
A 4-Year Longitudinal Investigation of the Processes by Which Parents and Peers Influence the Development of Early Adolescent Girls' Bulimic Symptoms

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Abstract

Bulimic symptoms are fairly common among adolescent girls, and the dual pathway model outlines one possible etiological chain leading to bulimic symptoms. The present study seeks to longitudinally examine the pathways proposed by this model while focusing on the relative contribution of parents and peers (via direct encouragement or pressure to be thin and indirect discussion of dieting). Four years of self-report data were collected from 85 early adolescent girls during fifth through eighth grades. Results indicated that mothers, fathers, and peers each played an important role in the development of girls' bulimic symptoms by affecting their body dissatisfaction, which was related to later dieting behaviors, depressive symptoms, and bulimic symptoms. Furthermore, results suggested that peers

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were a stronger influence than mothers and fathers. The authors conclude that both parents and peers play important roles in girls' development of bulimic symptoms, and future work should especially include peers.

Keywords

eating disorders/diet, parenting processes/practices, peers, developmental processes, longitudinal data, structural equation modeling

Bulimic symptoms largely afflict adolescents, typically girls between the ages of 12 and 25 (Lewinsohn, Striegel-Moore, & Seeley, 2000; Woodside & Garfinkel, 1992). For instance, studies of community samples suggest that approximately 2% of girls in junior high and 4% to 9% of girls in high school show clinical levels of bulimic symptoms (Gross & Rosen, 1988; Stein & Brinza, 1989). Furthermore, between 12% and 44% of adolescent girls may exhibit some form of subclinical bulimic behaviors (Stice, 2001; Stice, Killen, Hayward, & Taylor, 1998). Because of these alarming statistics, close attention should be paid to potential risk factors and processes associated with the development of bulimic symptoms in adolescence.

Stice's (1994) dual pathway model proposes that sociocultural pressure to have a thin body may lead to bulimic symptoms among females by promoting an internalization of the thin ideal body stereotype, which leads to body dissatisfaction, dieting behaviors, and negative affect. Empirical support for the dual pathway model in its entirety has been limited to work by Stice and his colleagues using cross-sectional data (Stice, Ziemba, Margolis, & Flick, 1996) or data including only two time points, spanning a period of 9 months (Stice, Shaw, & Nemeroff, 1998). In addition, Stice (2001) used three waves of data over a period of 20 months to test individual components of the dual pathway model. The present study, in contrast, uses longitudinal data spanning a period of 4 years (e.g., Grades 5-8) to examine all of the relations proposed by the dual pathway model together.

Sociocultural Pressure to be Thin: The Roles of Parents and Peers

In their work examining the dual pathway model, Stice and colleagues (Stice & Bearman, 2001; Stice et al., 1996; Stice, Killen, et al., 1998; Stice, Shaw, et al., 1998) have focused on broadly defined sociocultural pressure to be thin. For example, pressures from family members, peers, and dating partners were combined into one overall construct. As a result, we are left uncertain

who may be more influential in girls' development of bulimic symptoms. In our study, we seek to examine the relative, separate contribution of both parents and peers in the process leading to girls' bulimic symptoms as outlined by the dual pathway model.

Despite the lack of research investigating the role of parents versus peers separately in the dual pathway model, other studies have provided clues as to how these patterns of relations may unfold. We focus our attention on two particular sociocultural influences: one direct (e.g., encouragement or pressure to be thin) and one indirect (e.g., discussion of dieting). Such influences may promote an internalization of the thin ideal body stereotype, implying that adolescents develop an internalized schema for what it means to be attractive. If the adolescent does not feel that she meets this thin ideal, she may express body dissatisfaction. A wealth of research has indicated that such direct and indirect influences by both parents and peers have been associated with girls' body dissatisfaction as well as their dieting behaviors (Benedikt, Wertheim, & Love, 1998; Dunkley, Wertheim, & Paxton, 2001; Jones, 2004; Jones & Crawford, 2006; Paxton, Schutz, Wertheim, & Muir, 1999; Sinton & Birch, 2006; Smolak, Levine, & Schermer, 1999).

Clearly, studies demonstrate that both parents and peers play important roles in the development of body dissatisfaction among adolescent girls when considered separately. Other studies that investigate the roles of both parents and peers together, however, suggest that peers may be more influential than parents. For example, Presnell, Bearman, and Stice (2003) found that perceived pressure to be thin from peers predicted increases in girls' body dissatisfaction whereas pressure from parents did not. This could be due to the age group of the sample in their study; their participants were between the ages of 16 and 19. The younger a child is, the more likely it is that parents will be influential in matters of weight and appearance. During the early adolescent period, however, peer relations intensify and more time is spent away from parents and with peers (Collins & Laursen, 2000). It appears as though the transition to adolescence involves a switch in dependencies, simultaneously becoming more autonomous from parents yet more reliant on peers (Steinberg, 2001). Thus, it is possible that peers have a stronger influence over adolescents than parents at this time, especially as arbitrators of appearance. To test this particular hypothesis, our study focuses on early adolescent girls during the transition period.

