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Family, friend, and media factors are associated with patterns of weight control behavior among adolescent girls

Katherine N. Balantekin, PhD, RD^{a,b,*}, Leann L. Birch, PhD^c, and Jennifer S. Savage, PhD^{a,b}

^aCenter for Childhood Obesity Research, The Pennsylvania State University, 129 Noll Laboratory, University Park, PA 16802, United States

^bDepartment of Nutritional Sciences, The Pennsylvania State University, 110 Chandlee Laboratory, University Park, PA 16802, United States

^cDepartment of Foods and Nutrition, The University of Georgia, Athens, GA 30602, United States

Abstract

Purpose—To examine the relationship of family, friend, and media factors on weight control group membership at 15ys separately and in a combined model.

Methods—Subjects included 166 15yo girls. Latent class analysis identified four patterns of weight control behaviors: Non-dieters, Lifestyle, Dieters, and Extreme Dieters. Family (family functioning, priority of the family meals, maternal/paternal weight-teasing, mother’s/father’s dieting), friend (weight-teasing, dieting), and media variables (media sensitivity, weekly TV time) were included as predictors of weight control group membership.

Results—Family functioning and priority of family meals predicted membership in the Extreme Dieters group, and maternal weight-teasing predicted membership in both Dieters and Extreme Dieters. Friend’s dieting and weight-teasing predicted membership in both Dieters and Extreme Dieters. Media sensitivity was significantly associated with membership in Lifestyle, Dieters, and Extreme Dieters. In a combined influence model with family, friend, and media factors included, the following remained significantly associated with weight control group membership: family functioning, friends’ dieting, and media sensitivity.

Conclusion—Family, friends, and the media are three sources of sociocultural influence that play a role in adolescent girls’ use of patterns of weight control behaviors; family functioning was a protective factor whereas friend’s dieting and media sensitivity were risk factors. These findings emphasize the need for multidimensional interventions, addressing risk factors for dieting and use of unhealthy weight control behaviors at the family, peer, and community (e.g. media) levels.

*Corresponding author: balantekink@psychiatry.wustl.edu (K. Balantekin), Phone: 314-286-2070 “not for publication”, Fax: 314-286-2091 “not for publication”.

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Research Involving Human Participants: 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.

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

Keywords

Dieting; family; friends; media; adolescents

Dieting is common among adolescents; recent data indicate that two-thirds of adolescent girls report trying to lose weight [1]. However, self-reported dieting in adolescents is related to increased sexual activity, increased drug, tobacco, and alcohol use [2], and increased risk for disordered eating [3] and depression [4]. Given our current obesogenic environment, some weight management may be necessary [5]. However, dieting is often assessed as a dichotomous variable, which obscures differences in the weight control behaviors used when one diets [6]. Using a technique such as Latent Class Analysis (LCA) to capture patterns of weight control behaviors helps distinguish between behaviors consistent with healthy weight management from those that may constitute subclinical disordered eating [5, 7]. Latent Class Analysis of weight control behavior [6] data has revealed differences in the patterns of reported weight control behaviors in both adolescents and adults [5, 7]. Among a sample of adolescent girls, one group of non-dieters and three groups of dieters emerged: two groups whose behaviors included those consistent with healthy weight management (e.g., increase fruits/vegetables), with one of the groups also endorsing reduction behaviors (e.g., reduce snacking), and a third group who also reported using at least one unhealthy weight control behavior (e.g., using laxatives) [7]. These groups differed on several individual characteristics, including body mass index (BMI) and depression. However, it is unclear how various sociocultural factors may relate to different patterns of weight control behavior.

There are three primary sources of sociocultural influences on adolescent body dissatisfaction, weight concerns, and dieting behavior: family, peers, and the media [8–11]. The thin ideal is ubiquitous in the mainstream media, reinforcing the normative discontent with weight. Research suggests that acute exposure to thin images in both print (e.g., magazine ads) and digital media (e.g., television shows) increases body dissatisfaction [12], and has been shown to predict the use of healthy, unhealthy, and extreme weight control behaviors 5 years later [13].

Prior research indicates that family and friends influence girls' self-initiated dieting behaviors through verbal comments such as weight-teasing [14] and encouragement to diet [15], and through the modeling of dieting and disordered eating behaviors [16]. Families can also affect dieting behavior through their influence on the home environment (e.g., family functioning and family meals). For example, increased priority and frequency of family meals have been negatively associated with reports of the use of unhealthy weight control behaviors [17], and positive family functioning has been negatively associated with use of unhealthy and extreme weight control behaviors [18]. It has also been shown that family interactions during meals that focus on dieting and weight-related talk may negate the potential protective effects of family meals on disordered eating and dieting behavior [19], indicating that several family factors should be examined concurrently.

