Predictive Effects of Mother and Peer Influences on Increases in Adolescent Eating Disorder Risk Factors and Symptoms: A 3-Year Longitudinal Study

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ABSTRACT

Objective: To investigate the relation of maternal and peer attitudes and behaviors to changes in eating disorder risk factors and symptoms in adolescent females.

Method: We tested whether maternal and peer eating attitudes, behaviors, and deficits in social support at baseline predicted subsequent increases in eating disorder risk factors and symptoms among 483 late adolescent females followed over 3 years.

Results: Data provide partial support for hypotheses, as eating disorder risk factors and symptoms increased over time and maternal thin ideal internalization significantly predicted a future increases in adolescent bulimic symptoms. There were no significant predictors of adolescent thin ideal internalization or body dissatisfaction.

Discussion: Findings only partially support the hypothesis that unhealthy attitudes and behaviors of mothers increase risk for eating disorder symptoms in their late adolescent daughters. These results underscore why eating disorder prevention programs should be based on risk factor research that has used prospective and rigorous designs.

Keywords: maternal and peer; eating disorders; predictive effects

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Introduction

Sociocultural agents, such as peers, parents, and the media, are hypothesized to contribute to the development of eating disordered attitudes and behaviors.[1,2] Influences from one's immediate subculture may consist of potent messages regarding the need to conform to the societal standard of thinness. These influences are thought to significantly affect the development of body image disturbances and disordered eating. Potential pathways of influence include both direct and indirect messages from parents and peers. Longitudinal studies have indicated that eating disorders are most likely to emerge during late adolescence,[3,4] suggesting it is a critical period for investigating parental and peer influences.

Parental Influences

As primary socialization agents, parents are theorized to influence the development of eating disturbances by reinforcing societal messages regarding the importance of thinness, even in late adolescence.[5,6] Empirical support for indirect parental influence on older adolescents includes the adolescent's perception of family internalization of the thin-ideal[7,8] and adolescents' experience of thin-ideal pressure from parents.[9] The indirect influence of maternal body dissatisfaction on younger and older adolescents' eating disorder symptoms has been supported in the literature,[10–12] with some exceptions.[13,14] However, researchers have found that the less well-studied paternal dieting and body dissatisfaction has less empirical support for influencing eating disorder symptoms among adolescents.[15,16]

Direct messages from parents may also play an etiologic role in the development of eating disorders.[17] Negative comments, especially by mothers, encouraging their daughter's weight loss are correlated with disordered eating and drive for thinness among young adolescents.[11,18,19] In addition, negative comments by fathers may also be associated

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with disordered eating among adolescents though more conclusive research is needed.[15,20]

Researchers have also examined how levels of parental support may be related to child and adolescent eating disorder behaviors and symptoms. Lack of parental support and support that is perceived to be conditional to meeting appearance expectations may promote body dissatisfaction and disordered eating among young adolescents.[21,22] Barker and Galambos[23] found that greater maternal support is associated with greater body satisfaction among early adolescents. In addition, one prospective study found that deficits in parental support predicted future increases in body dissatisfaction among adolescent girls, aged 11–15,[24] though other prospective studies have yielded null effects.[25,26] More research is needed to determine how maternal support influences older adolescents' eating disorder risk factors and symptoms.

Peer Influences

Peers also seem to influence the development of adolescent girls' body image and eating behaviors. Peer groups often have similar levels of body image concerns, frequency of extreme weight-loss behaviors, and dietary restraint.[27] Peer influences, such as interpersonal pressure to be thin and criticism about appearance, correlate with body dissatisfaction and disordered eating among adolescent females, aged 11–17.[28] For middle and late adolescence, Shomaker and Furman[1] found that adolescents' perceived pressure to be thin and friends' reports of the pressure to be thin predicted future increases in disordered eating among adolescents. Likewise, perceived peer endorsement of the thin-ideal and peer modeling of eating disordered behaviors correlated with bulimic symptoms and increased risk for future onset of symptoms in adolescent girls.[8]

