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Role of Maternal Messages on Girls’ Body Image and their Approach and Avoidance of Foods

A thesis submitted in partial fulfillment of the requirement

for the degree of Bachelor of Arts in Psychology from

The College of William and Mary

by

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Accepted for Honors

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Williamsburg, VA

December 11, 2012
Acknowledgements

I would like to express my appreciation and thanks to the people who have helped and supported me throughout the completion of this thesis. My thesis advisors, Dr. Catherine Forestell and Dr. Meghan Sinton, have given me wonderful guidance and support throughout the project, as well as a large amount of their time. They have taught me a great deal about being a successful researcher, and I feel that their help and this experience have prepared me for school and work beyond William & Mary in a way that classes could not. I would also like to thank Dr. Melissa McInerney for serving on my thesis defense committee and giving her time, as well as her kind encouragement. Without the Charles Center and the Honors Fellowship, I would have been unable to complete my research, and I want to thank them and all those who donated to me, including my family and friends, for giving me this opportunity.
Role of Maternal Messages on Girls’ Body Image and their Approach and Avoidance of Foods

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Abstract

From a young age, girls form attitudes about their weight and body shape. The goal of the present paper is to explore how maternal messages, both direct and indirect, regarding dieting and body image affect girls’ body image and their approach and avoidance responses to healthy and unhealthy foods. A sample of 73 girls between the ages of 4 and 12 years completed an approach/avoidance task (AAT), and measures of their dieting behavior and body image. Sixty-one mothers completed questionnaires examining their own body image and eating habits, as well as their child feeding practices. Direct messages (e.g. telling girls’ to diet, actively restricting girls’ food intake) significantly predicted body image in regression analyses, and mediation analyses revealed that while indirect maternal messages (e.g. mothers’ own weight, shape, and eating concern) may affect girls’ body image, the effect of these messages on body dissatisfaction is mediated by girls’ fear of becoming overweight. For the AAT, regression models revealed that indirect messages predicted a significant amount of variance for girls’ responses to unhealthful foods, while girls' body image and their eating behaviors predicted a significant amount of variance in their responses to healthful foods. The results indicate that the AAT is a valid measure for approach and avoidance of healthful and unhealthful foods in girls age 7 years and older, and both direct and indirect messages from mothers effect girls’ body image and their responses to foods.

**Keywords:** Approach and Avoidance, Maternal Messages, Body Image, Disordered Eating
Role of Maternal Messages on Girls’ Body Image and their Approach and Avoidance of Foods

Close to 10% of American women will be diagnosed with some form of eating disorder during their lifetime (Hudson, Hiripi, Pope, & Kessler, 2007; Le Grange, Swanson, Crow, & Merikangas, 2012). Girls as young as four to six years of age demonstrate dissatisfaction with their own bodies, and are more likely to rate their ideal figure as significantly thinner than their current figure (Musher-Eizenman et al., 2003, Lowes & Tiggeman, 2003). These findings suggest that from a young age, girls form unhealthy attitudes about weight and body shape that may affect their responses to food or lead to disordered eating patterns during middle childhood (Davison, Markey, & Birch, 2003). This has been demonstrated in a longitudinal study which found that by seven years of age, girls were exhibiting dietary restraint, or the desire to restrain their food intake in order to lose weight, and this restraint correlated with higher levels of body dissatisfaction (Shunk & Birch, 2004).

Once disordered eating behaviors become established, they can persist for years and are difficult to treat (Cook-Cottone, 2009). The continuation of long-term disordered eating can be linked to the development of other problems, such as substance use disorders, and potentially death if these problems continue over an extended period of time (Crow, Peterson, Swanson, Raymond, Specker, Eckert, & Mitchell, 2009; Harrop & Marlatt, 2010). Out of all possible psychological disorders, eating disorders are associated with the highest mortality rates as they are physically dangerous for individuals and result in serious medical complications, such as cardiac arrhythmia and electrolyte imbalance (Fichter, Quadflieg, & Hedlund, 2006; Stice, Shaw, & Marti, 2007). Thus, identifying early indicators of risk for disordered eating is necessary in
order to curb the development of later eating disorders. However, more refined approaches for studying these factors are necessary to achieve this goal.

Assessing eating and weight concerns in children is difficult, and many of the available measures rely on self-report which is prone to inaccuracy (Decaluwe & Braet, 2004; Goldschmidt, Doyle, & Wilfley, 2007; Tanofsky-Kraff et al., 2003). The development of valid and reliable tasks that do not involve self-report is therefore important for understanding and precisely measuring of children’s eating pathologies. One possible new approach involves approach and avoidance dieting styles, which have become a topic of interest in the development of disordered eating habits (Otis & Pelletier, 2008; Pelletier et al., 2004; Pelletier & Dion, 2007).

Approach-Avoidance and Dieting Behavior

In general, those who employ approach orientations move towards desirable goals and strive to achieve those goals, such as wanting a good grade on exam to do better than your peers. In contrast, individuals with an avoidance orientation focus on undesirable outcomes and seek to move away from those outcomes, such as studying to avoid doing poorly on an exam in comparison to peers (Darnon, Butera, Mugny, Quimzade, & Hulleman, 2009; Elliot & Church, 1997). Studies show that individuals who approach tasks in a positive, adaptive manner achieve more for their efforts, whereas those who perform in ways that avoid negative judgments are not as successful (Dweck, 1986). These reactions are thought to be due to two brain-behavior systems: the approach system is referred to as the Behavioral Action System (BAS), which activates behavior towards both conditioned and unconditioned incentives, whereas the Behavioral Inhibition System (BIS) looks for conflict in the environment, directs attention towards it, and facilitates defensive behavior away from the negative occurrences (Gray, 1970; McNaughton & Gray, 2002).
In terms of dieting, this suggests that foods that are good for an individual could produce approach tendencies, while 'bad' foods would activate avoidance tendencies. However, approach-avoidance paradigm is relatively new to the study of dieting and disordered eating. Food choice and dieting tendencies have more commonly been described in terms of two main regulation strategies: autonomous and controlled. Individuals engaging in autonomous regulation of eating behaviors choose foods out of a sense of choice and responsibility to themselves and their bodies. Conversely, those that choose controlled regulation choose foods as a function of pressure from themselves or others (Otis & Pelletier, 2008). Research suggests that autonomous regulation is linked to healthier eating habits (e.g. eating more healthful foods, better portion control) and subsequently fewer disordered eating behaviors (e.g. restraint, binging), than controlled regulation which is linked to consumption of fewer healthful foods, and bulimic symptoms (Hagger, Chatzisarantis, & Harris, 2006; Otis & Pelletier, 2008; Pelletier et al., 2004; Pelletier & Dion, 2007). According to Otis and Pelletier (2008) avoidance behaviors towards unhealthful foods (i.e. I will not eat these unhealthful foods anymore) may lead to dysfunctional eating habits whereas those who primarily approach healthful food (i.e. I will eat more fruits and vegetables) may have healthier eating behaviors overall. These contentions are supported by research which has demonstrated that those who were randomly assigned to a group that was instructed to avoid unhealthful foods actually ate more unhealthful foods than those who were assigned to a group that was instructed to eat healthful foods (Sullivan & Rothman, 2008).

Various measures have been developed to measure approach-avoidance styles in adults, such as the Achievement Goals Questionnaire (Elliot & Thrash, 2010). Behavioral paradigms have also been developed to measure approach-avoidance styles. These paradigms have been successfully used with adults and children. For instance, using a task in which participants were...
instructed to pull or push a lever connected to a computer in response to angry or fearful faces, adults were shown to avoid angry faces more rapidly than they approached them, but approached fearful faces faster (Marsh, Ambady, & Kleck, 2005). Participants’ level of fear of spiders was also examined in adults as well as children using an implicit approach-avoidance task (AAT) that required participants to pull or push a joystick in response to pictures of spiders, butterflies, or neutral images (Klein, Becker, & Rinck, 2011; Rinck & Becker, 2007).

