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The Caregiver Eating Messages Scale: Development and psychometric investigation☆

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ABSTRACT

Certain caregiver eating messages – restriction of food intake and pressures to eat – are associated with body dissatisfaction and eating disturbances among young girls. This study explored whether these messages are also associated with body attitudes and eating behaviors of young adult women and men. The Caregiver Eating Messages Scale was developed to measure this construct. Two studies (*N*s = 238, 288) indicated that it contained two factors (restrictive/critical messages and pressure to eat messages) and yielded internally consistent, stable, and valid scores. Both factors were positively related to women's BMI, and restrictive/critical messages were positively related to men's BMI. Restrictive/critical messages predicted lower perceived familial body acceptance and intuitive eating and higher perceived familial pressure to be lean and disordered eating. Restrictive/critical messages predicted participants' body attitudes indirectly via their perceptions of their family's attitude toward their body, with one exception: restrictive/critical messages uniquely predicted men's body appreciation.

Introduction

The family environment is believed to have a profound effect on children's body image and eating behavior, playing an instrumental role in determining their patterns of food intake and selection (Fisher, Sinton, & Birch, 2009). Certain caregiver messages about eating (i.e., those related to restricting children's food intake and pressuring them to eat) and weight (i.e., pressuring children to lose weight) are connected to children's body attitudes and eating behavior (Abramovitz & Birch, 2000; Birch, 1999; Birch & Fisher, 2000; Cutting, Fisher, Grimm-Thomas, & Birch, 1999; Fisher & Birch, 1999). When caregivers withhold certain foods (usually high-calorie, fat, and/or sugar foods), those foods actually become more desirable to their children (Birch, Fisher, & Davison, 2003). When caregivers pressure children to eat (usually nutrient-dense foods), children avoid the foods that are being pushed upon them, as they form negative emotions and associations (e.g., fights at the dinner table) with these foods (Galloway, Fiorito, Francis, & Birch, 2006). When caregivers pressure children to lose weight, children tend to internalize the lean-ideal standard and focus attention on their appearance (Presnell, Bearman, & Stice, 2004; Tylka & Hill, 2004).

Research on caregiver eating messages specifically has focused on the body dissatisfaction and disordered eating behavior of young children. Girls' perception of parental pressure to eat was positively related to their dietary restraint, while their perception of having restrictions placed on their eating was positively related to their disinhibited eating (Carper, Fisher, & Birch, 2000) and increased intake of snack food (Fisher & Birch, 1999). Importantly, these associations are supported in prospective studies. Mothers who reported restraining their children's eating and encouraging them to lose weight were more likely to have daughters who engaged in dieting behaviors over a 6-year period (Francis & Birch, 2005). Higher maternal restriction of food intake when daughters were five predicted their eating in the absence of hunger at age seven and at age nine (Birch et al., 2003). In a comprehensive literature review of parents' feeding styles and children's eating behavior, Faith, Scanlon, Birch, Francis, and Sherry (2004) concluded that parental restriction of food intake was positively associated with children's weight and tendency to eat in a disinhibited manner.

It remains largely unknown whether caregiver eating and body-related messages predict body attitudes and eating behavior beyond adolescence. These messages may likely continue to impact a person's body attitudes and eating behaviors even after direct exposure to these messages has lessened (e.g., after leaving home); the extent of this impact has yet to be determined. A 17-year longitudinal study found that one narrow aspect of caregiver–child feeding dynamics, unpleasant meals during early childhood, predicted disordered eating in early adolescence, which was then

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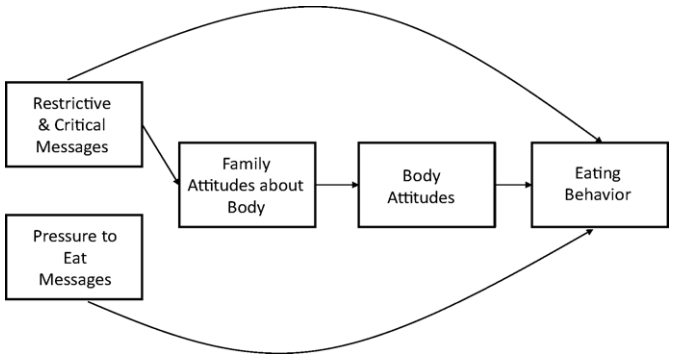

Fig. 1. Hypothesized structural model.

associated with a 9-fold increase in eating disorder risk during late adolescence, which in turn was associated with a 35-fold increase in adult eating disorder risk (Kotler, Cohen, Davies, Pine, & Walsh, 2001). Unfortunately, caregivers were not asked to report specific messages they sent their children during these unpleasant meals. Clearly, researchers need to determine the extent to which specific caregiver messages regarding food and weight during childhood predict body attitudes and eating behavior throughout adulthood.

In order to undertake this research, a measure of perceived caregiver eating messages (both restrictive/critical messages and pressure to eat messages) needs to be designed. Therefore, in two studies, we developed such a measure and investigated its psychometric properties—such as its internal consistency reliability, test–retest reliability over a 4-week period, and factor structure. An important preliminary step for research using this measure would be to explore whether caregiver eating messages are associated with young adults' body attitudes and eating behavior; these significant associations would accrue validity evidence for this measure. Thus, we investigated these associations within a model (Fig. 1), which was grounded in the extant theoretical and empirical literature.

We chose to examine positive and negative variations of this model, as it is important to investigate both positive and negative body image as well as adaptive and maladaptive eating behaviors. Positive body image is not simply the absence of negative body image, and adaptive eating is not solely absence of disordered eating. Body appreciation, an aspect of positive body image that reflects unconditional acceptance of and respect for the body regardless of its congruence to societal body ideals predicted unique variance in psychological well-being above and beyond body dissatisfaction (Avalos, Tylka, & Wood-Barcalow, 2005). Similarly, intuitive eating, or trust in and connection with physiological hunger and satiety cues and eating in response to these cues, predicted unique variance in psychological health above and beyond disordered eating (Tylka & Wilcox, 2006). Thus, body appreciation and intuitive eating are worthy of study in their own right and will contribute to a more comprehensive understanding of how participants' perceived caregiver eating messages are associated with their body image and eating behavior. The positive variation of the model included associations between caregiver eating messages and body acceptance from family, body appreciation, and intuitive eating. The negative variation of the model included associations between caregiver eating messages and pressure from family to lose weight, body dissatisfaction, and disordered eating.