However, while every day adolescent girls are subject to family, friend, and media influences, prior research has tended to focus on examining these influences in isolation, without examining the influences of all three together. The studies that have examined the

influences together have primarily focused on how these sociocultural factors influence cognitive factors that may influence eating behavior (e.g., dietary restraint, body image, eating attitudes) [8–11]; thus, it remains unclear how these sociocultural factors are associated with reports of specific dieting behaviors. Building on findings that family, friends, and the media all individually affect weight control behavior, the current study will expand on the extant literature by exploring their combined associations with patterns of weight control behavior. The present study has two aims: first, to examine the separate influence of family, friend and media factors on adolescent girls' patterns of weight control behavior to identify which factors to include in the full model; and second, to examine the combined influence of multiple family, friend, and media sociocultural factors on adolescent girls' patterns of weight control behavior.

Methods

Participants

Participants in this cross-sectional study included 167 15 year old non-Hispanic, white girls living in Central Pennsylvania recruited as part of a longitudinal cohort study of the health and development of young girls with one of the primary aims to identify familial predictors of individual differences in behavioral controls of food intake, including dieting. Eligibility criteria for girls' participation at recruitment (age 5) included living with the biological mother and father, the absence of severe food allergies or chronic medical problems affecting food intake, and the absence of dietary restrictions involving animal products. The sample was not recruited based on weight status or eating behavior, and families were recruited for participation into the study using flyers and newspaper advertisements. In addition, families with age-eligible female children within a five-county radius received mailings and follow-up phone calls (Metromail Inc.). Families were then assessed every 2 years until age 15. Attrition was primarily due to family relocation outside of the area. Additional details on the study population can be found elsewhere [15]. One girl at 15ys had missing weight control behavior data, and thus the final sample had 166 girls and their families. The Pennsylvania State University Institutional Review Board approved all study procedures, and parents provided consent for their family's participation before the study began.

Measures

All measures in the current study were assessed at age 15.

Anthropometric measures (Body Mass Index, BMI)—Height and weight were measured in triplicate by a trained staff member following procedures described by Lohman [20] and were used to calculate BMI (weight (kg)/height (m)²) scores. Because all children in the study were girls and are in the same age cohort, standardized scores or percentile ranking were not needed, and BMI can be used as a relative measure of adiposity within our sample.

Family influence—The priority of family meals was assessed using the 5-item family meal patterns factor from Project EAT [17]. An example item is, “In my family, it is

important that the family eat at least one meal a day together.” Internal consistency was $\alpha = 0.84$. Family functioning was assessed using girls’ reports on the Family APGAR [21]. An example item is, “I am satisfied with the way my family talks things over with me and shares problems with me.” Internal consistency was $\alpha = 0.77$. Consistent with other studies [14, 22, 23], girls’ perceptions of mother and father weight-teasing were each assessed by asking, “Does your mother/father ever criticize (put you down) or tease you about your weight?” Response options include: really no, sort of no, sort of yes, really yes. Consistent with other studies [23, 24], girls’ perceptions of mothers’ and fathers’ dieting was each assessed by asking, “Has your mother/father ever tried to lose weight?” Response options include: really no, sort of no, sort of yes, really yes.

Friend influence—To obtain an indicator of peer influence, girls’ perceptions of friends’ weight-teasing and dieting were measured. Consistent with other studies [14, 22, 23], friend weight-teasing was assessed by asking, “Do your friends ever criticize (put you down) or tease you about your weight?” Response options include: really no, sort of no, sort of yes, really yes. Consistent with other studies [23, 24], girls’ perceptions of friends’ dieting was assessed by asking, “Have your friends ever tried to lose weight?” Response options include: really no, sort of no, sort of yes, really yes.

Media influence—Media sensitivity was assessed using a revised version of the Multidimensional Multimedia Influence Scale (MMIS) [25]. The revised version contains 14 items (1 = strongly disagree, 4 = strongly agree), and was designed to assess media influence on 4 dimensions: internalization, awareness, appearance comparison, and use of the media for information. A factor analysis was conducted with the current sample, and revealed only one factor with an eigenvalue over 1, containing all 14 items. Thus, a total media sensitivity score, the mean of all 14 items, was used. Internal consistency was high ($\alpha = 0.96$). Total weekly TV time assessed media exposure, and was asked as “How many hours per day do you spend watching television/videos” for both school and non-school days.

