Risk Factors for Body Dissatisfaction in Adolescent Girls: A Longitudinal Investigation

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Because few prospective studies have examined predictors of body dissatisfaction—an established risk factor for eating disorders—the authors tested whether a set of sociocultural, biological, interpersonal, and affective factors predicted increases in body dissatisfaction using longitudinal data from adolescent girls ($N = 496$). Elevated adiposity, perceived pressure to be thin, thin-ideal internalization, and social support deficits predicted increases in body dissatisfaction, but early menarche, weight-related teasing, and depression did not. There was evidence of 2 distinct pathways to body dissatisfaction—1 involving pressure to be thin and 1 involving adiposity. Results support the contention that certain sociocultural, biological, and interpersonal factors increase the risk for body dissatisfaction, but suggest that other accepted risk factors are not related to this outcome.

A large portion of adolescent girls report significant body dissatisfaction (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). This body dissatisfaction is associated with marked emotional distress, appearance rumination, and unnecessary cosmetic surgery (Ohring, Graber, & Brooks-Gunn, 2002; Thompson et al., 1999). Body dissatisfaction also increases the risk for subsequent onset of eating pathology (Attie & Brooks-Gunn, 1989; Killen et al., 1996) and depression among adolescent girls (Rierdan, Koff, & Stubbs, 1989; Stice, Hayward, Cameron, Killen, & Taylor, 2000). Despite the evidence that body dissatisfaction is pervasive and is associated with concurrent and subsequent psychopathology, few studies have investigated the risk factors that predict development of body dissatisfaction. Accordingly, the goal of this study was to test whether a set of sociocultural, biological, interpersonal, and affective risk factors predicted increases in body dissatisfaction by obtaining longitudinal data from early adolescent girls.

The putative risk factors for body dissatisfaction that have received the most theoretical attention involve sociocultural pressures. It has been suggested that pressure to be thin from one's social environment fosters body dissatisfaction because repeated messages that one is not thin enough would be expected to produce discontent with physical appearance (Striegel-Moore, Silberstein, & Rodin, 1986; Thompson et al., 1999). These pressures to be thin can emanate from a variety of sources, such as parents, peers, dating partners, and the media. Further, these pressures to be thin can be direct, such as a parent encouraging a daughter to diet, or indirect, such as a peer voicing admiration of ultraslender models. Scholars have also suggested that weight-related teasing contributes to body image disturbances (Cattarin & Thompson, 1994). For example, overweight children may be given derogatory names that are applied for years. In addition, heightened internalization of the current thin ideal espoused for females and the belief that achieving thinness will result in a plethora of social benefits, such as acceptance and academic success, is also thought to promote body dissatisfaction (Stice & Bearman, 2001). Theoretically, the relentless pursuit of an ultraslender body that is virtually unattainable promotes dissatisfaction with one's physical appearance.

There is emerging support for the hypothesized effects of sociocultural pressures. First, perceived pressure to be thin predicted subsequent increases in body dissatisfaction (Field et al., 2001; Stice & Bearman, 2001). Pressure to be thin from peers (being told to diet) was not significantly related to increase in body dissatisfaction in one study (Byely, Archibald, Graber, & Brooks-Gunn, 2000), but the null effect likely occurred because the small sample resulted in low statistical power. Another study that used a small sample found that weight-related teasing did not predict increases in body dissatisfaction (Cattarin & Thompson, 1994). Nonetheless, one study found that elevated thin-ideal internalization predicted increases in body dissatisfaction (Stice & Bearman, 2001). There is also experimental evidence that an intervention that decreases thin-ideal internalization resulted in reduced body dissatisfaction (Stice, Mazotti, Weibel, & Agras, 2000). Within this context it should be noted that we focused exclusively on prospective or experimental studies in our literature review because it is not possible to differentiate a precursor of body dissatisfaction from a consequence with cross-sectional data. This is critical because it is possible that elevated body dissatisfaction causes the putative risk factors (e.g., body dissatisfaction might cause girls to perceive greater pressure to be thin). In addition, we included only prospective studies that tested whether a putative risk factor predicted subsequent body dissatisfaction above and beyond the effects of initial body dissatisfaction because it is necessary to control for

initial levels of the outcome to provide evidence of a prospective effect (i.e., model change). In studies that do not control for initial levels of the outcome, it is possible that an apparent prospective effect is due to a reverse direction of effect.

It has also been suggested that certain biological factors promote body dissatisfaction. Researchers have posited that early pubertal development fosters body dissatisfaction because the marked increase in adipose tissue that accompanies puberty moves early maturing girls away from the thin beauty ideal (Graber, Brooks-Gunn, Paikoff, & Warren, 1994; Tobin-Richards, Boxer, Kavrell, & Petersen, 1984). This increase in adipose tissue is thought to make early menarche particularly stressful because it is developmentally deviant, in that it occurs before most girls' puberty-related weight gain. Other physical changes that occur with puberty, such as onset of menses, may foster feelings of bodily shame because our culture emits negative messages about this aspect of female maturation. Further, it is possible that the hormonal changes that accompany menarche result in emotional lability (Paikoff, Brooks-Gunn, & Warren, 1991), which might foster cognitive processing biases that place girls at risk for body dissatisfaction. More generally, elevated adiposity is theorized to promote body dissatisfaction because the current beauty ideal for females favors an ultrathin figure (Graber et al., 1994). Presumably the greater degree of deviation from the thin ideal, the greater the ensuing body dissatisfaction.

