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Elizabeth A. Claydon
West Virginia University

Keith J. Zullig
West Virginia University

Christa L. Lilly
West Virginia University

Stephanie C. Zerwas
University of North Carolina at Chapel Hill

Danielle M. Davidov
West Virginia University

See next page for additional authors

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Authors

Elizabeth A. Claydon, Keith J. Zullig, Christa L. Lilly, Stephanie C. Zerwas, Danielle M. Davidov, Lesley Cottrell, and Marney A. White



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An Exploratory Study on the Intergenerational Transmission of Obesity and Dieting Proneness

Elizabeth A. Claydon^{a,*}, Keith J. Zullig^a, Christa L. Lilly^b, Stephanie C. Zerwas^c, Danielle M. Davidov^{a,d}, Lesley Cottrell^{a,e}, and Marney A. White^f

^aDepartment of Social and Behavioral Sciences, West Virginia University School of Public Health, Morgantown, WV

^bDepartment of Biostatistics, West Virginia University School of Public Health, Morgantown, WV

^cDepartment of Psychiatry, UNC School of Medicine, Chapel Hill, NC

^dDepartment of Emergency Medicine, West Virginia University School of Medicine, Morgantown, WV

^eDepartment of Pediatrics, West Virginia University School of Medicine, Morgantown, WV

^fDepartment of Social and Behavioral Sciences, Yale School of Public Health, New Haven, CT

Abstract

PURPOSE—There is a paucity of research exploring individuals’ memories of parental dieting behavior, engagement in “fat talk”, or criticism of weight or eating behavior in childhood. This exploratory study utilized a community sample to further characterize the retrospective report of parenting dieting behavior.

METHODS—A total of 507 participants (78.1% female; 20.7% male; and 1.2% transgender) were recruited to participate in an online, self-administered survey.

RESULTS—Forty percent (216) of participants reported maternal dieting in their family of origin and 34% (182) reported maternal fat talk; 24% (120) reported paternal dieting and 11% recalled paternal ‘fat talk’ (58). Subgroup analyses suggest that both male and female participants had greater odds of remembering maternal rather than paternal weight or shape criticism and encouragement to diet (OR = 58.1; and OR=3.12; $p<.0001$ for male and female participants respectively). Retrospective report of indirect parental behaviors (e.g. parental dieting) also appear

*Corresponding author: Elizabeth Claydon, MPH, MS, Department of Social & Behavioral Sciences, West Virginia University School of Public Health, Robert C. Byrd Health Sciences Center, West Virginia University, One Medical Center Drive, P.O. Box 9190, Morgantown, WV 26506-9190, Tel.: (304) 376-1900; Fax: (304) 293-6685; eac0006@mix.wvu.edu, ORCID ID: 0000-0002-8153-5132.

Conflict of Interest:

S.C. Zerwas has consulted with Coleman Research
No other authors have a conflict of interest to declare.

Compliance with Ethical Standards

Ethical approval – Human Subjects: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Ethical approval – Animals: This article does not contain any studies with animals performed by any of the authors.

Informed consent: Informed consent was obtained from all individual participants included in the study.

to be associated with direct parental behaviors (e.g. encouraging children to diet). Additionally, participants who recalled maternal encouragement to diet reported a significantly higher adult BMI ($\beta = 1.31$, $SE = 0.32$, $p < .0001$).

CONCLUSION—Results provide preliminary evidence that a sizeable percentage of both adult male and female participants recalled that their parents engaged in fat talk and dieting. In addition, participants recalled parental criticism of their own weight or eating behaviors, which were associated with recall of parental dieting and fat talk.

Keywords

dieting behaviors; fat talk; family fat talk; obesity; intergenerational transmission

1. Introduction

Parents often are confused about how to communicate health messages about weight to their children effectively. In some circumstances, parental feedback, including critical statements or parental dieting, have been associated with higher body mass index (BMI), weight dissatisfaction, and increased dieting among offspring later in life [1, 2].