Weight control behaviors for Latent Class Analysis—Weight control behaviors were assessed by responses to the question, “Have you ever done any of the follow things to lose weight or to keep from gaining weight?” Twenty weight control behaviors from the comprehensive list developed by French et al. [6] were selected as potential items to be used in the Latent Class Analysis (LCA). Weight control behaviors were coded as healthy or unhealthy using French’s classification of the behaviors [6]. In order to reduce sparseness in the observed data contingency table, similar items (e.g., eliminate snacking and eliminate sweets and junk) were combined if their correlation was high (~ 0.70). Thus, the following items were combined into superordinate factors: i) eliminating snacking, sweets, and junk food; ii) reducing the amount of food consumed and calories eaten. The unhealthy weight control behaviors (use of laxatives/enemas, diuretics, liquid diets, diet pills, appetite suppressants, smoking cigarettes, or vomiting) were combined into one factor, which is an approach consistently used in this area [23]. Response options for each weight control behavior were: never, rarely, sometimes, often, and always. Dichotomous indicators of each weight-control behavior were created for use in LCA models for this study, coded yes (two)

for healthy behaviors rated “sometimes” or more often and yes for unhealthy behaviors rated “rarely” or more often.

Statistical analyses

All data analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC). Statistical significance was defined as $p < 0.05$.

Latent class analysis (LCA) is a person-centered measurement method used to identify an underlying latent grouping variable that is not observed but can be inferred from a set of measured indicators [26]. Parameters estimated in LCA include class membership probabilities, defined as the proportion of a population expected to belong to each latent class and sum to one, and item-response probabilities, defined as the probability of endorsing each item given class membership. Probabilities of items close to one indicate that the item is characteristic of membership in that latent class (i.e., those in that latent class are likely to have tried it as a weight-control behavior). Probabilities of items close to zero indicate that individuals in that latent class are not likely to have tried the behavior. This method was used to identify 4 classes of weight control behaviors in the current sample, shown in Table 1: Non-dieters (26%) who did not endorse any weight control behaviors, and three dieting groups. Girls in the Lifestyle group (16%) only reported increasing fruits/vegetables and exercise. The Dieters group (43%) was characterized by behaviors commonly associated with dieting (e.g., eliminating sweets and snacking, reducing calories). In addition to what the Dieters reported, the Extreme Dieters (16%) group also reported skipping meals, and over half reported use of an unhealthy behavior (e.g., vomiting). Additional details are presented elsewhere [7]. The four weight control groups previously identified for this sample are used as outcomes in the present study.

First, to identify family, friend, and media factors that influence weight control group membership, three LCA models were tested, one for each set of factors (family, friends, media). All potential variables were first tested as independent predictors of weight control group membership; father’s dieting was not significant and thus was excluded from future models. The family model included family functioning, priority of family meals, mother’s dieting, maternal weight-teasing, and paternal weight-teasing. The friend model included friends’ dieting and friend weight-teasing. The media model included media sensitivity and media exposure. All models were adjusted for girls’ BMI to account for the influence of BMI on weight control membership [7]. Including the variables in the latent class model allows one to examine the estimation of odds ratios that describe the increase in odds of membership in a particular latent class relative to a reference class (i.e., Non-Dieters in the current study) corresponding to a one-unit change in the variable.

Next, to examine the combined influence of family, friend, and media factors, a generalized linear model was conducted using PROC GENMOD. Each girl was assigned to the weight control group using the classify-analyze approach [27], identified and described elsewhere [7]. Girls’ BMI was included in the model to account for the influence of BMI on weight control membership. The first step was to include all significant predictors identified from the individual family, friend, and media models (family functioning, priority of family meals, maternal weight-teasing, friend weight-teasing, friends’ dieting, and media

sensitivity) in the model, adjusting for BMI. Backwards elimination was used to eliminate the variables that were no longer significant, one at a time. This procedure was repeated until all variables remaining were significant at $p < 0.05$.

Results

Descriptive data for the family, friend, and media factors are presented in Table 2.

Individual family, friend and media models

The individual family, friend, and media models are shown in Table 3. In the family model, family functioning, priority of family meals, and maternal weight-teasing were significantly associated with weight control group membership. With an increase in family functioning, girls were less likely to be Extreme Dieters than Non-dieters. With an increase in priority in family meals, girls were less likely to be Extreme Dieters than Non-dieters. With an increase in maternal weight-teasing, girls were more likely to be Dieters and Extreme Dieters than Non-dieters. Neither mother's dieting nor paternal weight-teasing were significant predictors of weight control group membership. In the friend model, friends' dieting and weight-teasing were significantly associated with weight control group membership. With an increase in friend weight-teasing, girls were more likely to be Dieters and Extreme Dieters than Non-dieters. Girls who reported that their friends have dieted were more likely to be Dieters and Extreme Dieters compared to Non-dieters. In the media model, media sensitivity was significantly associated with weight control group membership. With an increase in media sensitivity, girls were more likely to be in the Lifestyle, Dieters, and Extreme Dieters groups than to be in Non-dieters. Media exposure was not a significant predictor of weight control group membership.

