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Evaluation of an Intervention Targeting Both Depressive and Bulimic Pathology: A Randomized Prevention Trial

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Abstract

Because depressive and bulimic pathologies often co-occur among adolescent girls, a preventive program focusing on both disturbances would have clinical utility. Thus, we developed a cognitive-behavioral intervention targeting body dissatisfaction, an established risk factor for both conditions. A randomized prevention trial with late adolescent girls suggested that the intervention reduced body dissatisfaction, negative affect, depressive symptoms, and bulimic symptoms, but not dieting. Effects persisted through 3-month follow-up, but most faded by 6-month follow-up. Intervention effects on negative affect, depressive symptoms, and bulimic symptoms appeared to be mediated by change in body dissatisfaction. Participant age, ethnicity, and body mass did not moderate intervention effects. Results suggest that an intervention that improves body satisfaction might reduce depressive and bulimic symptoms but imply that greater emphasis on preventing future symptoms might be necessary for persistent effects.

Two of the more common psychiatric disturbances to afflict adolescent girls are depression and bulimia (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993; Newman et al., 1996). Both disorders are chronic and associated with high rates of relapse, suicidal ideation, and functional impairment (Birmaher et al., 1996; Fairburn, Cooper, Doll, Norman, & O'Connor, 2000). Because most individuals with these disorders will not receive treatment (Newman et al.), concerted efforts have focused on designing prevention interventions for these pernicious conditions.

Effective prevention interventions for depression (Clarke et al., 1995; Clarke et al., 2001; Seligman, Schulman, DeRubeis, & Hollon, 1999) and bulimic pathology (Neumark-Sztainer, Butler, & Palti, 1995; Stice, Trost, & Chase, 2003) have been developed, but there is room for improvement. First, past prevention programs for depression and eating pathology have produced moderate effects (average pre-post intervention effect sizes explained 4% and 5% of the variance, respectively). Second, most interventions have been time-intensive, with some ranging up to 20 sessions. Third, prior prevention programs have targeted either depression or bulimic pathology, despite the elevated comorbidity of these two conditions (Lewinsohn et al., 1993). Because these conditions often co-occur, share risk factors, are more common in females, and show a peak rate of onset during adolescence

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(Hankin et al., 1998; Newman et al., 1996), it may be feasible to address both disturbances with a single intervention focused on a common risk factor. Although a number of risk factors predict future increases in both depressive and bulimic pathology, body dissatisfaction may be the most potent shared risk factor for these two symptom dimensions, particularly for girls (Stice & Bearman, 2001). To this end, we designed a brief prevention intervention targeting an established risk factor for both depression and bulimic pathology and tested its efficacy in a randomized trial of high-risk participants.

Body dissatisfaction has been implicated in the development of depression. Theoretically, as girls' bodies mature during pubertal development, they naturally move away from the culturally prescribed thin-ideal. The discrepancy between their own bodies and the ideal size and shape may lead to body dissatisfaction, rendering girls increasingly vulnerable to depression (McCarthy, 1990). This process is especially powerful because appearance is so important for females in Western culture (Stice, Hayward, Cameron, Killen, & Taylor, 2000). Body dissatisfaction was found to predict subsequent increases in depressive symptoms (Stice & Bearman, 2001) and onset of major depression in adolescent girls (Rierdan, Koff, & Stubbs, 1989; Stice et al., 2000). Within this context it should be noted that we focused solely on prospective and experimental studies in our literature review because the direction of effects cannot be unambiguously interpreted in cross-sectional data.

Body dissatisfaction may also promote bulimic pathology. Elevated body dissatisfaction is thought to lead to dieting because most people believe that dieting is an effective way to lose weight and increase body satisfaction. Dieting may result in a greater risk for bulimic pathology because individuals may binge eat to counteract the effects of caloric deprivation. Dieting also entails a switch from physiological to cognitive control overeating (Polivy & Herman, 1985), increasing risk of overeating when these cognitive controls are disrupted. Body dissatisfaction predicted subsequent increases in bulimic symptoms (Cooley & Toray, 2001; Stice, 2001) and onset of bulimic pathology (Field, Camargo, Taylor, Berkey, & Colditz, 1999), as well as future increases in dieting (Cooley & Toray). Moreover, dieting predicted future increases in bulimic symptoms (Cooley & Toray; Stice) and onset of bulimic pathology (Field et al., 1999).