In other work investigating the contribution of parents and peers specifically among a sample of middle school girls, Keery, van den Berg, and Thompson (2004) found that both parents and peers had significant effects on girls' body dissatisfaction when considered separately. In an expansion of

this analysis that included parent and peer constructs tested together, Shroff and Thompson (2006a, 2006b) found that only peer influences (e.g., modeling, teasing, preoccupation with dieting) were significantly related to bulimic symptoms among middle school girls. This study did not, however, examine each peer behavior separately; doing so would allow for a more complete understanding of the specific actions associated with body image and weight-related concerns. Because it is unclear whether direct encouragement or pressure to be thin are stronger predictors of maladaptive eating patterns than more indirect discussions of dieting, the present study seeks to examine each variable separately.

Body Dissatisfaction, Dieting Behaviors, Depressive Symptoms, and Bulimic Symptoms

Although no longitudinal work exists examining the dual pathway model in its entirety, various components of the model have in fact been tested empirically. First, body dissatisfaction has predicted both dieting behaviors (Cattarin & Thompson, 1994; Wertheim, Koerner, & Paxton, 2001) and depressive symptoms (Stice & Bearman, 2001; Stice, Hayward, Cameron, Killen, & Taylor, 2000). Body dissatisfaction may lead to dieting behaviors due to the personal belief that dieting is an effective weight control strategy and will ultimately lead to a more desired, thinner body. Furthermore, body dissatisfaction may foster depressive affect among females in particular because attractiveness is often thought to be central in evaluating success (Smolak & Levine, 1996; Stice, 2002).

Second, dieting behaviors have been linked with bulimic symptoms over time (Killen et al., 1994, 1996; Stice & Agras, 1998). Dieting is thought to increase the risk of developing bulimic symptoms because individuals may binge to counteract the effects of dietary restrictions or may purge in order to adhere to the strict rules of caloric deprivation often involved in dieting. Last, depressive symptoms have been associated with bulimic symptoms longitudinally (Measelle, Stice, & Hogansen, 2006; Stice, Burton, & Shaw, 2004). This may be due to the belief that behaviors associated with bulimic symptoms (e.g., bingeing) can reduce feelings of heightened negativity and stress because they provide comfort and distraction.

The Present Study

To summarize, there has been limited, and mostly cross-sectional, support for the dual pathway model. Currently, there are no known studies that

examine the specific longitudinal, process-oriented connections between these constructs during the transition to adolescence. Thus, the present study proposes and tests a series of models in which parent and peer factors in fifth grade are linked to early adolescent girls' body dissatisfaction in sixth grade and dieting behaviors in seventh grade. Body dissatisfaction then is linked to both dieting behaviors and depressive symptoms in seventh grade, which then are linked to bulimic symptoms in eighth grade. In these models, we control for prior levels of bulimic symptoms in order to examine change in eating pathology over time (see Stice, 2002).

A particular contribution of our study is the separate examination of early adolescent girls' perceptions regarding mothers, fathers, and peers. First, we hypothesize that separate direct and indirect parent factors, including encouragement to lose weight and discussion of dieting, will drive the process leading to early adolescent girls' bulimic symptoms. We hypothesize that these effects will exist for girls' perceptions regarding both mothers and fathers. Second, we hypothesize that separate direct and indirect peer factors, including pressure to be thin and discussion of dieting, will drive the process leading to girls' bulimic symptoms. Finally, we examine combined models with both parent and peer factors together, in an attempt to determine whether parents or peers contribute most strongly to girls' bulimic symptoms. As research suggesting body mass index (BMI) plays an important role in the development of bulimic symptoms (see Stice, 2002, for a review), we also control for BMI in sixth grade in our models.

Method

Participants

The data analyzed in the present study were collected as part of a larger project investigating parenting and child outcomes during the transition to adolescence. Initial contact letters were distributed by primary schools in a medium-sized, Midwestern city or by direct mailings to parents of children in fourth grade. The letters described the study and instructed mothers to contact the research office if interested in participating. Mothers were told that this was a study of maternal and child adjustment during the transition to adolescence.

In the 1st year of the study when the children were in fourth grade, 102 mother-girl dyads participated. Due to attrition over the course of the study (e.g., relocation and refusal to continue participation) as well as missing data, a final total of 85 dyads' data were available for analysis. According to analysis of variance

and chi-square procedures, the 85 participating mother-girl dyads did not differ significantly on any demographic variables (e.g., age, ethnicity, marital status, family size, education, and income) during the 1st year of the study from the dyads that discontinued participation (all $ps > .05$).

The data of interest to the present study were collected from 85 early adolescent girls during fifth through eighth grades. Although boys were involved in the greater project, we did not include them in the present analysis because body image concerns and bulimic symptoms are more common among girls (Lewinsohn et al., 2000), and the measures of body dissatisfaction and dieting behaviors used in this study may not be appropriate for boys as they often want to become larger and more muscular as opposed to thinner (McCabe & Ricciardelli, 2005). At the fifth-grade assessment, girls were between the ages of 10 and 12 years ($M = 10.59$, $SD = 0.52$). Most girls identified themselves as European American (93.1%); fewer were African American (1.1%), Latina (1.1%), Native American (1.1%), or other (3.4%). At the fifth-grade assessment, the majority of mothers were married (93.1%); fewer were divorced (5.7%) or separated (1.1%). There was an average of 2.5 children in the families. The families tended to be educated and upper-middle class. On average, mothers had completed 3 years of education after receiving their high school diplomas, and 71.3% worked full- or part-time outside the home. The annual household income per family ranged from US\$10,000 to US\$400,000 ($M = US\$85,601$, $SD = 64,485$).