Unfortunately, we were unable to locate any studies that tested whether early menarche predicted subsequent increases in body dissatisfaction above and beyond the effects of initial body image disturbances. Although prospective studies on this topic have been conducted (e.g., Simmons, Blyth, & McKinney, 1983; Smolak, Levine, & Gralen, 1993; Wright, 1989), none tested for a prospective effect of early menarche on change in body dissatisfaction. Even cross-sectional analyses have generated mixed support for this relation, with some reporting significant effects (Cok, 1990; Simmons et al., 1983) but others reporting nonsignificant effects (Gargiulo, Attie, Brooks-Gunn, & Warren, 1987; Smolak et al., 1993). For example, one study that examined the correlation between pubertal timing and body dissatisfaction several times during a longitudinal study found that the correlations ranged from −.09 to .49 and that only two of the four were statistically significant (Wright, 1989). Findings for adiposity have also conflicted, with some suggesting that body mass predicts subsequent increases in body dissatisfaction (Cattarin & Thompson, 1994; Field et al., 2001) and others generating null effects (Byely et al., 2000; Stice & Bearman, 2001).

Interpersonal processes have also been implicated in the genesis of body dissatisfaction. Theorists have suggested that a lack of social support may play an important role in promoting body image and eating disturbances (Stice, Presnell, & Spangler, 2002; Swarr & Richards, 1996). The perception that one is accepted and appreciated in one's immediate social environment is thought to help girls feel more positively about themselves and their bodies. Perceived social support may also buffer girls from the myriad pressures to conform to the culturally defined thin ideal that putatively fosters body dissatisfaction. The only study that tested whether social support deficits predicted body dissatisfaction yielded null findings (Byely et al., 2000), although this study had low statistical power. Nonetheless, there is mounting indirect evidence for the assertion that social support may be related to

body dissatisfaction. First, research suggests that deficits in social support predicted eating pathology onset (Stice et al., 2002). Second, social support has been found to mitigate the adverse effects of sociocultural pressures to be thin on the subsequent development of body dissatisfaction (Stice, Spangler, & Agras, 2001).

Whereas numerous theorists have hypothesized that body dissatisfaction is a risk factor for depression (McCarthy, 1990; Nolen-Hoeksema, 1994), others have posited that negative affect increases the risk for body dissatisfaction (Taylor & Cooper, 1992; Williamson, 1990). Theoretically, depressed affect is associated with a negative information-processing bias that results in the perception that one's current body shape is further from one's ideal body shape. In support, there is experimental evidence that negative affect inductions result in acute body dissatisfaction (Baker, Williamson, & Sylve, 1995; Taylor & Cooper, 1992). However, studies that tested whether emotional disturbances predicted increases in body dissatisfaction produced null findings (Cattarin & Thompson, 1994; Rierdan et al., 1989). This pattern of findings may suggest that negative affect exerts only acute effects on body dissatisfaction.

In sum, research has generated support for the assertion that elevated perceived pressure to be thin, thin-ideal internalization, and body mass are risk factors for body dissatisfaction, although some studies observed nonsignificant relations for these variables. In contrast, past research has produced nonsignificant findings for weight-related teasing, deficits in social support, and depression in the prediction of body dissatisfaction.

Whereas these studies provide preliminary support for several of the assertions regarding the risk factors for body dissatisfaction, this literature has certain limitations. First, there has been an overreliance on cross-sectional designs. We were only able to locate five prospective studies that investigated risk factors for body dissatisfaction. Second, two of these prospective studies used small samples, which resulted in insufficient power to detect effects. Indeed, 83% of the null findings occurred in studies with small sample sizes ($N < 100$) whereas 83% of the significant findings occurred in studies with large samples ($N > 200$). Interestingly, the only null effect found in a study that used a large sample was for depression, which may suggest that affective disturbances do not predict change in body dissatisfaction over time. No other methodological factor appeared to be related to finding significant versus nonsignificant effects (e.g., use of nonvalidated measures or length of follow-up).

There are also two important gaps in this literature. First, we were unable to locate a single study that tested whether early menarche predicted subsequent increases in body dissatisfaction. Second, research has apparently not tested for interactive effects between these putative risk factors in the prediction of body dissatisfaction. This is particularly important given that interactive effects have been hypothesized (e.g., social support is thought to moderate the effects of pressure to be thin on body dissatisfaction; Stice, Spangler, & Agras, 2001).

Accordingly, the primary aim of this study was to test the hypothesis that early menarche, elevated body mass, perceived pressure to be thin, weight-related teasing, thin-ideal internalization, depression, and deficient social support would predict subsequent increases in body dissatisfaction over time in adolescent girls. A secondary aim was to explore the possibility that there were interactions among the risk factors in the prediction of body

dissatisfaction. These aims were addressed with data from a longitudinal study that attempted to remedy some of the methodological shortcomings of past research (e.g., by using a prospective design and a large sample). We focused on early adolescence because of the evidence that this is a high-risk period for increases in body dissatisfaction (Wright, 1989).

Method

Participants

Participants were 496 adolescent girls from four public and four private middle schools in a metropolitan area of the southwestern United States. Adolescents ranged from 11 to 15 years of age at baseline (0.2% = 11; 24.6% = 12; 49.6% = 13; 24.8% = 14; 0.8% = 15). The sample was composed of 2% Asian/Pacific Islanders, 7% African Americans, 68% Caucasians, 18% Hispanics, 1% Native Americans, and 4% who specified "other" or mixed racial heritage. Average parental education ranged from grade school graduate (2%) to graduate degree (11%), with a mode of college graduate (29%).

