDE-Q Normal Dieting	.421	.055	.543**	.145	
	EDE-Q Global Scores	.623	.270	.174*	.013	

Table 4 (continued)

Linear Regression Analyses with Eating Attitudes Test (EAT) factors as Dependent Variables, BMI as covariate, and Fruit and Vegetable scales, Eating Disorders Examination – Questionnaire (EDE-Q) Normal Dieting, and EDE-Q Global Scores as Independent Variables

Dependent	Predictors	B	SE(B)	β	R^2	F
4. EAT-16 Awareness of Food Contents					.515	53.279
	BMI	.046	.050	.050	.002	
	Fruit/Veg Revised	.875	.269	.168**	.026	
	EDE-Q Normal Dieting	.389	.056	.502**	.116	
	EDE-Q Global Scores	.659	.270	.184**	.014	
5. EAT-16 Dieting					.640	89.511
	BMI	-.034	.054	-.029	.000	
	Fruit/Veg Original	.246	.356	.030	.000	
	EDE-Q Normal Dieting	.277	.058	.288**	.041	
	EDE-Q Global Scores	2.589	.287	.581**	.145	
6. EAT-16 Dieting					.642	90.138
	BMI	-.032	.054	-.028	.000	
	Fruit/Veg Revised	.337	.286	.052	.003	
	EDE-Q Normal Dieting	.262	.060	.273**	.034	
	EDE-Q Global Scores	2.608	.287	.585**	.147	

Note. BMI was included as a covariate in all analyses to control for the possible effect of BMI on the EAT factors. The Fruit and Vegetable scale is a measure taken from the

Block Rapid Food Screener that measures fruit and vegetable intake. The revised Fruit and Vegetable scale eliminated three items from the original Fruit and Vegetable scale because they appeared less relevant to healthy eating. The EDE-Q Normal Dieting scale is a revised version of the EDE-Q Restraint scale in which the items deemed indicative of pathological eating were removed. EDE-Q Global Scores is the average of the scores on all the factors of the EDE-Q and indicates overall eating psychopathology. R^2 for the independent variables is represented by the squared semipartial correlation coefficient.