In Social Cognitive Theory, parents can positively or negatively reinforce certain behaviors or ideas through modeling or feedback [3]. Children model parental behavior and adopt values towards weight and dieting, whether positive or negative, including their parents' relationship with food and/or body image [4]. For example, positive parental role modeling has been associated with improving a child's varied food intake [5].

Although parents can provide positive modeling for children's eating and body image, there is also the potential of parents modeling negative attitudes and behaviors, especially if parents struggle with their own weight [6]. "Fat talk," which has been defined as an "informal dialogue during which individuals express body dissatisfaction", [7]^(pp247) is one of the forms of commentary receiving attention, especially among girls and women [8]. However, parents can provide a negative environment for children's body image, weight, and eating behaviors through modeling, criticism, and/or food restriction. This parental feedback can happen *directly* through a parent's comments or criticism of their child's weight, or *indirectly* by a parent's dieting or fat talk [1]. For example, indirect parental feedback might include self-criticism of weight and/or body shape, commentary of one's own calorie consumption, or modeling of restrictive or excessive eating.

Costanzo and Woody's [9] Obesity Proneness Model (OBPM) provides a theoretical underpinning into *direct* parental feedback (e.g. comments or restrictive feeding practices) to perceived or actual weight problems. This direct parental feedback is guided by the degree to which parents are invested in societal values about weight and shape; prior research indicates this relationship is moderated by child sex [10]. The direct parental feedback of comments or restrictive feeding could be associated with children's internalization of weight concern and an inability to self-regulate their eating, respectively. However, thus far to our knowledge, *indirect* parental feedback has not been adequately examined. For example, Nickelson et al. [6] tested the viability of Costanzo and Woody's [9] OBPM for an

adolescent population, but only considered direct parental feedback on weight and body image. The current study includes indirect feedback.

Two recent studies illustrate associations between parental comments and/or maternal dieting and girls' weight satisfaction, BMI, and early dieting behavior [1, 2]. Wansink et al.'s [1] cross-sectional study of adult female participants found a significant relationship between recall of parental comments about their weight as a child and current adult BMI and weight dissatisfaction. Additionally, participants' weight concern was significantly associated with parents' concern about their own weight. Both of these forms of indirect and direct parental feedback were assessed; however, parental comments (direct feedback) were significantly related to children having a higher adult BMI. Coffman et al. [2] found similar results within a longitudinal study of young girls and their mothers; girls of dieting mothers were more likely to diet prior to age 11 years compared to daughters of mothers who were not dieting.

Two studies, based in France and Australia respectively, also examined the association between parental comments and child body satisfaction through the Parental Comments Questionnaire [11, 12]. The French study [11] found that parental comments explained more variability in girls' body dissatisfaction and disordered eating than boys. This finding was replicated in the Australian cohort [12], with both positive and negative parental comments related to female outcomes, whereas only negative parental comments were related to male body dissatisfaction.

These quantitative studies are corroborated by a qualitative study that included a focus group with 22 female adolescents (aged 15–22 years) discussing body dissatisfaction and dieting [13]. One emergent theme was direct and indirect pressures from parents. For example, students mentioned direct pressures like a parent making them diet or indirect pressures such as modeling eating habits or lack of parental self-confidence. It is important to note that students felt both direct and indirect pressures were detrimental and helped institute dieting or body negativity as a norm.

Although these studies expand the research on parental weight commentary and dieting, they have several limitations. Many studies only considered parental feedback upon daughters, not sons, and few considered the influence of both maternal and paternal feedback [1, 6, 11, 12]. Lastly, there was not one standardized measure used across all studies to aid comparability of findings [1].

The purpose of this study was to investigate potential associations between the recall of direct and indirect parental feedback and weight, body image, and eating behavior. It expands the literature through a novel questionnaire demonstrating the extent to which both male and female adults recall parental fat talk, dieting, or weight-related criticism in their families of origin.