Combined influence model

In the combined influence model, friend's dieting (parameter estimate: -0.38 , SE: 0.17 , $p < .05$), family functioning (parameter estimate: 0.99 , SE: 0.32 , $p < .01$), and media sensitivity (parameter estimate: -1.30 , SE: 0.24 , $p < .001$) all remained significantly associated with weight control group membership. Family functioning was a protective factor for membership in the Non-dieters group versus the three dieting groups, whereas friends' dieting and media sensitivity were all risk factors for membership in the three dieting groups. While priority of family meals, maternal weight-teasing, and friend weight-teasing were significant when explored in individual models, they were no longer significant in the context of the combined model.

Discussion

The current study provides additional evidence that family, friend, and media factors are all associated with adolescent eating behavior, extending the findings by examining the influence of these factors on patterns of weight control behavior. Specifically, in a model examining all three influences together, a level from each area of influence, friends' dieting, family functioning, and media sensitivity, remained a significant predictor of weight control group membership, indicating that these might be the most salient risk factors. Given that

one of the primary methodological limitations of the dieting literature is that dieting is often assessed as a dichotomous variable, which can obscure differences in weight control behaviors used when one diets, the current study used Latent Class Analysis to explore differences based in family, friend, and media predictors on patterns of weight control behavior. In the individual models, family functioning, priority of family meals, and maternal weight-teasing were identified as significant family factors, friends' dieting and weight-teasing were identified as significant friend factors, and media sensitivity was identified as a significant media factor.

One factor that was associated with weight control group membership in the family model was maternal weight-teasing. Girls who reported that their parent teased them about their weight were more likely to be Dieters and Extreme Dieters, which is consistent with prior findings with the use of unhealthy weight control behaviors as a dichotomous outcome [14, 23]. Given that these studies only included a measure of general family weight-teasing [14, 23], the current study extends the extant literature by suggesting that it is maternal, but not paternal, weight-teasing that is related to the type of adolescent dieting behavior. The current findings also extend the literature by indicating that maternal weight teasing increased the likelihood of dieting in general, not just the use of unhealthy weight control behavior. While it is unclear why mothers are engaging in weight-teasing, mothers who are worried about daughter's weight should engage in conversations about healthy eating and physical activity, which has been shown to be protective against adolescent disordered dieting [28]. Current findings that mothers' dieting was not associated with weight control group follows reports from adolescents that mother's dieting is not an important cause of dieting behavior [29]. The lack of significant findings for paternal influences on adolescent daughters' weight control behavior is consistent with most [23, 30], but not all [15], previous findings, indicating that much more work is needed to understand the influence fathers can have on daughters' eating behavior.

Two family environment factors, family functioning and priority of family meals, were associated with decreased risk of membership in the Extreme Dieters group, and thus the use of unhealthy weight control behaviors. This is consistent with previous findings [17, 19], but differs in that in the current study, increased priority of family meals was not associated with decreased dieting in general, as it did not decrease odds of membership in the Dieters group. This may be reflective of the high prevalence of self-reported dieting among adolescents, but may indicate that family meals are protective against the use of unhealthy weight control behaviors but not all dieting behavior. For example, the family meal may provide an opportunity for parents to notice their daughter's dieting behavior early, before they start using unhealthy weight control behaviors. Not only does eating meals together help promote social connectedness, but it also provides opportunities for parents to continue to provide adolescents with a variety of nutrient-dense foods despite adolescent's increasing autonomy, and has been associated with higher adolescent diet quality [31]. For these reasons, frequent family meals and an increased priority on family meals should be recommended to all families.

In the friend model, both friends' dieting and weight-teasing were associated with negative patterns of weight control behavior. This follows qualitative reports that friends' dieting is an

important cause of dieting behavior for adolescents [29], and adds that girls' reports of their friends' dieting is associated with both the use of healthy and unhealthy weight control behaviors (i.e., membership in Dieters and Extreme Dieters). Future work should examine the influence of friends' use of specific weight control behaviors on girls' use of healthy and unhealthy weight control behaviors. Consistent with past research, friend weight-teasing was related to the use of unhealthy weight control behaviors (i.e. Extreme Dieters) [14], and extends the literature by demonstrating that friend weight-teasing was also related to the use of healthy weight control behaviors (i.e. Dieters). Given the high-prevalence of peer weight-teasing and the relationship between weight-teasing and low body dissatisfaction and poor mental health [22], there is a need for school-based weight-teasing interventions for adolescents.