Next, we present research supporting the model paths and our hypotheses. First, parental restriction of food intake has been found to predict children's perceptions of parental pressure to lose weight (Fisher & Birch, 1999); thus, we hypothesized that perceptions of caregiver messages to restrict food intake would predict participants' perceptions of their family's attitudes toward their body (e.g., lower body acceptance, increased pressure to lose weight). Second, based on the findings of Carper et al. (2000) and Birch and Fisher (2000), we hypothesized that caregiver eating messages to restrict food intake and pressure to eat would each negatively predict participants' intuitive eating and positively predict their disordered eating. Third, because caregivers' opinions have a profound influence on how individuals feel about their body (Avalos & Tylka, 2006; Stice, Nemeroff, & Shaw, 1996; Tantleff-Dunn & Gokee, 2002; Tylka & Hill, 2004), we hypothesized that perceptions of their family's attitudes toward their body will predict individuals' own body attitudes. Specifically, perceived body acceptance will positively predict their body appreciation, and perceived pressure to lose weight will positively predict their body dissatisfaction. Fourth, much research supports the relationships between body attitudes and eating behavior (e.g., Avalos & Tylka, 2006; Stice, 2002; Tylka, 2004; Tylka & Hill, 2004), and thus we hypothesized that body appreciation would positively predict intuitive eating, and body dissatisfaction would positively predict disordered eating.

In addition, we wanted to determine whether women and men differed in their levels of caregiver eating messages as well as the strengths of the model paths. To date, no study has investigated gender differences in the levels of perceived restrictive/critical messages and pressure to eat messages. Given society's pressures for boys to eat to gain muscle and for girls to be thin, we hypothesized that men would report higher levels of pressure to eat messages and women would report higher levels of restrictive/critical messages. Very little research has investigated gender differences in the strength of the relationships between caregiver eating messages and body- and eating-related variables. Caregiver messages about body size/shape have been found to impact the body dissatisfaction of both girls and boys; however, girls, on average, are impacted more strongly than boys (Smolak, Levine, & Schermer, 1999). Thus, we expected that the relationship between familial body acceptance and pressures to lose weight would be stronger for women than for men. Given the paucity of research investigating gender differences in the strength of the relationships between the model variables, we did not articulate specific hypotheses for the remaining model paths.

Study 1

The first purpose of this study was to develop the Caregiver Eating Messages Scale (CEMS), to explore the factor structure and reliability of its scores, and to test the positive variation of our model proposed in Fig. 1. We hypothesized that the CEMS will consist of two factors: one that measures restrictive/critical caregiver eating messages and the other which measures caregiver pressure to eat. We assert that these two factors will demonstrate evidence of internal consistency reliability and be stable over a 4-week period. Second, we examined a model of the association between caregiver eating messages and participant reports of positive body attitudes and adaptive (i.e., intuitive) eating, which will accrue validity evidence for the CEMS.

Method

Participants and procedure

Participants ($N = 238$) were college women ($n = 160$) and men ($n = 78$) ranging in age from 18–35 years ($M = 20.87$, $SD = 3.92$). Our sample size exceeded the number of participants needed (130) for a case-to-parameter ratio of 10:1 to examine the structural model as well as to conduct all planned analyses (Kline, 2005). They identified as Caucasian (91.6%), African-American (2.5%), Asian American (2.5%), multiracial (2.9%), or Native American (0.4%). In terms of college rank, 55.9% were first-year students,

18.5% were sophomores, 15.1% were juniors, 4.6% were seniors, 0.8% were post-baccalaureate students, and 2.5% were graduate students. Six participants (2.5%) did not report a specific college rank. Most participants identified their social economic status as middle class (50.4%), working class (21.4%), or upper-middle class (23.5%).

After obtaining IRB approval, participants were recruited from introductory psychology classes at a large Midwestern university and a community college in the same region. They were informed that the purpose of the study was to investigate their attitudes, as well as their perceptions of others' attitudes, toward their body and eating behavior. They were assured that their responses would remain anonymous. At the university, participants completed the measures in a classroom used as a research lab and received class credit. At the community college, participants were instructed to complete the study after class and return it to the experimenter. They also received extra credit toward their class. Measures were counterbalanced to control for order effects.

Measures

Perceived caregiver eating messages. We developed the CEMS, as no current measure assesses individuals' perceptions of the messages they received from caregivers about what to eat, when to eat, and how much to eat. We collaborated to create 19 items aimed at assessing the two major domains of caregiver feeding messages articulated in the theoretical and empirical literature (e.g., Birch & Fisher, 1998; Drucker, Hammer, Agras, & Bryson, 1999; Eneli, Crum, & Tylka, 2008; Faith et al., 2004; Satter, 1986, 2005): pressure to eat and being critical of/restrictive toward food intake. Participants were instructed: "Please indicate the degree to which your parents/caregivers emphasized the following behaviors while you were growing up." The response scale ranged from 1 (*never*) to 6 (*always*), with higher items scores indicating greater perceived pressure to eat or criticalness/restriction of food choice/intake.