This study had two exploratory hypotheses. The first hypothesis had two components. First, due to the disproportionate number of women with body dissatisfaction and accumulating literature describing female fat talk, we hypothesized that participants would be more likely to recall maternal rather than paternal dieting and/or fat talk. Second, due to the existing

evidence, particularly regarding female children and mothers, as well as the OBPM, we hypothesized that female participants would be more likely to recall maternal rather than paternal criticism of their eating and weight, as well as encouragement to diet [9]. Analyses also explored participant recall of indirect or direct parental feedback, with an expectation that indirect feedback might be associated with direct feedback.

The secondary research question considered whether recalled parental feedback (e.g. parental dieting, fat talk, encouragement to diet, or weight criticism) was related to participants' adult BMI. Therefore, our second study hypothesis was that recall of parental feedback would be related to a higher adult BMI using Wansink et al.'s [1] study as a basis.

The expected results are theorized to test a revised Obesity & Dieting Proneness Theoretical Model that incorporates *direct* as well as *indirect* parental feedback (Fig. 1). This theoretical model is not intended to be a mathematical model, but underpins the analyses and explicates the complicated relationship of intergenerational transmission of dieting.

2. Methods

2.1 Questionnaire Development

There are two existing questionnaires to capture parental or caregiver feedback: *Parental Comments Questionnaire* and *The Caregiver Eating Messages Scale* [11, 14]. Both have been shown to demonstrate adequate reliability (including internal consistency) and validity. However, the *Caregiver Eating Messages Scale* only address direct messages that a caregiver makes about eating, not message about body size or weight. Additionally, the *Parental Comments Questionnaire* has not been validated in a US population [11]. Neither questionnaire address indirect feedback such as parental dieting or fat talk. There is a questionnaire to address fat talk among family members, *The Family Fat Talk Questionnaire* [1]. However, this measure is limited because it primarily addresses female fat talk, does not differentiate between maternal or paternal fat talk, and does not address maternal or paternal dieting practices or criticism of children's eating behaviors or weight.

Our questionnaire was developed to fill these gaps and built on the concepts of fat talk, as well as the influence of family fat talk identified by MacDonald et al. [15]. In addition to assessing parental fat talk, dimensions were added to the instrument to measure parental dieting (e.g. *Did your mother engage in diets specifically to lose weight?*), parental encouragement to diet (e.g. *Did your father encourage you to diet?*), and parental criticism of a child's weight (e.g. *Did your mother criticize your weight, shape, or eating behaviors?*). Each dimension contained two items each, with participants asked to recall maternal and paternal feedback independently. Once the final instrument was constructed (see Appendix), expert review was used to discover and remediate identified issues with the developed questionnaire. Social desirability was also assessed using the short-form Marlowe-Crowne scale, where a score above 5 indicates high social desirability and a score equal to or below 5 indicates low social desirability [16]. The final questionnaire contained 15 items not including demographic questions.

Parental Dieting Behavior & Fat Talk—Participants were asked the following dichotomous (yes/no) questions regarding parental dieting behavior and fat talk (separately asked to mothers and fathers): “Did your mother/father engage in diets specifically to lose weight?” and “Did your mother/father engage in ‘fat talk,’ that is degrading talk specifically about her/his weight, shape, or size?” Follow-up questions to each of these questions inquired how often and at what age each happened but were not analyzed as part of this study.

Parental Criticism & Pressure to Diet—Four questions (separately asked to mothers and fathers) were: “Did your mother/father criticize your weight, shape, or eating behaviors?” and “Did your mother/father encourage you to diet?” Response options were yes/no to each. Participants were asked these same questions about whether their parents provided this feedback once participants were adults (over 18 years-old), with yes/no response choices.