Media sensitivity, but not media exposure, was identified as being significantly associated with weight control group membership in the media model. While it could be that those more susceptible to media influence self-select for increased media exposure, findings from the current study indicate that it is not media exposure, but rather media sensitivity, that predicts weight control group membership. Stice et al. [32] noted that the adverse effects of media exposure to thin-ideal images may only have lasting effects on those who had elevated body dissatisfaction, and perceived pressure to be thin from family, friends, and dating partners. Thus, for the current sample, current findings in combination with previous findings in the same sample [7] indicate that given their higher levels of body dissatisfaction, girls in the Extreme group will be the most susceptible to long-lasting effects from exposure to the thin-ideal in the media. As such, girls with this pattern of characteristics would likely benefit the most from a psychoeducational media literacy training that emphasizes that most images are artificially created and enhanced and do not represent true body shapes. Future research should examine the impact of media literacy training on use of specific weight control behaviors.

Given that girls experience family, friend, and media influences on most days, there is a need to also examine the combined effect of these influences on weight control group membership. While future work is needed to confirm these findings, examining all of these influences together in the same model will help identify components that researchers might want to include in future interventions aimed at decreasing use of unhealthy weight control behaviors. When these factors were included in the same model, one factor from each sector of influence (family functioning, friends' dieting, and media sensitivity, respectively) remained a significant predictor of weight control group membership. In this model, a friend influence (e.g., friends' dieting) remained significant while the maternal influence (e.g., maternal weight-teasing) lost significance. This indicates that during adolescence, weight-related influences from friends might have more impact than weight-related influences from parents, and is a pattern consistent with the increasing susceptibility to peer influence and decreasing susceptibility to parental influence that occurs as children become adolescents [33]. The importance of peer modeling of dieting behavior seen in the current study supports the need for school-based interventions to target large groups of adolescents at once. However, this is not to say that family factors are not influential - general family functioning remained significant in the context of the other family, peer, and media influences. This is a novel finding, and is not surprising given the relationship between family functioning and

the physical, social, and emotional well-being of children [34, 35]. The current findings that media influence remains a significant predictor of dieting behavior in the context of family and friend factors suggests that the media is contributing unique influence above and beyond family and friend influences, and highlights the importance of including media literacy training in a school-setting, impacting all adolescents.

The current study is not without limitations. The current sample was homogenous – white adolescent females from middle-class families in Central Pennsylvania, and thus the results may not be generalizable to more racially and ethnically diverse populations. Additionally, much of the data was self-reported by the girls, which might have resulted in reporting and social desirability bias. Another limitation is the use of one-item measures to assess family and friend dieting and weight teasing. While this is common in this field, this might not at the complexity of these constructs; future work should focus on developing tools to assess the multiple dimensions of these constructs. One potential limitation is the use of girls' reports of their family and friends' behaviors; however, other research has shown that child report of parent behaviors is more closely related to adolescent dieting behavior than parent report [36]. A possible limitation could be the uneven sample sizes of the four groups, which could have limited the ability to detect group differences. However, given that differences between the groups were identified, this is less of a concern.

The current study supports the contention that family, peers, and the media are three sources of sociocultural influence that play a role in adolescent girls' dieting behavior [9–11]. The current research suggests that while there were a number of identified family, friend, and media risk factors adolescent weight control behavior, friends' dieting, general family functioning, and media influence remained significant in the context of all the factors. These findings support the idea that body dissatisfaction and dieting are more likely to occur when multiple agents exert influence [11], emphasizing the need for a multidimensional prevention and interventions, addressing risk factors for dieting and use of unhealthy and extreme weight control behaviors at the family, peer, and community (e.g., media) levels. Dietitians and other health care professionals have an important role in educating adolescents and their parents on the importance of using healthy weight management behaviors consistent with guidelines (e.g., increase fruit and vegetable intake and exercise) and should help teach them the skills necessary to maintain these behaviors for long-term weight maintenance. Adolescents may also need guidance on how to harness social support for healthy weight control behaviors. Health professionals should also consider assessing family functioning and offer guidance to help families improve their family functioning by increasing quality time spent together and improving communication and supportiveness.