Procedure

The study was described to parents and participants as an investigation of adolescent mental and physical health. An active parental-consent procedure was used to recruit participants. First, parents of 7th- and 8th-grade girls from the schools were sent a description of the study along with an informed consent letter and stamped self-addressed return envelope. A second mailing was sent to nonresponders after 2 weeks. Adolescent assent was secured immediately before data collection. This resulted in an average participation rate of 56% of eligible students, which is similar to that of other school-recruited samples that used active consent procedures and involved structured interviews (e.g., 61% for Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). The ethnic composition of the sample was representative of that observed in the schools from which we sampled (2% Asian/Pacific Islanders, 8% African Americans, 65% Caucasians, 21% Hispanics, 4% "other" or mixed racial heritage). The educational attainment of parents (a proxy for socioeconomic status) was similar to state census data for comparably aged adults (grade school graduate = 3%; high school graduate = 30%; college graduate = 25%; graduate degree = 8%). The median body mass index (BMI = kg/m^2) score in our sample (19.9) was close to the median (18.8) from a representative national sample (Rosner, Prineas, Loggie, & Daniels, 1998). The median age of menarche in this study (12.0) was close to that reported for adolescents in the United States (12.5; Graber, Petersen, & Brooks-Gunn, 1996). Finally, the 1-year prevalence rates of major depression (4.2%), bulimia nervosa (0.4%), and substance abuse (8.9%; Stice, Presnell, & Bearman, 2001) were similar to the rates found in other epidemiological studies of adolescents despite some variation in the age of participants (Lewinsohn et al., 1993; Newman et al., 1996).

Adolescents completed a questionnaire, participated in a psychiatric interview, and had their weight and height measured by female research assistants at baseline (T1) and again 1 year later (T2). Female assessors with a bachelor's, master's, or doctoral degree in psychology conducted interviews. Assessors attended 24 hr of training, wherein they learned structured interview skills; reviewed diagnostic criteria for major depression, anorexia nervosa, bulimia nervosa, and binge eating disorder; observed simulated interviews; and role-played interviews. Assessors had to demonstrate an interrater agreement ($\kappa > .80$) with experts using tape-recorded interviews before collecting data. Interviews were recorded periodically to ensure that assessors continued to demonstrate acceptable interrater agreement with experts ($\kappa > .80$). Assessments took place on school campuses, at project offices, or at participants' homes. Girls received a $15 gift certificate to a local book and music store as compensation for participating in the study. This project received the appropriate institutional approval.

Measures

Early menarche. At T1, interviewers inquired about the age of menarche using questions adapted from the McKnight Risk Factor Survey (Shisslak et al., 1999). Age at menarche is an indicator of the more advanced stages of pubertal development; in most healthy girls, menarche follows 6 to 12 months after the height spurt and after breasts and pubic hair have developed to Tanner's fourth stage (Tanner, 1978). Self-reports of age at menarche have been found to be reliable and valid (Caspi & Moffitt, 1991; Duke, Litt, & Gross, 1980). There was excellent test–retest agreement between self-reported age of menarche at T1 and T2 in the current study ($r = .74$), providing support for the temporal reliability of this variable.

It has been argued that the appropriate comparison for determining pubertal timing is in relation to one's agemates in a particular subpopulation rather than a national sample (Ge, Conger, & Elder, 1996). Because such a classification scheme is defensible from a developmental psychopathology perspective, the third of the participants who reported the earliest age of menarche constituted the early menarche group ($n = 165$) and the remaining participants constituted the non-early menarche group ($n = 331$). In the present sample, this relative distribution approach resulted in adolescents who experienced menarche prior to 11.6 years of age being placed in the early group (early menarche was coded as 1, and non-early menarche as 0). Although a subset of girls had not yet experienced menarche by the T1 interview ($n = 127$), they were all older than 11.6 years and were thus placed in the non-early menarche group. Roughly equivalent proportions of preadolescents (less than 13; 39%) and adolescents (13 or older; 31%) were placed in the early menarche group, $\chi^2(1, N = 496) = 2.74$, *ns*. This suggests that age was not operating as a confounding variable for any relations observed in this study.

Body mass. The BMI was used to reflect adiposity (Pietrobelli et al., 1998). Height was measured to the nearest millimeter using portable stadiometers. Students were measured without shoes and with the body positioned such that the heels and buttocks were against the vertical support of the stadiometer and the head aligned so that the auditory canal and the lower rim of the orbit were in a horizontal plane. Body weight was assessed to the nearest 0.1 kg using digital scales, with the girls wearing light indoor clothing. Two measures of height and weight were obtained and averaged. The BMI shows acceptable test–retest reliability ($r = .92$) and convergent validity ($r = .80–.90$) with direct measures of body fat such as dual-energy x-ray absorptiometry (Pietrobelli et al., 1998; Stice & Bearman, 2001).

Perceived pressure to be thin. The Perceived Sociocultural Pressure Scale (Stice & Bearman, 2001) assessed the amount of pressure to be thin that participants perceived from family, friends, dating partners, and the media. Participants used a 5-point response format ranging from 1 (*none*) to 5 (*a lot*) and the results were averaged to form a scale score (as for all scales reported below). This scale possessed adequate internal consistency ($\alpha = .88$), test–retest reliability ($r = .93$), and predictive validity (Stice & Bearman, 2001). This scale had an alpha of .85 at T1.