The relation between body dissatisfaction and bulimic pathology might also be partially mediated by negative affect. Because it is widely believed that eating provides comfort and distraction from negative emotions, individuals may binge eat in response to the negative mood engendered by body dissatisfaction. In support, body dissatisfaction predicted increases in negative affect (Stice, 2001) and onset of major depression (Stice et al., 2000). Negative affect has also emerged as a risk factor for future increases in bulimic symptoms (Cooley & Toray, 2001; Stice) and onset of bulimic pathology (Field et al., 1999).

The evidence that body dissatisfaction is a risk factor for both depression and bulimic pathology suggests that an intervention that reduces body dissatisfaction might produce effects for both of these outcomes. The fact that body dissatisfaction is ubiquitous in females and associated with subjective distress and functional impairment (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) implies that an intervention that decreases body image disturbance is desirable in its own right. Therefore, we developed a brief intervention that

sought to decrease body dissatisfaction among a high-risk group of adolescent females with body image concerns.

We adapted a cognitive-behavioral treatment (CBT) for body dysmorphic disorder developed by Cash, Rosen, and colleagues (Butters & Cash, 1987; Rosen, Saltzberg, & Srebnik, 1989). Participants use cognitive and behavioral strategies to test maladaptive beliefs about their body image. Throughout the intervention, they accumulate evidence that they are overestimating how "bad" they look and how negatively they will be evaluated. They also learn to more accurately assess their ability to gain control over their shape. Past controlled trials of this type of intervention produced significant reductions in body dissatisfaction and increases in self-esteem in individuals with body image disturbances (e.g., Butters & Cash; Rosen et al., 1989), as well as decreases in binge eating among obese participants (Rosen, Orosan, & Reiter, 1995). Uncontrolled evaluations of this intervention also imply that it reduced depressive symptoms and eating disturbances (e.g., Grant & Cash, 1995).

We targeted a high-risk subgroup of women with body image concerns in our intervention for two reasons. First, universal prevention programs for several psychiatric disorders, including depression (Clarke et al., 1995), eating disorders (Killen et al., 1993), and substance abuse (Murphy et al., 2001), have been found to produce larger intervention effects for high-risk subsamples than for the full unselected samples in these trials. Second, there is a general trend for selected prevention programs to produce larger intervention effects relative to universal prevention programs (Stice, 2003).

We hypothesized that this intervention would decrease current body dissatisfaction, negative affect, depressive symptoms, dieting, and bulimic symptoms and prevent increases observed in these criteria over time in the wait-list control group. We focused on depressive and bulimic symptoms rather than diagnoses because even subdiagnostic levels of these conditions are associated with emotional distress and psychosocial impairment (e.g., Gotlib, Lewinsohn, & Seeley, 1995). We also hypothesized that the intervention effects on negative affect, depressive symptoms, and bulimic symptoms would be mediated by change in body dissatisfaction. Finally, we tested whether there was any evidence that intervention effects were moderated by individual difference factors, including participant body mass, age, and ethnicity.

Methods

Participants

Participants were 74 females who ranged in age from 17 to 20 (mean = 18.9). In light of the higher rate of body dissatisfaction among females and the low rates of bulimic pathology in males, only females were included. The Body Mass Index (BMI = kg/m^2; Garrow & Webster, 1985) of participants ranged from 16.1 to 31.3 (M = 21.7). The sample was composed of 32% Asians/Pacific Islanders, 3% African Americans, 14% Hispanics, 47% Caucasians, and 4% who specified "other." Parental education (a proxy for socioeconomic status) ranged from grade school graduate (3% of mothers and 7% of fathers) to graduate/professional degree (25% of mothers and 34% of fathers). One participant became pregnant

during the study period and was dropped from statistical analyses, resulting in a sample size of 73.

Procedure

Participants responded to fliers posted on campuses of local colleges and universities and announcements at the beginning of large classes that invited females between the ages of 17 and 20 to take part in a research study evaluating an intervention aimed at helping females improve their body image. We considered this a targeted prevention program because we attempted to recruit women with body image concerns. We chose this approach because we can more easily generalize our results to females who might respond to such a program if it were offered in similar settings in the future. Participants were randomly assigned to either the CBT intervention (n = 38) or a wait-list control group (n = 35). The CBT group consisted of four 1-hour sessions facilitated by clinical psychology graduate students and an undergraduate cofacilitator at no charge to participants. CBT groups consisted of 5 to 12 women. Participants completed a survey assessing attitudes, emotions, and behaviors over the past week at baseline, at intervention termination, and at 1-, 3-, and 6-month follow-ups. The baseline survey also assessed basic demographic information (e.g., age, ethnicity, and parental education) and self-reported height and weight. The wait-list control group was assessed according to the same schedule, with the exception of the 6-month follow-up measure because of ethical concerns regarding withholding the intervention for the full 6-month period from participants desiring the body acceptance program. Participants gave voluntary written informed consent and were paid $40 for completing all of the questionnaires.