Cross-sectional studies indicate that attitudes about eating and eating-related behaviors are more similar among individuals who self-select housemates than among those whose housemates who are randomly selected and that individuals in friendship cliques have similar levels of body image concerns, dietary restraint, and extreme weight loss behaviors.[27,29] There is also evidence that subcultural norms in friendship groups can influence eating disordered attitudes and behaviors over time. For example, research suggests that socialization among peers results in a convergence of body image concerns and restrictive attitudes[30] and bulimic symptoms[29] among peer groups. Moreover, this influence appears to increase with increasing amounts of contact with selected peers. The quality of peer relationships may also play a role in eating-disordered attitudes and behaviors[28] because adolescents may attempt to conform to the thin-ideal as a means to gain greater acceptance from peers. Additional research would help to further elucidate the effects of interpersonal variables, such as social support, on eating disorder symptoms.

Study Purpose

Most prior studies examining parental and peer influences on eating disorders among adolescents have been cross-sectional, making it impossible to determine whether the influences predate the emergence of eating pathology. Further, few studies have investigated the potential impact of messages from both parents and peers. Thus, the purpose of this study was to test whether peer and maternal attitudes and behaviors predict future increases in eating disorder risk factors (thin-ideal internalization, body dissatisfaction) and eating disorder symptoms. We focused on mothers because the literature suggests they may have a greater influence than fathers on their daughter's eating disorder symptoms. We also examined peer influences because they may be particularly salient socialization agents during late adolescence and the transition to college. Most prior research has relied solely on adolescent report of perceived parental or peer influences (versus direct reports from parents and peers), used cross-sectional designs, and relied upon only questionnaire data to assess disordered eating. To our knowledge, this is the first study using adolescent as well as mother and peer report, a prospective design, and structured diagnostic interviews to assess adolescent eating pathology. We hypothesized that maternal and peer thin-ideal internalization, body dissatisfaction, and eating disorder symptoms, pressure to be thin, and deficits in maternal and peer social support would predict future increases in eating disorder risk factors and symptoms among adolescents.

Method

Participants

At the beginning of the study (TI), participants were 483 adolescent girls ranging in age from 15 to 19 (mean age = 17.5 years, SD = 0.67) recruited from public and private high schools using direct mailings, their mothers (mean age = 46.4 years, SD = 5.8), and a nominated same-sex peer (mean age = 17.3 years, SD = 2.0). At

Time 1, 444 of 483 possible parents participated (95.6%) and 389 of 484 possible peers participated (80.5%). At Time 2, 475 adolescents participated while at Times 3 and 4, 460 and 462 adolescents (respectively) participated. There was not a single exclusion criterion for the study. The study was described as an investigation of adolescent mental and physical health and used an active consent procedure, resulting in a mean participation rate of 56%, which is similar to that of other school-recruited samples requiring active consent and structured interviews (e.g., 61%[31]). The ethnic composition of the sample was 70% Caucasian, 16% Hispanic, 8% African American, 2% Asian/Pacific Islander, and 4% who specified "other" or mixed racial heritage. Average parental education (a proxy for socioeconomic status) was 21% high school graduate or less, 17% some college, 40% college graduate, and 17% graduate degree; these figures are similar to census data.

Procedures

The study was described to parents, peers, and participants as an investigation of adolescent mental and physical health. Prior to data collection we secured active parental consent and adolescent assent. There were no exclusion criteria for the study. Adolescents completed a survey and a structured interview at baseline (T1) and at three annual follow-ups (T2, T3, T4). At each assessment adolescents provided data on eating disorder risk factors and completed structured interviews assessing the diagnostic criteria for DSM-IV eating disorders. Female assessors with at least a bachelor's degree in psychology attended a 3-day training, during which they received instruction in structured interview skills, reviewed diagnostic criteria for relevant disorders, observed simulated interviews, and role-played interviews. Assessors were required to demonstrate a minimum inter-rater agreement (kappa [k] > 0.80) with experts by using tape-recorded interviews conducted with individuals with and without eating disorders before data were collected. Parents and a nominated same-sex peer completed a survey at T1 only after providing informed consent. Parents and peers each received $25, and each adolescent received $50 for completing each assessment. The University of Texas at Austin Institutional Review Board approved this project.