*p<.05, **p<.01

Table 5

Correlations between Eating Attitudes Test items and Fruit and Vegetable scale

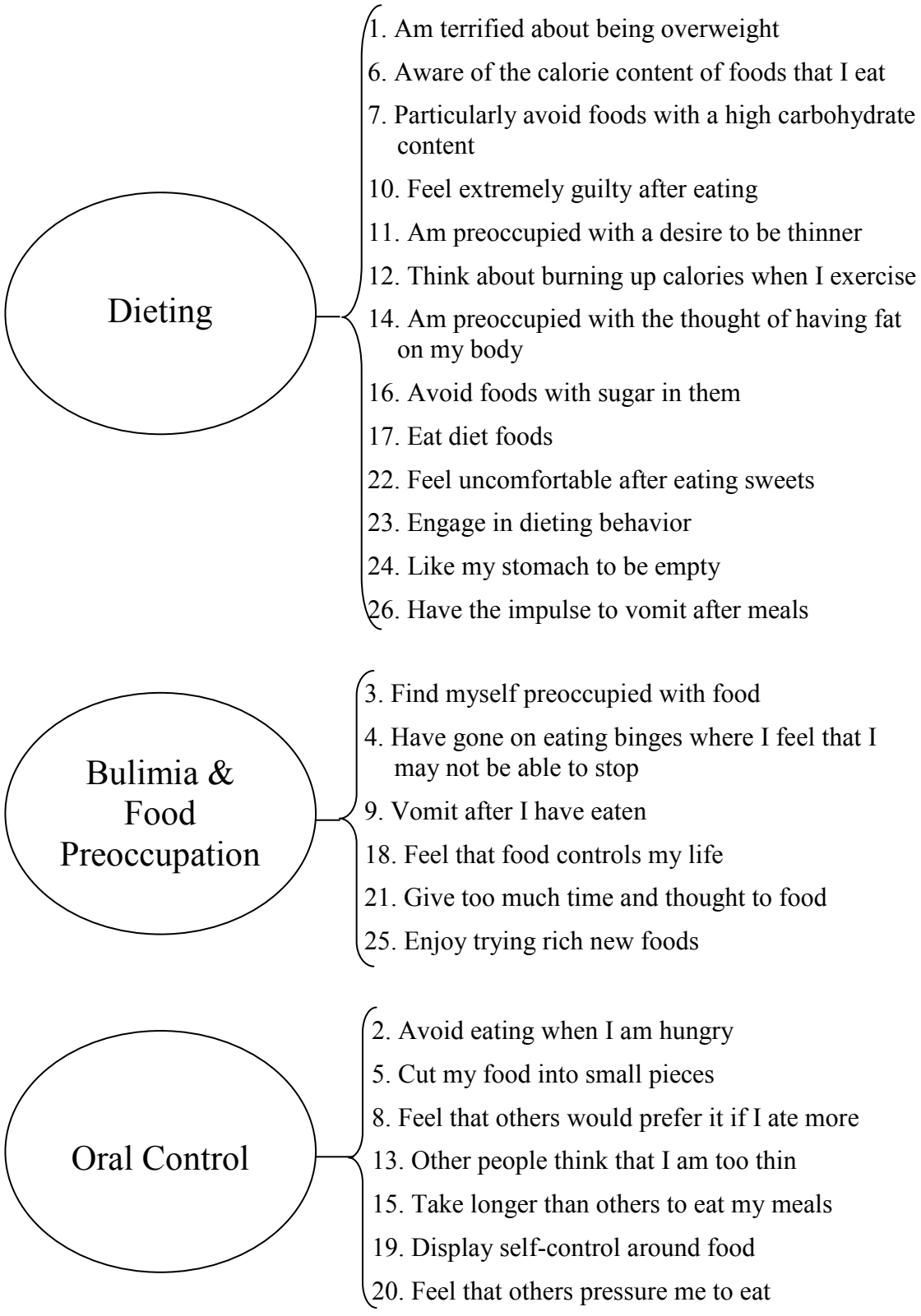
	Fruit and Vegetable	Fruit and Vegetable Revised
EAT-16 Awareness of Food Contents		
EAT06	.202*	.322*
EAT07	.135	.274*
EAT16	.182	.300*
EAT17	.064	.137
EAT-16 Dieting		
EAT10	-.026	.079
EAT12	.051	.150
EAT22	.007	.127
EAT23	.077	.205**
EAT25	-.032	-.048
EAT-26 Dieting		
EAT01	-.099	-.012
EAT11	-.067	.062
EAT14	-.068	.062
EAT26	.006	.107

Note. The EAT-16 Awareness of Food Contents factor focuses on a general awareness of the nutrition content of foods. EAT-16 Dieting centers on behaviors representative of