CBT intervention—This intervention was adapted from the program designed by Cash and Rosen (Butters & Cash, 1987; Rosen, Cado, Silberg, Srebnik, & Wendt, 1990). Modeling and role-plays were used to increase interest and acquisition of cognitive and behavioral skills. Homework assignments were reviewed at each session as a means of increasing completion and account-ability. To enhance treatment fidelity, the intervention was manualized, and sessions were audio-recorded and reviewed by the first author.

Session 1: This session began by introducing the topic of body dissatisfaction and exploring the issues thought to promote and maintain it, as well as negative consequences that can result. Information on weight, eating, and obesity was provided. Participants were familiarized with automatic negative beliefs and the role of avoidance in maintaining these beliefs. Next, in vivo exposure was used to create a hierarchy of body distress, and cognitive restructuring was used to positively reframe the negative beliefs and consequences attached to the body parts described. Finally, participants were introduced to the Antecedents, Beliefs, and Consequences (ABC) model. For homework, participants were asked to keep a body image self-monitoring diary and to complete scales for use in later sessions.

Session 2: Participants reviewed homework and the ABC model. Group leaders modeled how to identify and challenge negative thoughts, and these skills were practiced in role-plays. The rest of the session was spent challenging negative beliefs from the participants' self-monitoring diaries. Group members were encouraged to aid others in finding

disconfirming evidence for negative beliefs and creating disputing thoughts. For homework, participants were asked to implement corrective thinking into their self-monitoring diaries. They were also asked to participate in a body-desensitization exposure session each night of the interim week.

Session 3: The role of behavioral exposure in cognitive change of body image was introduced. Participants collaborated with facilitators to devise behavioral exposure plans to address their body distress hierarchy. Next, the concept of preparing ahead of time to handle situations that incite negative body image was explained. Participants specified negative cognitions likely to occur during their exposure situations and rehearsed more adaptive thoughts in role-plays. For homework, participants continued their body image diary, enacted their behavioral exposure plan, and engaged in a body-enhancing activity daily (e.g., a bath).

Session 4: Participants reviewed homework and compared the actual versus feared outcomes of their exposure exercises. Participants were encouraged to expose themselves to feared situations two more times over the next few weeks and to engage in one body-enhancement activity every other day. The remainder of the session focused on a discussion of residual intrusive thoughts of body dissatisfaction in an attempt to normalize some negative body image cognitions. Finally, relapse prevention was discussed, and participants generated possible triggers for relapse and discussed ways to prepare for these high-risk situations.

Measures

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 nine body parts (e.g., waist, thighs, and weight) using a 5-point response format ranging from 1 = *extremely dissatisfied* to 5 = *extremely satisfied*. Items are summed for analyses for this scale and those described below. This scale has acceptable internal consistency (α = .94), test-retest reliability (*r* = .90), and predictive validity (Stice, 2001). This scale had an α = .93 at baseline.

Negative affect—Negative affect was assessed with the sadness, guilt, and fear/anxiety subscales from the PANAS-X (Watson & Clark, 1992). Participants report the extent to which they have felt various negative emotional states (e.g., sad) on 5-point scales ranging from *very slightly or not at all* to *extremely*. This scale has adequate internal consistency (α = .95) and test-retest reliability (*r* = .71; Watson & Clark, 1991). This scale had an α = .94 at baseline.

Depression—The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) assessed depression symptoms. For each item, participants select among four alternative responses reflecting the increasing levels of symptom severity (0 = *no symptom present*, 3 = *severe symptom presentation*). This scale possesses acceptable internal consistency (αs = .73 to .95), reliability (test-retest *r*s .60 to .90), and convergent validity with clinician ratings of depressive symptoms (mean *r* = .75; Ambrosini et al., 1991; Beck, Steer, & Garbin, 1988). This scale had an α = .92 at baseline.