2.2 Procedure

Participants were recruited over a 2-week period in Spring 2014 to participate in this online, self-administered survey via internet and social media-based advertising. Advertisements asked individuals to participate in this questionnaire which was part of a class research project; no incentives were provided in exchange for participation, except for the opportunity to advance research. Qualtrics software was used to host and distribute the survey. The study was granted an exemption by Yale University’s Institutional Review Board because it did not collect any identifying information.

2.2.1 Participants—A convenience sample of 673 participants was recruited; participants were included in the analysis only if they had lived with both their mother and father at least part of the time when they were a child, reducing the sample to 507. The majority of respondents were female (n=396, 78.1%), White (n=338) had at least a college degree (n=386, 76.1%), and lived in the United States (n=391, 77.1%). Most were young and in the normal weight range, although there was high variance on both age (mean age 31.9 years \pm 12.9) and BMI (24.6 \pm 5.2 full sample; 25.4 \pm 5.0 for men; 24.4 \pm 5.3 for women). Annual family income was normally distributed but the majority made less than \$50,000 per year. Approximately 27% (n=135) of the respondents were parents themselves (See Table I).

2.2.2 Analysis—First, the psychometrics of the questionnaire were evaluated through calculating internal consistency estimates via Kuder-Richardson (KR20) and Item Response Theory (IRT). IRT uses a mathematical function to relate an individual’s probability of endorsing an item to a latent (i.e., not directly measured) trait of that individual. A two-parameter logistic model (2PL model) was employed, which includes 2 sets of parameters including *a* (item discrimination, i.e., probability of endorsing an item for people with high levels of the trait than for those with low levels) and *b* (item difficulty, i.e., percent of people who endorse the item). Item characteristic curves (ICC) which demonstrates the 2PL model were examined, the 2 parameters are presented. Descriptive analyses including contingency analyses (an analysis that allows for the exploration of a nominal or ordinal variable across the levels of a second categorical variable) and subgroup analyses were conducted using

SAS JMP® 12.0 [17]. Specifically, to assess the first hypothesis that participants were more likely to recall their mother dieting and/or participating in fat talk, a contingency analysis was used to compare the proportion of recall of maternal and paternal commentary and dieting. For the second component of the first hypothesis, subgroup analyses were conducted to calculate the odds of participants recalling maternal or paternal encouragement to diet or weight/shape criticism based on the sex of the participant. A linear regression was used to test the second hypothesis of whether recall of direct or indirect parental feedback was associated with a higher participant BMI in adulthood.

3. Results

3.1 Questionnaire Reliability and Validity

Internal consistency estimates were calculated for the questionnaire through Kuder-Richardson (KR20), with a resulting value of 0.8; acceptable values range from 0.7 to 0.9 [18].

This survey had a score of 4.7 ($SD = 2.1$) on the Marlowe-Crowne scale, indicating that there could be the presence of possible moderate social desirability.

Additionally, IRT was used to assess the specific binary items within the questionnaire and to evaluate test items and latent constructs [19]. Item discrimination (factor loadings) and difficulty (intercept) was calculated for each of the primary study questions. Items with similar discrimination and difficulty indicates that those items are measuring a common construct consistently [20].

IRT positive scores on item difficulty indicated less than 50% answered positively to the item (stated ‘yes’), which is corroborated with all items having less than a 50% endorsement. Although all items were fairly similar for difficulty (ranging between 0.71–2.17) and discrimination (ranging from 0.70–2.19), some items were more similar to each other, suggesting three potential constructs or clusters (Table II). For example, one cluster can be conceptualized as *maternal dieting behaviors and encouragement to diet* including items 1–4 (although item 3 is less similar). A second cluster, *paternal dieting behaviors*, comprised items 5 & 6, regarding paternal dieting or fat talk. The last cluster, *paternal encouragement/criticism*, had almost identical discrimination and difficulty: 1.4, 2.2 and 1.2, 2.1. Collectively, IRT results suggest the items displayed evidence of measurement validity [21].