To our knowledge, no empirical research has been conducted to investigate the factors involved in the development of approach-avoidance styles to foods. Therefore, one of the goals of the current study was to use an approach avoidance task (AAT; Rink & Becker, 2007) to determine whether parental factors, such as parental control over eating, are related to girls’ approach/avoidance responses to healthful and unhealthful foods. Because implicit paradigms such as the AAT, which allows the measurement of responses that are independent of voluntary control, have not been used to test children’s responses to foods, we hoped to additionally validate this task with a sample of girls between the ages of 4 and 12 years. A second goal of the present study was to investigate whether parental factors affect girls’ preoccupation with being thin and their approach and avoidance of healthful and unhealthful foods (Agras, Bryson, Hammer, & Kraemer, 2007; Blisset, Meyer, & Haycraft, 2006; Fisher & Birch, 2000).

**Parental Messages Regarding Eating**

Although there are multiple factors that impact the development of approach and avoidance eating styles, parents are considered to be an important factor because of their immediate influence and long term effects on young children’s behavior and attitudes. Indeed, research suggests that the effects of parental pressure about children’s weight and shape and their eating behaviors appear to persist over time (Cook-Cottone, 2009; Davison, Markey, & Birch,
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2003; Sancho, Arija, Asorey, & Canals, 2007). For instance, those who felt pressure from family members to maintain a thin body shape were significantly more likely to be bulimic by the time they reached college (Young, Clopton, & Beckley, 2004). The current study examines the role of two types of maternal messages; direct and indirect, and how they influence young girls’ eating habits and body image.

Although likely not intentional, mothers have strong, consistent, direct and indirect effects on daughters eating behaviors and perceptions of themselves (Gross & Nelson, 2000; Striegel-Moore & Bulik, 2007). Girls as young as four years of age who have mothers who give them messages about losing weight are more likely to express concern over being overweight, (McCabe, Ricciardelli, Stanford, Holt, Keegan, & Miller, 2007). Thus, the continued study of maternal messages, which may be direct and/or indirect, about food and eating and their body and their influence on young girls’ eating and body image may contribute to an understanding of girls approach/avoidance behaviors regarding food.

**Mothers’ Direct Effect on Daughters’ Eating.** Mothers may directly influence daughters’ eating habits and body image through actively restricting their daughters’ food intake, criticizing their daughters’ food choices and weight. Studies suggest that children will automatically autonomously regulate their food intake and the energy density of their diet in order to get the proper amount of nutrients (Birch & Fisher, 1998). However, pressure from parents to eat more or to restrict their food intake may interrupt self-regulation of food intake, leading children to ignore their own internal hunger cues and employ a controlled regulation style and avoidance tendencies in their approach to dieting (Carper, Fisher, & Birch, 2000; Johnson & Birch, 1994). This becomes increasingly problematic when considering that mothers who actively restrain their food intake and use avoidance strategies in order to control their own
Bingeing desires also tend to restrict their child’s food intake (Blissett, Meyer, & Haycraft, 2006). Similarly, those parents who were the most rigid in terms of body shape acceptability were also those most likely to display rigid feeding practices for their children (Musher-Eizenman, Holub, Edwards-Leeper, Persson, & Goldstein, 2003).

Children whose parents restrict their food intake also have a more negative self-evaluation of eating overall (Fisher & Birch, 2000). In a longitudinal study by Francis and Birch (2005), mothers who were preoccupied with their own weight, restricted their daughter’s intake in order to lose weight, and had daughters who were more likely to restrain their own eating. Therefore, these girls were potentially more likely to employ avoidance tendencies, particularly once they reached ages 9 to 11 years (Francis & Birch, 2005). This interruption of automatic food regulation where normal hunger cues are ignored may increase the risk of future disordered eating habits. Similarly, research has shown that girls who felt pressured and criticized about their eating endorsed negative body image (Cooley, Toray, Wang, & Valdez, 2008). Furthermore, girls who are teased by their family about their weight are more likely to experience body dissatisfaction and unhealthful weight control behaviors as teenagers (Neumark-Sztainer et al., 2010, Taylor et al., 2006). Collectively, such research suggests that direct criticism and teasing from mothers will lead to unhealthy eating behaviors, such as the development of avoidance style eating, and negative body image attitudes.

**Mothers’ Indirect Effect on Daughters’ Eating.** In addition to direct messages, mothers may also indirectly or inadvertently influence their daughter’s body image and eating habits through expression of their concerns about their own weight and shape. For example, girls five to eight years of age are more likely to express a desire to be thinner and experience an increase in body dissatisfaction if their mothers demonstrate higher levels of concern about their
own bodies (Lowes & Tiggemann, 2003). Moreover, other research has suggested that girls were more than twice as likely to be aware of dieting and dieting techniques if their mothers had recently or were currently dieting (Abramovitz & Birch, 2000; Cooley et al., 2008). It is suggested then that mothers are unconsciously modeling avoidance style eating and dieting patterns to their children. Thus it appears that the messages that girls receive from their mothers, whether direct or indirect, may affect the development of their own approach avoidance strategies.

Therefore, because behaviors that are modeled to girls, as well as those which are directly expressed, affect girls' body image and eating behavior, it is important to study both types of messages. This study will examine both the attitudes regarding eating and weight control that are directly communicated to girls by mothers, and those attitudes that mothers' hold regarding their own body, but that may be indirectly transmitted to girls through modeling.

**Current Study**

The overarching goal of the current study is to examine how mothers directly and indirectly influence their daughters' approach and avoidance of foods. Towards this aim, an approach and avoidance task (AAT) developed by Rinck and Becker (2007) will be used in order to implicitly measure young girls implicit approach and avoidance reactions to healthful and unhealthful foods. Because this task has not previously been employed to study dieting behaviors, this will be the first study to validate the AAT for use with foods in children by correlating girls’ responses in this implicit task to self-report data about their eating habits and body shape. We hypothesize that based on previous findings (Harrison, Treasure, & Smillie, 2011; Otis & Pelletier, 2008; Sullivan & Rothman, 2008), girls who score high on items measuring fear of gaining weight, restraining food, dieting, and weight concern, as well as a
desire to have a thinner body shape, will show avoidance of unhealthful foods rather than approach of healthful foods presented in the AAT.

The second aim is to examine the influence of mothers’ direct and indirect messages on girls’ fear of gaining weight, their food intake, dieting, and body image. We hypothesize that girls with concerns about their weight and who diet to lose weight will have mothers who score high on similar measures, such as weight concern, shape concern, and who will restrain their food intake as a means of weight control. Additionally, we hypothesize that girls with these concerns will also have mothers who are more likely to directly comment on their daughter’s diet and exercise habits, as well as restrain their daughter’s food intake, pressure them to eat certain foods, and monitor what they eat.

**Method**

**Participants**

Mothers and their 4 to 12 year old daughters were recruited through the placement of ads placed in local businesses, pediatrician offices, and daycare centers, as well as through mass mailings throughout the Hampton Roads area in Virginia. Only girls who were reported to have no developmental delays were eligible for the study.

During a telephone interview, mothers were informed that the purpose of the study was to examine the development of body image and eating habits, and that participation required the completion of questionnaires online, taking approximately 15-20 minutes total, and a one hour visit to the laboratory. The general procedure for the study was described, without revealing the hypothesis of the study. The College of William and Mary Humans Subjects Committee approved all procedures, and consent was obtained from Mothers both online and in the laboratory, as well as from all girls ages seven or older.
Materials

**Picture Stimuli.** Twelve food pictures were created by taking pictures of the selected foods on a white square plate. Pictures consisted of six healthful foods (an orange, strawberries, yogurt, wheat bread, green beans, and a tomato) and six unhealthful foods (chicken fingers, cookies, french fries, a cupcake, a cheeseburger, and a cinnamon roll). For the healthful and unhealthful food categories, half of the pictures contained multiple items (e.g., several fries, several strawberries), whereas the remaining pictures contained only one item (e.g., one orange, one cupcake). (Appendix A).