Dieting—The Dutch Restrained Eating Scale (DRES;van Strien, Frijters, van Staveren, Defares, & Deurenberg, 1986) was used to assess dieting. Participants indicate the frequency of dieting behaviors using a 5-point response format ranging from 1 = *never* to 5 = *always*. This scale has adequate internal consistency (α = .95), test-retest reliability (*r* = .82), and correlates negatively with self-reported caloric intake (Stice, 2001). This scale had an α = . 93 at baseline.

Bulimic symptoms—The Eating Disorder Examination–Questionnaire (EDE-Q; Fairburn & Beglin, 1994) was used to assess bulimic symptoms. The EDE-Q is derived directly from the Eating Disorder Examination interview (EDE; Fairburn & Cooper, 1993), a validated measure of eating pathology. The 12 diagnostic items were summed to form an overall bulimic symptom index (no additional items were administered). The internal consistency (α = .84), test-retest reliability (mean *r* = .80), and convergent validity (with the interview version of the EDE-Q; mean *r* = .81) of the EDE-Q have been documented (Black & Wilson, 1996; Fairburn & Beglin, 1994). A pilot study with an adolescent sample (*N* = 26) revealed a 3-week test-retest coefficient of .89. This scale had an α = .77 at baseline.

Body mass—The BMI was used to reflect adiposity. This index divides weight by height (squared) and is thus a measure of relative weight. Self-reported weight and height have been found to correlate well with direct measures in adolescent samples, with the correlations ranging between .94 and .99 (Attie & Brooks-Gunn, 1989; Galambos, Almedia, & Petersen, 1990). Research has documented that BMI is a reliable and valid index of adiposity for adolescents (Pietrobelli et al., 1998). The 1-month test-retest of BMI scores in the wait-list control group was *r* = .98.

Results

Preliminary Analyses

Table 1 reports the correlations among the outcome variables at baseline, as well as the means and standard deviations. In support of the expectation that our recruitment strategy would generate a high-risk sample with elevated body image concerns, the mean body dissatisfaction score was significantly higher than that observed in a comparison sample of nonbulimic individuals, nonsignificantly different from individuals with subthreshold bulimia, and significantly lower than individuals with full threshold bulimia nervosa (Stice, Ziemba, Margolis, & Flick, 1996). Our sample also evidenced significantly higher dieting, negative affect, depressive symptom, and bulimic symptom scores relative to nonbulimic comparison groups (drawn from Stice, 2001, and Stice et al., 1996).

Table 2 reports descriptive statistics for the demographic factors and body mass for participants in the CBT and wait-list condition. One-way analysis of variance (ANOVA) and chi-square analyses indicated that there were no significant differences between participants assigned to the two conditions in terms of age, ethnicity, maternal education, paternal education, body mass, negative affect, depressive symptoms, or bulimic pathology at baseline. However, CBT participants showed significantly higher body dissatisfaction scores (*p* = .04) and marginally higher dieting scores (*p* = .09). Accordingly, all analyses testing for intervention effects used initial body dissatisfaction and dieting scores as covariates.

Thirteen of the participants dropped from the study before providing complete data. Attrition analyses verified that participants who provided complete data did not differ significantly from those who dropped on any demographic factors or outcome variables (all *p* values > .10).[1] Data from all available participants are used for each analysis.

Main Effects of Intervention

Repeated measures ANOVA models tested whether participants in the CBT intervention experienced reductions in each of the outcomes relative to participants in the wait-list control condition, with condition as a two-level between-subjects factor and time as a four-level within-subjects factor. Because the control group did not complete a 6-month follow-up, the repeated-measures ANOVA model did not include data from this assessment. A priori planned comparisons were conducted to test whether there were significant changes in outcomes over time in each condition relative to baseline values. These analyses were conducted even if the initial time-by-condition interaction did not reach significance to ensure that we did not miss any effects due to the relatively modest power to detect the time-by-condition interactive effect (Snedecor & Cochran, 1989). Unadjusted means and standard deviations for the CBT and control groups at each wave of measurement are reported in Table 3, along with results from the paired *t* tests.

Participants in the CBT group showed significant decreases in body dissatisfaction from baseline to termination. This effect was evident at 1-, 3-, and 6-month follow-ups, whereas participants in the control condition did not show significant decreases in this outcome. The group-by-time interaction was significant, $F(3, 168) = 5,37$, $p = .001$, 8.8% variance explained, indicating that the decreases in body dissatisfaction were significantly stronger in the CBT condition versus the control condition.