Procedure

Once annually, mothers and their early adolescents visited a university research laboratory for approximately 2 hours. During each visit, mothers and adolescents separately completed consent/assent forms and self-report questionnaires. However, only girls were asked to complete self-reports on the variables of interest to the present study because we were specifically interested in their perceptions and experiences. In compensation for their participation, the dyads were paid US\$30.00 in the 1st year of the study, and this rate increased by US\$10.00 each year such that in the 5th year of the study (e.g., when the adolescent was in eighth grade), each dyad received US\$70.00.

Measures

Measures were obtained from self-report questionnaires administered to early adolescent girls during fifth through eighth grades because not all measures were available in fourth grade.

Sociocultural Parent and Peer Factors. Four sociocultural factors were assessed by measures given to early adolescent girls during fifth grade: two were parent factors and two were peer factors. Items for these measures were distributed throughout the packet of surveys so that they did not appear consecutively.

Parental encouragement to lose weight. A two-item scale was used to assess early adolescents' perceptions of maternal and paternal encouragement for them to lose weight. These items were drawn from the eight-item Family History of Eating Survey (Moreno & Thelen, 1993). Items were as follows: "Has your mom/dad told you that you need to lose weight?" and "Has your mom/dad discussed your weight with you?" Adolescents were asked to answer items separately for both their mothers and their fathers, indicating the frequency of such encouragement on a 6-point scale ranging from 0 (*never*) to 5 (*always*). Higher scores indicated more parental encouragement of weight loss. The correlation between the two items of this scale for adolescents' perceptions of mothers was .68; for fathers, the correlation was .65.

Parental discussion of dieting. A two-item scale was developed to assess early adolescents' perceptions of mothers' and fathers' discussion of dieting with them. The two items were "Has your mom/dad talked about her/his own dieting with you?" and "Has your mom/dad said that she/he needs to lose weight?" Adolescents were asked to answer items separately for both their mothers and their fathers, indicating the frequency of such discussion on a 6-point scale ranging from 0 (*never*) to 5 (*always*). Higher scores indicated more parental discussion of dieting. The correlation between the two items of this scale for adolescents' perceptions of mothers was .63; for fathers, the correlation was .73.

Peer pressure to be thin. A six-item self-report measure, the Peer Pressure to be Thin Scale, was developed for this study to assess the perceived importance and pressures early adolescents felt from their peers about weight and thinness. Items were drawn from a larger measure, the McKnight Risk Factor Survey, which assesses a variety of risk factors associated with the development of eating disorders (Shisslak et al., 1999). Example items included "How important has it been to your friends that you be thin?" and "How often have you changed your eating when you were around your friends?" Adolescents responded on a 6-point scale ranging from 0 (*never*) to 5 (*always*), with higher scores indicating greater perceived pressure to be thin. Internal consistency (Cronbach's α) for the six-item scale was estimated at .81.

Peer discussion of dieting. In the present study, peer discussion of dieting was assessed by a single item: "How often have your friends talked about wanting to lose weight?" (Shisslak et al., 1999). Adolescents responded to

this question using a 6-point scale ranging from 0 (*never*) to 5 (*always*). Higher scores indicated more discussion with peers about weight loss.

Early Adolescent Factors. A number of early adolescent factors were examined in the present study. First, we measured BMI among girls during sixth grade. In addition, girls self-reported on body dissatisfaction in sixth grade and dieting behaviors and depressive symptoms in seventh grade.

BMI. In order to obtain measures of BMI after completion of the questionnaires, research assistants measured the height and weight of the early adolescents in a private room. Participants were asked to remove their shoes and any heavy coats. BMI was then individually calculated for each participant (weight [kg]/height [m²]).

Body dissatisfaction. Body dissatisfaction was assessed with the nine-item Body Dissatisfaction subscale of the Eating Disorders Inventory (EDI; Garner, Olmsted, & Polivy, 1983). Example items included the following: "I think that my stomach is too big" and "I think that my thighs are too large." Adolescents indicated the frequency of their endorsement of each statement using a 6-point scale ranging from 0 (*never*) to 5 (*always*), with higher scores indicating greater body dissatisfaction (see Tylka & Subich, 2004). The Body Dissatisfaction subscale has demonstrated evidence of its internal consistency with 11- to 18-year-old adolescent girls ($\alpha = .91$; see Shore & Porter, 1990). Internal consistency of the subscale was estimated at .94.

Dieting behaviors. A seven-item self-report measure of dieting behaviors, the Dieting Behaviors Scale (Blodgett Salafia, Gondoli, Corning, McEnery, & Grundy, 2007), was used to assess caloric restriction and elimination behaviors used by early adolescents. Dieting behaviors were defined as overt, socially acceptable means of restricting and eliminating caloric intake in which adolescents might engage. Adolescents indicated their responses to such items as "How often have you skipped meals to lose weight?" and "How often have you exercised more to lose weight?" on a 6-point scale ranging from 0 (*never*) to 5 (*always*). Higher scores indicated greater engagement in dieting behaviors. Internal consistency was estimated at .93.