Parent and Peer Measures

Thin-Ideal Internalization. Internalization of the thin-ideal was assessed with the Ideal-Body Stereotype Scale-Revised.[32] This scale asked mothers and peers to indicate their level of agreement with statements concerning what attractive women look like (e.g., "Slender women are more attractive") on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items were averaged for this and subsequent scales. This scale has acceptable internal consistency ($\alpha = 0.89$) and predictive validity[32] and had an $\alpha = 0.88$ for mothers and 0.82 for peers at T1.

Pressure to be Thin. Eight items derived from the Perceived Sociocultural Pressure Scale,[32] assessed the degree of pressure to be thin that mothers/peers reported exerting on their daughters/friends. The scale assessed the degree of encouragement to be thin with statements such as "I encourage my daughter/friend to watch her weight" and "I comment to my daughter/friend about how attractive thin girls/women look" on a five-point response format ranging from 1 (none) to 5 (a lot). In our study, this adapted scale had an $\alpha = 0.84$ for mothers and 0.80 for peers at T1.

Body Dissatisfaction. An adapted form of the Satisfaction and Dissatisfaction with Body Parts Scale[33] assessed satisfaction with body parts typically of concern to females (e.g., waist, hips, and thighs). This scale has shown internal consistency ($\alpha = 0.94$), 3-week test-retest reliability ($r = 0.90$), and predictive validity for bulimic symptom onset.[32] This scale had an $\alpha = 0.93$ for mothers and 0.93 for peers at T1.

Social Support. Maternal and peer social support was measured with six items adapted from the Network of Relationships Inventory,[34] which assesses behaviors affecting the relationships, such as providing emotional self-worth ("I treated her with respect and admiration") and instrumental help ("I gave her good advice about how to handle problems"). Items used a five-point response format ranging from 1 (strongly disagree) to 5 (strongly agree). In our study, this measure had an $\alpha = 0.86$ for mothers and 0.89 for peers at T1.

Bulimic Symptoms. The diagnostic symptoms of bulimia nervosa were assessed with the Eating Disorder Diagnostic Scale (EDDS[35]). Items assessing the frequency of binge eating, frequency of compensatory behaviors (e.g., vomiting, laxative/diuretic abuse, fasting, and excessive exercise), and overvaluation of weight and shape were summed to form an overall eating disorder symptom composite. A square root transformation was applied to normalize the moderate positive skewness in the distribution. The EDDS has shown high agreement ($\kappa = 0.78$–0.83) with eating disorder diagnoses made with the Eating Disorder Examination (EDE[36]), internal consistency ($\alpha = 0.89$), 1-week test-retest reliability ($r = 0.87$), sensitivity to detecting intervention effects, and predictive validity for future onset of eating pathology and depression.[35,37] In our study, this measure had an $\alpha = 0.66$ for mothers and 0.89 for peers at T1.

Adolescent Measures

Adolescents completed the measures of thin-ideal internalization and body dissatisfaction as well as a structured interview (see below) at each assessment.