Weight-related teasing. Two items adapted from Levine, Smolak, and Hayden (1994) assessed the amount of teasing that participants experienced from their peers and family members regarding their body weight. Participants used a 5-point response format ranging from 1 (*none*) to 5 (*a lot*). The reliability and validity of these items has been documented (Levine et al., 1994). This scale had an alpha of .67 at T1.

Thin-ideal internalization. The Thinness and Restricting Expectancy Inventory (TREI; Hohlstein, Smith, & Atlas, 1998) assessed thin-ideal internalization. Items were selected from the TREI assessing agreement with statements concerning expected social and psychological benefits from achieving thinness using a 5-point response format ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The TREI has adequate internal

consistency (α = .98) and convergent validity (Hohlstein et al., 1998). This scale had an alpha of .86 at T1.

Social support. Perceived social support was measured with items adapted from the Network of Relationships Inventory (Furman & Buhrmester, 1985) assessing companionship, guidance, intimacy, affection, admiration, and reliable alliance from parents and peers using a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The internal consistency (mean α = .89), test-retest reliability (mean r = .69), and convergent and criterion validity of this measure have been documented (Furman, 1996; Furman & Buhrmester, 1985). This scale had an alpha of .85 at T1.

Depressive symptoms. An adapted version of the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS; Lewinsohn et al., 1993), a structured psychiatric interview, was used to assess symptoms of major depression as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., American Psychiatric Association, 1994). Responses were standardized and averaged. The K-SADS has been found to have acceptable test–retest reliability (κ = .63–1.00), interrater reliability (κ = .73–1.00), internal consistency (α = .68–.84), and discriminate validity (Ambrosini, 2000; Lewinsohn et al., 1993). To assess the interrater reliability of the K-SADS in this study, a randomly selected subset of participants (5%) was interviewed within a 3-day period by a second clinical assessor who was unaware of the first diagnosis, resulting in high interrater agreement (κ = 1.00). Another randomly selected subset of participants (5%) completed a second diagnostic interview with the same clinical assessor 1 week later, resulting in excellent test–retest reliability (κ = 1.00). This scale had an alpha of .85 at T1.

Body dissatisfaction. An adapted form of the Satisfaction and Dissatisfaction With Body Parts Scale (Berscheid, Walster, & Bohrnstedt, 1973) was used to assess body dissatisfaction. This scale asks participants to indicate their level of satisfaction with 9 body parts (e.g., waist, thighs) using a 5-point scale ranging from 1 (*extremely dissatisfied*) to 5 (*extremely satisfied*). Research has found that this scale has acceptable internal consistency (α = .94), test–retest reliability (r = .90), and predictive validity (Stice & Bearman, 2001; Stice et al., 2002). This scale had an alpha of .94 at T1 and .93 at T2.

Results

Preliminary Analyses

Of the initial 496 participants, 10 (2%) dropped out of the study before providing data at T2. Attrition analyses indicated that girls who dropped from the study did not differ significantly from those who provided data at both assessments on demographic factors (age, ethnicity, or parental education) or any of the variables considered in this study at T1 ($p > .10$). These results suggest that attrition did not introduce any systematic bias that would compromise the generalizability of the findings. Because preliminary analyses indicated that adolescent age, ethnicity, and parental education did not show significant relations to increases in body dissatisfaction, these demographic factors were not included as covariates. The correlations between the putative risk factors and outcomes are presented in Table 1, along with the means, standard deviations, and skew coefficients.

The mean body dissatisfaction score was 2.8 at both T1 and T2, which represents an average response that corresponds to the neutral anchor for this scale (neither satisfied nor dissatisfied). Nonetheless, a substantial portion of the girls in this sample reported body dissatisfaction. If body dissatisfaction is defined as a score that corresponds to an average response of "dissatisfied" or "extremely dissatisfied," the rates of body dissatisfaction at T1 and T2 were 24% and 23%, respectively. The 1-year test–retest coefficient for the body dissatisfaction scale was .69. Despite the high test–retest correlation, there were both increases and decreases in body dissatisfaction over time. Twelve percent of those not meeting the criterion for body dissatisfaction at T1 met the criterion at T2, and 37% of those meeting the criterion for body dissatisfaction at T1 no longer met the criterion at T2. As indicated in Table 2, girls who reported initial body dissatisfaction, relative to those who did not, evidenced significantly higher body mass, perceived pressure to be thin, weight-related teasing, thin-ideal internalization, depressive symptoms, and lower levels of social support. There were no significant differences in the rates of early menarche between these two groups.

Risk Factors for Increases in Body Dissatisfaction

The relations between each of the T1 putative risk factors and increases in body dissatisfaction were first investigated in individual multiple regression models to gain an understanding of these relations that was not complicated by multicollinearity. These models examined the univariate relation between each T1 risk factor and T2 body dissatisfaction, controlling for the effects of T1 body dissatisfaction. The unstandardized parameter estimates, confidence intervals, standardized parameters, correlation coefficients, and p values from the univariate models are reported in Table 3. As

Table 1

Correlations Among the T1 Putative Risk Factors and T1 and T2 Body Dissatisfaction, Along with the Means, Standard Deviations, and Skew Coefficients

Variable	1	2	3	4	5	6	7	8	9	M	SD	Skew
1. Body mass index	—	.20	.42	.34	.32	−.22	.25	.52	.47	21.11	4.57	1.94
2. Early menarche		—	.16	.10	.07	−.15	.15	.13	.06	0.33	0.47	0.71
3. Perceived pressure to be thin			—	.52	.45	−.25	.32	.53	.47	1.82	0.81	1.09
4. Weight-related teasing				—	.29	−.26	.30	.39	.28	1.83	1.10	1.22
5. Thin-ideal internalization					—	−.17	.27	.46	.40	3.10	1.12	−0.06
6. Social support						—	−.39	−.34	−.31	4.15	0.64	−1.24
7. Depressive symptoms							—	.43	.33	1.34	0.37	1.68
8. T1 body dissatisfaction								—	.67	2.80	1.02	0.17
9. T2 body dissatisfaction									—	2.76	0.98	0.04

Note. Absolute correlations greater than .09 are significant at $p < .05$. T = Time.