Participants in the CBT intervention also reported significant decreases in negative affect from baseline to termination, and this effect remained at 1- and 3-month follow-up (but not 6-month follow-up). Participants in the wait-list control condition did not evidence significant decreases in negative affect. The decreases in negative affect were significantly stronger in the CBT condition than in the control condition, $F(3, 162) = 4.84$, $p = .003$, 8.2% variance explained.

Participants in the CBT intervention reported the anticipated decreases in depressive symptoms at termination and this effect was still evident at 3-month follow-up (but not at the 1- and 6-month follow-ups), whereas the wait-list control group did not report decreases in this outcome. The decreases in depressive symptoms were significantly stronger in the CBT condition versus the control condition, $F(3, 162) = 3.55$, $p = .016$, 6.2% variance explained.

CBT participants evidenced significant reductions in dieting at termination, 1-month, 3-month, and 6-month follow-ups. Unexpectedly, there were significant decreases in dieting at

[1]It should be noted that the results were virtually identical when an intent-to-treat approach was employed (i.e., the same effects were still significant and no new ones became significant). In these analyses, the last available data point was used to replace subsequent missing values (e.g., if the participant dropped after T1, their T1 scores were carried forward for all variables). These analyses provide further evidence that attrition did not bias the estimates of intervention effects.

1-month and 3-month follow-ups in the control group (but not at termination). The time-by-condition interaction was not significant, $F(3, 168) = 0.60$, $p = .617$, 1.1% variance explained. It appeared that the null time-by-condition interaction resulted from the anomalous decreases in dieting in the wait-list control group.

CBT participants reported significant reductions in bulimic symptoms at termination and at 1 and 3-month follow-ups (but not at 6-month follow-up) relative to baseline levels. Control participants reported no significant changes in bulimic symptoms over the study period. There were significantly stronger decreases in bulimic pathology in the CBT condition relative to the control condition, $F(3, 159) = 3.32$, $p = 021$, 5.9% variance explained.

Reliable Change of Main Effects of Intervention

To provide an indication of the variability of the change in key outcomes from pretest to posttest, we conducted reliable change score analyses. Participants were classified on the basis of pre-to-post change scores on each outcome using Jacobson and Truax's (1991) reliable change index (RCI) into improved (RCI < −1.96) and not improved (RCI > −1.95). The CBT group showed higher rates of improved (47% versus 6%) on body dissatisfaction relative to wait-list controls, which represented a significant difference across conditions, χ^2 ($df = 1$, $N = 67$) = 14.96, $p < .001$. The CBT group showed higher rates of improved (31% versus 6%) on depressive symptoms in comparison to wait-list controls, which represented a significant difference, χ^2 ($df = 1$, $N = 67$) = 7.41, $p < .01$. The CBT group showed higher rates of improved (29% versus 15%) on bulimic symptoms relative to wait-list controls, but this difference was not significant, χ^2 ($df = 1$, $N = 65$) = 1.97, $p = .16$.

Test of Hypothesized Mediator of Intervention Effects

We used multiple regression analyses to test whether change in body dissatisfaction mediated the intervention effects on change in negative affect, depressive symptoms, and bulimic symptoms. All models controlled for baseline body dissatisfaction and dieting scores, as well as initial levels of the outcome variables.

Following Baron and Kenny (1986), we first tested whether condition predicted change scores for body dissatisfaction (post-pre). Results confirmed that treatment condition was significantly related to change in body dissatisfaction ($r = .32$, $p = .004$). Next, we tested whether condition predicted change scores for negative affect, depressive symptoms, and bulimic symptoms. Analyses confirmed that treatment condition predicted change scores for negative affect ($r = .42$, $p < .001$), depressive symptoms ($r = 30$, $p = .01$), and bulimic symptoms ($r = .30$, $p < .005$). We then tested whether change in body dissatisfaction predicted change in the outcome variables. Separate models confirmed that body dissatisfaction change scores predicted negative affect change scores ($r = .38$, $p = .001$), depressive symptom change scores ($r = .38$, $p = .001$), and bulimic pathology change scores ($r = .41$, $p < .001$). Finally, we entered the body dissatisfaction change score as a covariate to the three models reported above in Step 2 to test whether the significant relation between the independent and dependent variable becomes nonsignificant when change in the mediator is controlled statistically. Condition was still significantly related to change in negative affect when body dissatisfaction change scores were used as a covariate, but the