Bulimic Symptoms. The diagnostic items from the Eating Disorder Examination (EDE[36]), a structured interview that assesses DSM-IV (American Psychiatric Association, 2000) was used to reflect overall eating disorder symptoms. Items assessing frequency of binge eating and compensatory behaviors (self-induced vomiting, fasting, laxative/diuretic abuse, and excessive exercise) and overvaluation of weight and shape were averaged to form a past-month bulimic-symptom composite for each assessment, as done previously.[38,39] A square root transformation was applied to normalize the moderate positive skewness in the distribution. This composite has shown internal consistency ($\alpha = 0.96$), 1-month test-retest reliability ($r = 0.95$), convergent validity with alternative measures of eating pathology, and sensitivity to detecting intervention effects described in past studies.[4]

Results

Mixed effects regression models[40,41] estimated with SAS (version 9.0) PROC MIXED were used to model the developmental trajectories of adolescent thin-ideal internalization, body dissatisfaction, and bulimic symptoms from study waves T1 to T4. These multilevel models of change are especially suited to the analysis of longitudinal studies, providing solutions to such common problems as missing data, irregular measurement occasions, and serial correlations.[42] Models were specified with a random intercept (defined at T1), a random trajectory, and an unstructured covariance structure.

A two step process was used to assess predictors of change in adolescent thin ideal internalization, body dissatisfaction, and bulimic symptoms (see **Table 1** for means and standard deviations). First, a univariate model for each parent and peer measure hypothesized to influence the adolescent developmental trajectories was individually added and then removed from the model. Next, each parent or peer measure from the univariate analysis that marginally ($p < 0.10$) predicted intercept or trajectory was simultaneously entered into a final multivariate model. Use of a more traditional level ($p < 0.05$) during univariable analysis often fails to identify variables known to be important[43,44] as it does not accommodate the possibility that a weak association with an outcome can become stronger in a multivariate analysis. Interpretation of multivariate effects was set at $p < 0.05$. At each step, effect size is summarized by the r equivalent[45] and is appropriate where no generally accepted effect size estimate exists, as is the case with mixed effects models.

TABLE 1. Descriptive statistics for adolescent outcomes

	T1		T2		T3		T4	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Body dissatisfaction	3.13	0.88	2.89	0.86	2.95	0.89	3.09	0.89
Thin ideal	3.34	0.69	3.40	0.71	3.36	0.72	3.42	0.72
Bulimic symptoms	0.63	0.37	0.64	0.41	0.72	0.34	0.68	0.36

SD = standard deviation.
Note: Bulimic symptoms reported as square root transformed.

Maximum likelihood estimation allowed for the use of all available adolescent data and provided unbiased results, assuming the data were missing at random.[46] In the present study, missing adolescent data (1% at T2, 3% at T3, 7% at T4) did not appear to represent a meaningful departure from the missing-at-random assumption, meaning that missing data were not likely to depend on unobserved determinants of the outcome of interest.[47] Missing data for the parent and peer predictors at T1 ranged from 8 to 20%. A maximum-likelihood estimate was used to impute missing data (SPSS Missing Value Analysis module: SPSS, 2006) for parent and peer predictors as it produces more accurate and efficient parameter estimates than list-wise deletion.

Each parent and peer measure assessed at T1 (see **Table 2** for means and standard deviations) was individually added and then removed from the model to determine its unique influence on the adolescent intercept and developmental trajectories and identify predictors to include for the multivariate models. A higher score for adolescent thin ideal at the T1 intercept was significantly associated with a higher parent thin ideal score (estimate = 0.171, SE = 0.041, $t = 4.24$, $p < 0.001$, $r = 0.19$), a higher peer thin ideal score (estimate = 0.157, SE = 0.043, $t = 3.64$, $p < 0.001$, $r = 0.16$) and was marginally associated with a higher parent body dissatisfaction score (estimate = 0.057, SE = 0.035, $t = 1.69$, $p = 0.091$, $r = 0.08$). A lower score for adolescent thin ideal at T1 was marginally associated with a higher peer bulimic symptom score (estimate = −0.075, SE = 0.042, $t = -1.78$, $p = 0.076$, $r = 0.08$). No parent or peer measure predicted change in the adolescent thin ideal developmental trajectory. In addition, no parent or peer measures were associated with initial adolescent level of body dissatisfaction or developmental trajectory. A higher parent thin ideal score was significantly associated with an increasing adolescent bulimic symptom trajectory during the developmental period (estimate = 0.018, SE = 0.009, $t = 2.08$, $p = 0.038$, $r = 0.10$). Finally, higher levels of parental pressure to be thin was marginally associated with higher levels of adolescent bulimic symptoms at T1