Table 2
Mean Differences on the Time 1 (T1) Putative Risk Factors for Girls Reporting Body Dissatisfaction and Those Not Reporting Body Dissatisfaction at T1

T1 risk factors	No initial body dissatisfaction		Initial body dissatisfaction	
	M	*SD*	*M*	*SD*
Body mass index	19.95	3.58	24.73	5.39***
Pressure to be thin	1.60	0.66	2.50	0.85***
Weight-related teasing	1.59	0.93	2.57	1.26***
Thin-ideal internalization	2.84	1.06	3.90	0.92***
Social support	4.26	0.58	3.83	0.71***
Depressive symptoms	1.26	0.31	1.58	0.45***
	N	%	*N*	%
Early menarche	67	17.8	29	24.2

*** $p < .001$.

hypothesized, initial elevations in body mass, perceived pressure to be thin, thin-ideal internalization, and deficits in social support prospectively predicted increases in body dissatisfaction over the 1-year study period. However, early menarche, weight-related teasing, and depressive symptoms did not show significant prospective relations. The significant effects were small to moderate according to Cohen's (1988) criteria.[1]

Incidentally, the differences in the results presented in Tables 1 and 3 illustrate how failing to control for initial levels of the outcome variable can lead to erroneous conclusions. Table 1 indicates that both T1 weight-related teasing and depressive symptoms show significant correlations with T2 body dissatisfaction. However, these effects became nonsignificant in the prospective analyses that controlled for initial body dissatisfaction. This pattern of findings illustrates that one can find significant longitudinal correlations that are a result of initial elevations in the outcome rather than a true prospective effect.

Risk factors that showed significant univariate relations were included in a multivariate regression model to assess the unique effect of each predictor controlling for the other predictors. This

Table 3
Parameter Estimates and Confidence Intervals From the Univariate Multiple Regression Models Examining the Relations of T1 Risk Factors and Subsequent Increases in Body Dissatisfaction

T1 risk factors	Increases in body dissatisfaction from T1 to T2				
	B	95% CI	β	*r*	*p*
Early menarche	−.05	−.18–.09	−.02	−.03	.5094
Body mass index	.04	.02–.05	.16	.19****	.0001
Pressure to be thin	.19	.10–.28	.16	.19****	.0001
Weight-related teasing	.03	−.03–.09	.03	.04	.3690
Thin-ideal internalization	.10	.04–.16	.11	.14**	.0021
Social support	−.12	−.23−−.02	−.08	−.10*	.0249
Depressive symptoms	.13	−.05–.32	.05	.06	.1743

Note. T = Time; CI = confidence interval.
* $p < .05$.   ** $p < .01$.   **** $p < .0001$.

model tested whether T1 body mass, perceived pressure to be thin, thin-ideal internalization, and social support predicted T2 body dissatisfaction, controlling for T1 body dissatisfaction. The unstandardized parameter estimates, confidence intervals, standardized parameters, correlation coefficients, and *p* values from the multivariate model are reported in Table 4. Initial elevations in body mass and perceived pressure to be thin showed significant unique relations to subsequent increases in body dissatisfaction in the multivariate model, but the unique effects for thin-ideal internalization and social support were only marginally significant. The significant and marginally significant effects were small in magnitude according to Cohen's (1988) criteria.

Interactive Effects Between the Risk Factors

Finally, a classification tree analysis (CTA; Breiman, Friedman, Olshen, & Stone, 1984) was conducted to provide an exploratory test of possible interactions between the risk factors in the prospective prediction of body dissatisfaction. CTA is a nonparametric analytic technique that uses a recursive partitioning approach that results in a series of "and/or" (Boolean) decision rules defining subgroups that are at more or less risk for a dichotomous outcome. CTA is more sensitive to detecting interactions than typical analytic procedures (e.g., logistic regression analysis), and these interactions do not have to be linear. CTA selects the optimal cutpoint on the optimal risk factor (of all possible cutpoints and all possible risk factors) for generating subgroups with differential risk for the outcome. This procedure is then repeated in each successive subgroup that is generated until there are no remaining risk factors that identify subgroups at significantly differential risk or the node sizes become too small. This process yields a system of decision rules referred to as a classification tree. When different

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[1] Given the moderate age range in this sample, some readers might wonder if the observed effects are consistent across the age range of participants (i.e., whether age moderates the effects). Accordingly, we tested whether participant age interacted with any of the putative risk factors in the univariate models predicting increases in body dissatisfaction. However, none of these interactions reached statistical significance (all $p > .10$), suggesting that age did not moderate the observed effects.