Depressive symptoms. Depressive symptoms were measured with the Children's Depression Inventory (CDI; Kovacs, 1985). For each item, adolescents selected one of three sentences (scaled from 0 to 2), listed in order of increasing severity, that best described them. An example item included "I am sad once in a while," "I am sad many times," and "I am sad all the time." Higher scores indicated greater depressive symptoms. The CDI has demonstrated evidence of its internal consistency with 9- to 15-year-old adolescents ($\alpha = .88$; see Cole & Jordan, 1995). At the request of the institution's human subjects review board to remove an item that assessed suicidal tendency, the

original 27-item CDI was reduced to 26. Internal consistency of the 26 items was estimated at .84.

Outcome Variable. Last, to measure our outcome variable, we used early adolescents' self-report measures of bulimic symptoms during eighth grade. In addition, in order to control for prior levels of symptomatology, we assessed bulimic symptoms in fifth grade.

Bulimic symptoms. Bulimic symptoms were assessed with the seven-item Bulimia subscale of the EDI (Garner et al., 1983). Example items included "I have gone on eating binges where I have felt that I could not stop" and "I have the thought of trying to vomit in order to lose weight." Adolescents indicated their responses using a continuous 6-point scale ranging from 0 (*never*) to 5 (*always*), with higher scores indicating greater bulimic symptoms. The Bulimia subscale has demonstrated evidence of its internal consistency with 11- to 18-year-old adolescent girls ($\alpha = .69$; see Shore & Porter, 1990). Internal consistency of the subscale in the present study was estimated at .73 in fifth grade and .71 in eighth grade.

Results

Means, standard deviations, and intercorrelations of the study variables are reported in Table 1. Moderate to strong correlations between the proposed pathways provided initial support for our hypothesized models. To further estimate relations among the study variables, we conducted structural equation modeling procedures using Mplus (Muthén & Muthén, 2007).

Separate Parental and Peer Effects

First, we hypothesized that each parent factor in fifth grade (e.g., encouragement to lose weight or discussion of dieting) was associated with body dissatisfaction in sixth grade and dieting behaviors in seventh grade; body dissatisfaction was related to dieting behaviors and depressive symptoms in seventh grade, which then was associated with early adolescent girls' bulimic symptoms in eighth grade. Models were examined separately for girls' perceptions regarding mothers and fathers. Because it is probable that girls with higher weight may be more dissatisfied with their bodies and more likely to engage in dieting behaviors, we included BMI in these models by allowing BMI in sixth grade to correlate with girls' body dissatisfaction in sixth grade and also to predict their later dieting behaviors in seventh grade. In Table 2, we report only significant path coefficients linking the initial variables to body dissatisfaction because these are the primary pathways of interest. Path

Table 1. Means, Standard Deviations, and Intercorrelations of the Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Maternal encouragement to lose weight, Grade 5	—	.69*	.52*	.38*	.60*	.35*	.51*	.23*	.19	.18	.20	.12
Paternal encouragement to lose weight, Grade 5		—	.42*	.45*	.58*	.49*	.47*	.36*	.38*	.19	.050	.11
Maternal discussion of dieting, Grade 5			—	.38*	.53*	.30*	.32*	.23*	.27*	.28*	.24*	.14
Paternal discussion of dieting, Grade 5				—	.49*	.33*	.43*	.38*	.18	.35*	-.094	.17
Peer pressure to be thin, Grade 5					—	.61*	.46*	.54*	.38*	.43*	.24*	.24*
Peer discussion of dieting, Grade 5						—	.35*	.49*	.43*	.25*	.45*	.18
BMI, Grade 6							—	.57*	.25*	.58*	.15	.15
Body dissatisfaction, Grade 6								—	.47*	.59*	.062	.37*
Depressive symptoms, Grade 7									—	.31*	.21	.35*
Dieting behaviors, Grade 7										—	.14	.39*
Bulimic symptoms, Grade 5											—	.24*
Bulimic symptoms, Grade 8												—
M	1.24	0.74	3.22	1.76	4.48	0.83	19.34	11.13	4.23	7.32	4.02	5.29
SD	2.01	1.95	2.91	2.44	5.11	1.25	4.19	10.35	4.54	8.38	3.98	4.05

Note: BMI = body mass index.

* $p < .05$.

Table 2. Summary of Path Coefficients Linking Sociocultural Parent and Peer Variables With Adolescent Girls' Body Dissatisfaction: Six Separate Models

Model	Sociocultural variable (fifth grade)	Body dissatisfaction (sixth grade)
1	Maternal encouragement to lose weight	.23*
2	Maternal discussion of dieting	.23*
3	Paternal encouragement to lose weight	.36*
4	Paternal discussion of dieting	.38*
5	Peer pressure to be thin	.54*
6	Peer discussion of dieting	.49*

* $p < .05$.

coefficients for the latter half of the model (e.g., linking body dissatisfaction, dieting behaviors, depressive symptoms, and bulimic symptoms) were significant and nearly identical in the various models.

Results for mothers indicated that both direct encouragement to lose weight and indirect discussion of dieting in fifth grade were related to early adolescent girls' body dissatisfaction in sixth grade ($\lambda = .23$, for both). In addition, both encouragement to lose weight and discussion of dieting from mothers were associated with girls' current level of symptomatology in fifth grade ($\lambda = .20$ and $\lambda = .24$, respectively). Similar results were obtained in model testing for fathers in that both direct encouragement to lose weight and indirect discussion of dieting in fifth grade were related to girls' body dissatisfaction in sixth grade ($\lambda = .36$ and $\lambda = .38$, respectively). However, in contrast to mothers, neither encouragement to lose weight nor discussion of dieting from fathers was significantly associated with girls' concurrent levels of bulimic symptoms.