effect decreased from an r = .42 to .31. This suggests that body dissatisfaction only partially mediated the intervention effects on negative affect. Condition was no longer significantly related to depressive symptom change scores when body dissatisfaction change scores were used as a covariate (effect decreased from an r = .30 to .18). Condition was no longer significantly related to bulimic symptom change scores when body dissatisfaction change scores were used as a covariate (effect decreased from an r = .30 to .16). Finally, all three of the mediational effects were statistically significant according to Sobel's (1982) formula for testing indirect effects (all p values < .005).

Test of Potential Moderators of Intervention Effects

In an effort to explore the potential boundaries of our effects, we tested whether there was any evidence that our intervention was differentially effective for certain subgroups of participants. Accordingly, we tested whether the effects of the intervention, as assessed in the repeated-measures ANOVA models described above, were moderated by participant body mass, age, or ethnicity. There was no evidence that body mass (p = .98), age (p = .66), or ethnicity (p = .79) moderated intervention effects on body dissatisfaction. Similarly, there was no evidence that body mass (p = .10), age (p = .17), or ethnicity (p = .67) moderated intervention effects on negative affect or that body mass (p = .17), age (p = .20), or ethnicity (p = .55) moderated intervention effects on depressive symptoms. Furthermore, there was no evidence that body mass (p = .29), age (p = .28), or ethnicity (p = .11) moderated intervention effects on dieting. Finally, there was no evidence that body mass (p = .33), age (p = .67), or ethnicity (p = .92) moderated intervention effects on bulimic pathology.

Discussion

The goal of this trial was to evaluate the effects of a brief CBT intervention targeting body dissatisfaction on depressive and bulimic pathology. Results indicated that we successfully reduced body dissatisfaction. Participants in the CBT condition evidenced significant decreases in dissatisfaction with their bodies compared to participants in the wait-list condition (9% variance explained). This finding persisted through 6-month follow-up, suggesting a relatively durable effect. These results are consistent with those reported by Cash, Rosen, and colleagues (Butters & Cash, 1987; Rosen et al., 1989) in several treatment trials of the original program. The current study extends this research by examining the effect of a briefer iteration of this intervention on depressive symptoms and bulimic pathology among normal-weight individuals in a controlled prevention trial.

As hypothesized, the intervention also resulted in statistically significant decreases in both negative affect and depressive symptoms. These effects persisted through 3-month follow-up assessment, but became nonsignificant by 6-month follow-up. Our pre-to-post effect size for depressive symptoms (6% variance explained) compared favorably with the effects produced in past trials (Jaycox et al., 1994, 3% variance explained; Clarke et al., 1995, 6% variance explained). This is noteworthy because this intervention was briefer than other empirically supported depression prevention trials, which have been as long as 15 sessions. Theoretically, improving girls' body image decreases the negative mood girls may experience as a result of feeling dissatisfied with their appearance.

The intervention also resulted in significant decreases in bulimic symptoms. These effects persisted through 3-month follow-up but became nonsignificant by 6-month follow-up. Our pre-to-post effect size for bulimic pathology (6% variance explained) was equivalent to the average effect size (6% variance explained) from the few effective eating disorder prevention programs (Stice, 2003). Presumably, increased body satisfaction decreases the risk for the use of radical weight control methods such as vomiting or laxative abuse.

Mediational analyses supported the hypothesis that the intervention effects on change in negative affect, depressive symptoms, and bulimic symptoms were mediated by change in body dissatisfaction. Results suggested that the intervention effects on depressive and bulimic symptoms were fully mediated by change in body dissatisfaction, but that the intervention effects on negative affect were only partially mediated by change in body dissatisfaction. This pattern of findings may suggest that nonspecific factors play a more pronounced role in reducing negative affect, relative to depressive and bulimic symptoms.

Unexpectedly, there were no intervention effects for dieting. This finding is inconsistent with the widely held belief that body dissatisfaction increases the risk for weight loss dieting (Stice, 2001). This finding may suggest that body dissatisfaction does not contribute to risk for dieting, or that other factors increased dieting behaviors for both groups (for example, being asked to attend to dieting practices and eating habits in the surveys may have increased dieting among both groups). It will be necessary to conduct future research, including independent replication of this prevention trial, to better understand these unexpected findings.