3.2 Study Variables

Regarding the variables of interest (See Table II), 40% ($n=216$) of participants recalled maternal dieting and 34% ($n=182$) recalled maternal fat talk. Twenty-five percent of participants endorsed maternal encouragement to diet. Thirty-two percent of participants ($n=175$) recalled that their mothers were critical of the participants’ weight, shape, or eating behaviors. Paternal dieting was recalled less ($n=120$; 24%) and only 11% recalled paternal ‘fat talk’ ($n=58$). Fifteen percent reported paternal encouragement to diet ($n=76$), while 20% indicated that their fathers had been critical of their weight, shape, or eating behaviors. Additionally, 18% of participants recalled maternal encouragement to diet once the

participant was an adult (over 18), 21% recalled maternal criticism, and 12% reported both paternal encouragement to diet and paternal criticism.

3.3 Contingency Analysis Findings

The contingency analysis suggests that participants had significantly greater odds of remembering maternal (rather than paternal) dieting, fat talk, encouragement to diet, or criticism of participant weight, shape, or eating behavior. Participants had 5.8 times (95% CI: 3.46, 9.81) greater odds of reporting that their mother (rather than their father) encouraged them to diet and 4.0 times (95% CI: 2.5, 6.4) greater odds of recalling maternal (rather than paternal) criticism of their weight, shape, or eating behavior. (Table III)

Subgroup analyses suggested that participants had greater odds of remembering maternal encouragement to diet and criticism than paternal. This was consistent for both male and female participants. Female participants were 3.1 times more likely to recall maternal than paternal encouragement to diet (95% CI: 1.9, 5.2)] and 4.1 times more likely to recall maternal criticism (95% CI: 2.5, 6.8) Male participants had almost 60 times [OR=58.1 (6.47, 522.05)] greater odds of recalling maternal than paternal encouragement to diet (a Fisher's Exact Test was used due to small cell size) and 3.4 times (95% CI: 1.1, 11.2) greater odds of recalling maternal rather than paternal criticism.

Further contingency analyses showed how recalled indirect parental feedback was associated with recalled direct parental feedback. If a participant recalled maternal fat talk, they were 7.6 (95% CI: 4.9, 11.7) times more likely to recall that their mother also encouraged them to diet and 4.2 (95% CI: 2.8, 6.1) times more likely to remember maternal criticism of their shape or weight ($p < .0001$). Similarly, recall of maternal dieting was significantly associated with increased odds of recalled maternal encouragement to diet (OR: 3.0; 95% CI: 2.0, 4.4; $p < .0001$). Paternal influences were also significant with recall of paternal fat talk significantly associated with paternal encouragement to diet (OR: 3.3; 95% CI: 2.0, 5.4; $p < .0001$) and paternal criticism (OR: 2.2; 95% CI: 1.4, 3.5; $p = .0016$). Additionally, if a participant recalled their father dieting, they were 6.6 (95% CI: 3.6, 12.0) times more likely to recall that their father also encouraged them to diet and 8.8 (95% CI: 4.8, 16.0) times more likely to remember paternal criticism of their shape or weight ($p < .0001$). The only non-significant association was recall of maternal dieting with recall of maternal criticism of the participant's weight or shape (OR = 1.4; 95% CI: 1.0, 2.0; $p = .07$).

Results of the multivariate linear regression are displayed in Table IV. There was no evidence of multicollinearity and model assumptions were met. Findings suggest a significant relationship between BMI and recall of maternal encouragement to diet. For those who recalled maternal encouragement to diet, adult BMI was 1.3 points higher than the intercept of 25.4 ($p < .0001$). When stratified by gender, men did not have any significant associations with BMI, while women still demonstrated a significant relationship between BMI and maternal encouragement to diet ($\beta = 1.3$; $p = .0003$).

4. Discussion

Preliminary study findings highlight three main findings. First, among non-clinical participants, there is a high recall of direct *and* indirect parent behaviors around weight and dieting. Second, maternal feedback was more frequently recalled than paternal feedback by both male and female participants.