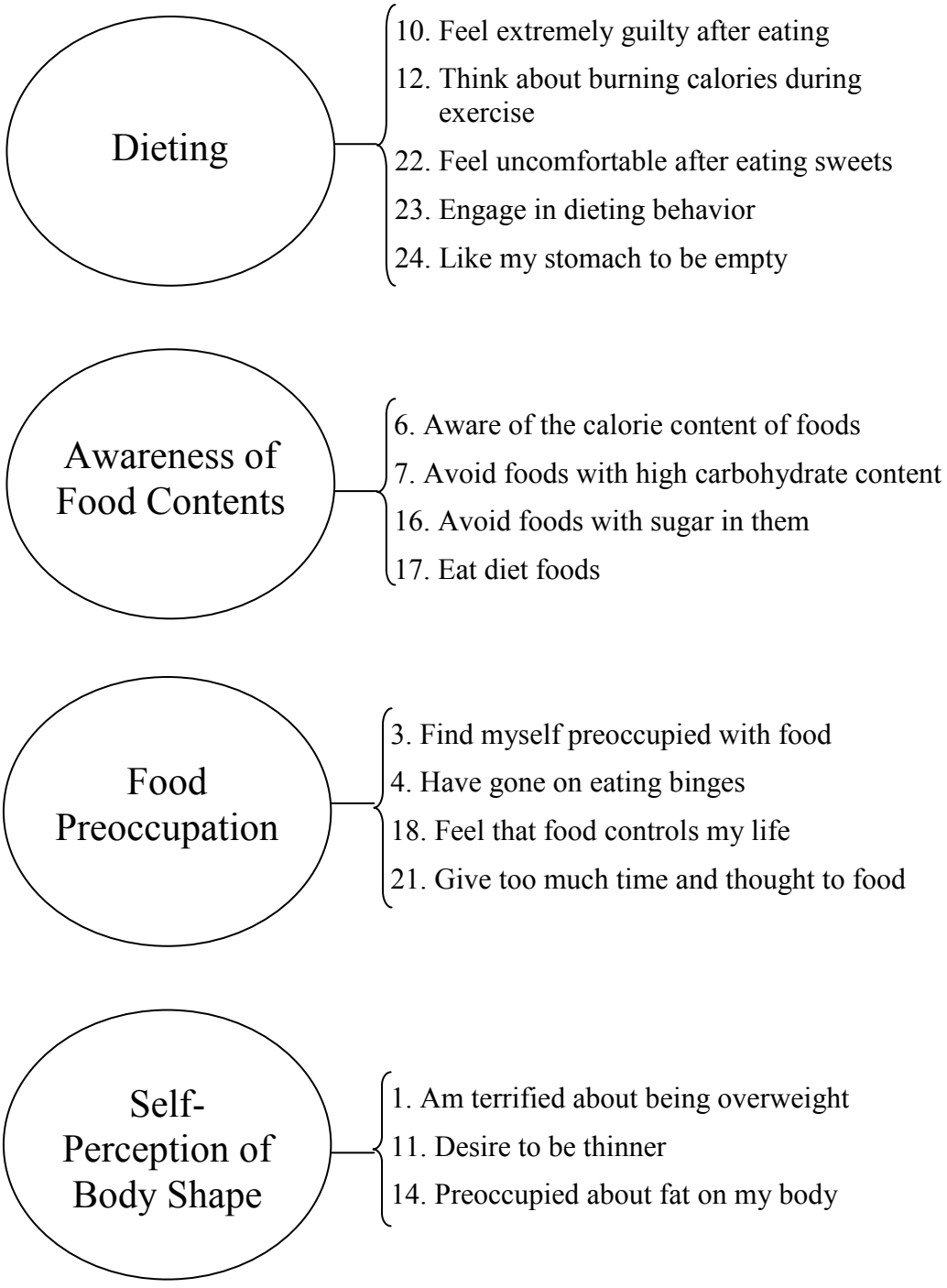
pathological dieting. Finally, EAT-26 Dieting can best be described as measuring drive for thinness. The item numbers are taken from the EAT-26. The Fruit and Vegetable scale is a measure taken from the Block Rapid Food Screener that measures fruit and vegetable intake. The revised Fruit and Vegetable scale eliminated three items from the original Fruit and Vegetable scale because they appeared less relevant to healthy eating. Because several items on the EAT-16 subscales were also on the EAT-26 Dieting subscale, only those EAT-26 Dieting items that had not already been correlated with the Fruit and Vegetable are shown here under EAT-26 Dieting. Specifically, all of the items on the EAT-16 Awareness of Food Contents scale were also on the EAT-26 Dieting scale; additionally, Items #12, 22, and 23 from the EAT-16 Dieting scale were also on the EAT-26 Dieting scale. The four remaining EAT-26 Dieting items are shown here. Family-wise Bonferroni alpha corrections were applied for each scale of the EAT.

*p<.006; **p<.005

Appendix A. Eating Attitudes Test – 26 Factor Structure



Appendix B. Eating Attitudes Test – 16 Factor Structure*



*The 16-item, 4-factor structure is taken from Ocker, Lam, Jensen, & Zhang, 2007. Ocker and colleagues found that this factor structure provided a better fit for the data. This structure has since been independently replicated (Belon, Smith, Bryan, Lash, & Winn, 2011).