TABLE 2. Means, standard deviations, and bivariate correlations among maternal risk factors, peer risk factors, and eating disorder symptoms

Factor	2	3	4	5	6	7	8	9	10	11	12	13	M	SD
1. Maternal TII	0.28*	−0.02	−0.01	0.16*	0.16*	0.09	0.02	0.06	0.01	0.18*	0.03	0.01	3.24	0.75
2. Maternal pressure to be thin		−0.05	0.02	0.29*	−0.01	0.04	−0.05	−0.09	−0.01	0.01	−0.14*	0.06	1.96	0.74
3. Maternal body dissatisfaction			0.09	−0.49*	0.16*	−0.02	−0.02	0.06	−0.02	0.06	0.17*	0.02	2.95	0.92
4. Maternal social support				−0.08	0.04	−0.08	−0.04	0.03	−0.04	−0.02	0.13*	0.00	4.45	0.61
5. Maternal bulimic symptoms					−0.13*	0.01	−0.01	−0.07	−0.01	−0.02	−0.10*	0.02	0.47	0.40
6. Peer TII						0.19*	0.22*	0.08	0.25*	0.18*	−0.06	0.03	3.29	0.70
7. Peer pressure to be thin							0.20*	0.08	0.34*	0.02	−0.07	0.04	1.83	0.68
8. Peer body dissatisfaction								0.01	0.50*	0.02	−0.10	−0.02	2.87	0.94
9. Peer social support									−0.01	0.07	0.01	−0.05	4.52	0.65
10. Peer bulimic symptoms										−0.07	0.05	−0.06	2.16	1.57
11. Adolescent TII											−0.19*	0.18*	3.34	0.69
12. Adolescent body dissatisfaction												−0.31*	3.13	0.88
13. Adolescent bulimic symptoms													0.63	0.37

Note. TII = thin ideal internalization
* = $p < 0.05$.

(estimate = 0.041, SE = 0.021, t = 1.93, p = 0.054, r = 0.09).

Multivariate analysis of adolescent thin ideal showed parent thin ideal (estimate = 0.146, SE = 0.041, t = 3.55, $p < 0.001$, r = 0.16), peer thin ideal internalization (estimate = 0.140, SE = 0.046, t = 3.05, p = 0.002, r = 0.14), and peer bulimic symptoms (estimate = −0.111, SE = 0.042, t = −2.58, p = 0.010, r = 0.12) were significant predictors of an adolescent T1 measure of thin ideal internalization. No significant or marginally significant univariate predictors were found for adolescent body dissatisfaction so a multivariate model was not warranted. Multivariate analysis of adolescent bulimic symptoms showed parent thin ideal significantly predicted change in adolescent bulimic symptoms during the developmental period (estimate = 0.021, SE = 0.009, t = 2.27, p = 0.023, r = 0.10).

Discussion

Consistent with previous research, the results provide support for the hypothesis that eating disorder risk factors and symptoms increase over time.[4,48] For study participants, adolescent thin-ideal internalization and bulimic symptoms increased during the transition from adolescence to young adulthood (T1-T4) whereas body dissatisfaction decreased and then increased again over the study period. These results suggest that while adolescent participants were internalizing the thin-ideal and participating in bulimic behaviors to a greater degree over time, body dissatisfaction seemed to decrease initially and then increase again during the transition to college. Perhaps this is because sexual relations may become more normative in late adolescence, which may give rise to an increase in body dissatisfaction.