Second, we hypothesized that each peer factor (e.g., pressure to be thin or discussion of dieting) was associated with early adolescent girls' bulimic symptoms. Results indicated that both direct pressure to be thin and indirect discussion of dieting from peers in fifth grade were strongly related to girls' body dissatisfaction in sixth grade ($\lambda = .54$ and $\lambda = .49$, respectively). In addition, peer pressure to be thin was associated with girls' current bulimic symptoms in fifth grade ($\lambda = .24$).

Combined Parental and Peer Effects

Our third set of hypothesized models investigated parental and peer influences together in order to determine whether parents or peers contributed

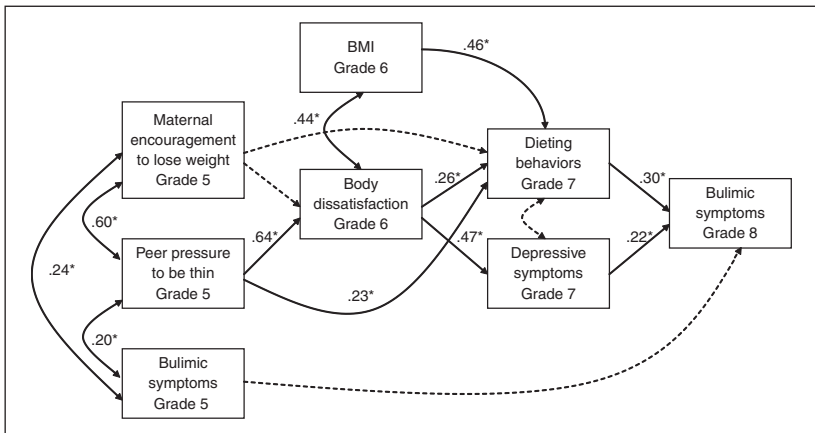


Figure 1. Combined model with both maternal encouragement to lose weight and peer pressure to be thin leading to early adolescent girls' bulimic symptoms

Note: BMI = body mass index. Dotted lines indicate that paths were estimated in the model, but the path coefficients were not significant. $\chi^2(10, N = 85) = 12.13, p = .28$; comparative fit index = 1.00; root mean square error of approximation = .049; standardized root mean square = .040.

* $p < .05$.

more strongly to the process leading to early adolescent girls' bulimic symptoms. Thus, one set of models examined the roles of mothers and peers together, and one set of models examined the roles of fathers and peers. Again, we included BMI in these models.

Mothers versus peers. Our first combined model examined maternal encouragement to lose weight and peer pressure to be thin as the initial variables (see Figure 1). In this case, the previously significant connection between maternal influence and girls' body dissatisfaction became nonsignificant while the effect of peers remained significant ($\lambda = .64$). In addition, both peers and mothers had an influence on girls' current levels of bulimic symptoms in the fifth grade ($\lambda = .20$ and $\lambda = .24$, respectively). Our second combined model investigated discussion of dieting from both mothers and peers as the initial variables (see Figure 2). In this model, maternal discussion of their own dieting was no longer significantly associated with girls' body dissatisfaction when peer discussion of dieting was considered. Peers, however, remained a strong influence on later body dissatisfaction ($\lambda = .46$). Despite this finding, mothers' discussion of dieting did affect their daughters' current levels of bulimic symptoms, as

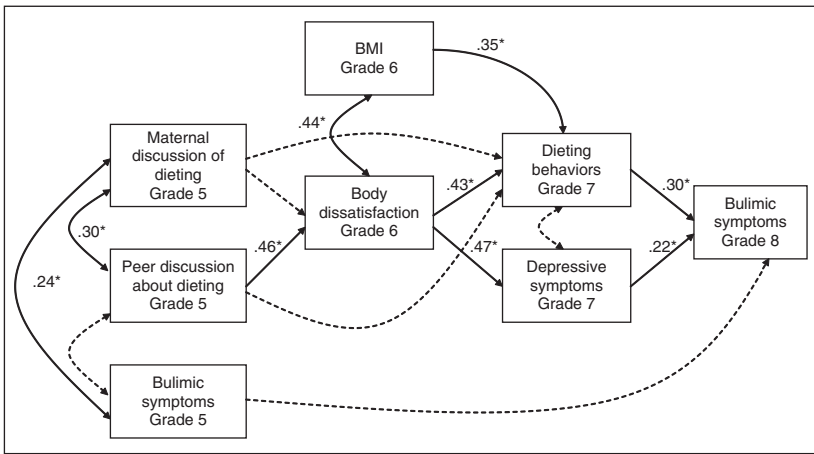


Figure 2. Combined model with both maternal discussion of dieting and peer discussion of dieting leading to early adolescent girls' bulimic symptoms
 Note: BMI = body mass index. Dotted lines indicate that paths were estimated in the model, but the path coefficients were not significant. $\chi^2(10, N = 85) = 15.92, p = .10$; comparative fit index = 0.96; root mean square error of approximation = .082; standardized root mean square = .053.

* $p < .05$.

evidenced by the significant correlation between the two variables during the fifth grade ($\lambda = .24$).