**Approach-Avoidance Task (AAT; Rinck & Becker, 2007).** Girls were presented with a series of food pictures (3.75” X 4”) on a 15.4 inch monitor with a 1440 x 900 resolution. The stimulus set consisted of pictures of six healthful and unhealthful foods that were divided according to the number of items of food on the plate, as described above.

Girls were instructed to respond to each picture displayed in the center of a computer screen by either pushing or pulling the mouse with their dominant hand. When the participant pushed the mouse away, the picture’s size decreased until the picture disappeared. Similarly, when the participant pulled the mouse towards them, the size of the picture increased until it disappeared. At this time, the phrase “click here to continue” would appear in the middle of the screen. In order to continue on to the next image, the participant had to click this phrase, thereby returning the mouse to its original position in the center of the screen for the beginning of each picture and ensuring that each trial was initiated by the participant.

This task consisted of two sessions which contained 12 randomly presented trials. For the first session, half of the girls were asked to push the mouse away to make it smaller if there were multiple items of food on the plate, and to pull the mouse towards them to make it bigger if there
was only a single item of food on the plate. In session two, which occurred immediately after the first the instructions were reversed; the participants were asked to push the mouse away when there was a single-item food, and pull the mouse towards them if there was a multiple-item food. For the remaining girls the two sessions were reversed.

Prior to the beginning of the task, children were trained to follow the instructions using four example pictures (a personal size pizza, corn, chips, and a donut). After reading the instructions to the girls, the experimenter would show the girls a picture and ask “If this picture appeared on the screen, do you think you would push it away, or pull it towards you?” If the girls guessed the wrong answer, the experimenter would explain the correct response.

Child Body Figures (Eckstein et al., 2006). A small poster with seven figures of girls of varying body sizes was presented to the girls. These sketches were dependent on the girl's age, as girls ages 4-5, 6-9, and 10-12 had different representational figures. The middle figure represented a girl at the 50th BMI percentile for that age range. The girls were asked to choose the figure that looked most like them, the figure they would most want to look like, and the figure they thought their Mother would most want them to look like. (Appendix B)

Questionnaires

Demographics. Mothers answered general background information relating to their age, ethnicity, race, estimated weight and height, education level, and whether or not both biological parents lived in the household, as well as the father’s ethnicity and race.

Eating Disorder Examination Questionnaire (Fairburn & Beglin, 1994). Mothers completed the Eating Disorder Examination Questionnaire (EDE-Q), which is a self-report measure to assess attitudes, feelings, and behaviors related to eating and body image over the past 28-days, and measures criteria for clinical eating disorders. The EDE-Q has been shown to
have high internal consistency and test-retest reliability, with Cronbach alphas ranging from 0.81 to 0.94 (Luce & Crowther, 1999). (Appendix C)

**Child Feeding Questionnaire** (*CFQ;* Birch et al., 2001). The CFQ is a 26-item self-report measure that assesses the mothers' child-feeding practices and their perception of their children's risk for being overweight. This questionnaire consists of six sub-scales. Restriction measures the extent to which mothers control how much, when, and what their child eats. Monitoring assesses the extent to which mothers keep track of what their child eats. Pressure to eat assesses the primary caregiver’s tendency to pressure his or her child into eating more food. Perceived child weight addresses the primary caregiver’s perceptions of his or her child’s weight history. Perceived parent self-weight measures the mother’s perception of her own weight history, and concern about child's weight assesses the primary caregiver’s concern about his or her child’s risk of becoming overweight. Perceived responsibility assesses to what degree the parent feels it is their duty to feed their child. The range of responses for each question is on a five point Likert scale, with responses ranging from 1, “disagree,” to 5, “agree,” or 1, “never,” to 5, “always.” Internal consistency was found to be above 0.70. (Appendix D).

**Concern with Child’s Weight** (Thelen & Cormier, 1995). Four items were taken from the Family History of Eating questionnaire for parents (Moreno & Thelen, 1993). These items addressed how often mothers instructed their daughter to diet or exercise more in order to prevent weight gain, for example “How many times have you told your child to eat less food or eat different foods in order to lose weight or to keep for gaining weight?” Responses were on a five point Likert scale, ranging from “never” to “always.” Cronbach's alpha coefficients generated for the items used in the Thelen and Cormier (1995) study (mothers and fathers for sons and daughters) indicated a high degree of internal consistency, ranging from .84 to .95. The
mean of these items is later referred to as maternal encouragement of daughter weight control. (Appendix E).

**Body Image and Eating Questionnaire for Children** (Thelen, Powell, Lawrence, & Kuhnert, 1992). The Body Image and Eating Questionnaire for children includes 14 items. Eight of these items focus on concerns and fears about being or becoming overweight. Three of the items addressed history of dieting behavior, and the other three examined restrained eating habits (restraint). Responses to questions were in multiple formats, ranging from yes-no answers, four point Likert scales, and five point Likert scales. Cronbach alphas for the scales ranged from 0.77 to 0.83 (Thelen, Powell, Lawrence, & Kuhnert, 1992). (Appendix F)

**Procedure**

Mothers and their daughters participated in a one-time experimental study. Mothers completed two online questionnaires, taking approximately 15 to 20 minutes total, prior to visiting the Eating Behavior and Child Development Center at the College of William and Mary. Links to the questionnaires were sent through email, and participants were able to complete them at home, at their own convenience. Mothers were instructed to not eat or to feed their daughters for one hour before their scheduled visit to the lab.

After informed consent was obtained and mothers and daughters had acclimated to the test environment, mothers were instructed to fill out the CFQ and the Concern with Child’s Weight questionnaire, while the girls completed the AAT. The instructions were read to the girls, and example pictures were shown in order to give the girls practice before beginning the timed task. The researcher stayed in the same room but sat out of sight of the girls in order to answer any questions and ensure compliance with the task. Once the computer task ended, children were shown seven figures of girls, corresponding to their age, body types. They were asked to choose
three figures; the one that looked most like them, the figure that they would want to look like, and the figure that their parents would want them to look like.

After the completion of the computer and body figure tasks, the researcher then read the Body Image and Eating Questionnaire for Children, the Weight Concern Scale for Children questionnaire, and the Perception of Parental Concern questions to the child and recorded her responses. The girls were then allowed to play in the original room, while the mother was interviewed regarding general background information. The weight and height of the girl and mother were then measured. The daughter was given a beanie baby and the mother received $20 for their participation.

Data Analyses

To analyze the girls’ body image, the difference between girls’ perceived figure and their ideal figure (girl BI difference) was computed by subtracting the number associated with the figure they chose as representing them from that of the figure that they wanted to look like. Therefore, a negative number indicated that they girls wished to look like a smaller figure than their perceived figure. Similarly, to analyze girls’ perception of their parents’ views about the girls’ bodies, the difference between girls’ perceived figure and what they believed to be their parents’ ideal figure for the girls (girl-parent BI difference) was computed. A negative score indicated that the girls believed that their parents wanted them to be a smaller figure than their current, perceived figure.

To clear the AAT dataset of outliers, the average time taken to push or pull was calculated for each picture, and all scores (2.8%) more than three standard deviations from the mean were excluded from the dataset. To calculate the AAT scores, the difference between push reaction times and pull reaction times was calculated for both healthful and unhealthful pictures.
(push reaction time minus pull reaction times). A negative AAT score indicated an avoidance tendency, whereas a positive AAT score indicated an approach tendency.

All study variables were examined for skewness prior to analyses and all variables were within acceptable limits. Correlations, hierarchical linear regressions, and mediation analyses were used to examine study aims.

**Results**

**Participant Characteristics**

Overall, 73 girls (which included 12 sibling pairs) participated in the study. As shown in Table 1, the girls had a mean age of 7.89 (SD = 2.26) years and were on average normal weight with an average z-BMI score of 0.27 (SD = 1.08). Approximately 8% of the girls were Hispanic, and their racial breakdown was 79.5% Caucasian, 5.5% African American, and 15.1% mixed/other. Mothers (N= 61) were 38.4 (SD = 6.33) years old on average, and were overweight with a mean BMI of 26.9 (SD = 7.46). Mothers were highly educated with 89.0% reporting at least some college education. For 80.8% of the families, both biological parents lived in the same household.