Appendix C. Demographics

1. What is your age? _____

2. What is your marital status? (*Please circle one*)
   a. Married & living with husband
   b. Married but not living with husband
   c. Never married
   d. Divorced
   e. Separated
   f. Widowed

3. How would you describe your ethnic identity?

   _____

   If you are Native American, to what tribe do you belong?

   _____

4. What is your occupation?

   _____

(If you are a full-time or part-time student, please indicate this in addition to mentioning employment)

5. What is your highest level of education? (*Please circle one)*
   a. Completed junior year in high school (11th grade)
   b. Graduated from high school (12th grade) or GED
   c. Completed at least 1 year of college (but did not receive a degree)
   d. Completed an associate's degree or equivalent (2 years of college)
   e. Completed 3 years of college
   f. Completed a bachelor's degree (4 year college)
   g. Completed some graduate school (but did not receive a degree)
   h. Completed a masters degree
   i. Other (please specify)

      _____

6. If you have a husband or a Significant Other, what is that person's occupation?

   _____

7. If you have a husband or a Significant Other, how long have you been with this person?

   _____ years and/or _____ months

8. If you have a husband/Significant Other, what is their highest level of education (*circle one*):
   a. Completed less than junior high school (*less than* 7th grade)
   b. Completed 7th grade
   c. Completed junior high school (8th grade)
   d. Completed freshman year (9th grade)
   e. Completed sophomore year (10th grade)
   f. Completed junior year (11th grade)
   g. Graduated from high school (12th grade) or GED
   h. Completed at least 1 year of college (but did not receive a degree)
   i. Completed an associate's degree or equivalent (2 years of college)
   j. Completed a bachelor's degree (4 year college)
   k. Completed some graduate school (but did not receive a degree)
   l. Completed a masters degree
   m. Other (please specify)