Unexpectedly, there were no significant predictors of future increases in adolescent thin ideal internalization or body dissatisfaction. It is possible that that parents and peers may actually have little impact in this regard and that possibly other factors, such as media are more impactful. Another explanation may be that the effects of maternal and peer factors on thin ideal internalization and body dissatisfaction among adolescents may be more salient during preadolescence and early to middle adolescence, versus during the transition to college when peer networks often are shifting and mothers are less influential in their children's everyday lives. Study findings do not provide support for the notion that girls will imitate their mothers' body image dissatisfaction, at least into young adulthood. Although some cross-sectional studies have demonstrated a link between maternal and adolescent body image dissatisfaction,[11,49] this relation has not emerged in prospective studies. This suggests that the direction of effects may be in the opposite direction (i.e., eating and weight disturbances in the child may increase those patterns in their parents) or that the maternal and peer variables measured in this study are not the most potent risk factors for the development of body dissatisfaction in late adolescents. It is also noteworthy that there were no peer predictive effects found in this study which is inconsistent with a few longitudinal findings.[1,8] One reason for this finding may be that adolescents in the study nominated their best friend as the "peer informant" and these close friends may provide much more positive support than negative.

Of note, maternal thin ideal internalization did emerge as a significant predictor of future increases

in adolescent bulimic symptoms. In addition, maternal pressure to be thin was also a marginally significant predictor of adolescent bulimic symptoms for the trajectory of the study. These significant results are consistent with previous cross sectional and longitudinal research findings in that mothers and peers have been shown to influence the development of eating disturbances by reinforcing societal messages regarding the importance of thinness.[1,9,50] Given that adolescents are already receiving messages from their larger social contexts about the importance of being thin, it makes sense that when an adolescent also receives similar messages from her mother that she would take extreme measures (disordered eating behaviors) to conform.

Limitations

It is important to note the limitations of this study. First, no data were collected from fathers or multiple peers. Despite this limitation, the study did rely on the report of multiple informants to avoid any limitations associated with obtaining only a single perspective.[51] Second, there is limited data on the reliability and validity of two of the study measures: social support and pressure to be thin; however, these results indicate that both measures showed internal consistency. Finally, the recruitment rate was low (56%), suggesting results should be generalized with care.

Conclusions and Implications for Future Research

This study provides partial support for the theory that some attitudes and behaviors of mothers and peers increase risk for future escalations in eating disorder symptoms. Future research studies should further examine the effects of maternal and peer influences on adolescent eating disturbances by using prospective designs that collect data from multiple informants at multiple time points, perhaps focusing on a younger developmental period. Such findings will help the prevention field further elucidate and clarify which risk factors are most salient in the development of eating disturbances for late adolescents and young adults and also track trends in how parent and peer influences shift as an adolescent transitions into young adulthood. The findings of this study underscore the importance of eating disorder prevention programs that are empirically based and informed by risk factor research that has used prospective and rigorous designs.