In line with our first hypothesis, participants were significantly more likely to recall maternal dieting, fat talk, encouragement to diet, and criticism of weight and shape than paternal feedback. Additionally, both female and male participants were more likely to recall maternal direct and indirect feedback rather than paternal. This may be due to the societal norm of female dieting or that mothers might have spent more time with their children in this sample than fathers. One interpretation of these results is that these factors were significant enough for the participants to remember them years later and could be potentially detrimental, especially among individuals who have a genetic predisposition to an eating disorder.

Consistent with our secondary hypothesis, participants who recalled maternal encouragement to diet reported a higher adult BMI. This is consistent with existing literature and highlights the association between maternal feedback and offspring BMI [1]. Because this study is correlational it is hard to determine the direction of effect. It may be that maternal encouragement to diet was in response to higher childhood BMI or that greater maternal encouragement to diet led to a later higher adult BMI.

We analyzed additional constructs to Costanzo & Woody's [9] original OBPM, including child gender, parental concern about their own weight, and indirect and direct parental feedback that may be significant influences in forming perceptions of body image and eating behavior practices. We observed that both female and male participants were more likely to recall maternal rather than paternal feedback. Thus, this topic needs to be addressed among men since this recall of maternal feedback is not limited to female participants. Recent research has examined disordered eating and body image among men, however, many of the studies examining maternal and paternal direct and indirect feedback did not include male participants [1, 2, 13]. Parental weight concern is an important example of indirect feedback that has been addressed by some studies. In the current study, there was a considerable recall of both maternal and paternal fat talk and parental dieting, suggesting that participants were aware of this indirect feedback – and potentially susceptible to this feedback – as children. Lastly, indirect and direct feedback were included in our proposed Obesity & Dieting Proneness Theoretical Model separately because they appear to influence each other, as evidenced by our findings. Results suggest that participant recall of parental indirect feedback (e.g. parental fat talk or dieting) was also significantly associated with recall of direct parental feedback (e.g. encouraging a child to diet or criticizing a child's weight or eating). This relationship is shown by an arrow between indirect and direct feedback in Fig. I.

Parents, especially those with eating disorder histories, often express worries about modeling healthy eating or talking with their children about weight and health [22]. These

results suggest the need for parental interventions to educate parents about potential indirect and direct feedback to children around eating, weight, and shape. Nonetheless, additional research is necessary to further replicate our findings.

4.1. Limitations

This study has several notable limitations. First, the questionnaire used in this study was exploratory; however, it demonstrated preliminary acceptable estimates of internal consistency, reliability, and validity. Second, the greater recall of maternal dieting, fat talk, and criticism or encouragement to diet could be due to the heightened weight and size pressures on women. There could be additional recall bias from adults with greater body/weight concerns more likely to recall childhood issues or the association could be mediated by genetic vulnerabilities rather than environmental factors. Third, the linear regression is limited by not having access to childhood BMI, providing the likelihood that the relationship between BMI and recall of maternal encouragement to diet could be in response to a higher childhood BMI. However, there were no significant associations for recall of paternal feedback in the linear regression or for any other maternal predictors. Fourth, the sample had a large proportion of female participants, which appeared to explain the significant association between recalling maternal encouragement to diet and adult BMI in the linear regression. When analyses were stratified by gender, there was no significant relationship between recall of maternal encouragement to diet and adult BMI for male participants. Therefore, future research with a more equal proportion of male and female participants will be needed to understand this association. Fifth, findings cannot be considered causal owing to the cross-sectional study design. It could be that participants with more weight and body image concerns now are more likely to recall parental feedback. Longitudinal studies will be needed to clarify this association. Sixth, due to constraints with the length of the questionnaire, we did not ask about – and therefore, could not control for – body image, body dissatisfaction, or disordered eating among participants. Finally, results are not considered generalizable because of the convenience sampling methodology.