Of the 73 participants who completed the study, 21 were excluded from the AAT analyses due to noncompliance. These girls were deemed noncompliant because they failed to consistently follow the directions for the task by pushing the mouse when they were instructed to pull, or vice versa on more than 20% of the trials, suggesting that they did not understand the task (Lange et al. 2010; Zhou et al., 2012). These girls were significantly younger than the girls who complied (t(71) = 4.80, p<0.01) and more than 66% were less than 6 years of age. Girls who failed to comply did not differ from those who did on z-BMI (p = 0.95), or dieting (p = 0.32),
fear ($p = 0.38$) or restraint ($p = 0.26$). As shown in Table 2, the remaining 52 girls failed to differ from the full sample on any of the above demographic characteristics.

**Mothers’ Direct and Indirect Effects on Girls’ Body Image**

**Correlation Analyses.** Higher girl BI difference scores (i.e., the difference between girls’ perceived figure and their ideal figure), were significantly, positively correlated with both z-BMI ($r = 0.32, p<.01$) and age ($r = 0.29, p<.02$), such that as girls’ age and z-BMI increased, they reported more body dissatisfaction. As girl BI difference scores increased, mothers concern about their daughter’s weight also increased ($r = 0.50, p<.001$), as did maternal encouragement of daughter weight control ($r = 0.47, p<.001$) and mothers’ own reports of feeling heavier ($r = 0.41, p<.001$). Similarly, as girl BI difference scores increased, mothers’ own weight concern ($r = 0.24, p<.05$) and shape concern scores increased ($r = 0.27, p<.03$). Thus, as mothers reported more concerns about both the daughter’s weight and shape and their own weight and shape, girls demonstrated more body dissatisfaction.

Higher girl BI difference scores were also significantly, positively correlated with girls’ reports of dieting ($r = 0.32, p<.01$), their fear of being or becoming overweight ($r = 0.63, p<.001$), and their desire to restrain their food intake ($r = 0.43, p<.001$), as well as their mothers desire for restraint ($r = 0.27, p < .02$). This suggests that as girls experienced greater body dissatisfaction and as their mothers reported unhealthy eating habits, girls reported more symptoms of disordered weight control.

As shown in Table 3, similar patterns emerged for the girl-parent BI difference (i.e., the difference between girls' perceived figures and the figure that they believe their parents would most want the girls to look like), which correlated significantly with the girl BI difference ($r = 0.69, p<.001$). Higher girl-parent difference scores were also significantly, positively correlated
with girls’ z-BMI ($r = 0.32, p<.01$) and age ($r = 0.27, p<.03$). As girl-parent BI difference scores increased, so did maternal concern over their daughter's weight ($r = 0.46, p<.001$), and maternal encouragement of daughter weight control ($r = 0.41, p<.01$). This difference score was also negatively associated with maternal reports of pressuring their daughters to eat ($r = -0.26, p<.03$) suggesting that as girls’ perceptions of their mothers’ dissatisfaction with their daughters’ bodies increased, their mothers reported more concerns about their daughter’s weight and put less pressure on the daughter to eat. This difference score was also positively associated with girls’ desire to diet ($r = 0.45, p<.001$), their fear of being or becoming overweight ($r = 0.50, p<.001$), and their desire to restrain their food intake ($r = 0.40, p<.001$).

**Regression Analyses.** Separate hierarchical regression analyses were used to examine the individual contributions of girl demographic variables and child and parent perceptions about dieting and weight on girl BI differences and girl-parent ideal differences. Potential issues with collinearity between predictor variables were addressed by examining the variance inflation factor (VIF). In all cases the VIF was less than 10. Order of entry of the variables followed ecological systems theory, which suggests that individual characteristics have the strongest impact on development, followed by the more immediate family environments (Bronfenbrenner, 1992). Therefore, child age and z-BMI were entered as step 1 of the analyses, fear of gaining weight, dieting, and restraint scores from the Body Image and Eating Questionnaire for children were entered in as step 2, concern over child’s weight, pressure on child to eat, restriction of child’s foods, and monitoring of foods subscales from the CFQ were entered in step 3, and the restraint, eating concern, weight concern, and shape concern subscales from the EDEQ were entered in step 4.
As shown in Table 4, for the girl BI difference, the model accounted for 53.1% of the variance in girls’ perceived figures and ideal figures. As shown in Table 6, steps 1, 2, and 3 each accounted for a significant increase in the amount of variance accounted for in the model; Step 1, which included girls' age and z-BMI, accounted for 17.6% of the variability (F(2, 70) = 7.469, p< .01). Step 2, which included girls' reports of dieting and body image concerns, accounted for an additional 24.2% of the variability in this difference score (F(3,67) = 9.293, p< .001). Step 3, which included mothers' child feeding practices and concerns, accounted for 8.1% of the variability (F(4,63) = 2.561, p <.05). Step 4 did not account for a significant amount of variance in girl BI difference score (p>.05).

For the girl-parent BI difference shown in Table 5, the model accounted for a similar amount of variance as reported above for girl BI difference; 48.3%. Step 1, which included girls' age and z-BMI, accounted for 16.7% of the variance (F(2,70) = 7.001, p<.01). Step 2, which included girls' reports of dieting and body image concerns, accounted for an additional 17.4% of the variance (F(3,67) = 5.898, p<.01). Step 3 did not account for any significant amount of variance. Step 4, which included mothers' mother disordered eating variables, accounted for an additional 8.4% of the variance (F(4,59)= 2.388, p=.06) and was marginally significant.

Mediation Analyses. To determine whether girl BI difference scores were directly predicted by maternal direct or indirect messages (e.g., pressure, restraint, or concern about weight), or whether these relationships were indirect relationships that were mediated by girls’ fear of being overweight, dieting habits, or desire to restrain food intake, mediation analyses were conducted following Baron and Kenny (1986).

Because previous analyses revealed that mothers’ shape concern from the EDE-Q was the subscale correlated with Girl BI difference, and fear of becoming overweight, these three factors
were included in the analyses. These analyses involve meeting the following four criteria: 1) Mothers’ shape concern (predictor) and girls’ fear of being overweight (mediator) as measured by the subscale from the Eating Disorder Examination Questionnaire should be associated, 2) the mediator and criterion variables (i.e., girl BI difference score) should be associated, 3) the predictor should be associated with the criterion, and 4) the association between the predictor and criterion should decrease (partial mediation) or fail to reach significance (total mediation) when the mediator is controlled.

To determine whether fear mediated the relationship between the girl BI difference scores and mothers’ shape concern, fear over being or becoming over weight scores were regressed with girl BI difference scores on mothers’ shape concern. These analyses revealed a significant effect of mothers’ shape concern on fear (t(72) = 3.26, p < .01). There was also a significant effect of fear on girl BI difference (t(72) = 6.11, p < .001). Step 3 revealed that there was also a significant, direct effect of mothers’ shape concern on girl BI difference scores (t(72) = 2.38, p < .02), but step 4, when girls’ fear of being overweight was controlled, was not significant (t(72) = 0.52, p = .61). Overall, the model was significant (F(2,70) = 22.96, p < .001). This suggests that mothers’ shape concern indirectly (by increasing girls’ fear of becoming overweight) affects the girls’ body dissatisfaction (see Figure 1).

Similarly, previous analyses revealed that maternal encouragement of daughter weight control was correlated with both the dependent and mediating factors. To determine whether fear mediated the relationship between the girl BI difference and maternal encouragement of daughter weight control, fear over being or becoming over weight scores were regressed with girl BI difference scores on concern for child’s weight. These analyses revealed a significant effect of maternal encouragement of daughter weight control on fear (t(58) = 4.39, p < .001), as well as for
fear on girl BI difference (t(58) = 4.00, p < .001). The direct relationship between girl BI difference scores and maternal encouragement of daughter weight control (t(58) = 4.00, p < .001) was significant, but the relationship between the two when fear was controlled for was not significant (t(58) = 1.62, p = .11). Overall, the model was significant (F(2,56) = 23.85, p < .001). This suggests that concern for child’s weight as expressed through directives from mothers to eat less and weigh less indirectly affects girls’ desires to be smaller (see Figure 2).