Moderational analyses suggest that the effects of this intervention did not differ depending on age, ethnicity, or initial body mass. This is encouraging because it suggests that the intervention may be effective for various subpopulations of individuals. It should be acknowledged, however, that both a moderate sample size and a relatively homogeneous sample of university students somewhat limited our statistical power to detect such moderation effects.

Overall, these results were positive given that this appears to be the first randomized trial of a prevention intervention for both depressive and bulimic pathology. The finding that this brief intervention compared favorably to significantly longer prevention efforts targeting depression, bulimic pathology, and body dissatisfaction is promising, as the shorter duration of the present intervention should facilitate dissemination. The preventative utility of this program should be qualified by noting that this intervention reduced current mood and bulimic symptoms rather than preventing future increases in symptoms that might have been observed in the control group. However, reducing current symptoms is important, given that subdiagnostic levels of these psychiatric disorders are associated with subjective distress and functional impairment and predict future onset of several psychiatric disturbances (Birmaher et al., 1996; Wilson, Heffernan, & Black, 1996). Moreover, the finding that body dissatisfaction tended to increase over the course of the study for the wait-list control group (although not significantly) provides reassurance regarding the usefulness of this intervention as a preventative tool. Because of the evidence that elevated body dissatisfaction predicts subsequent onset of depressive and bulimic pathology (e.g., Stice et

al., 2000), preventing future body dissatisfaction should theoretically reduce the likelihood of these adverse outcomes.

These results might be cautiously interpreted as providing experimental evidence that a decrease in body dissatisfaction produced consequent reductions in depressive symptoms and bulimic pathology. This interpretation is consistent with the evidence that change in body dissatisfaction mediated the intervention effects on decreases in depressive and bulimic symptoms. Although the role of body dissatisfaction as a risk factor for depression and bulimic pathology has been supported in prospective studies, few randomized experiments have tested this relation. This is particularly important because randomized experiments more effectively rule out potential third-variable explanations (Kraemer et al., 1997). Convergent evidence from these two types of studies is encouraging because each type of design addresses the limitations of the other. Even greater confidence could be placed in these conclusions if a tightly controlled laboratory experiment that reduced acute body dissatisfaction produced significant reductions in acute depressive symptoms and bulimic pathology.

It is important to consider the limitations of this study. First, the sample size was moderate, which limited our ability to detect effects. Second, greater confidence could have been placed in the findings if we had used validated structured psychiatric interviews rather than self-report measures. Third, the use of an active control group would have reduced the possibility that expectancies or demand characteristics produced the observed effects. However, because the intervention was presented as focusing on body image concerns and participants were not told that we expected decreases in affective or bulimic symptoms, it seems unlikely that expectancies or demand characteristics can account for the effects for these outcomes. Another limitation of the study was the lack of empirical evidence of treatment integrity and fidelity to the intervention. Future trials should record sessions and then conduct blind coding of the tapes in order to verify fidelity. Finally, our sampling frame targeting college-aged women with body dissatisfaction may constrain how generalizable this program will be to other populations.

Although these results suggest that a brief intervention targeting body dissatisfaction may be useful for reducing depressive and bulimic pathology among high-risk young women, it is important to note that the effects of the intervention for negative affect, depressive symptoms, and bulimic pathology were no longer significant at 6-month follow up, while the effects for body dissatisfaction persisted. This may suggest that body dissatisfaction exerts only an acute effect on depressive symptoms and eating pathology, or that other, unexamined risk factors play a role in exacerbating these outcomes. Although this is still an improvement on past prevention interventions for depressive symptoms and bulimic pathology, future research should attempt to bolster the intervention so that the effect persists over longer periods of time. It might be necessary to include additional sessions that increase the emphasis on preventing future body dissatisfaction or that expand the focus to affect other potential risk factors. Because of the pervasive and serious nature of depressive symptoms and bulimic pathology, attempts to strengthen this intervention are clearly warranted.

The brief nature of this intervention suggests that it might lend itself to dissemination. Therefore, it would also be useful to conduct an effectiveness trial to determine whether this intervention could be effectively administered by school personnel. As noted above, it would also be useful if tightly controlled laboratory experiments tested whether an acute reduction in body dissatisfaction results in improved mood and eating disordered attitudes.