We performed several steps to ensure that the CEMS items were clear and represented the constructs of interest (i.e., caregiver pressures to eat and caregiver restrictive/critical eating messages). First, an undergraduate senior honors student looked at the initial CEMS items and revised them for clarity. Next, we piloted the revised items with a group of 43 college students (12 men and 31 women; *M* age = 26.40) who did not suggest any additional items or further wording changes. They also rated the clarity of each item on a scale ranging from 1 (*very unclear*) to 5 (*very clear*). The average rating across all items was a 4.79; thus, each item was clearly written, with item averages ranging between 4.42 and 4.91. We then consulted seven professionals (four professors of psychology who specialize in eating behavior and child/parent feeding dynamics, two pediatricians who specialize in treating family eating problems and are familiar with the empirical literature on child/parent feeding dynamics, and one nutritionist who specializes in promoting intuitive eating and treating disordered eating) to independently evaluate the items. Each stated that the items adequately and comprehensively assessed the two major domains of caregiver feeding messages. Four items were removed due to being questionable and/or not entirely representative of the content domain.

Perceived body acceptance by family. Perceived familial acceptance of body weight and shape was measured using two items on the Family subscale of the Body Acceptance by Others Scale (BAOS; Avalos & Tylka, 2006): "I've felt acceptance from my family regarding my body shape and/or weight" and "My family has sent me the message that my body shape and/or weight are fine." Participants rate these items along a 5-point scale ranging from 1 (*never*) to 5 (*always*). Higher scores indicate higher levels of perceived acceptance. Past research with college women has shown that it yields internally consistent scores (α = .93; Avalos & Tylka, 2006) despite it containing only two items. It has been shown to be inversely related to perceived familial pressures to be lean, supporting its convergent validity (Avalos & Tylka, 2006). In our sample, its alpha was .94 for women and .91 for men.

Body appreciation. This construct was measured using the 13-item Body Appreciation Scale (BAS; Avalos et al., 2005). Its items (e.g., "Despite its flaws, I accept my body for what it is"), are rated along a scale ranging from 1 (*never*) to 5 (*always*) and averaged, with higher scores reflecting higher levels of body appreciation. The BAS has demonstrated a unidimensional factor structure with European, European American, African, German, and South Asian college and community samples of women and men (Avalos et al., 2005; Swami, Airs, Chouhan, Leon, & Towell, 2009; Swami, Hadji-Michael, & Furnham, 2008; Swami, Stieger, Haubner, & Voracek, 2008), and a bidimensional structure with Malaysian women (Swami & Chamorro-Premuzic, 2008). Additionally, these studies have supported the internal consistency reliability, 3-week test–retest reliability, convergent, and discriminant validity of its scores. In our sample, its alpha was .93 for women and .91 for men.

Intuitive eating. The Intuitive Eating Scale (IES; Tylka, 2006) contains 21 items that measure central characteristics of intuitive eating: unconditional permission to eat (e.g., "If I am craving a certain food, I allow myself to have it"), eating for physical rather than emotional reasons (e.g., "I find myself eating when I am bored, even when I'm not physically hungry" [reverse scored]), and reliance on internal hunger and satiety cues (e.g., "I trust my body to tell me how much to eat") to govern eating behavior. Subscales can be calculated to reflect these characteristics; however, these subscales load on a higher-order intuitive eating factor (Tylka, 2006). Consequently, we chose to use the IES total score in lieu of subscales. Item responses are rated on a scale that ranges from 1 (*strongly disagree*) to 5 (*strongly agree*). After appropriate items are reverse scored, item responses are averaged. Higher total scores correspond with higher levels of intuitive eating. With various samples of college women, Tylka (2006) upheld the internal consistency reliability and 3-week test–retest reliability of its scores, its convergent validity, and its discriminant validity. To our knowledge, the IES has not yet been explored with samples of men. In our sample, IES total score alphas were .85 for women and .84 for men.

Body mass index (*BMI*). Participants provided an estimate of their actual weight (in pounds) and height (in feet/inches). We converted these estimates to metric units to compute BMI (kg/m^2).

Results

Factor analysis of the CEMS

Ten missing data points (i.e., single item values) were handled by substituting participants' mean scale or subscale scores for the missing value. We conducted an exploratory factor analysis on the 15 CEMS items using principle axis factoring and varimax rotation, as the factors should not be highly correlated given that they were designed to assess different messages about food and eating. The significance of Bartlett's test of sphericity, χ^2 (153, N = 238) = 1626.91, $p < .001$, and the size of the Kaiser–Meyer–Oklin measure of sampling adequacy = .78, revealed that the CEMS had adequate common variance for factor analysis (Tabachnick & Fidell, 2001).

The number of factors was determined by parallel analysis, which is the method of choice as it prevents overfactoring (Fabrigar, Wegener, MacCallum, & Strahan, 1999). We first generated 50 random data sets that had the same dimensions as the actual data set and then factor analyzed each of the random data sets. Next, we compared eigenvalues extracted from the actual data to the criterion eigenvalues (i.e., 95th percentile) calculated from the random data. As recommended (Fabrigar et al., 1999), we only retained factors that had greater corresponding

eigenvalues than the random data. Two factors had eigenvalues greater than those estimated from the random data criterion and were thus interpreted.

Criteria to retain an item were that it loaded at least ≥.40 on its primary factor and less than ≤.25 on any other factor. Ten items met these criteria and were thus retained. We performed another factor analysis with these 10 items using principle axis factoring and varimax rotation. All items loaded ≥.40 on their primary factor and ≤.25 on the other factor. Five items loaded on the first factor, which had an eigenvalue of 3.37 and accounted for 33.69% of the variance. Its factor loadings ranged from .53 to .92. This factor was labeled pressure to eat messages (PEM). Five items loaded on the second factor, which had an eigenvalue of 2.66 and accounted for 26.64% additional variance. Its factor loadings ranged from .60 to .84. This factor was labeled Restrictive and Critical Messages (RCM). The final CEMS, used in the remaining analyses, is presented in Appendix A.