      _____

9. How tall are you? _____

10. Approximately how much do you weigh? _____
    (If you do not know, we have a scale you can use in private)

11. Have you ever been diagnosed with an eating disorder? (*circle*) Yes No

12. Have you ever received treatment for an eating disorder? (*circle*) Yes No

    If YES: please indicate the type of eating disorder:
    _____,

    as well as when _____

    and where you were treated
    _____

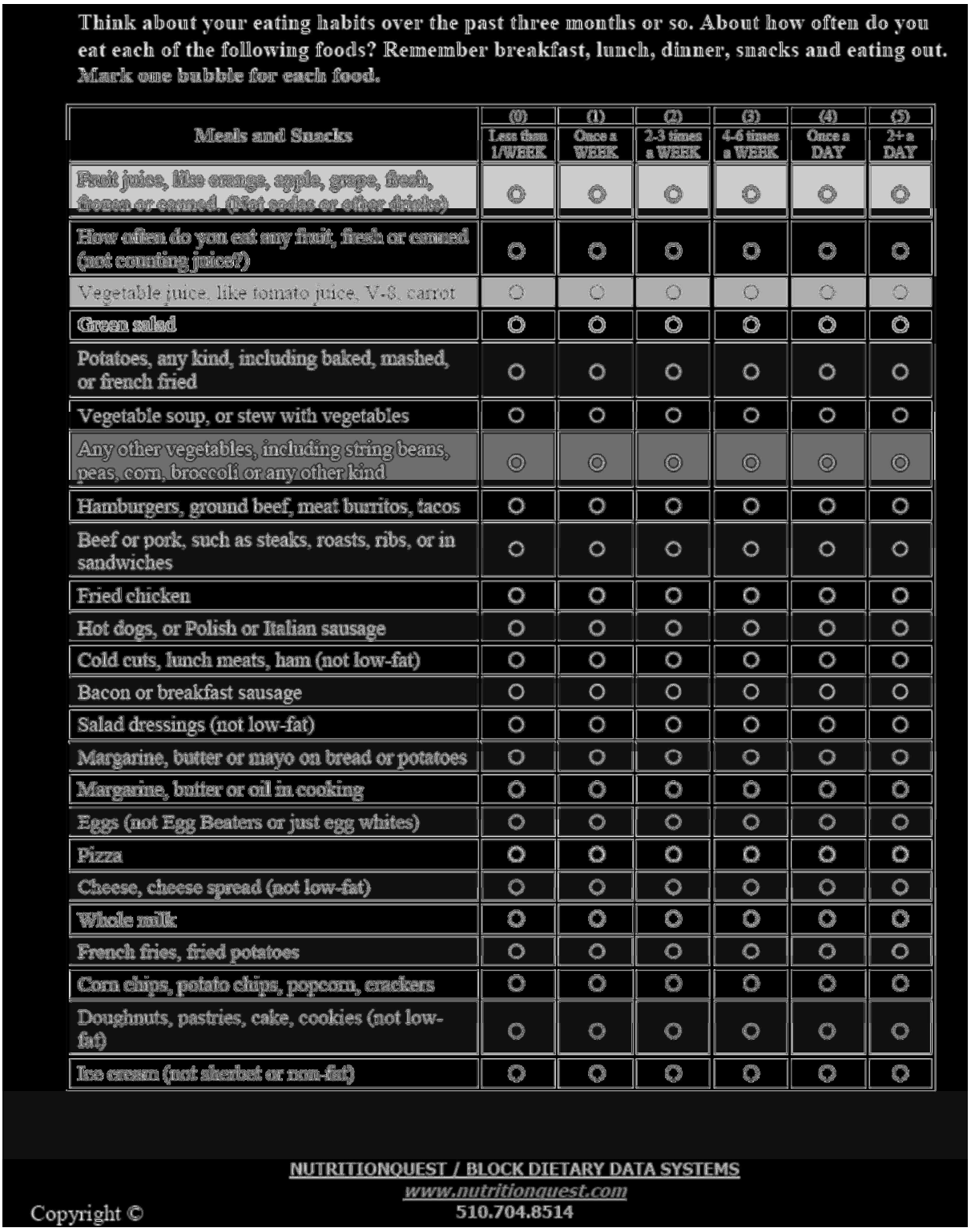
13. Do you think you are overweight? (*circle*)
    Yes No

    If YES: how many pounds do you think you should lose? _____

14. Do you think you are underweight? (*circle*)
    Yes No

    If YES: how many pounds do you think you should gain? _____

Appendix D. Block Rapid Food Screener*



Think about your eating habits over the past three months or so. About how often do you eat each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out. Mark one bubble for each food.

Meals and Snacks	(0) Less than 1/WEEK	(1) Once a WEEK	(2) 2-3 times a WEEK	(3) 4-6 times a WEEK	(4) Once a DAY	(5) 2+ a DAY
Fruit juice, like orange, apple, grape, fresh, frozen or canned. (Not sodas or other drinks)						
How often do you eat any fruit, fresh or canned (not counting juice?)						
Vegetable juice, like tomato juice, V-8, carrot						
Green salad						
Potatoes, any kind, including baked, mashed, or french fried						
Vegetable soup, or stew with vegetables						
Any other vegetables, including string beans, peas, corn, broccoli or any other kind						
Hamburgers, ground beef, meat burritos, tacos						
Beef or pork, such as steaks, roasts, ribs, or in sandwiches						
Fried chicken						
Hot dogs, or Polish or Italian sausage						
Cold cuts, lunch meats, ham (not low-fat)						
Bacon or breakfast sausage						
Salad dressings (not low-fat)						
Margarine, butter or mayo on bread or potatoes						
Margarine, butter or oil in cooking						
Eggs (not Egg Beaters or just egg whites)						
Pizza						
Cheese, cheese spread (not low-fat)						
Whole milk						
French fries, fried potatoes						
Corn chips, potato chips, popcorn, crackers						
Doughnuts, pastries, cake, cookies (not low-fat)						
Ice cream (not sherbet or non-fat)						

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*The Fruit and Vegetable scale consists of the first seven items on the Screener; the Fat scale consists of the remaining 17 items. The modified Fruit and Vegetable scale includes items 2, 4, 6, and 7.