Table 4

Parameter Estimates and Confidence Intervals From the Multivariate Multiple Regression Models Examining the Relations of T1 Risk Factors and Subsequent Increases in Body Dissatisfaction

T1 risk factors	Increases in body dissatisfaction from T1 to T2				
	B	95% CI	β	r	p
Body mass index	.03	.01–.05	.12	.15**	.0014
Pressure to be thin	.13	.03–.22	.10	.12**	.0015
Thin-ideal internalization	.06	−.01–.13	.07	.08†	.0725
Social support	−.09	−.20–.01	−.06	−.08†	.0864

Note. T = Time; CI = confidence interval.
† $p < .10$.   ** $p < .01$.

risk factors are identified for two branches of the same fork (i.e., the optimal predictor for the outcome in one subgroup is different than that for another subgroup), this signifies an interaction.

Early menarche, body mass, perceived pressure to be thin, weight-related teasing, thin-ideal internalization, social support, and depressive symptoms were included as potential predictors of body dissatisfaction onset in the CTA. For this analysis, girls were classified as either body dissatisfied or body satisfied at T1 and T2 according to the criteria specified above. This allowed us to use the T1 putative risk factors to predict onset of body dissatisfaction among initially body satisfied youth. Of the initial 364 adolescent girls who denied body dissatisfaction at T1 (and who provided complete data on the risk factors), 45 showed onset of body dissatisfaction by T2.[2] To minimize capitalization on chance, the minimum node size was set at 30 and an alpha of .01 was used.

The CTA produced a tree with two forks and three terminal nodes (Figure 1). Perceived pressure to be thin emerged as the most potent predictor of body dissatisfaction onset. Girls who reported a response that corresponded to perceiving at least "a little" pressure to be thin were at four times the risk for onset of body dissatisfaction than were girls who reported lower levels of pressure to be thin (probabilities of .26 versus .07, respectively). This difference in risk for onset of body dissatisfaction was statistically significant, $\chi^2(1, 364) = 54.61$, $p < .0001$, and represented a large effect size ($r = .41$). Initial body mass emerged as the next most powerful predictor of onset of body dissatisfaction, but only for girls who reported lower levels of perceived pressure to be thin. Among girls with low pressure to be thin, those with a BMI score that exceeded the mean BMI score for this sample were at eight times the risk for onset of body dissatisfaction relative to those with lower BMI scores (probabilities of .23 versus .03, respectively). This difference in risk for onset of body dissatisfaction was also statistically significant, $\chi^2(1, N = 260) = 26.71$, $p < .0001$, and represented a large effect size ($r = .32$). Thus, the CTA revealed a two-way interaction between perceived pressure to be thin and body mass in the prediction of body dissatisfaction onset.

Discussion

The primary aim of this study was to test whether a set of putative sociocultural, biological, interpersonal, and affective risk factors predicted increases in body dissatisfaction in a sample of

early adolescent girls. Initial elevations in adiposity, perceived pressure to be thin, thin-ideal internalization, and deficits in social support, but not early menarche, weight-related teasing, or depressive symptoms, predicted subsequent increases in body dissatisfaction. The prospective design provides some assurance that the direction of effects was as hypothesized. Further, the relatively large sample size, low attrition rate, and use of structured interviews increase the confidence that can be placed in these findings.

Elevated adiposity emerged as one of the most potent predictors of increases in body dissatisfaction. The one systematic difference between the studies that found nonsignificant effects for this adiposity (Byely et al., 2000; Stice & Bearman, 2001) and those that found significant effects (the current study; Cattarin & Thompson, 1994; Field et al., 2001) is that the former focused exclusively on girls in private schools and the latter focused primarily on girls in public schools. Perhaps there is a restriction in range in body mass for private schools that attenuates the relation between this risk factor and body dissatisfaction (it is established that adiposity is inversely related to socioeconomic status). Consistent with this conjecture, the 87 girls from private schools in this sample showed a significantly lower mean body mass, $t(493) = 3.92$, $p < .001$ (M = 19.4 vs. 21.5), and smaller standard deviation in body mass (SD = 2.9 vs. 4.8) than the girls from public schools. However, the interaction between school type and T1 body mass in the prediction of T2 body dissatisfaction (controlling for T1 body mass) did not reach statistical significance ($p = .102$). Overall, these findings provide additional support for the assertion that the greater the degree of departure from the current thin-ideal for females, the greater the body dissatisfaction (Graber et al., 1994).

There was no support for the assertion that early menarche results in subsequent increases in body dissatisfaction. The fact that the sole prospective test of this relation yielded nonsignificant effects, along with the evidence that early menarche has not been found to correlate consistently with body dissatisfaction (Smolak et al., 1993; Wright, 1989), raises questions about the body of literature discussing the import of early menarche in promoting body dissatisfaction. Within this context, it should be noted that large sample size renders it unlikely that our null findings for early menarche resulted from insufficient statistical power. It will be necessary for future studies to test for prospective relations between pubertal timing and subsequent increases in body dissatisfaction before firm conclusions can be drawn about the importance of pubertal timing in the genesis of body image disturbances.

Perceived pressure to be thin also emerged as one of the most potent predictors of body dissatisfaction. That this finding is consistent with those from the two past prospective studies investigating this relation (Field et al., 2001; Stice & Bearman, 2001) suggests this effect is robust, particularly because these studies

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[2] Because some readers might wonder if the results from the regression models would have changed if participants with body dissatisfaction at T1 had been excluded, the regression models were re-estimated excluding these participants. Because this had the effect of restricting the range of initial body dissatisfaction, the effect sizes were attenuated. Although the effects for body mass and pressure to be thin remained statistically significant in these more conservative analyses, the effects for thin-ideal internalization and social support were only marginally significant ($p < .09$).