Mothers’ Effects on Girls’ Performance on the Approach – Avoidance Task

Correlation Analyses. As shown in Table 6, the rates of response in the first block did not significantly differ for healthful or unhealthful foods (t(51) = 0.70, p = .48). The second block had similar results (t(51) = 0.80, p = .43). Overall rates of response were more closely related than the individual blocks, but still not significant (t(103) = 1.05, p = .29). As girls’ avoidance of unhealthful foods increased, girl BI difference scores increased (r = -0.27, p = 0.05) as did the girl-parent BI difference (r = 0.36, p < 0.01) and they reported being more fearful of being or becoming overweight (r = -0.29, p < 0.04). Moreover, as shown in Table 3, avoidance of unhealthful foods was marginally associated with mothers’ concerns about their own weight (r = -0.24, p = 0.08) and their daughters’ weight (r = -0.27, p = 0.05). Girls who more readily approached healthful foods were more restrained (r = 0.29, p < 0.04), and had mothers who were more concerned about their own eating (r = 0.28, p < 0.05).

Regression Analyses. Separate hierarchical regression analyses were used to examine the individual contributions of girls' demographic variables and child and parent perceptions about dieting and weight on the approach and avoidance of healthful or unhealthful foods. Girls' age and z-BMI were entered as Step 1 of the analyses, with fear of gaining weight, dieting, and restraint scores from the Body Image and Eating Questionnaire for children, as well as BI
difference scores, entered in as Step 2, the following Child Feeding Questionnaire subscales: concern over child’s weight, pressure on child to eat, restriction of child’s foods, and monitoring of foods in Step 3, and the EDEQ subscales restraint, eating concern, weight concern, and shape concern in Step 4.

As shown in Table 7, for the unhealthful foods, the model accounted for 44.5% of the overall variance in girls’ approach or avoidance of unhealthful foods. Steps 1, 2, and 3 did not significantly predict variance within the model ($p$s>.05). However, in Step 3, mothers’ restriction of daughters’ food from the CFQ was significant ($p$<0.05). Step 4 did marginally predict variance within the model, as the unique contribution of the mother disordered eating variables accounted for 14.4% of the variability ($F(4, 36) = 2.327, p=.07$). This suggests that mothers’ indirect messages, i.e., their own disordered eating behaviors which they model affect to an extent girls’ approach and avoidance related to unhealthful foods.

For the healthful foods, the model shown in Table 8 accounted for 37.1% of the variance in girls’ responses to healthful foods. While Step 1 did not significantly predict variance within the model ($p$>.05), Step 2 was significant, as the unique contribution of the body image, restraint, fear, and dieting factors accounted for 26.2% of the variability ($F(5, 44) = 3.155, p < 0.02$). Steps three and four did not significantly predict variance within the model ($p$>.05).

**Discussion**

The goal of the present study was to examine mothers’ direct and indirect effects on their daughters’ body image and eating behavior, and consequently, their effects on girls’ approach or avoidance of healthful and unhealthful foods. Overall, results were generally consistent with previous literature (Hagger, Chatzisarantis, & Harris, 2006; Otis & Pelletier, 2008; Pelletier et al., 2004; Pelletier & Dion, 2007). Both direct (e.g. commenting about weight, restraining girls’
MATERNAL MESSAGES ON GIRLS' APPROACH AND AVOIDANCE

food) and indirect (e.g. modeling disordered eating behavior) maternal messages effected girls’ body image and girls’ approach and avoidance of healthful and unhealthful foods.

This study is also the first to examine the Approach Avoidance Task (AAT) as a valid measure for the approach-avoidance behaviors to food in children. Results suggest that the task may be valid, as girls’ approach and avoidance of healthful and unhealthful foods were significantly correlated with self-reported eating behaviors and attitudes. However, this task appeared to be developmentally appropriate for girls who were 7 years of age and older; younger girls did not appear to understand the task, as most girls less than 7 years of age were excluded because they were unable to follow directions correctly at least 80% of the time. (Hagger, Chatzisarantis, & Harris, 2006; Otis & Pelletier, 2008; Pelletier et al., 2004; Pelletier & Dion, 2007). Based on the results from this task, it appears that girls’ unhealthy eating behaviors and poor body image are related to avoidance strategies. This is consistent with previous studies on the approach-avoidance paradigm in relation to dieting.

**Predictors of Girls’ Body Image Difference Scores**

Correlation and regression analyses collectively revealed that girls’ age and z-BMI scores increased as their body dissatisfaction increased (i.e., they had greater girl BI difference scores), supporting previous research that age and weight play a crucial role in girls’ body image (Goldschmidt et al., 2008). Mothers’ indirect (e.g. mothers’ weight concern, shape concern, restraint) and direct messages (e.g., maternal encouragement of daughters’ weight control) were all correlated with girl’s body dissatisfaction. However, above and beyond the influence of girls’ individual characteristics, mothers’ direct messages about weight and eating (e.g. maternal eating concern, maternal weight concern, maternal shape concern) predicted girls’ body image difference scores. Indirect maternal messages, though, were not significant predictors.
However, additional analyses reveal that a straightforward prediction of girls’ body image fails to reflect complex pathways. Mediation results suggested that girls’ fear of being overweight fully mediated the association between maternal encouragement of daughters’ weight control and girls’ body dissatisfaction, as well as the association between maternal shape concern and girls’ body dissatisfaction. These findings suggest that the pathway between mothers’ concern over girls’ weight and girls’ body image is complex. In other words, additional constructs may underlie associations between the two variables. These results are interesting given that variables associated with mothers’ indirect messages were only marginally significant in the hierarchical regression analyses, and it is possible that these measures were not sensitive enough to fully detect the relationship between the types of direct and indirect messages mothers communicate. More research is warranted to fully understand how mothers communicate their concern about weight to their daughters.

Similar patterns emerged when examining girls’ perception of their figure and how they felt their parents wanted them to look, as variables such as girls' reports about fears of becoming overweight, restraint, and dieting along with mothers’ concerns about weight were associated with this measure. Unlike the girl BI difference, mother’s indirect messages were no longer correlated with this measure. However, after controlling for girls’ individual characteristics and disordered eating habits, only mothers’ indirect messages predicted girl-parent BI difference scores at a trend level.

In combination, these findings suggest that it is important for mothers to be aware of the direct and indirect messages that they are sending to their daughters about their weight. Although our results indicate that girls perceive that their mothers want them to be thinner, indirect messages from mothers regarding body image and weight control may not directly influence
girls' BI difference scores between the ages of 4-12 years. It is possible, however, that these indirect messages may affect girls’ assessment of their own bodies over the long term (Linville, Stice, Gau, & O’Neill, 2011). In contrast to indirect messages, direct messages do affect girls’ fear of being overweight, which in turn leads to poor body image. Once sensitive to the issues of weight and eating, daughters are more likely to continue to interpret comments in a more harmful manner than intended (Baker, Whisman, & Brownell, 2000). This could produce a snowball effect, causing even well-intended comments about healthful eating to be seen as negative, or as pointing out the failures of the young girl.

Predictors of Girls’ Approach/Avoidance of Foods

Previous research suggests that those who approach healthful foods will have healthier eating habits and are more likely to eat properly proportioned meals and healthful foods, whereas those who try to avoid foods will exhibit more restrained eating habits, are more likely to binge, and are more likely to feel pressure to eat or appear a certain way (Otis & Pelletier, 2008; Pelletier et al., 2004; Pelletier & Dion, 2007). The results from the AAT in the current study are consistent with these findings. Both body dissatisfaction and girls’ perceived pressure from their mothers to look different were positively correlated with the avoidance of unhealthful foods, as was mothers’ reports of restriction of girls’ food intake. Avoidance of unhealthy foods was also correlated with girls’ z-BMI, and with girls’ fear of being or becoming overweight.