5. Conclusion

Results from this preliminary study suggest how potential environmental childhood triggers are remembered by adult participants. Additionally, participants who recalled parents providing indirect feedback, such as dieting or talking negatively about their weight or shape, were also more likely to report that their parents encouraged them to diet as a child. Future research is needed to expand this topic and the potential implications of these forms of social modeling. A modified Obesity and Dieting Proneness Theoretical Model proposes factors which may be central to understanding this topic. Further research will need to capture information on body image, body dissatisfaction, and disordered eating among participants in order to control for those variables to elaborate this relationship. Additionally, translational research is needed to find the best ways to educate parents about modeling healthy lifestyles and discussing health rather than weight with their children.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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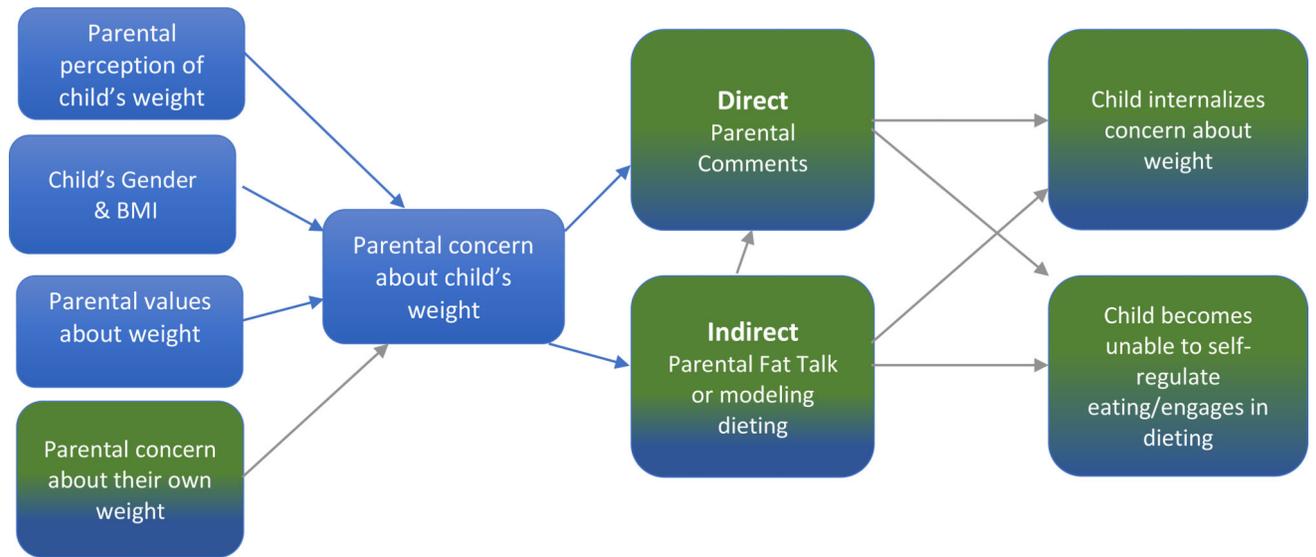


Fig. 1.
 Revised Obesity & Dieting Proneness Theoretical Model
 Credit to P.R. Costanzo & E.Z. Woody; permission to use this image received from P.R. Costanzo: Costanzo PR, Woody EZ (1985) Domain-specific parenting styles and their impact on the child's development of particular deviance: the example of obesity proneness. *J Soc Clin Psychol* 3: 425–445.