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References

1. Eaton DK, Kann L, Kinchen S, et al. Youth risk behavior surveillance-United States, 2011. *MMWR Surveill Summ.* 2012; 61(4):1–162.
2. French SA, Story M, Downes B, et al. Frequent dieting among adolescents: psychosocial and health behavior correlates. *Am J Public Health.* 1995; 85(5):695–701. DOI: 10.2105/AJPH.85.5.695 [PubMed: 7733431]
3. Neumark-Sztainer D, Wall M, Guo J, et al. Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: How do dieters fare 5 years later? *J Am Diet Assoc.* 2006; 106(4): 559–568. DOI: 10.1016/j.jada.2006.01.003 [PubMed: 16567152]
4. Stice E, Hayward C, Cameron RP, et al. Body-image and eating disturbances predict onset of depression among female adolescents: a longitudinal study. *J Abnorm Psychol.* 2000; 109(3):438–444. DOI: 10.1037/0021-843X.109.3.438 [PubMed: 11016113]
5. Savage JS, Birch LL. Patterns of Weight Control Strategies Predict Differences in Women's 4-Year Weight Gain. *Obesity.* 2010; 18(3):513–520. DOI: 10.1038/oby.2009.265 [PubMed: 19696759]
6. French SA, Perry CL, Leon GR, Fulkerson JA. Dieting behaviors and weight change history in female adolescents. *Health Psychol.* 1995; 14(6):548–555. DOI: 10.1037/0278-6133.14.6.548 [PubMed: 8565929]
7. Balantekin KN, Birch LL, Savage JS. Patterns of Weight-Control Behavior among 15 Year Old Girls. *Int J Eat Disorder.* 2015; 46(6):589–600. DOI: 10.1002/eat.22426
8. Stice E. Modeling of eating pathology and social reinforcement of the thin-ideal predict onset of bulimic symptoms. *Behav Res Ther.* 1998; 36(10):931–944. DOI: 10.1016/S0005-7967(98)00074-6 [PubMed: 9714944]
9. Dunkley TL, Wertheim EH, Paxton SJ. Examination of a model of multiple sociocultural influences on adolescent girls' body dissatisfaction and dietary restraint. *Adolescence.* 2001; 36(142):265–279. [PubMed: 11572305]
10. Ata RN, Ludden AB, Lally MM. The effects of gender and family, friend, and media influences on eating behaviors and body image during adolescence. *J Youth Adolescence.* 2007; 36(8):1024–1037. DOI: 10.1007/s10964-006-9159-x
11. Levine MP, Smolak L, Hayden HL. The relation of sociocultural factors to eating attitudes and behaviors among middle school girls. *J Early Adolescence.* 1994; 14(4):471–490. DOI: 10.1177/0272431694014004004
12. Grabe S, Ward LM, Hyde JS. The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychol Bull.* 2008; 134(3):460–476. DOI: 10.1037/0033-2909.134.3.460 [PubMed: 18444705]
13. van den Berg P, Neumark-Sztainer D, Hannan PJ, et al. Is dieting advice from magazines helpful or harmful? Five-year associations with weight-control behaviors and psychological outcomes in adolescents. *Pediatrics.* 2007; 119(1):e30–e37. DOI: 10.1542/peds.2006-0978 [PubMed: 17200254]
14. Neumark-Sztainer D, Falkner N, Story M, et al. Weight-teasing among adolescents: correlations with weight status and disordered eating behaviors. *Int J Obesity.* 2002; 26(1):123–131. DOI: 10.1038/sj.ijo.0801853
15. Balantekin KN, Savage JS, Marini ME, et al. Parental encouragement of dieting promotes daughters' early dieting. *Appetite.* 2014; 80:190–196. DOI: 10.1016/j.appet.2014.05.016 [PubMed: 24858835]
16. Smolak L, Levine MP, Schermer F. Parental input and weight concerns among elementary school children. *Int J Eat Disorder.* 1999; 25(3):263–271. DOI: 10.1002/(SICI)1098-108X(199904)25:3<263::AID-EAT3>3.0.CO;2-V
17. Neumark-Sztainer D, Wall M, Story M, et al. Are family meal patterns associated with disordered eating behaviors among adolescents? *J Adolescent Health.* 2004; 35(5):350–359. DOI: 10.1016/j.jadohealth.2004.01.004
18. Berge JM, Wall M, Larson N, et al. The unique and additive associations of family functioning and parenting practices with disordered eating behaviors in diverse adolescents. *J Behav Med.* 2014; 37(2):205–217. DOI: 10.1007/s10865-012-9478-1 [PubMed: 23196919]