INITIALLY NON-BODY DISSATISFIED
ADOLESCENTS
n = 364
p = .12

T1 PERCEIVED PRESSURE
TO BE THIN < 1.81
n = 260
p = .07

T1 PERCEIVED PRESSURE
TO BE THIN > 1.81
n = 104
p = .26

T1 BODY MASS
INDEX < 21.23
n = 213

T1 BODY MASS
INDEX > 21.23
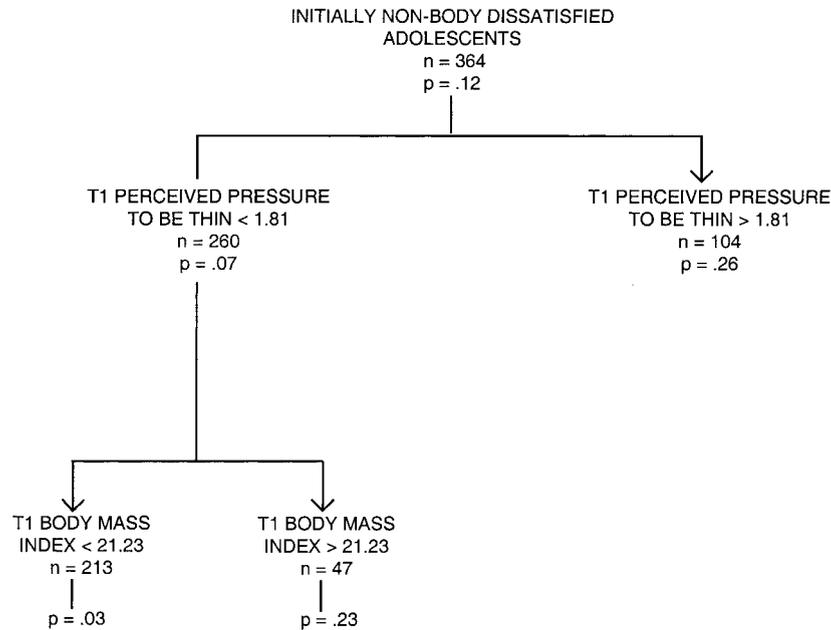n = 47

p = .03

p = .23

Figure 1. Graphical depiction of the classification tree analysis decision rules. The empirically derived cutpoints are shown, along with the sample size and probability of showing onset of body dissatisfaction during the 1-year study period for each branch and node. T1 = Time 1.

focused on different developmental periods and used different measures, methods, and follow-up periods. Collectively, results provide considerable support for the position that recurrent messages that one is not thin enough from one's social environment foster body dissatisfaction (Thompson et al., 1999). Unexpectedly, weight-related teasing did not predict increases in body dissatisfaction. The fact that a nonsignificant effect was also found in the only other prospective test of this relation (Cattarin & Thompson, 1994) implies that teasing may play a less important role than suspected in promoting body dissatisfaction. These findings suggest that more earnest messages about the importance of thinness might exert greater adverse effects on adolescent body satisfaction than weight-related teasing. However, there is a possibility that the low internal consistency of our teasing scale resulted in our null effects and that the modest sample size of Cattarin and Thompson (1994) resulted in the null relation observed in that study. Future investigations of this relation should remedy these limitations.

There was also evidence that thin-ideal internalization predicted increases in body dissatisfaction, which converges with the one study that examined this relation prospectively (Stice & Bearman, 2001). These results provide support for the assertion that attitudinal acceptance of the thin-ideal espoused for women increases the risk for the development of body image disturbances. Presumably, pursuit of the thin ideal results in body dissatisfaction because most girls cannot achieve the level of emaciation promoted in western culture.

A unique finding was that deficits in perceived social support predicted increased body dissatisfaction. Although the one prior prospective test of this effect produced a nonsignificant finding (Byely et al., 2000), this probably resulted because of low statistical power—the effect size observed in the Byely study ($r =$ $-.16$) was actually larger than that found in the present study ($r =$

$-.10$). Our results are consistent with the assertion that acceptance in one's immediate social network might help girls feel more positively about themselves and their bodies and render them more resilient to sociocultural pressures to be thin. Results suggest that it might be fruitful to direct greater attention to the role of social support deficits in promoting body image disturbances.

Depressive symptoms did not show significant relations to subsequent increases in body dissatisfaction. This null effect converges with those observed in the only other prospective tests of this relation (Cattarin & Thompson, 1994; Rierdan et al., 1989). Collectively, these results provide little support for the contention that affective disturbances increase the risk for body dissatisfaction over time (Taylor & Cooper, 1992). It is important to note that these null findings cannot be attributed to insufficient statistical power because two of these studies used large samples. Taken in conjunction with the consistent evidence that body dissatisfaction predicts subsequent increases in depression (Rierdan et al., 1989; Stice & Bearman, 2001; Stice, Hayward, et al., 2000), these findings imply that the direction of effect between variables may be opposite of that hypothesized by Taylor and Cooper (1992). Another possibility, suggested by the experimental evidence that negative affect inductions result in body dissatisfaction in the lab (Baker et al., 1995; Taylor & Cooper, 1992), is that negative affect only exerts acute effects on body dissatisfaction. Future prospective and experimental studies are needed to more definitively establish the nature of the relation between affective disturbances and body dissatisfaction, as well as the duration of any effects.