Of interest are findings involving girls’ restraint and their approach of healthful foods. Previous studies (using older samples) would suggest that restraint would be predictive of avoidance strategies (Otis & Pelletier, 2008; Pelletier et al., 2004; Pelletier & Dion, 2007). It is possible that this is more of a reflection of the experimental protocol. An association could have been detected because during the task, girls approached healthier foods more quickly due to their
desire to avoid unhealthful foods, such that findings reflect behavioral differences due to the experimental protocol as opposed to actual attitudes or preferences. It may also be that at this young age, this association, and girls’ reports of dietary restraint, reflect developmental differences in eating behaviors and girls’ understanding of these behaviors. Indeed, this area of study is complex, as although restraint was associated with this factor, approach of healthful food was not associated with girls’ fear of gaining weight or dieting, further highlighting that girls’ understanding of restraint in this study may have been considered a healthful behavior. Longitudinal studies may help clarify developmental shifts in these associations.

In terms of mothers’ concurrent influence on girls’ approach and avoidance strategies, studies show that mothers have both direct and indirect effects on their daughters’ eating and body image (Fisher & Birch, 2000; Francis & Birch, 2005). In line with these previous studies, findings from this study revealed an association between mothers’ concern over girls’ weight and girls’ avoidance of unhealthy foods. Furthermore, in a regression analysis, mothers’ restriction of girls’ food intake was found to individually predict variance in the model for approach and avoidance of unhealthful foods. However, mothers’ direct effects on girls overall did not significantly predict variance in regression models for healthful or unhealthful foods. This is in contrast to previous studies, which suggest that direct messages or criticism regarding weight do have effects on girls eating habits and body image (Carper et al., 2000; Cooley et al., 2008; Francis & Birch, 2005; Johnson & Birch, 1994). Continued examination of the associations between mothers' direct effects and girls' approach or avoidance strategies remains important.

Mothers’ indirect messages appeared to be associated with girls’ avoidance of unhealthful foods. Girls who were faster to avoid than to approach unhealthful foods had mothers who showed more concern for their own weight, consistent with previous literature
suggesting that mothers’ dissatisfaction with their own weight correlates with daughters’ dissatisfaction (Lowes & Tiggemann, 2003). Mothers’ disordered eating attitudes and behaviors, in turn, predicted almost 15% of the variability in girls' responses to unhealthful foods, above the influence of girls’ individual characteristics. These findings add to the body of research highlighting associations between girls’ disordered eating development and mothers’ modeling of their own disordered eating habits (Abramovitz & Birch, 2000; Cooley et al., 2008; Lowes & Tiggemann, 2003) by suggesting that maternal indirect messages also influence girls’ approach and avoidance strategies as assessed by the AAT.

Of note, a different set of constructs predicted girls’ responses to foods and their body image; girls’ own dieting behaviors, fear of being overweight, and BI difference scores contributed 26.2% of the variability in the healthful foods model. The girl-parent BI difference score was moderately predicted by mothers’ indirect messages, and the girl BI difference score was significantly predicted by direct messages regarding weight and control over eating. While mothers’ direct and indirect messages do not appear to affect approach and avoidance for healthful foods in this study, the indirect relationships between mothers’ messages, girls’ body image, and healthful foods are worth exploring in later studies.

The differences in predictors for the distinct approach styles are noteworthy. For example, because an individual’s personal factors and beliefs are important when using autonomous regulatory styles and approach strategies (Otis & Pelletier, 2008), it is possible that girls’ personal factors were more important for healthful foods due to their own innate desire to be healthier. In contrast, those who use avoidance strategies are more focused on external factors and strive to avoid negative outcomes (Otis & Pelletier, 2008). This could potentially explain why mother variables are important in the unhealthful foods model. It may then be that maternal
factors influence avoidance strategies but are not significant predictors of responses to healthful foods because girls’ approach behaviors are not influenced by external factors. Similarly, the behaviors assessed in this study were related to disordered eating variables, and it may be that other maternal behaviors not assessed in this study influence responses to healthful foods. Further research would need to be conducted in order to examine this relationship.

Limitations and Future Directions

Although the contributions of this study are noted, there were several limitations to be addressed. First, our sample was primarily Caucasian and most mothers were highly educated, limiting the generalizability of our findings. Future studies should examine more diverse samples. Similarly, this study focused solely on young girls; future studies should also examine boys’ reactions to the AAT. Young boys are often understudied in body image and disordered eating research despite being prone to the development of these issues as well (Lavender, Gratz, & Anderson, 2012; Ricciardelli, McCabe, Lillis, & Thomas, 2006), yet many of the current measures for these factors were developed for girls (Cafri & Thompson, 2004; Smolak & Stein, 2006). Further, the sample size is somewhat small, which may have reduced the ability to detect some associations between maternal and girl constructs. Indeed, although girls between the ages 4 to 12 years were asked to complete the AAT task, girls ages 6 and younger were not generally capable of following the instructions accurately. Because these girls were excluded, the sample size for AAT analyses was smaller than first anticipated.

However, the results from the present study suggest that the AAT may therefore be employed with girls as young as 7 years of age. This suggests that in the future, AAT studies conducted with children can expand to larger age ranges than previously thought. In addition, only information about mothers’ messages was collected due to a low response rate from fathers,
and it is likely that an important influence on girls’ body image and approach and avoidance strategies was missed. Indeed, studies show that both parents are important in girls’ body image and eating habits (Agras, Bryson, Hammer, & Kraemer, 2007; Blissett & Haycraft, 2011; Helfert & Warschburger, 2011). Future studies should therefore examine paternal direct and indirect messages as well in order to achieve a more complete view of the messages affecting girls’ body image and eating habits, as well as girls’ development of approach and avoidance strategies towards food.

Related to this, when asked about body image figures, girls were asked how they felt their parents would want them to look. Because mothers and fathers often have different routes by which they affect girls’ body image (McCabe & Ricciardelli, 2001), future studies should assess the separate, not combined, influence of mothers and fathers on girls body image. Finally, this study also did not ask parents to rate their daughters’ figures, and the figures that parents would prefer their daughters to look like. These findings could have implications for ways in which parental messages are getting lost or distorted in translation. Upcoming studies should examine girls’ perceptions about their parents’ weight preferences for their daughters and compare them to parents’ actual preferences.

The high correlation between girls’ dissatisfaction with their bodies, their fear of gaining weight, and their mothers’ messages about girls’ bodies as well as their own suggests that teaching parents how to address body image and weight in ways that allow girls to be both confident and happy could lead to an increase in girls’ positive perceptions of themselves. Research regarding effective strategies for parental communication, as well as research on how to train parents to use these strategies, should be conducted in the future. While it is often difficult to change parental beliefs about themselves, beliefs which might lead to modeling
negative messages regarding eating and body image, direct messages from parents are more easily addressed. Teaching parents to improve the messages that they are directly communicating to their children could potentially lead to children having a better outlook on dieting and body image, which could lead to children being more likely to employ approach strategies later on in life.

With respect to children’s approach and avoidance of foods, these results suggest that those children who use avoidance strategies are more likely to have disordered eating habits and poor body image. The AAT could be used a measure of risk for these problems in the future. If children are found to employ avoidance strategies towards food at a young age, this could indicate a need to address their issues concerning body image and dieting before problems become more ingrained. Research should be done on how to teach both children and their parents to use or model approach strategies, in order to provide children with a barrier against these problems.