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References

1. Shomaker L, Furman W. Interpersonal influences on late adolescent girls' and boys' disordered eating. Eat Behav 2009;10: 97–106.
2. Tantleff-Dunn S, Gokee J. Interpersonal influences on body image development. In: Cash TF, Pruzinsky T, editors. Body Image: A Handbook of Theory, Research, and Clinical Practice. New York, NY: Guilford Press, 2004, pp.108–116.
3. Lewinsohn PM, Striegel-Moore RH, Seeley JH. Epidemiology and natural course of eating disorders in young women from adolescence to young adulthood. J Am Acad Child Adolesc Psychiatry 2000;39:1284–1292.
4. Stice E, Marti CN, Shaw H, Jaconis M. An 8-year longitudinal study of the natural history of threshold, subthreshold, and partial eating disorders from a community sample of adolescents. J Abnorm Psychol 2009;118:587–597.
5. Mills JS, Miller JL. Experimental effects of receiving negative weight-related feedback: A weight guessing study. Body Image 2007;4:309–316.
6. Neziroglu F, Khemlani-Patel S, Veale D. Social learning theory and cognitive behavioral models of body dysmorphic disorder. Body Image 2008;5:28–38.
7. Davis C, Shuster B, Blackmore E, Fox J. Looking good: Family focus on appearance and the risk for eating disorders. Int J Eat Disord 2004;35:136–144.
8. Stice E. Modeling of eating pathology and social reinforcement of the thin-ideal predict onset of bulimic symptoms. Behav Res Ther 1998;36:931–944.
9. Stice E, Ziemba C, Margolis J, Flick P. The dual pathway model differentiates bulimics, subclinical bulimics, and controls: Testing the continuity hypothesis. Behav Ther 1996;27:531–549.
10. Canals J, Sancho C, Arija MV. Influence of parent's eating attitudes on eating disorders in school adolescents. Eur Child Adolesc Psychiatry 2009;18:353–359.
11. Pike KM, Rodin J. Mothers, daughters, and disordered eating. J Abnorm Psychol 1991;100:198–204.
12. Smolak L. Body image in children and adolescents: Where do we go from here? Body Image 2004;1:15–28.
13. Attie I, Brooks-Gunn J. Development of eating problems in adolescent girls: A longitudinal study. Dev Psychol 1993;25: 70–79.
14. Griffiths JA, McCabe MP. The influence of significant others on disordered eating and body dissatisfaction among early adolescent girls. Eur Eat Disord Rev 2000;8:301–314.
15. Kanakis DM, Thelen MH. Parental variables associated with bulimia nervosa. Addict Behav 1995;20:491–500.
16. Thelen MH, Cormier JF. Desire to be thinner and weight control among children and their parents. Behav Ther 1995;26:85–99.
17. Rodgers R, Chabrol H. Parental attitudes, body image disturbances and disordered eating amongst adolescents and young adults: A review. Eur Eat Disord Rev 2009;17:137–151.
18. Tremblay L, Lariviere M. The influence of puberty onset, body mass index, and pressure to be thin on disordered eating behaviors in children and adolescents. Eat Behav 2009;10:75–83.
19. Wertheim EH, Martin G, Prior M, Sanson A, Smart D. Parent influences in the transmission of eating and weight related values and behaviors. Eat Disord 2002;10:321–224.
20. Keel P, Heatherton T, Harnden J, Hornig C. Mothers, fathers, daughters: Dieting and disordered eating. Eat Disord 1997;5:216–228.