Appendix E. Eating Attitudes – 26

INSTRUCTIONS

Please place and (X) under the column which applies best to each of the numbered statements. All of the results will be strictly confidential. Most of the questions directly relate to food or eating, although other types of questions have been included. Please answer each question carefully. Thank you.

ALWAYS	USUALLY	OFTEN	SOMETIMES	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 foods with a high carbohydrate content.(e.g. 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 fonds.
☐	☐	☐	☐	☐	☐	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 behaviour.
☐	☐	☐	☐	☐	☐	24.	Like my stomach to be empty.
☐	☐	☐	☐	☐	☐	25.	Enjoy trying new rich foods.
☐	☐	☐	☐	☐	☐	26.	Have the impulse to vomit after meals.

[1]D.M. Garner and D.E. Garfinkel (1979) Toronto General Hospital, Toronto, Canada

Appendix F. Eating Disorders Examination-Questionnaire

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all the questions. Thank you.

Questions 1 to 12: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

	On how many of the past 28 days	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
1	Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
2	Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	0	1	2	3	4	5	6
3	Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
4	Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
5	Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?	0	1	2	3	4	5	6
6	Have you had a definite desire to have a totally flat stomach?	0	1	2	3	4	5	6
7	Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
8	Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
9	Have you had a definite fear of losing control over eating?	0	1	2	3	4	5	6
10	Have you had a definite fear that you might gain weight?	0	1	2	3	4	5	6
11	Have you felt fat?	0	1	2	3	4	5	6
12	Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past four weeks (28 days) .....

13 Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)? .....

14 ..... On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)? .....

15 Over the past 28 days, on how many DAYS have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)? .....

16 Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight? .....

17 Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight? .....

18 Over the past 28 days, how many times have you exercised in a "driven" or "compulsive" way as a means of controlling your weight, shape or amount of fat, or to burn off calories? .....

Questions 19 to 21: Please circle the appropriate number. Please note that for these questions the term "binge eating" means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

19 Over the past 28 days, on how many days have you eaten in secret (ie. furtively)? ..... Do not count episodes of binge eating	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
	0	1	2	3	4	5	6
20 On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight? ..... Do not count episodes of binge eating	None of the times	A few of the times	Less than half	Half of the times	More than half	Most of the time	Every time
	0	1	2	3	4	5	6
21 Over the past 28 days, how concerned have you been about other people seeing you eat? ..... Do not count episodes of binge eating	Not at all		Slightly		Moderately		Markedly
	0	1	2	3	4	5	6

Questions 22 to 28: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past 28 days	Not at all		Slightly		Moderate -ly		Markedly
22 Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
23 Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
24 How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?	0	1	2	3	4	5	6
25 How dissatisfied have you been with your weight?	0	1	2	3	4	5	6
26 How dissatisfied have you been with your shape?	0	1	2	3	4	5	6
27 How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	0	1	2	3	4	5	6
28 How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	0	1	2	3	4	5	6

What is your weight at present? (Please give your best estimate.) .....

What is your height? (Please give your best estimate.) .....

If female: Over the past three-to-four months have you missed any menstrual periods? .....

If so, how many? .....

Have you been taking the "pill"? .....

THANK YOU

Appendix G. Consent Form

University of New Mexico
Consent Form

Project Title:	Women's Body Images
Project Supervisors:	Jane Ellen Smith, Ph.D. (277-2650) University of New Mexico, Psychology Department, Albuquerque
Project Coordinators:	Katherine Belon (277-7514) Loren Gianini (331-0277)

Your signature on this form acknowledges that the following points have been explained to you, and that you understand them. If you have any questions, please have them answered before you sign the form. In signing the form you are not in any way committing yourself to completing the project, and you may discontinue at any time without being penalized. All information will be kept strictly confidential and your name will not appear on any of the questionnaires.