Reliability of the CEMS's subscale scores

Cronbach's alphas for PEM were .86 for women and .79 for men, while alphas for RCM were .86 for women and .70 for men. We evaluated the test–retest reliability of the CEMS scores over a 4-week period with a subsample of 18 young adult students (56% women, 44% men, *M* age = 20.65, *SD* = 2.78, 94% Caucasian) who volunteered to participate in a follow-up study without incentive. Scores for PEM ($r = .80$) and RCM ($r = .74$) were found to be consistent over this time period. Paired sample *t*-tests indicated that the subscale means neither increased nor decreased over time, $t(17) = .45$, *ns* for PEM and $t(17) = .47$, *ns* for RCM, lending additional support for the stability of the subscale scores.

We screened our data for normality of distribution. Researchers testing models via path analysis should transform variables that have absolute values of skewness > 3 and kurtosis > 10 (Kline, 2005). The skewness and kurtosis values for BMI and the five variables in this study were lower than these values (skewness range = −0.66 to 1.68, kurtosis range = −0.62 to 3.56); therefore, we did not transform any variable. Next, we calculated the scale/subscale means, standard deviations, and correlations for women and men separately. These values are presented in Table 1. Restrictive/critical caregiver eating messages were related in a positive direction to BMI and in a negative direction to perceived body acceptance from family, body appreciation, and intuitive eating, providing preliminary evidence of the construct validity of its scores. Pressure to eat caregiver messages were only related slightly in a negative direction to women's BMI.

We then performed a 2 × 6 multivariate analysis of variance (MANOVA) to determine if women and men differ on the measure variables. The overall MANOVA indicated differences between women and men, $F(6, 225) = 3.16$, $p < .01$, Wilks's $\Lambda = .92$, with women having significantly lower levels of pressure to eat messages, $F(1, 230) = 5.54$, $p < .05$, body appreciation, $F(1, 230) = 10.10$, $p < .01$ and intuitive eating, $F(1, 230) = 5.26$, $p < .05$ than men.

Multiple-group analysis

We used Mplus Version 4.1 (Muthén & Muthén, 2006) with maximum likelihood (ML) estimation and the covariance matrix as input to analyze the structural model (Fig. 1). Because pressure to eat messages was not correlated with intuitive eating, we did not include it within our model. Total scale and subscale scores served as the observed variables in this analysis. Given BMI's significant relationship with many of the model variables, we specified BMI to be a covariate, predicting each of the four manifest variables. We determined the adequacy of model fit by three indices recommended by Hu and Bentler (1999): the Comparative Fit Index (CFI), the standardized root-mean square residual (SRMR), and the root-mean square error of approximation (RMSEA). CFI values of .95 and higher, SRMR values of .08 or lower, and RMSEA values of .06 and lower indicate a relatively good fit of the model to the data, whereas CFI values of .90–.94, SRMR values of .09–.10, and RMSEA values of .07–.10 reflect an acceptable fit. Values outside of these ranges suggest an unacceptable fit.

Although the CFI (.98) and SRMR (.04) values were acceptable, the RMSEA value was not (.12). An examination of the modification indices indicated that the path from restrictive/critical eating messages to body appreciation needed to be estimated. Once this path was estimated, the model provided an acceptable to good fit to the data (CFI = .99, SRMR = .02, RMSEA = .09). This path was significant for men, but not for women. All other hypothesized paths were significant.

Next, we determined whether the five paths among the variables were similar in strength for both women and men. Two multiple-group models were tested. In the first model, the values of the five structural paths were allowed to vary (i.e., permitting the estimation of different structural paths) for women and men. In the second (i.e., invariant) model, the five structural paths were constrained to be equal (i.e., not allowing the estimation of different structural paths) for women and men. If these two models do not differ in fit, then the structural paths would be similar for women and men. If the models differ in fit, then one or more structural paths would be different. Both models provided an adequate fit to the data (variant: CFI = .99, RMSEA = .09, SRMR = .02; invariant: CFI = .99, RMSEA = .06, SRMR = .05), but differed in fit, $\chi^2_{\text{difference}}(5, N = 238) = 16.23$, $p < .05$. We then compared the invariant model with five different models, each allowing only one of the structural paths to vary, to detect the different path/s. For each of these model comparisons, we conducted a chi-square difference test; if the models are significantly different, then the strength of the structural path that was allowed to vary is different for women and men. Only the path from restrictive/critical eating messages to body appreciation varied between women and men in that it was significantly stronger for men, $\chi^2_{\text{difference}}(1, N = 238) = 4.26$, $p < .05$. Contrary to prediction, the path from familial body acceptance to body appreciation was not significantly stronger for women.

The path coefficients for the structural model are presented in Fig. 2. Restrictive/critical eating messages accounted for 34.6%

Table 1
Study 1 means (*SD*) and correlations among measures for women and men.

Measure	Women	Men	Partial η^2	Response range	1	2	3	4	5	6
1. BMI	24.80 (5.86)	24.84 (4.70)	.00	n/a	–	.43*	−.03	−.22	−.17	−.24
2. Restriction/Critical Messages	2.10 (1.06)	2.09 (0.80)	.00	1–6	.19*	–	−.16	−.50*	−.49*	−.53*
3. Pressure to Eat Messages	2.98_a (1.07)	3.31_a (0.99)	.03	1–6	.17*	.09	–	−.22	−.11	−.22
4. BAOS (Body Acceptance by Family)	3.98 (0.95)	4.09 (0.94)	.00	1–5	−.23*	−.56*	−.02	–	.59*	.30*
5. BAS (Body Appreciation)	3.40_b (0.77)	3.72_b (0.74)	.04	1–5	−.31*	−.36*	.03	.57*	–	.50*
6. IES (Intuitive Eating)	3.34_c (0.51)	3.49_c (0.51)	.02	1–5	−.25*	−.42*	.01	.49*	.53*	–

Notes: $N = 238$. Values that share a common subscript (reading horizontally) reveal significant differences between women and men ($p < .05$). BAOS = Body Acceptance by Others Scale; BAS = Body Appreciation Scale; IES = Intuitive Eating Scale. Data from women ($n = 160$) are presented below the diagonal, whereas data from men ($n = 78$) are presented above the diagonal.