19. Loth K, Wall M, Choi C-W, et al. Family meals and disordered eating in adolescents: Are the benefits the same for everyone? *Int J Eat Disorder*. 2015; 48(1):100–110. DOI: 10.1002/eat.22339
20. Lohman, TG, Roche, AF., Martorell, R., editors. *Anthropometric Standardization Reference Manual*. Champaign, IL: Human Kinetics; 1988.
21. Smilkstein G, Ashworth C, Montano D. Validity and reliability of the family APGAR as a test of family function. *J Fam Pract*. 1982; 15(2):303–11. [PubMed: 7097168]
22. Eisenberg ME, Neumark-Sztainer D, Haines J, et al. Weight-teasing and emotional well-being in adolescents: longitudinal findings from Project EAT. *J Adolescent Health*. 2006; 38(6):675–683. DOI: 10.1016/j.jadohealth.2005.07.002
23. Neumark-Sztainer D, Bauer KW, Friend S, et al. Family Weight Talk and Dieting: How Much Do They Matter for Body Dissatisfaction and Disordered Eating Behaviors in Adolescent Girls? *J Adolescent Health*. 2010; 47(3):270–276. DOI: 10.1016/j.jadohealth.2010.02.001
24. Paxton SJ, Wertheim EH, Gibbons K, et al. Body image satisfaction, dieting beliefs, and weight loss behaviors in adolescent girls and boys. *J Youth Adolesc*. 1991; 20(3):361–379. DOI: 10.1007/BF01537402 [PubMed: 24265063]
25. Cusumano DL, Thompson JK. Media Influence and Body Image in 8–11-Year-Old Boys and Girls: A Preliminary Report on the Multidimensional Media Influence Scale. *Int J Eat Disorder*. 2001; 29(1):37–44. DOI: 10.1002/1098-108X(200101)29:1%3C37::AID-EAT6%3E3.3.CO;2-7
26. Lanza ST, Collins LM, Lemmon DR, et al. PROC LCA: A SAS procedure for latent class analysis. *Struct Equ Modeling*. 2007; 14(4):671–694. DOI: 10.1080/10705510701575602 [PubMed: 19953201]
27. Bray B, Lanza S, Tan X. Eliminating bias in classify-analyze approaches for latent class analysis. *Struct Equ Modeling*. 2015; 22(1):1–11. DOI: 10.1080/10705511.2014.935265 [PubMed: 25614730]
28. Berge JM, MacLehose R, Loth KA, et al. Parent conversations about healthful eating and weight: associations with adolescent disordered eating behaviors. *JAMA Pediatr*. 2013; 167(8):746–753. DOI: 10.1001/jamapediatrics.2013.78 [PubMed: 23797808]
29. Wertheim EH, Paxton SJ, Schutz HK, et al. Why do adolescent girls watch their weight? An interview study examining sociocultural pressures to be thin. *J Psychosom Res*. 1997; 42(4):345–355. DOI: 10.1016/S0022-3999(96)00368-6 [PubMed: 9160274]
30. Keel PK, Heatherton TF, Harnden JL, et al. Mothers, fathers, and daughters: Dieting and disordered eating. *Eating Disorders*. 1997; 5(3):216–228. DOI: 10.1080/10640269708249227
31. Neumark-Sztainer D, Hannan PJ, Story M, et al. Family meal patterns: Associations with sociodemographic characteristics and improved dietary intake among adolescents. *J Am Diet Assoc*. 2003; 103(3):317–322. DOI: 10.1053/jada.2003.50048 [PubMed: 12616252]
32. Stice E, Spangler D, Agras WS. Exposure to media-portrayed thin-ideal images adversely affects vulnerable girls: A longitudinal experiment. *J Soc Clin Psychol*. 2001; 20(3):270–288. DOI: 10.1521/jscp.20.3.270.22309
33. Berndt TJ. Developmental changes in conformity to peers and parents. *Dev Psychol*. 1979; 15(6):608. doi: 10.1037/0012-1649.15.6.608
34. Kim HK, Viner-Brown SI, Garcia J. Children’s mental health and family functioning in Rhode Island. *Pediatrics*. 2007; 119(Supplement 1):S22–S28. DOI: 10.1542/peds.2006-2089E [PubMed: 17272581]
35. Wilkins SC, Kendrick OW, Stitt KR, et al. Family functioning is related to overweight in children. *J Am Diet Assoc*. 1998; 98(5):572–574. DOI: 10.1016/S0002-8223(98)00128-X [PubMed: 9597032]
36. Haines J, Neumark-Sztainer D, Hannan P, et al. Child versus parent report of parental influences on children’s weight-related attitudes and behaviors. *J Pediatr Psychol*. 2008; 33(7):783–788. DOI: 10.1093/jpepsy/jsn016

Table 1
Probability of girls reporting using each weight-control behavior given latent class membership