In conclusion, findings from this study suggest that mothers have a meaningful influence on girls’ body image, but that these associations are complex. Indeed, it appears that young girls are not only aware of their mothers’ messages regarding eating and weight control, but that they are aware of maternal fears about their own weight and shape. This awareness appears to affect girls’ own fear of being overweight, which in turn directly affects their desire to be smaller. These findings indicate that girls are not simply modeling behaviors and beliefs presented by their mothers, but that they are internalizing these fears about weight and shape. It is therefore important to draw attention to these issues at an early age, as these negative beliefs are difficult to control once entrenched.
Furthermore, this study supports recent literature suggesting that the approach-avoidance paradigm may be an effective measure to assess dieting and eating habits. Girls’ use of avoidance strategies was correlated with factors such as fear of gaining weight, as well as with mothers’ disordered eating variables. More importantly, this study presents the AAT as a possible valid measure for responses to healthful and unhealthful foods. Although this paradigm holds considerable promise for providing an unbiased implicit tool to measure responses to foods, future research which further explores the validity of this measure as a predictor of unhealthy eating habits is warranted.
References


Hagger, M. S., Chatzisarantis, N. L. D., & Harris, J. (2006). From psychological need satisfaction to intentional behavior: Testing a motivational sequence in two behavioral


Table 1

*Participant Characteristics*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean (SD)</th>
</tr>
</thead>
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<tr>
<td>Girls' Age [years], mean (SD)</td>
<td>7.89 (2.26)</td>
</tr>
<tr>
<td>Mothers' Age [years], mean (SD)</td>
<td>38.4 (6.33)</td>
</tr>
<tr>
<td>Girls' Ethnicity, % (n)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>8.2% (6)</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>91.8% (57)</td>
</tr>
<tr>
<td>Girls' Race, % (n)</td>
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<tr>
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</tr>
<tr>
<td>African American</td>
<td>5.5% (4)</td>
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<tr>
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<tr>
<td>Girls' z-BMI, mean (SD)</td>
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<td>Mothers' BMI [kg/m²], mean (SD)</td>
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<td>Both biological parent in household, % (n)</td>
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<td>Mothers with at least some college education, % (n)</td>
<td>89.0% (65)</td>
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Table 2

*Participant Characteristics for those included in the AAT*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Girls' Age [years], mean (SD)</th>
<th>Mothers' Age [years], mean (SD)</th>
<th>Girls' Ethnicity, % (n)</th>
<th>Girls' Race, % (n)</th>
<th>Girls' z-BMI, mean (SD)</th>
<th>Mothers' BMI [kg/m²], mean (SD)</th>
<th>Both biological parent in household, % (n)</th>
<th>Mothers with at least some college education, % (n)</th>
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<td></td>
<td>8.59 (2.05)</td>
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<td>Hispanic</td>
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<td>0.27 (1.16)</td>
<td>27.71 (7.92)</td>
<td>76.9% (40)</td>
<td>80.7% (45)</td>
</tr>
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<td>Non-Hispanic</td>
<td>90.4% (57)</td>
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<td></td>
<td>Caucasian</td>
<td>76.9% (40)</td>
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<td></td>
<td></td>
<td></td>
<td>African American</td>
<td>7.7% (4)</td>
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<td></td>
<td></td>
<td>Mixed/Other</td>
<td>15.4% (8)</td>
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</table>
Table 3

**Correlational analyses**

<table>
<thead>
<tr>
<th></th>
<th>Girl BI Difference (N=73)</th>
<th>Girl-Parent BI Difference (N=73)</th>
<th>Responses to healthful foods (N=52)</th>
<th>Responses to unhealthful foods (N=52)</th>
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<tr>
<td>Child Age</td>
<td>0.29*</td>
<td>0.27*</td>
<td>-0.02</td>
<td>-0.20</td>
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<tr>
<td>z-BMI</td>
<td>0.32**</td>
<td>0.32**</td>
<td>0.07</td>
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<tr>
<td>CFQ</td>
<td></td>
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<tr>
<td>Restriction</td>
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<td>0.13</td>
<td>0.03</td>
<td>0.18</td>
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<td>Monitoring</td>
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<td>Pressure</td>
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<td>-0.26*</td>
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<td>Concern for Child Weight</td>
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<td>0.46***</td>
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<td>Perceived Parent Weight</td>
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<td>-0.14*</td>
<td>-0.12</td>
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<td>Maternal Encouragement of Daughter Weight Control</td>
<td>0.47***</td>
<td>0.341**</td>
<td>-0.07</td>
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<tr>
<td>BIEQ-C</td>
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<tr>
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<td>0.50***</td>
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<td>-0.29*</td>
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<td>0.45***</td>
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<td>0.40***</td>
<td>0.29*</td>
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<td>Restraint</td>
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<td>0.04</td>
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<td>Eating Concern</td>
<td>Shape Concern</td>
<td>Weight Concern</td>
<td>Girl BI Difference</td>
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<tr>
<td>CFQ</td>
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<td>-0.21</td>
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</tbody>
</table>

*Note.* CFQ=Child Feeding Questionnaire; BIEQ-C= Body Image and Eating Behavior Questionnaire for Children; EDE-Q=Eating Disorder Examination Questionnaire; Girl BI Difference Score= Difference between girls’ perceived figures and their ideal figures; Girl-Parent BI Difference=Difference between girls’ perceived figures and the figures that they believe their parents would want them to look like.

* ≤ .05 ** ≤ .01 *** ≤ .001
Table 4

Hierarchical regression results for the difference between girls' perceived figures and their ideal figures.

<table>
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<th>Construct</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>p</th>
<th>R²</th>
<th>ΔR²</th>
<th>p  ΔR²</th>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Girls’ Age</td>
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<td>0.07</td>
<td>0.28</td>
<td>.01</td>
<td></td>
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<tr>
<td>Girls’ z-BMI</td>
<td>0.39</td>
<td>0.14</td>
<td>0.31</td>
<td>.01</td>
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<tr>
<td><strong>Step 2</strong></td>
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Note. BIEQ-C = Body Image and Eating Questionnaire for Children; CFQ = Child Feeding Questionnaire; EDEQ = Eating Disorder Examination Questionnaire
Table 5

Hierarchical regression results for the difference between girls' perceived figures and the figure that they believe their parents would most want them to look like.

<table>
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<th>Construct</th>
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<th>β</th>
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*Note.* BIEQ-C = Body Image and Eating Questionnaire for Children; CFQ = Child Feeding Questionnaire; EDEQ= Eating Disorder Examination Questionnaire
Table 6  Approach Avoidance Task mean difference scores and standard deviations for each picture type shown separately for each block

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<th>Block</th>
<th>Healthful (SD)</th>
<th>Unhealthful (SD)</th>
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<td>1</td>
<td>0.387 (2.893)</td>
<td>0.051 (2.408)</td>
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<tr>
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<td>0.531 (5.386)</td>
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<td>Total</td>
<td>0.459 (4.303)</td>
<td>-0.045 (3.429)</td>
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Note: Negative scores indicate overall avoidance (i.e., girls were slower to pull mouse, and as a result the picture, toward them relative to when they pushed it away), whereas positive scores indicate overall approach toward the categories of foods displayed.
Table 7

Hierarchical regression results for girls’ approach and avoidance of unhealthful foods

<table>
<thead>
<tr>
<th>Construct</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>p</th>
<th>R²</th>
<th>ΔR²</th>
<th>p ΔR²</th>
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*Note.* BIEQ-C = Body Image and Eating Questionnaire for Children; CFQ = Child Feeding Questionnaire; EDEQ = Eating Disorder Examination Questionnaire
Table 8

_Hierarchical regression results for girls’ approach and avoidance of healthful foods_

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_Note._ BIEQ-C = Body Image and Eating Questionnaire for Children; CFQ = Child Feeding Questionnaire; EDEQ = Eating Disorder Examination Questionnaire
Figure 1. Diagram of mediation analysis examining girls’ fear of being overweight as a possible mediator of maternal shape concern on girl BI difference scores. The figure in parentheses indicates the effect of maternal shape concern on girl BI difference scores when fear is controlled.
Figure 2. Diagram of mediation analysis examining girls’ fear of being overweight as a possible mediator of mothers’ concern for child’s weight on girl BI difference scores. The figure in parentheses indicates the effect of concern on girl BI difference scores when fear is controlled.
Appendix A

Healthful and Unhealthful Pictures used in the Approach Avoidance Task

Unhealthy

<table>
<thead>
<tr>
<th>Single Items</th>
<th>Healthy</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Donut" /></td>
<td><img src="image2.png" alt="Tomato" /></td>
</tr>
<tr>
<td><img src="image3.png" alt="Burger" /></td>
<td><img src="image4.png" alt="Orange" /></td>
</tr>
<tr>
<td><img src="image5.png" alt="Muffin" /></td>
<td><img src="image6.png" alt="Ice Cream" /></td>
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</tbody>
</table>
Unhealthy

Multiple Items

Healthy
Appendix B

Child Figures

<table>
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<tr>
<th>Ages</th>
<th>Figures</th>
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<tr>
<td>4-5</td>
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<tr>
<td>6-9</td>
<td><img src="image2" alt="Ages 6-9 Figures" /></td>
</tr>
<tr>
<td>10-12</td>
<td><img src="image3" alt="Ages 10-12 Figures" /></td>
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Appendix C

EATING 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.