Fathers versus peers. We next examined paternal encouragement to lose weight and peer pressure to be thin as the initial variables (see Figure 3). Results from this model testing were similar to those regarding mothers in that peers were a stronger influence than fathers on girls' later levels of body dissatisfaction ($\lambda = .50$) as well as their current levels of bulimic symptoms among girls ($\lambda = .24$). When investigating paternal and peer discussion of dieting together in the same model (see Figure 4), we found that both fathers and peers significantly contributed to girls' body dissatisfaction, although the path coefficient for peers was slightly more robust ($\lambda = .25$ and $\lambda = .41$, respectively). This is the first model in which we see a remaining parental influence.

Discussion

This study longitudinally investigated Stice's (1994) dual pathway model, in which sociocultural pressure to have a thin body promotes internalization of

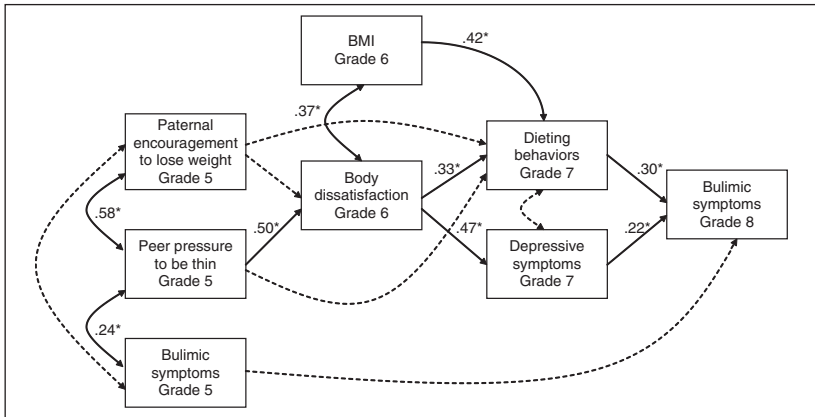


Figure 3. Combined model with both paternal encouragement to lose weight and peer pressure to be thin leading to early adolescent girls' bulimic symptoms
 Note: BMI = body mass index. Dotted lines indicate that paths were estimated in the model, but the path coefficients were not significant. $\chi^2(10, N = 84) = 16.50, p = .08$; comparative fit index = 0.96; root mean square error of approximation = .086; standardized root mean square = .049. $N = 84$ because one girl did not answer items about fathers.
 * $p < .05$.

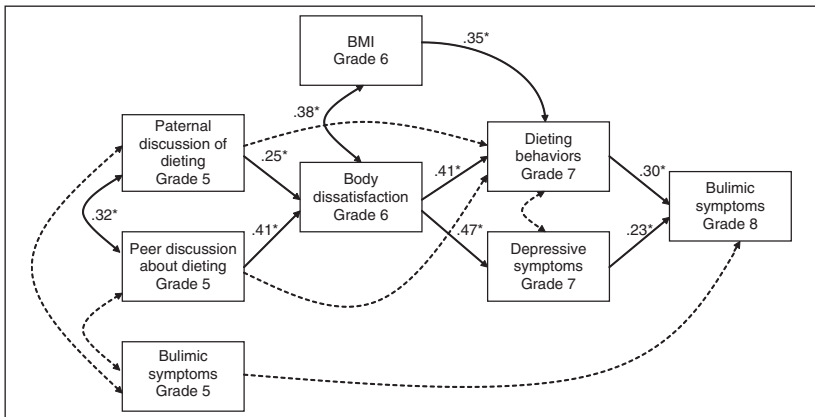


Figure 4. Combined model with both paternal discussion of dieting and peer discussion of dieting leading to early adolescent girls' bulimic symptoms
 Note: BMI = body mass index. Dotted lines indicate that paths were estimated in the model, but the path coefficients were not significant. $\chi^2(10, N = 84) = 16.00, p = .10$; comparative fit index = 0.96; root mean square error of approximation = .083; standardized root mean square = .053. $N = 84$ because one girl did not answer items about fathers.
 * $p < .05$.

the ideal body stereotype, which leads to body dissatisfaction. In turn, body dissatisfaction leads to both dietary restraint and negative affect, which then predict subclinical and clinical levels of bulimic symptoms. Whereas this model has been evaluated using either cross-sectional or limited longitudinal data (e.g., Stice, 2001; Stice et al., 1996; Stice, Killen, et al., 1998, Stice, Shaw, et al., 1998), our study is the first known empirical examination of these relations over a 4-year period. Furthermore, we examined adolescents' perceptions of the separate, relative contribution of mothers, fathers, and peers as initial sources of sociocultural pressure in early adolescent girls' development of bulimic symptoms via direct encouragement or pressure to be thin and indirect discussions about dieting.

The Separate Roles of Parents and Peers

The latter half of our models, linking body dissatisfaction with dieting behaviors, depressive symptoms, and bulimic symptoms remained similar, whether early adolescents' perceptions of mothers, fathers, or peers were considered. Thus, it seems as though the crucial paths worth highlighting are those stemming from the initial parent and peer influences. We found that, when considered separately, mothers, fathers, and peers each influenced girls' body dissatisfaction, which, in turn, was associated with later dieting behaviors, depressive symptoms, and ultimately bulimic symptoms. This pattern of relations was evident whether adolescents' perceptions of direct encouragement and pressure to be thin or indirect discussions about dieting were considered. Comments or discussions about thinness from parents and peers may promote girls' internalization of the thin ideal, which results in body dissatisfaction when the girls realize that they have not obtained the thin ideal. Numerous empirical studies provide support for these findings (e.g., Benedikt et al., 1998; Dunkley et al., 2001; Jones, 2004; Jones & Crawford, 2006; Paxton et al., 1999; Sinton & Birch, 2006; Smolak et al., 1999).