I agree that this project has been explained to me and that I understand the following points:

1. I will be participating in a research project conducted through the Psychology Department at the University of New Mexico. The study will ask about my body image, eating and exercise habits, and ethnicity.
2. I will be completing 9 questionnaires and one interview. It will take about 1 ½ hours altogether. I will receive 2 experimental credits for completing the questionnaires and the interview.
3. I understand that the interview about my eating habits will be audiotaped. This is to allow a second experimenter to later listen to the tape to see if she reaches the same conclusion about my eating patterns.
4. I also understand that I will be asked my height and weight. If I do not know my weight, I will be asked to weigh myself (in private) on a scale provided by the researchers.
5. I am not required to participate in this study, but I am doing so voluntarily. I understand that I may choose to discontinue the study at any time without any penalty.
6. My name will never be found on any of the questionnaires that I fill out, nor will it be on the audiotaped interview.
7. I will not receive individual feedback on my responses, but I will receive information about the topic and study in general.
8. I understand that I am not waiving any of my legal rights by signing this form.
9. There are no known physical risks for participation beyond those of normal daily activities. Potential psychological risks include becoming upset upon reading and thinking about the questions. I understand that I will be given referral information for counselors as part of the debriefing.
10. I may contact Dr. Jane Ellen Smith (505-277-2650; janellen@unm.edu) if I have any questions regarding this topic in the future. I may also contact her at: Psychology Department, University of New Mexico, MSC03 2220, Albuquerque, NM 87131. I may also contact the University of New Mexico Main Campus Institutional Review Board: 1717 Roma NE, Room 205, Albuquerque, NM 87131; (505) 277-0067.

HRPO #:	99397	Page 1 of 2	Version: 1/19/2011
APPROVED:	2/7/2011	OFFICIAL USE ONLY	EXPIRES: 7/5/2011

UNM | Human Research Protections Office
The University of New Mexico Institutional Review Board (HRRC/MCIRB)

CONSENT

Signature of Participant | Date

Printed Name of Participant

Signature of Researcher | Date

Appendix H. Debriefing Form

The study you participated in was interested in looking at how women feel about their bodies, and how this relates to their eating habits. We know that many, many women in our country are very unhappy with their bodies, and that some of these individuals even develop eating disorders (anorexia, bulimia). Although the majority of females who feel poorly about their bodies do not end up with eating disorders, these women often still struggle with low opinions of themselves in general. This study is an attempt to determine whether women from different ethnic groups respond differently on several standard eating disorder measures that are commonly used. If differences are detected, this will be the first step towards modifying treatments to better suit the various ethnic groups.

It is possible that by participating in this study you may decide that you would like to either learn more about poor body image and eating disorders, or perhaps even receive treatment for a problem. As noted on the consent form, you can always call (or e-mail) the University of New Mexico faculty sponsor of the project for more information:
Jane Ellen Smith, Ph.D. Office Phone: (505) 277-2650 e-mail: janellen@unm.edu
There are also a number of national organizations that can provide information or referrals:

National Association of Anorexia Nervosa and Associated Disorders (ANAD)
Phone: (847) 831-3438 Internet: http://www.injersev.com/LivinglHealth/anad.index.html

American Anorexia/Bulimia Association, Inc. (AABA)
Phone: (212) 501- 8351 Internet: http://members.aol.com/amanbu/index.html

Overeaters Anonymous (OA)
Phone: (505) 891-2664 Internet: www.overeatersanonymous.org

Professionals are also available within Albuquerque/Belen to diagnose or treat eating disorders:

UNM Psychology Clinic	Phone: 277-5164
Holly Finlay, MA, LPCC	Phone: 266-6121
Rosemary Clarke, PhD	Phone: 271-1884
Helene Fellen, LISW, MFCC	Phone: 872-2171
Beth Dineris, MA, LPCC	Phone: 266-9604
Judith Pentz, MD	Phone: 342-0400
Joel Yager, MD	Phone: 272-5416
Tom Selby, MSW, LISW	Phone: 884-1205
Rosemary Hunter, MD	Phone: 881-1123
Jane Ellen Smith, PhD	Phone: 277-2650
Brenda Wolfe, Ph.D.	Phone: 884-5700
Deborah Okon, Ph.D.	Phone: 861-3894

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