* $p < .05$.

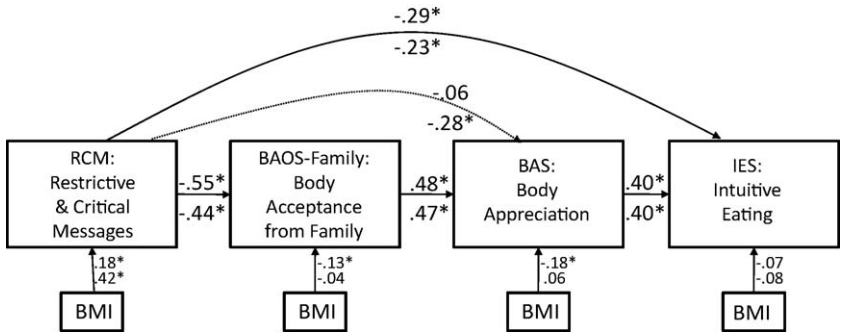

Fig. 2. Test of the positive body attitudes and adaptive eating model. Total scale and subscale scores serve as observed variables in the model. RCM = Restrictive Critical Messages subscale of the Caregiver Eating Messages Scale, BOAS-Family = Family subscale of the Body Acceptance by Others Scale, BAS = Body Appreciation Scale, and IES = Intuitive Eating Scale. Solid lines represent hypothesized paths. The dashed line represents an additional path, detected via modification indices, that was significant for men but not for women. Path coefficients above the path are for women; path coefficients below the path are for men. $^{*}p < .05$.

and 20.7% of the variance in perceived body acceptance from family for women and men, respectively (i.e., the more restrictive/critical the eating messages, the lower the perceived acceptance). Restrictive/critical messages and perceived body acceptance from family accounted for 34.4% and 39.6% of the variance in body appreciation for women and men, respectively. Last, restrictive/critical eating messages and body appreciation accounted for 35.8% and 33.0% of the variance in intuitive eating for women and men, respectively.

Study 2

We performed a confirmatory factor analysis of the CEMS to determine whether its factor structure was upheld in a different sample. We also examined a model of the associations between caregiver eating messages, negative body attitudes, and maladaptive eating.

Method

Participants and procedure

Participants (N = 288) were college women (n = 171) and men (n = 117) recruited from introductory psychology classes during a subsequent year. Our sample size exceeded the number of participants needed for all planned analyses (Kline, 2005). Participants ranged in age from 18 to 30 years (M = 19.39 years, SD = 2.10). Most (80.2%) identified as Caucasian, followed by African-American (6.3%), multiracial (6.3%), Asian American (3.8%), Latino/a (3.1%), and Native American (0.3%). The majority of participants (76.4%) were first-year students; 17.0% were sophomores, 4.5% were juniors, 1.0% were seniors, 0.7% were post-baccalaureate students, and 0.3% were graduate students. Most reported being middle class (55.6%) or upper-middle class (24.0%).

Measures

Perceived caregiver eating messages. The 10-item CEMS was described in depth in Study 1. In this sample, alphas were .82 (women) and .70 (men) for RCM and .86 (women) and .81 (men) for PEM.

Familial pressure to be lean. Perceived familial pressures to be lean were assessed using the two-item Family subscale of the Perceived Sociocultural Pressures Scale (PSPS; Stice, Ziemba, Margolis, & Flick, 1996): "I've felt pressure from my family to lose weight," and "I've noticed a strong message from my family to have a thin body." Item responses are rated along a 5-point scale ranging from 1 (*never*) to 5 (*always*) and averaged. Higher subscale scores reflect greater pressure from family members. Calculated from data of college women (Tylka & Subich, 2004), the internal consistency reliability and construct validity have been upheld for this subscale's scores. In our sample, its alphas were .84 for women and .70 for men.

Body dissatisfaction. The Body Dissatisfaction subscale of the Eating Disorder Inventory-2 (EDI-2; Garner, 1991) was used to assess this construct. It contains nine items measuring the belief that certain body parts (e.g., hips, thighs, stomach) are too large and an overall item that measures dissatisfaction with overall body shape. Items are rated along a 6-point scale ranging from 1 (*always true of me*) to 6 (*never true of me*). Garner (1991) recommended that item responses *often true of me*, *usually true of me*, and *always true of me* receive a score of 1, 2, and 3, respectively, and the remaining item responses receive a score of 0. Given that this method restricts the range of responses, the coded responses (i.e., 1–6) were instead averaged. This continuous scoring method has been used with samples of college women (e.g., Tylka & Subich, 2004). Given that men's body dissatisfaction is not expressed as their thighs and hips being too large (Tylka, Bergeron, & Schwartz, 2005), only three items that reflected dissatisfaction with the stomach area and satisfaction with overall body shape were averaged for men. For women, all nine items were averaged. Higher scores reflect higher levels of body dissatisfaction. When scored continuously, its internal consistency reliability and construct validity has been supported for college women (Tylka & Subich, 2004). In this sample, alpha for the Body Dissatisfaction EDI-2 subscale was .92 for women, and alpha for the three-item measure was .84 for men.

Disordered eating. The Eating Attitudes Test-26 (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982) contains 26 items that assess symptoms of eating disorders (e.g., "I have gone on eating binges where I feel that I may not be able to stop"). Items are rated on a 6-point scale ranging from 1 (*never*) to 6 (*always*). Garner et al. (1982) recommended that the responses always, usually, and often receive scores of 3, 2, and 1, respectively, while the remaining responses receive a 0. However, because of the low base rate of clinical eating disorders, the full range of responses was retained. Item responses (i.e., 1–6) were averaged, and higher scores reflect greater symptoms of eating disorders. When scored continuously, its internal consistency reliability, 3-week test–retest reliability, and convergent validity have been supported for college women and men (Mazzeo, 1999; Tylka et al., 2005; Tylka & Subich, 2004). In this sample, alphas for the EAT-26 were .89 for women and .87 for men.