Table I

Demographic Characteristics

Characteristic	Total N= 507 N (%)	Mean ± SD N = 507
Age		31.9 ± 12.9
Gender		
Male	105 (20.7)	
Female	396 (78.1)	
Transgender or Other	6 (1.2)	
Hispanic or Latino/a	26 (5.1)	
Race/ethnicity^a		
White/Caucasian	338	
Black/African-American	10	
Asian	135	
American Indian, Alaskan Native	7	
Native Hawaiian, Pacific Islander, East Indian	3	
Other	16	
Country of Residence		
United States	391 (77.1)	
Canada	61 (12.0)	
Other/Prefer not to answer	56 (11.0)	
BMI		24.6 ± 5.2
Education		
College or Higher	386 (76.1)	
Some college or vocational school	74 (14.6)	
High School/GED	36 (7.1)	
Less than High School	11 (2.2)	
Annual Family Income		
< \$50,000	191 (37.7)	
\$50,000 – \$99,999	133 (26.2)	
\$100,000+	116 (22.9)	
Prefer not to answer	65 (12.8)	
Parent		
Yes	135 (26.6)	
No	372 (73.4)	
Relationship Status		
Married/Civil Union/Living with Partner	194 (38.3)	
Committed Relationship	111 (21.9)	
Single	184 (36.3)	
Other	18 (3.6)	

^aWording of this question was “Check all that apply”, therefore percentages are not appropriate.

Table II

Item Response Theory Findings & Recall of Parental Dieting, Fat Talk, & Criticism

Item	Difficulty	Discrimination	N (%) ^a
1. Did your mother engage in diets specifically to lose weight?	0.8	0.7	216 (40.1)
2. Did your mother engage in 'fat talk,' that is degrading talk specifically about her weight, shape, or size?	0.8	1.1	182 (33.8)
3. Did your mother encourage you to diet?	1.0	1.5	136 (25.4)
4. Did your mother criticize your weight, shape, or eating behaviors?	0.7	1.3	175 (32.7)
5. Did your father engage in diets specifically to lose weight?	2.0	0.7	120 (23.8)
6. Did your father engage in 'fat talk,' that is degrading talk specifically about her weight, shape, or size?	2.2	1.2	58 (11.7)
7. Did your father encourage you to diet?	1.4	2.2	76 (15.2)
8. Did your father criticize your weight, shape, or eating behaviors?	1.2	2.1	100 (20.3)

^aSample size differs by question due to the skip pattern inherent in the questionnaire. Therefore, not every participant will answer all the questions if they answer "no" to one of the initial questions in that series.

Table III

Odds ratios (OR) and 95% confidence intervals (95% CI) of recall of maternal dieting, fat talk, and criticism by paternal dieting, fat talk, and criticism (N=507)

Variable	OR (95% CI)	p
Dieting (n=502)		.017 [*]
Father (n=119)	1.00	
Mother (n=202)	1.7 (1.1, 2.5)	
Fat Talk (n=493)		.0002 ^{**}
Father (n=57)	1.00	
Mother (n=161)	2.8 (1.6, 4.9)	
Encouraging Dieting (n=498)		<.0001 ^{**}
Father (n=74)	1.00	
Mother (n=120)	5.8 (3.5, 9.8)	
Criticizing Weight, Shape, or Eating (n=491)		<.0001 ^{**}
Father (n=98)	1.00	
Mother (n=154)	4.0 (2.5, 6.4)	

*
p<.05

**
p<.0001

Table IV
Unstratified multivariate linear regression with indirect and direct predictors of adult BMI (N=507)

	F	df	p	R² adj.
Overall model	4.8	8	<.0001	0.06
Predictors of BMI			β ± SE	p
Intercept			25.4 ± 0.4	<.0001
Maternal Dieting			0.3 ± 0.3	.20
Maternal Fat Talk			0.2 ± 0.3	.57
Maternal Encouragement to Diet			1.3 ± 0.3	<.0001*
Maternal Criticism			0.0 ± 0.3	.98
Paternal Dieting			0.0 ± 0.3	.92
Paternal Fat Talk			-0.6 ± 0.4	.17
Paternal Encouragement to Diet			0.5 ± 0.4	.27
Paternal Criticism			0.1 ± 0.4	.84

SE = standard error, β = standardized regression coefficient, F = obtained F-ratio, p = probability, R² = proportion variance explained

* p<.0001