	Latent class			
	Non-dieters (26%)	Lifestyle (16%)	Dieters (43%)	Extreme Dieters (15%)
<u>Weight control behavior</u>				
Increase exercise (72%) ¹	0.26	0.69	0.98	0.84
Eat more fruits and vegetables (67%)	0.03	0.94	0.85	1.00
Eat less fat (60%)	0.02	0.34	0.90	1.00
Eliminate snacking, sweets, and junk (63%)	0.01	0.47	0.93	0.99
Reduce calories and amount of food (57%)	0.09	0.15	0.87	0.97
Eat low calorie food (42%)	0.02	0.11	0.62	0.83
Eat less meat (19%)	0.05	0.00	0.08	0.90
Skip meals (42%)	0.12	0.03	0.54	0.94
Unhealthy strategy (14%)	0.02	0.00	0.11	0.54

Unhealthy strategy refers to use of laxatives/enemas, diuretics, diet pills, or appetite suppressants, smoking cigarettes, or vomiting

¹Percent of total sample reporting use of each weight control behavior

Table 2

Descriptive information for the family, friend, and media factors

	Non-dieters (26%)	Lifestyle (16%)	Dieters (43%)	Extreme Dieters (15%)
Family functioning ¹	1.73 (0.41)	1.75 (0.24)	1.50 (0.54)	1.21 (0.71)
Priority of family meals ²	2.78 (0.71)	2.80 (0.77)	2.52 (0.72)	2.19 (0.77)
Mother's dieting ³	2.88 (1.15)	3.19 (0.98)	3.22 (0.91)	3.56 (0.65)
Maternal weight-teasing ⁴	1.10 (0.37)	1.35 (0.80)	1.47 (0.67)	1.68 (0.99)
Paternal weight-teasing ⁴	1.10 (0.37)	1.20 (0.71)	1.23 (0.59)	1.52 (0.87)
Friend's dieting ³	2.35 (1.08)	2.69 (0.93)	3.00 (0.90)	3.20 (0.96)
Friend's weight-teasing ⁴	1.07 (0.34)	1.23 (0.71)	1.42 (0.74)	1.52 (0.82)
Media sensitivity ⁵	1.55 (0.59)	1.89 (0.60)	2.46 (0.66)	2.65 (0.92)
Media exposure (hr/wk) ⁶	13.63 (7.79)	9.73 (5.16)	13.18 (7.39)	14.16 (8.09)

Data are presented as mean (SD).

¹ Assessed using Family APGAR; Range: 0 (Hardly ever) – 2 (Almost always)² Assessed using Priority of Family Meals; Range: 1 (Strongly disagree) – 4 (Strongly agree)³ Assessed with, "Has (have) your mother/father/friends ever tried to lose weight?"; Range: 1 (Really no) – 4 (Really yes)⁴ Assessed with, "Does (do) your mother/father/friends ever criticize or tease you about your weight?"; Range: 1 (Really no) – 4 (Really yes)⁵ Assessed with the MMIS; Range: 1 (Strongly disagree) – 4 (Strongly agree)⁶ Total average hours of TV per week

Table 3

Odds ratios for the individual factors in the family, friend, and media models on membership in the 3 dieting groups relative to the Non-dieters group

	P value	Lifestyle (16%)	Dieters (43%)	Extreme Dieters (15%)
Family model				
Family functioning	*	0.97 (0.34, 2.76)	0.59 (0.30, 1.17)	0.29 (0.13, 0.68)
Priority of Family Meals	**	0.95 (0.56, 1.62)	0.71 (0.48, 1.05)	0.42 (0.23, 0.78)
Maternal weight-teasing	**	1.51 (0.54, 4.16)	2.69 (1.29, 5.61)	2.70 (1.17, 6.26)
Paternal weight-teasing	NS	1.41 (0.52, 3.84)	0.68 (0.31, 1.52)	1.15 (0.48, 2.75)
Mother's dieting	NS	1.43 (0.90, 2.29)	1.32 (.99, 1.75)	1.85 (1.12, 3.04)
Friend model				
Friend's weight-teasing	**	1.33 (0.59, 3.03)	2.25 (1.23, 4.11)	2.78 (1.38, 5.60)
Friends' dieting	***	1.31 (0.87, 1.95)	1.66 (1.24, 2.22)	2.29 (1.46, 3.57)
Media model				
Weekly TV	NS	0.92 (0.87, 0.98)	0.97 (0.93, 1.01)	0.98 (0.92, 1.04)
Media sensitivity	****	1.93 (1.09, 3.44)	4.31 (2.72, 6.82)	6.62 (3.55, 12.33)

Non-dieters were used as the reference class. Odds ratios are in bold variable predicted membership in that class relative to the Non-dieters, and are shown with confidence interval in parentheses. All models were adjusted for girls' BMI.

* P < 0.10,

** P < 0.05,

*** P < .01,

**** P < .0001