BMI. Participants estimated their weight (in pounds) and height (in feet/inches), which was converted to metric units in order to compute BMI.

Table 2
Study 2 means (*SD*) and correlations among measures for women and men.

Measure	Women	Men	Partial η^2	Response range	1	2	3	4	5	6
1. BMI	23.16_a (5.42)	24.92_a (4.78)	.03	n/a	–	–.41*	.01	.41*	.52*	.21*
2. Restriction/Critical Messages	2.20 (0.94)	2.00 (0.74)	.01	1–6	.46*	–	.17*	.45*	.29*	.26*
3. Pressure to Eat Messages	3.07 (1.15)	3.22 (1.00)	.01	1–6	.15*	.27*	–	.02	.07	.13
4. PSPS (Pressure to be Lean by Family)	1.96_b (1.06)	1.61_b (0.72)	.03	1–5	.51*	.61*	.13	–	.48*	.35*
5. EDI-2 Body Dissatisfaction	3.38_c (1.19)	2.65_c (0.93)	.10	1–6	.56*	.43*	.06	.50*	–	.42*
6. EAT-26 (Disordered Eating)	2.41_d (0.67)	2.13_d (0.56)	.04	1–6	.25*	.48*	.11	.37*	.56*	–

Notes: $N = 288$. Values that share a common subscript (reading horizontally) reveal significant differences between women and men ($p < .05$). PSPS = Perceived Sociocultural Pressures Scale; EDI-2 = Eating Disorder Inventory-2; EAT-26 = Eating Attitudes Test-26. Data from women ($n = 171$) are presented below the diagonal, whereas data from men ($n = 117$) are presented above the diagonal.
* $p < .05$.

Results

Preliminary analyses

Participants' mean scale or subscale scores were substituted for the 12 missing data points (i.e., single item values) found in the data. Skewness and kurtosis values were evaluated and found to be acceptable (skewness range = −0.95 to 1.47, kurtosis range = −0.59 to 2.74; Kline, 2005) for the planned analyses; thus, no transformations were performed. Subscale means, standard deviations, and correlations for women and men are located in Table 2.

A 2 × 6 multivariate analysis of variance (MANOVA) revealed differences between women and men, $F(6, 281) = 14.90$, $p < .001$, Wilks's $\Lambda = .76$. Univariate tests indicated that men had significantly higher BMI, $F(1, 286) = 8.46$, $p < .01$ and lower levels of perceived pressure to be lean from family, $F(1, 286) = 9.68$, $p < .01$; body dissatisfaction, $F(1, 286) = 30.23$, $p < .001$; and disordered eating, $F(1, 286) = 13.21$, $p < .001$.

Cross-validation of the CEMS's factor structure

To reaffirm the CEMS's factor structure, we ran a confirmatory factor analysis, specifying RCM and PEM items to load on their respective factor, and analyzed it using Mplus with ML estimation and the covariance matrix as input. Fit indices suggested that the model provided an adequate fit to the data, CFI = .92, RMSEA = .08, SRMR = .06 (Hu & Bentler, 1999), lending additional support for the CEMS's factor structure. All items loaded significantly ($p < .001$) on their respective factor, ranging from .45 to .84 for RCM and .50 to .91 for PEM.

Test of the maladaptive structural model and additional construct validity of the CEMS

Similar to Study 1, pressure to eat messages was not related to familial pressure to be lean, body dissatisfaction, or disordered eating and was not considered in the structural model. We evaluated our revised structural model using Mplus with ML estimation and the covariance matrix as input. Total scale/subscale scores served as the observed variables. We specified BMI, as a covariate, to predict each of the four variables. This model provided an excellent fit to the data (CFI = 1.00, SRMR = .03, RMSEA = .04). All hypothesized paths were significant, and no modification index suggested that any other path should be estimated.

Next, we used multiple-group analysis to determine whether the four paths among the variables were similar in strength for both women and men. We created a variant and an invariant model and both provided an adequate-to-good fit to the data (variant: CFI = 1.00, SRMR = .03, RMSEA = .04; invariant: CFI = .99, RMSEA = .06, SRMR = .05). They did not differ in fit, $\chi^2_{\text{difference}}(4, N = 288) = 6.18$, *ns*, revealing that no structural path was significantly different in strength for women and men. Contrary to our hypothesis, the path from familial pressure to lose weight to body dissatisfaction was not stronger for women.

Fig. 3 includes the structural path coefficients for women and men. Restrictive/critical eating messages accounted for 42.5% and 30.8% of the variance in perceived pressure to be lean from family for women and men, respectively. Perceived pressure to be lean from family accounted for 37.4% and 34.5% of the variance in body dissatisfaction for women and men, respectively. Last, restrictive/critical eating messages and body dissatisfaction accounted for 36.2% and 26.8% of the variance in disordered eating for women and men, respectively.

General discussion

This study incrementally contributes to the literature on caregiver eating messages, body image, and eating behavior by presenting the CEMS, which measures individuals' perceptions of their caregivers' tendency to restrict food intake/make critical comments about their eating and impose pressure on them to eat certain foods. Experts of various disciplines (clinical psychology,