A secondary aim was to explore the possibility that there were interactions among the risk factors in the prediction of body dissatisfaction. The CTA indicated that there was a two-way interaction between perceived pressure to be thin and body mass. This analysis identified perceived pressure to be thin as the most

potent predictor of body dissatisfaction onset. Girls who reported at least moderate pressure to be thin were at four times the risk for onset of body dissatisfaction relative to girls who reported lower levels of pressure to be thin. It was notable that perceived pressure to be thin was a more powerful predictor of body dissatisfaction onset than was actual body mass. This implies that social pressure to be thin might play a larger role in fostering body dissatisfaction than physical deviation from the culturally defined thin ideal. Nonetheless, body mass did emerge as the second most powerful predictor of body dissatisfaction onset. Among girls who perceived low levels of pressure to be thin, those who were above average in body mass were at eight times the risk for onset of body dissatisfaction relative to girls with a lower body mass.

The two-way interaction revealed in the CTA suggests that there may be two pathways to body dissatisfaction in adolescent girls. The first appears to involve intense social pressures to be thin that presumably emanate from family, friends, and the media. The second involves elevated body mass in the absence of perceived pressures to be thin. This pattern of findings suggest that sociocultural pressures might overwhelm the predictive power of elevated body mass, and that only within the subgroup of adolescents who perceive little pressure to be thin can the effects of elevated body mass be detected. Interestingly, the two pathways appear to place adolescent girls at approximately the same risk for eventual onset of body dissatisfaction. Finally, it was noteworthy that the magnitude of the effects from the CTA were larger than those from the multiple regression models, attesting to the greater sensitivity of this analytic technique.

At a more general level, it was striking that a quarter of the girls in our early adolescent sample reported dissatisfaction with their bodies. Although these results are not consistent with the assertion that body dissatisfaction is normative (Striegel-Moore et al., 1986), this is still an alarming rate of dissatisfaction. These findings underscore the need to improve our understanding of the prevalence and consequences of body dissatisfaction in this population.

Limitations

Although the use of a prospective design, a large community-recruited sample, direct anthropomorphic measures, and structured interviews increase the confidence that can be placed in the results, this study had several limitations. First, we only followed participants for a 1-year period. It is possible that significant effects might have emerged for certain risk factors if we had followed participants for a longer period of time. Second, this study relied primarily on self-report data. Adolescents are considered the optimal reporters for their own internal experiences (Edelbrook, Costello, Dulcan, Kalas, & Conover, 1985), but the fact that most of the data were self-reported may have inflated the magnitude of effects. Third, the moderate participation rate raises concerns about the generalizability of the findings. Finally, the use of a nonexperimental longitudinal design does not allow us to rule out third-variable explanations, wherein some shared causal variable produces both the risk factor and body dissatisfaction.

Implications and Future Directions

The fact that numerous adolescent girls reported body dissatisfaction at T1 suggests that it will be important to conduct future longitudinal studies that start at an earlier age to isolate the risk factors for early onset of body dissatisfaction. There is a possibility that some of the risk factors that did not predict increases in body dissatisfaction in early adolescence will predict increases in body dissatisfaction during late childhood. In addition, the relatively modest effect sizes suggest that there are likely other risk factors for body dissatisfaction that have yet to be identified. Our results suggest that it might be particularly fruitful to focus on interpersonal factors. It will also be useful to collect multiple-reporter data on pressures to be thin, so it can be verified that these pressures are based in reality. Further, future studies should attempt to replicate the results from the exploratory data analyses that focused on the interactions between the risk factors. It would also be prudent to examine the risk factors for body dissatisfaction among males, given the evidence that it is on the rise (Thompson et al., 1999). Finally, despite the fact that prospective designs are an improvement over cross-sectional data, they do not rule out third-variable explanations for the relations. A crucial direction for future research would be to conduct randomized experiments that attempt to triangulate the effects from prospective studies. These experiments should include lab-based studies that focus on the acute causes of body dissatisfaction, as well as randomized prevention trials that examine the longer term impact of altering putative risk factors.

Regarding clinical implications, findings suggest that interventions that bolster girls' resiliency to sociocultural pressures to be thin might be a powerful way of reducing body dissatisfaction. Preliminary evaluations of interventions designed to render adolescents more resilient to media influences have generated promising findings (Irving, DuPen, & Berel, 1998). Perhaps these programs could be broadened to focus on pressures to be thin that emanate from family and peers as well. The current findings also suggest healthy weight management interventions might prove useful in reducing body dissatisfaction. Given the evidence that the rates of adolescent obesity are increasing (Thompson et al., 1999), these programs might offer the dual advantage of reducing a serious health risk and promoting body satisfaction. Finally, findings suggest that interventions that increase parental support may also reduce body image disturbances in youth.

Conclusion

In sum, results provided support for the assertions that sociocultural pressure, individual differences in body mass, and deficits in social support contribute to body dissatisfaction among adolescent girls. However, findings failed to provide support for the claims that early menarche, weight-related teasing, and depression foster body-image disturbances. Future prospective and experimental studies are needed to advance our understanding of the factors that contribute to the development of this pernicious problem.

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The Publications and Communications (P&C) Board has opened nominations for the editorships of ***Contemporary Psychology: APA Review of Books***, ***Developmental Psychology***, and ***Psychological Review*** for the years 2005–2010. Robert J. Sternberg, PhD, James L. Dannemiller, PhD, and Walter Mischel, PhD, respectively, are the incumbent editors.

Candidates should be members of APA and should be available to start receiving manuscripts in early 2004 to prepare for issues published in 2005. Please note that the P&C Board encourages participation by members of underrepresented groups in the publication process and would particularly welcome such nominees. Self-nominations are also encouraged.

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