We not only investigated parental and peer influences on girls' body dissatisfaction but also on their future dieting behaviors and concurrent bulimic symptoms. First, regarding dieting behaviors, we found that there were no significant connections with parent- or peer-related factors. We believe this was due to the role of BMI such that girls with higher BMI scores indicated greater dieting behaviors. Second, regarding concurrent levels of bulimic symptoms, we found that maternal encouragement to lose weight, maternal discussion of dieting, and peer pressure to be thin were associated with girls' current symptomatology. This means that mothers and peers have an important influence on girls' current levels of bulimic symptoms in addition to

their future levels. With regard to mothers, in a correlational study, Moreno and Thelen (1993) found that mothers who encouraged their adolescents to diet tended to have daughters who reported bulimic symptoms. Relatedly, Kanakis and Thelen (1995) reported that females who exhibited either sub-clinical or clinical levels of bulimic symptoms perceived pressure from their mothers to lose weight. Furthermore, research suggests that women who engage in dietary restriction or bulimic behaviors are more likely to have daughters who exhibit bulimic symptoms (e.g., Strober, Freeman, Lampert, Diamond, & Kaye, 2000). This may be due to a pervasive preoccupation with weight in the family, or daughters may be modeling their mothers' dietary and bulimic behaviors. It may also be the case that girls, because they have a similar body shape as their mothers, look to their mothers as models of attractiveness. In addition, girls' current levels of bulimic symptomatology were significantly related to the pressure they perceived from peers about the importance of thinness. Perhaps girls believe that engaging in bulimic behaviors will enable them to become thinner and, in turn, more popular with their peers.

Parents Versus Peers

When considered together, peers appeared to be a stronger contributor to the development of body dissatisfaction among early adolescent girls. Our findings are similar to those from a previous study indicating that peer influences, but not parental influences, were associated with middle school girls' internalization of the thin ideal and social comparison, which then were associated with body dissatisfaction, drive for thinness, and bulimic symptoms (Shroff & Thompson, 2006a, 2006b). During the transition to adolescence, children become reliant on their peers (Steinberg, 2001), spending more time with them (Collins & Laursen, 2000) and thus turning to them for appearance-related information and advice. For instance, girls report frequently engaging in body- and eating-related interactions (Oliver & Thelen, 1996) as well as social comparison regarding appearance with their peers (Heinberg & Thompson, 1992). Therefore, it is not surprising that early adolescent girls may perceive pressure from peers and discussions about dieting with peers to be more influential than corresponding actions by their parents. Despite this finding, it is important to note that mothers always had a significant impact on girls' current levels of bulimic symptoms and fathers still remained influential in affecting girls' body dissatisfaction. These findings indicate the importance family members have in the process leading to girls' bulimic symptoms.

Limitations and Future Directions

Some limitations of our data should be noted. For instance, our sample consisted of primarily European American early adolescent girls who came from upper-middle-class families. Because European American females represent a large majority of those affected by eating disorders (Striegel-Moore et al., 2003), it remains essential to examine the processes involved in predicting their bulimic symptoms. Despite this, caution should be taken when attempting to generalize our findings to other ethnic groups or members of different socioeconomic statuses, as the manifestation of eating disorders may differ.

Similarly, our sample size was small. However, evidence exists for testing indirect effects when sample size is small (Hoyle & Kenny, 1999); for example, MacKinnon, Warsi, and Dwyer (1995) found little bias in the estimation of standard error when examining a continuous variable in a sample size of 10. Scholars generally recommend that the sample be 5 to 10 times the number of free parameters in the hypothesized model(s) (e.g., Bentler & Chou, 1987; Kline, 2005). In our largest models, the number of free parameters was 10 (see Figures 1-4); thus, our sample size of 85 generally meets this criteria. In addition, although we had a relatively small sample size, the significant path coefficients in our models were quite robust (ranging from .2 to .6). Furthermore, these paths are supported by previous theoretical models (e.g., Stice, 1994) as well as empirical research (e.g., Stice et al., 1996; Stice, Killen, et al., 1998; Stice, Shaw, et al., 1998). Future studies should seek to longitudinally replicate the findings of this study with larger, more diverse samples. In doing so, researchers would be able to control for prior levels of all variables, including body dissatisfaction, dieting behaviors, and depressive symptoms. In our work, perhaps due to a limited sample size as well as high stability in our measures over time, we were unable to detect significant relations among constructs when all variables at all time points were considered.