<table>
<thead>
<tr>
<th>On how many of the past 28 days ...</th>
<th>No days</th>
<th>1-5 days</th>
<th>6-12 days</th>
<th>13-15 days</th>
<th>16-22 days</th>
<th>23-27 days</th>
<th>Every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>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)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>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?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>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)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>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)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5 Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6 Have you had a definite desire to have a totally flat stomach?</td>
<td>0</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>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)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>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)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9 Have you had a definite fear of losing control over eating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10 Have you had a definite fear that you might gain weight?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>11 Have you felt fat?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>12 Have you had a strong desire to lose weight?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
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)?

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?

21 Over the past 28 days, how concerned have you been about other people seeing you eat?
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).

<table>
<thead>
<tr>
<th>Question</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Markedly</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 Has your weight influenced how you think about (judge) yourself as a person?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>23 Has your shape influenced how you think about (judge) yourself as a person?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>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?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>25 How dissatisfied have you been with your weight?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>26 How dissatisfied have you been with your shape?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>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)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>28 How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms,</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Appendix D

Child Feeding Questionnaire

Instructions. Circle the response that best answers each of the following questions for your child that is currently being tested.

Circle the response that best answers each of the following questions:

1. How often are you responsible for feeding your child?
   Never    Seldom    Half of the time    Most of the time    Always

2. How often are you responsible for deciding what your child’s portion sizes are?
   Never    Seldom    Half of the time    Most of the time    Always

3. How often are you responsible for deciding if your child has eaten the right kinds of foods?
   Never    Seldom    Half of the time    Most of the time    Always

4. Would you describe yourself as a child (5-10 years) to be
   4. Overweight             5. Markedly overweight

5. Would you describe yourself as an adolescent to be
   4. Overweight             5. Markedly overweight

6. Would you describe yourself in your 20s to be
   4. Overweight             5. Markedly overweight

7. Would you describe yourself at present to be
   4. Overweight             5. Markedly overweight
8. How would you describe your child’s weight during the first year of life?
   1. Markedly underweight
   2. Underweight
   3. Normal
   4. Overweight
   5. Markedly overweight

9. How concerned are you about your child eating too much when you are not around him/her?
   1. unconcerned
   2. a little concerned
   3. concerned
   4. fairly concerned
   5. very concerned

10. How concerned are you about your child having to diet to maintain a desirable weight?
    1. unconcerned
    2. a little concerned
    3. concerned
    4. fairly concerned
    5. very concerned

11. How concerned are you about your child becoming overweight?
    1. unconcerned
    2. a little concerned
    3. concerned
    4. fairly concerned
    5. very concerned

12. I have to be sure that my child does not eat too many sweets (Candy, ice cream, cake or pastries).
    1. disagree
    2. slightly disagree
    3. neutral
    4. slightly agree
    5. agree

13. I have to be sure that my child does not eat too many high-fat foods.
    1. disagree
    2. slightly disagree
    3. neutral
    4. slightly agree
    5. agree

14. I have to be sure that my child does not eat too many of his/her favorite foods.
    1. disagree
    2. slightly disagree
    3. neutral
    4. slightly agree
    5. agree

15. I intentionally keep some foods out of my child’s reach.
1. disagree  
2. slightly disagree  
3. neutral  
4. slightly agree  
5. agree

16. I offer sweets (candy, ice cream, cake, pastries) to *my child* as a reward for good behavior.
   1. disagree  
   2. slightly disagree  
   3. neutral  
   4. slightly agree  
   5. agree

17. I offer *my child* his/her favorite foods in exchange for good behavior.
   1. disagree  
   2. slightly disagree  
   3. neutral  
   4. slightly agree  
   5. agree

18. If I did not guide or regulate *my child’s* eating s/he would eat too many junk foods.
   1. disagree  
   2. slightly disagree  
   3. neutral  
   4. slightly agree  
   5. agree

19. If I did not guide or regulate *my child’s* eating s/he would eat too many of his/her favorite foods.
   1. disagree  
   2. slightly disagree  
   3. neutral  
   4. slightly agree  
   5. agree

20. *My child* should always eat all of the food on his/her plate.
    1. disagree  
    2. slightly disagree  
    3. neutral  
    4. slightly agree  
    5. agree

21. I have to be especially careful to make sure *my child* eats enough.
    1. disagree  
    2. slightly disagree  
    3. neutral  
    4. slightly agree  
    5. agree

22. If *my child* indicates that they are not hungry, I try to get him/her to eat anyway.
    1. disagree  
    2. slightly disagree  
    3. neutral
4. slightly agree 5. agree

23. If I did not guide or regulate my child’s eating s/he would eat much less than s/he should.

1. disagree 2. slightly disagree 3. neutral
4. slightly agree 5. agree

24. How much do you keep track of the sweets (candy, ice cream, cake, pies pastries) that your child eats?

1. never 2. rarely 3. sometimes
4. mostly 5. always

25. How much do you keep track of the snack food (potato chips, Doritos, cheese puffs) that your child eats?

1. never 2. rarely 3. sometimes
4. mostly 5. always

26. How much do you keep track of the high fat foods that your child eats?

1. never 2. rarely 3. sometimes
4. mostly 5. always
Appendix E

Concern with Child’s Weight Questionnaire

1. How many times have you told your child that he/she weighs too much?
   Never   Rarely   Sometimes   Often   Always

2. How many times have you told your child to eat less food or eat different foods in order to lose weight or to keep from gaining weight?
   Never   Rarely   Sometimes   Often   Always

3. How many times have you told your child that he/she should exercise in order to lose weight or to keep from gaining weight?
   Never   Rarely   Sometimes   Often   Always

4. How often do you keep your child from eating foods that he/she likes so that he/she will lose weight or keep from gaining weight?
   Never   Rarely   Sometimes   Often   Always
Appendix F

Body Image and Eating Questionnaire for Children

1. Have you ever gone on a diet to lose weight?  Yes  No

2. How many times have you gone on a diet? (circle one).

   Never
   1 time
   2 or 3 times
   4 or 5 times
   More than 5

3. Are you on a diet or trying to lose weight now?  Yes  No

4. Have you ever thought that you needed to lose weight?  Yes  No

5. Do you think you are fat?  Yes  No

6. Have you ever been afraid of becoming fat or fatter?  Yes  No

7. Do you feel fat after eating a small amount of food?

   Never  Sometimes  A lot  All the time

8. I am bothered about how my body looks.

   Never  Sometimes  A lot  All the time

9. Do you think you are:

   1. Very underweight
   2. A little underweight
   3. About the right weight
   4. A little overweight
   5. Very overweight

10. I am bothered because I think I’m too fat.

    Never  Sometimes  A lot  All the time

11. Do you wish you were thinner?  Yes  No

12. Do you feel badly about yourself if you eat too much?
Never   Sometimes   A lot   All the time

13. Do you worry about eating foods that might make you gain weight?

Never   Sometimes   A lot   All the time

14. I try not to eat when I am hungry.

Never   Sometimes   A lot   All the time