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TABLE 1

Bivariate Correlation Among Predictors at Time 1, and Means and Standard Deviations for the Current Sample and the Nondisordered Controls and Subthreshold Bulimia Reference Groups

	Current Sample						Reference Groups		
	1	**2**	**3**	**4**	**5**	***X (SD)***	**Non-bulimic Controls** ***X (SD)***	**Sub-threshold Bulimia** ***X (SD)***	**Full-threshold Bulimia** ***X (SD)***
1. Body dissatisfaction		.32	.42	.29	.46	30.1 (8.6)	20.6 (7.4)	29.2 (6.7)	32.9 (6.8)
2. Negative affect			.76	.15	.39	33.1 (12.9)	18.2 (6.6)	26.3 (8.0)	31.6 (9.2)
3. Depressive symptoms				.08	.44	12.6 (9.0)	10.1(8.1)	n/a	n/a
4. Dieting					.56	30.5 (8.9)	16.2 (6.5)	26.1 (7.8)	37.4 (8.4)
5. Bulimic symptoms						18.4 (10.0)	12.6 (11.5)	n/a	n/a

Note. All correlations greater than .24 were statistically significant at the .05 level. $N = 75$. Note that the comparison means and standard deviations are drawn from Stice (2001) and Stice et al.(1996).

TABLE 2

Demographic Characteristics of the Intervention and Wait-List Control Groups

Variable	Intervention (*n* = 38) *M (SD)*	Wait-List Control (*n* = 35) *M (SD)*
Age in years	18.7 (.72)	19.1 (.87)
BMI	21.3 (2.4)	22.0 (3.6)
	Percent (*n*)	Percent (*n*)
Ethnicity		
Asian/Pacific Islander	31.6 (12)	34.3 (12)
Black	2.6 (1)	0 (0)
Hispanic	15.7 (6)	11.4 (4)
Caucasian	44.7 (17)	51.4 (18)
Other/mixed	5.2 (2)	2.9 (1)
Highest paternal education		
Grade school	14.9 (11)	5.7 (4)
High school	31.1 (23)	30 (21)
College	54.1 (40)	62.9 (44)

TABLE 3

Means and Standard Deviations for the Cognitive Behavioral and Wait-List Control Groups on the Dependent Variables, and Results From the Pairwise Comparisons

Dependent Variable	Baseline (Week 1) *M (SD)*	Termination (Week 4) *M (SD)*	1-Month Follow-up (Week 8) *M (SD)*	3-Month Follow-up (Week 16) *M (SD)*	6-Month Follow-up (Week 28) *M (SD)*
Body dissatisfaction					
Wait-list controls	27.97 (8.33)	28.89 (8.19)	28.97 (8.97)	29.67 (9.34)	
CBT	31.97 (8.94)$_a$	27.13 (9.91)$_b$	27.90 (9.01)$_b$	29.19 (10.35)$_b$	26.57 (10.09)$_b$
Negative affect					
Wait-list controls	31.23 (13.76)	35.91 (16.40)	31.39 (14.28)	34.91 (15.59)	
CBT	35.56 (12.16)$_a$	28.12 (12.24)$_b$	32.19 (12.03)$_b$	28.51 (15.15)$_b$	34.23 (16.36)
Depressive symptoms					
Wait-list controls	11.77 (9.29)	12.09 (11.19)	10.12 (10.79)	12.61 (13.06)	
CBT	13.78 (9.36)$_a$	9.28 (8.13)$_b$	13.35 (9.64)	9.45 (10.16)$_b$	13.40 (13.21)
Dieting					
Wait-list controls	32.34 (8.82)$_a$	30.20 (8.77)	28.15 (9.1 l)$_b$	28.56 (8.70)$_b$	
CBT	27.59 (8.78)$_a$	23.43 (9.83)$_b$	24.39 (9.52)$_b$	24.58 (8.71)$_b$	24.53 (9.63)$_b$
Bulimic symptoms					
Wait-list controls	18.94 (9.97)	18.43 (9.41)	17.50 (11.50)	17.85 (11.48)	
CBT	17.16 (10.85)$_a$	12.29 (10.70)$_b$	13.41 (10.41)$_b$	14.03 (12.05)$_b$	15.37 (13.27)

Note. Means within the same row with different subscripts were statistically significantly different ($p \leq .05$). Cell sizes were $n = 35$ for the control group and $n = 38$ for the intervention group.