We also had several measurement limitations. First, our results could be strengthened by using multimethod and multi-item scales. We note that, at our study's inception, few well-established, multi-item measures existed to examine parental and peer influences on eating attitudes and behaviors. As a result, researchers have often developed their own brief questionnaires (e.g., Jones & Crawford, 2006). Second, our measures were applicable to girls, as boys are often more concerned with becoming larger and more muscular rather than thinner (McCabe & Ricciardelli, 2005). However, disordered eating attitudes and behaviors, including bulimic symptoms, are indeed prevalent among males and thus should be a focus of future work (Muisse, Stein, & Arbess, 2003; Ricciardelli & McCabe, 2004). Third, our measures did not

assess pubertal status. Previous research has indicated an important connection between girls' pubertal development (e.g., postmenarche) and greater disordered eating symptoms including body dissatisfaction and dieting behaviors (Abraham & O'Dea, 2001; O'Dea & Abraham, 1999).

Although our study focuses on both parents and peers, future studies may want to consider the impact of other factors on early adolescent girls' disordered eating. For example, the media undoubtedly plays an important role in promoting the thin ideal, often associating thinness with beauty and success and thereby encouraging adolescents to develop disordered eating attitudes and behaviors (see Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999, for a review). We also note that expanding our current study's focus to include other parent and peer influences such as actual dieting behaviors (see Pike & Rodin, 1991) and teasing (see Keery, Boutelle, van den Berg, & Thompson, 2005) may provide additional unique perspectives on the factors associated with girls' bulimic symptoms. Last, we chose to examine one particular theoretical model, the dual pathway model. Future work could examine alternative versions of this model, such that girls who are initially dissatisfied with their bodies perceive pressure from their parents and peers (e.g., switching the order of the first two constructs in the model).

Contributions and Conclusions

Despite the aforementioned limitations, the present study makes several contributions. First, we used longitudinal data that spanned a period of 4 years, which responds to a gap in the literature calling for researchers to prospectively examine the connections between sociocultural pressure to be thin, body dissatisfaction, dieting behaviors, depressive symptoms, and bulimic symptoms (Stice et al., 1996; Stice, Killen, et al., 1998; Stice, Shaw, et al., 1998). We also note that using longitudinal data has allowed us to control for prior bulimic symptoms among girls, thereby enabling us to examine change in eating pathology over time (Stice, 2002).

A second contribution of the present study is that we focus on the relatively understudied period of the transition to adolescence. Scholars have noted that studies of eating disorders such as bulimic symptoms during this period are somewhat rare (e.g., Levine & Smolak, 2009; Thompson et al., 1999); studies instead tend to focus on late adolescents or early adults. However, it is essential to examine the processes involved in predicting bulimic symptoms during the transition to adolescence because this period is typically marked by instability due to a number of co-occurring physical, emotional, and cognitive challenges. By focusing explicitly on the sensitive time period

of the transition to adolescence, we attempt to determine the risk factors associated with eating disorders at an early and particularly influential age.

Third, we separately examine the roles of parents and peers in early adolescent girls' development of disordered eating attitudes and behaviors. This is in contrast to prior research that has typically focused on broadly defined sociocultural pressures to be thin (e.g., Stice, 2001; Stice et al., 1996; Stice, Killen, et al., 1998; Stice, Shaw, et al., 1998). In doing so, we were able to determine that while both parents and peers had a significant impact on girls' development of body dissatisfaction and engagement in dieting behaviors, peers appeared to be a stronger influence. We also note that we examined multiple influences from parents and peers, including direct encouragement to lose weight or pressure to be thin as well as indirect discussions about dieting. By showing that direct and indirect methods were strongly associated with girls' maladaptive eating patterns, we provide a more complete understanding of the ways in which parents and peers are influential.

Similarly, we were able to examine adolescents' perceptions about the separate roles of mothers and fathers, which is a notable fourth contribution of the present study. In studies that focus on parental influences on adolescents' maladjustment, there has generally been a failure to include fathers (see Phares, Fields, Kamboukos, & Lopez, 2005, for a review). Our work highlights the importance of both mothers and fathers in the process leading to early adolescent girls' bulimic symptoms.

Our findings suggest that more prevention and intervention work should be directed to preadolescent and early adolescent audiences. Furthermore, our results indicate that efforts should be aimed at both girls and their parents and peers, simultaneously. To date, no published programs have combined individual, family, and peer foci. As discussed by Levine and Smolak (2009), involving parents in eating disorder prevention has been difficult. However, broader, ecologically based programs focused on health promotion and drug abuse prevention have been relatively successful in involving parents and have produced favorable outcomes (Levine & Smolak, 2009; see also Gehrman, Hovell, Sallis, & Keating, 2006). Perhaps in the future, the approaches from such initiatives could be applied to the specific case of eating disorder prevention. Linking parallel parent education with school-based components focusing not only on media literacy and critique but also analysis of peer contributors to body dissatisfaction and dieting is warranted as well. Adolescent girls are certainly capable of learning to recognize peer "fat talk" and can understand alternatives to this type of everyday discourse (Neumark-Sztainer, 2005; Stice & Presnell, 2007). More generally, peers can serve as a protective factor against engaging in unhealthy weight-loss techniques; peer antidiets advice

has been associated with less body dissatisfaction (e.g., Shroff & Thompson, 2006a, 2006b) and less dieting (Wertheim, Paxton, Schutz, & Muir, 1997; see also Rodin, Striegel-Moore, & Silberstein, 1990). Prevention and intervention programs can capitalize on the power of peer influence and help girls create a supportive culture for themselves. When parents present healthy nutritional and exercise modeling at home, including refraining from talking about dieting (Neumark-Sztainer et al., 2007), a positive synergy between the family and peer environments can develop and be strengthened.

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