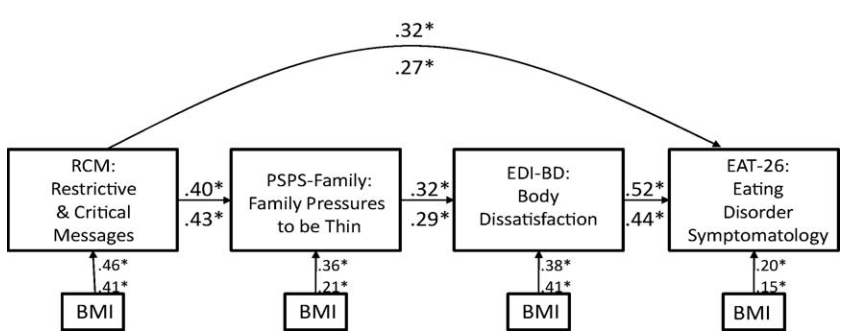

Fig. 3. Test of the negative body attitudes and maladaptive eating model. Total scale and subscale scores serve as observed variables in the model. RCM = Restrictive Critical Messages subscale of the Caregiver Eating Messages Scale, PSPS-Family = Family subscale of the Perceived Sociocultural Pressures Scale, EDI-BD = Body Dissatisfaction subscale of the Eating Disorder Inventory-2, and EAT-26 = Eating Attitudes Test-26. Path coefficients above the path are for women; path coefficients below the path are for men. *$p < .05$.

social psychology, health psychology, pediatric medicine, and dietetics) evaluated the items to ensure that they adequately and comprehensively represented the construct domain. A psychometric investigation of the CEMS indicated that it conformed to its hypothesized two-factor structure, measuring restrictive/critical caregiver eating messages and pressure to eat messages, and yielded internally consistent and stable scores over a 4-week period.

Restrictive/critical eating messages

For both women and men, restrictive/critical caregiver messages were related negatively to perceived familial body acceptance, body appreciation, and intuitive eating; and related positively to perceived familial pressure to be lean, body dissatisfaction, and disordered eating. These findings uphold the construct validity of the RCM subscale. Consistent with previous studies with children (e.g., for a review, see Faith et al., 2004) our participants' perception of caregiver restrictive/critical eating messages was related in a positive direction to BMI. Perhaps this finding is due to restrictive/critical messages encouraging eating in the absence of hunger (Birch et al., 2003), which may not dissipate in adulthood. The positive association between restrictive/critical caregiver eating messages and disordered eating also has been found for children and adolescents (Carper et al., 2000; Fisher & Birch, 1999; Francis & Birch, 2005).

We further explored restrictive/critical caregiver eating messages within the context of an adaptive/positive model (exploring body appreciation and intuitive eating) and a maladaptive/negative model (exploring body dissatisfaction and disordered eating) with young adult samples of women and men. Not only were perceptions of restrictive/critical caregiver eating messages associated directly or indirectly with variables that reflect psychological disturbance, but restrictive/critical messages also appear to be negatively related to variables suggestive of psychological well-being.

In the positive variation of the model, perceptions of restrictive/critical caregiver eating messages were negatively associated with lower perceived body acceptance from family and intuitive eating. These findings lend support to the theory that caregivers' attempts to restrict children's eating may backfire by disconnecting individuals from their natural hunger and satiety cues (Eneli et al., 2008; Satter, 1986, 2005; Tylka, 2006). This may continue into adulthood, as our participants who reported restrictive/critical caregiver eating messages reported a lower tendency to eat when physically hungry and stop eating when no longer hungry. In addition, perceived body acceptance from family was associated with higher body appreciation, and body appreciation was related to greater reports of intuitive eating behavior, similar to previous research on college women (Avalos & Tylka, 2006). In the negative variation of the model, restrictive/critical caregiver eating messages predicted family pressure to be lean and disordered eating. In turn, perceptions of family pressure to be lean predicted participants' body dissatisfaction, consistent with findings which suggest that girls and boys are also impacted by this pressure (Smolak et al., 1999). Body dissatisfaction predicted participants' disordered eating, which is consonant with findings with samples of children (e.g., Keel, Fulkerson, & Leon, 1997) and young adults (e.g., Tylka, 2004; Tylka & Subich, 2004).

Interestingly, only one difference between the direction and strength of the model paths was uncovered for women and men. For men, restrictive/critical caregiver eating messages was uniquely associated with their lower body appreciation; however, for women, perceived body acceptance by their family fully accounted for this relationship. Restrictive/critical caregiver eating messages may concurrently reduce men's beliefs that their caregivers accept their body as well as their own body appreciation. For women, these messages may reduce women's beliefs that their caregivers accept their body, which may be enough to lower their body appreciation. This gender difference was not uncovered for the maladaptive model including perceived pressure to lose weight and body dissatisfaction–for both women and men, perceived pressure to lose weight accounted for the relationship between restrictive/critical caregiver eating messages and participants' body dissatisfaction. Outside of this difference, this study suggests that the processes to which perceived restrictive/critical caregiver eating messages are associated with perceptions of family members' attitudes toward their bodies and their eating behaviors may be similar for adult men and women.

Pressure to eat messages

Curiously, our findings indicated that pressure to eat messages may not be associated with young adults' intuitive eating or disordered eating. Yet, young girls' perception of parental pressure to eat has been found to be positively related to their dietary restraint (Carper et al., 2000). Although we did not anticipate that pressure to eat messages would be related to other variables, it was slightly related to women's perceptions that their family pressured them to be lean as well as their BMI; it was not related to any eating or body-related variable for men. Pressure to eat caregiver messages has not been found to be associated with children's or adolescents' weight (Faith et al., 2004). Caregivers commonly pressure children to eat nutrient-dense high-satiety foods that tend to be low in fat and calories (e.g., vegetables and fruits; Satter, 2005). When under caregivers' control, children may have little choice but to eat the foods that their caregivers press upon them. Yet, when young adult women are independent from their caregivers (e.g., away at college) and have more control over food choice, they may avoid those foods that they were once pressured to eat, especially if they have developed an aversion to these foods (Galloway et al., 2006). Over time, avoidance of these nutrient-dense high-satiety foods may contribute to increased weight in young adult women, especially if they are replaced by high-calorie low-satiety foods (Yao & Roberts, 2001). These findings add limited support to the construct validity of the PEM subscale.