21. McVey GL, Pepler D, Davis R, Flett GL, Abdolell M. Risk and protective factors with disordered eating during early adolescence. J Early Adolesc 2002;22:75–95.
22. Swarr AE, Richards MH. Longitudinal effects of adolescent girls' pubertal development, perceptions of pubertal timing, and parental relations on eating problems. Dev Psychol 1996;32:636–646.
23. Barker ET, Galambos NL. Body dissatisfaction of adolescent girls and boys: Risk and resources factors. J Early Adolesc 2003;23: 141–165.
24. Stice E, Whitenton K. Risk factors for body dissatisfaction in adolescent girls: A longitudinal investigation. Dev Psychol 2002;38: 669–678.
25. Byely L, Archibald A, Graber J, Brooks-Gunn J. A prospective study of familial and social influences on girls' body image and dieting. Int J Eat Disord 2000;28:155–164.
26. Presnell K, Bearman SK, Stice E. Risk factors for body dissatisfaction in adolescent boys and girls: A prospective study. Int J Eat Disord 2004;36:389–401.
27. Paxton SJ, Schultz HK, Wertheim EH, Muir SL. Friendship clique and peer influences on body image concerns, dietary restraint, extreme weight-loss behaviors, and binge eating in adolescent girls. J Abnorm Psychol 1999;108:255–266.
28. Vincent MA, McCabe MP. Gender differences among adolescents in family and peer influences on body dissatisfaction, weight loss, and binge eating behaviors. J Youth Adolesc 2000;29: 205–221.
29. Zalta AK, Keel PK. Peer influence on bulimic symptoms in college students. J Abnorm Psychol 2006;115:185–189.
30. Meyer C, Waller G. Social convergence of disturbed eating attitudes in young adult women. J Nervous Ment Dis 2001;189:114–119.
31. Lewinsohn P, Hops H, Roberts R, Seeley J, Andrews J. Adolescent psychopathology I. Prevalence and incidence of depression and other DSM-II-R disorders in high school students. J Abnorm Psychol 1993;102:133–144.
32. Stice E. A prospective test of the dual pathway model of bulimic pathology: Mediating effects of dieting and negative affect. J Abnorm Psychol 2001;110:124–135.
33. Berscheid E, Walster E, Bohrnstedt G. The happy American body: A survey report. Psychol Today 1973;7:119–131.
34. Furman W, Buhrmester D. Children's perceptions of the personal relationships in their social networks. Dev Psychol 1985;21:1016–1024.
35. Stice E, Telch C, Rizvi S. Development and validation of the eating disorder diagnostic scale: A brief self-report measure of anorexia, bulimia and binge-eating disorder. Psychol Assess 2000;12:123–131.
36. Fairburn CG, Cooper Z. The eating disorder examination. In: Fairburn CG, Wilson GT, editors. Binge Eating: Nature, Assessment, and Treatment,12th ed. New York: Guilford Press, 1993, pp. 317–360.
37. Stice E, Fisher M, Martinez E. Eating disorder diagnostic scale: Additional evidence of reliability and validity. Psychol Assess 2004;16:60–71.
38. Presnell K, Stice E. An experimental test of the effect of weight-loss dieting on bulimic pathology: Tipping the scales in a different direction. J Abnorm Psychol 2003;112:166–170.
39. Stice E, Burton EM, Shaw H. Prospective relations between bulimic pathology, depression, and substance abuse: Unpacking comorbidity in adolescent girls. J Consult Clin Psychol 2004; 72:62–71.
40. Singer JD, Willett JB. Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence. New York, NY: Oxford University Press, 2003.
41. Hedeker D, Gibbons RD. Longitudinal Data Analysis. Chicago, IL: Wiley, 2006.
42. Gibbons RD, Hedeker D, Waternauz C, Kraemer HC, Greenhouse JB, Shea MT, et al. Some conceptual and statistical issues in analysis of longitudinal psychiatric data. Arch Gen Psychiatry 1993;50:739–750.
43. Bendel RB, Afifi AA. Comparison of Stopping Rules in Forward 'Stepwise' Regression. J Am Stat Assoc 1977;72:46–53.
44. Mickey J, Greenland S. A study of the impact of confounder-selection criteria of effect estimation. Am J Epidemiol 1989;129: 125–137.
45. Rosenthal R, Rubin DB. $r_{equivalent}$: A simple effect size indicator. Psychol Methods 2003;8:492–496.
46. Schafer JL, Graham JW. Missing data: Our view of the state of the art. Psychol Methods 2002;7:147–177.
47. Little RJ, Rubin DB. Statistical Analysis with Missing Data. New York, NY: Wiley, 2002.
48. Hoek HW. Incidence, prevalence and mortality of anorexia and other eating disorders. Curr Opin Psychiatry 2007;19:389–394.
49. Hall A, Brown L. A comparison of the attitudes of young anorexia nervosa patients and non patients with those of their mothers. Br J Psychol 1982;56:39–48.
50. Stice E, Ziemba C, Margolis J, Flick P. The dual pathway model differentiates bulimics, subclinical bulimics, and controls: Testing the continuity hypothesis. Behav Ther 1996;27:531–549.
51. Schwarz J, Barton-Henry M, Pruzinsky T. Assessing child-rearing behaviors: A comparison of ratings made by mother, father, child, and sibling on the CRPBI. Child Dev 1985;56:462–479.