Limitations and directions for future research

Despite its contributions, this study's limitations need to be addressed. While it is necessary to use self-report measures to understand individuals' perceptions and attitudes of the model variables, we relied exclusively on these measures which may have added method variance that increased variable correlations. Future work in this area should use reports from multiple informants (e.g., obtaining simultaneous reports from adults and their parents), which would minimize monomethod bias. In addition, we investigated participants' perceptions of their caregivers' eating messages and body-related messages, which are subject to retrospective recall (Reis & Gable, 2000). We cannot be certain of the accuracy of participants' reports of caregiver eating messages and their family's acceptance of their bodies. Although young adults are often removed from their childhood experiences, it is argued that perceptions, not actual occurrences, shape the psychological well-being, attitudes, and behaviors of individuals more so than what actually happened (Kelly, 1955). Young adults may be more reflective of their experiences than children and adolescents due to their advanced cognitive development, which could culminate in more accurate reports (Santrock, 2008).

Another limitation was the homogeneity of our sample and the methodological design. Our samples were limited to predominantly White, young adult, middle-class, first-year college students, and our findings may not generalize well to other individuals. Future research should investigate caregiver eating messages and its relationships to body image and eating behavior in more diverse (i.e., in terms of ethnicity, socio-economic status, non-collegiate) samples. We used the Body Dissatisfaction subscale of the EDI-2 to assess both women's and men's body image. We chose this scale to have a comparable measure for women and men in order to estimate the model. However, this subscale contains items that primarily reflect body areas of concern to women (Tylka et al., 2005). Although we only used the items that explored overall body dissatisfaction and dissatisfaction with the stomach area in the calculation of men's subscale score, we recognize that men's body dissatisfaction is more complex, with additional body areas of concern (e.g., arms, chest, shoulders, back) and a focus on muscularity coupled with low body fat (Tylka et al., 2005). Also, the perceived familial body acceptance subscale of the BAOS and familial pressure to be lean subscale of the PSPS each contained only two items; yet, alphas indicated that the two items from each subscale were internally consistent for both women and men, allaying this concern somewhat.

Additionally, we asked participants to report the extent to which they received the eating messages while growing up. One next step for research on caregiver eating messages would be to have young adult women and men complete the CEMS items twice: once thinking about the messages they received in preadolescence and once thinking about the messages they received in adolescence. Researchers could determine whether caregiver eating messages during these two time periods independently and additively predict the model variables. Also, we only assessed participants' current BMI. We encourage researchers to explore the associations between caregiver eating messages and participants' BMI while growing up (perhaps during preadolescence and adolescence).

Caregiver eating messages likely stem from caregivers' own struggles with food, their own eating habits, their weight, and internalization of the societal-ideal body size. It would be worthwhile to explore whether caregivers who binge eat or experience disinhibition from dieting may pressure their children to eat nutrient-lacking high-calorie foods with them (e.g., "Let's go get ice cream. I know you usually just get a small cone but have a triple scoop hot fudge sundae with me"), perhaps in attempt to lessen the guilt associated with eating (e.g., "At least I'm not eating alone"). Conversely, caregivers may pressure children to go on a diet with them for morale support. Caregivers who internalize societal standards of appearance may choose to treat their children differently due to their weight or gender (e.g., sending restrictive/critical eating messages to their daughter who is heavy while not providing these messages to their daughter who is thin, encouraging their sons to eat more to gain muscle and grow while encouraging their daughters to restrict their eating). We encourage researchers to further explore these associations.

Future research could confirm the reliability and validity of the CEMS with individuals with diagnosable eating disorders. This pattern may be dependent upon whether the caregiver eating messages precede or follow the development of an eating disorder. Individuals who have anorexia nervosa are likely to report current pressures to eat messages but may recall receiving restrictive/critical messages previously in their childhood. Individuals with current binge eating disorder or bulimia nervosa should indicate high levels of restrictive/critical caregiver eating messages (during their childhood and currently) on the CEMS. If these predictions are supported, confidence in the CEMS's criterion validity would be increased. Future studies could also examine the relationship between perceived caregiver eating messages and other variables, such as self-esteem, food acceptability (i.e., open to eating a range of foods; Satter, 1986, 2005), and consumption of nutrient-dense high-satiety foods. If perceived pressure to eat messages is negatively related to food acceptability and consumption of nutrient-dense high-satiety foods, then evidence for the PEM subscale's criterion validity would be provided. If restrictive/critical and pressure to eat caregiver eating messages are negatively related to self-esteem, then more evidence would be accrued for the CEMS's construct validity. These relationships, if significant, would also highlight the importance of increasing caregivers' awareness of the destructive nature of these messages and teaching them how to replace these maladaptive messages with adaptive messages about food and eating. Thus, it would also be worthy to explore which caregiver eating messages are adaptive and associated with well-being among children and adults, such as higher positive body image, lower food preoccupation, healthier BMI, and higher consumption of nutrient-dense high-satiety foods. Some adaptive eating messages may include "eat when you feel hunger in your stomach," "it's okay to stop eating if you are no longer hungry," "you can determine how much to eat," "fruits are not only tasty but good for you too."

Appendix A. Caregiver Eating Messages Scale

Directions for participants: Please indicate the degree to which your parents/caregivers emphasized the following behaviors while you were growing up.

1. Told you to eat all the food on your plate.

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

2. Made sure you finished all the food that was on your plate.

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

3. Made you eat at times you weren't hungry.

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

4. Told you to eat all your vegetables after you told them that you didn't want to eat any more.

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

5. Looked at you with raised eyebrows at how much you were eating, making you feel that you were eating too much.

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

6. Commented that you were eating too much.

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

7. Made fun of you (or scolded you) for eating too much.

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

8. Told you that you shouldn't eat certain foods because they will "make you fat."

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

9. Made you eat despite the fact that you were full.

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

10. Talked about dieting or restricting certain high calorie foods.

1	2	3	4	5	6
Never	Rarely	Sometimes	Often	Usually	Always

Scoring for PEM—average items 1, 2, 3, 4, and 9; *scoring for RCM*—average items 5, 6, 7, 8, and 10.

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