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Efficacy Trial of a Selective Prevention Program Targeting Both Eating Disorder Symptoms and Unhealthy Weight Gain Among Female College Students

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Objective: Evaluate a selective prevention program targeting both eating disorder symptoms and unhealthy weight gain in young women. **Method:** Female college students at high-risk for these outcomes by virtue of body image concerns ($N = 398$; M age = 18.4 years, $SD = 0.6$) were randomized to the *Healthy Weight* group-based 4-hr prevention program, which promotes gradual lasting healthy improvements to dietary intake and physical activity, or an educational brochure control condition. **Results:** Compared to controls, intervention participants showed significantly greater reductions in body dissatisfaction and eating disorder symptoms, and greater increases in physical activity, at posttest and significantly greater reductions in body mass index (BMI) and self-reported dieting at 6-month follow-up. Moderator analyses revealed significantly greater reductions in eating disorder symptoms for those with initially elevated symptoms and pressure to be thin and significantly greater reductions in BMI for those with initially elevated eating disorder symptoms. **Conclusions:** Results indicate that this intervention reduced both eating disorder symptoms and unhealthy weight gain, but suggest it should be improved to produce stronger and more persistent effects, and that it may be useful to target young women with both body image and eating disturbances.

Keywords: prevention, body dissatisfaction, eating disorder symptoms, weight gain, BMI

Effective prevention programs have been developed for eating disorders, which are marked by impairment, morbidity, and mortality, but the fact that obesity is much more prevalent and related to even greater morbidity and mortality has prompted calls for interventions that also reduce unhealthy weight gain (Irving & Neumark-Sztainer, 2002; Stice & Ragan, 2002). Four prevention programs have reduced both eating disorder symptoms and unhealthy weight gain (Austin, Field, Wiecha, Peterson, & Gortmaker, 2005; Jones et al., 2008; Stice, Marti, Spoor, Presnell, & Shaw, 2008). For instance, a 26-hr universal prevention program that promotes less media use, a healthy diet, and regular exercise reduced unhealthy weight control behaviors (e.g., vomiting, diet pill use) and body mass index (BMI) among female, but not male, preadolescents (Austin et al., 2005). However, only one has produced long-term reductions in eating disorder symptoms and BMI and has reduced onset of future eating disorders and obesity. The 3-hr *Healthy Weight* selective prevention program, which promotes incremental lasting healthy improvements to dietary intake and physical activity in young women with body image concerns,

(a) reduced eating disorder symptoms and BMI relative to assessment-only controls and alternative interventions through 3-year follow-up, (b) reduced eating disorder onset relative to assessment-only controls through 3-year follow-up (7% vs. 15%), and (c) reduced obesity onset relative to assessment-only controls and an alternative intervention at 1-year follow-up (1% vs. 12% and 9%, respectively) and assessment-only controls at 3-year follow-up (8% vs. 18%; Stice et al., 2008).

Because the effects for *Healthy Weight* were moderate in magnitude, we sought to increase its potency by adding principles that should facilitate healthy changes to dietary intake drawn largely from nutrition research (Ello-Martin, Roe, & Rolls, 2004), including (a) replacing high-energy dense foods with low-energy dense foods, (b) eating complex carbohydrates with high water content at the start of meals (e.g., soup, fruit, salad), (c) reducing portions sizes, (d) eating meals with less variety in the types of foods, and (e) keeping only healthy foods in the living area (e.g., not having unhealthy snacks in the home/dormitory). We added these principles because experiments suggest that they should contribute to larger weight gain prevention effects (e.g., Ello-Martin et al., 2004). We also added principles to facilitate increases in physical activity, including (a) scheduling time for exercise on a weekly basis, (b) making daily routines more active (e.g., taking the stairs, biking instead of driving to work), and (c) being creative about how to exercise (e.g., doing yard work, walking around an airport during long layovers). To accommodate this new information and to provide more time for dietary and activity changes, we increased the intervention from 3 to 4 1-hr sessions. *Healthy Weight 2* is described as a body acceptance program to facilitate recruitment and to avoid stigmatization. Young women with body dissatisfac-

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tion are targeted because they are at increased risk for escalation in both eating disorder symptoms and unhealthy weight gain (Haines, Neumark-Sztainer, Wall, & Story, 2007; Johnson & Wardle, 2005). Body dissatisfaction may also motivate people to make healthy dietary and activity changes. The healthy lifestyle change plan is participant-driven to promote internalization of the health goals and development of executive control over lifestyle choices.

Aim 1 was to test whether *Healthy Weight 2* participants would show greater reductions in eating disorder symptoms and BMI (primary outcomes) by posttest and 6-month follow-up than educational brochure controls. Aim 2 was to test for effects on secondary outcomes targeted in this intervention: dietary intake, dietary restraint, and physical activity. Because a reduction in BMI might improve body satisfaction and affect, we also tested for intervention effects on these outcomes. Aim 3 was to test whether intervention effects on the primary outcomes would be stronger for youth with initial elevations in eating disorder symptoms and BMI, as it should be easier to affect change among individuals with more room for improvement, yet weaker for youths with elevated risk factors not addressed by the intervention, including depressive symptoms and perceived pressure for thinness.

Method

Participants were 398 young women (M age = 18.4 years, SD = 0.6; M BMI = 23.7, SD = 4.3; 83% White, 8% Latino, 7% Asian, 2% Black) recruited from a university using mailings, flyers, and leaflets inviting freshmen women with body image concerns to

participate in a trial evaluating body acceptance interventions; written consent was obtained. We focused on this population because they are at increased risk for weight gain and eating disorders. The sole exclusion criterion was current anorexia nervosa, bulimia nervosa, or binge eating disorder. Participants were randomized to the *Healthy Weight 2* intervention or an educational brochure control condition via coin toss (see Figure 1 for a participant flowchart). See Table 1 for a description of the intervention, which consisted of 4 weekly 1-hr group sessions with 6–10 participants, facilitated by clinical graduate students. Facilitators read the intervention script and attended a 4-hr workshop to role-play core session elements and to discuss process issues. The second and third authors independently coded a randomly selected 50% of the audiotaped sessions for fidelity and competence (fidelity and competence rating interrater agreement; intraclass correlation coefficient [ICC] = .92 and .96, respectively). Supervision was provided based on tape review. The educational brochure was *Ten Steps to Positive Body Image* from the National Eating Disorders Association. Participants provided data at pre, post, and 6-month follow-up. Assessors attended 24 hr of training and had to demonstrate interrater agreement ($k > .80$) with supervisors using recorded interviews before collecting data. Participants received \$30 per assessment. The local Institutional Review Board approved this project.

The Eating Disorder Diagnostic Interview (Stice, Shaw, Burton, & Wade, 2006) assessed *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Asso-

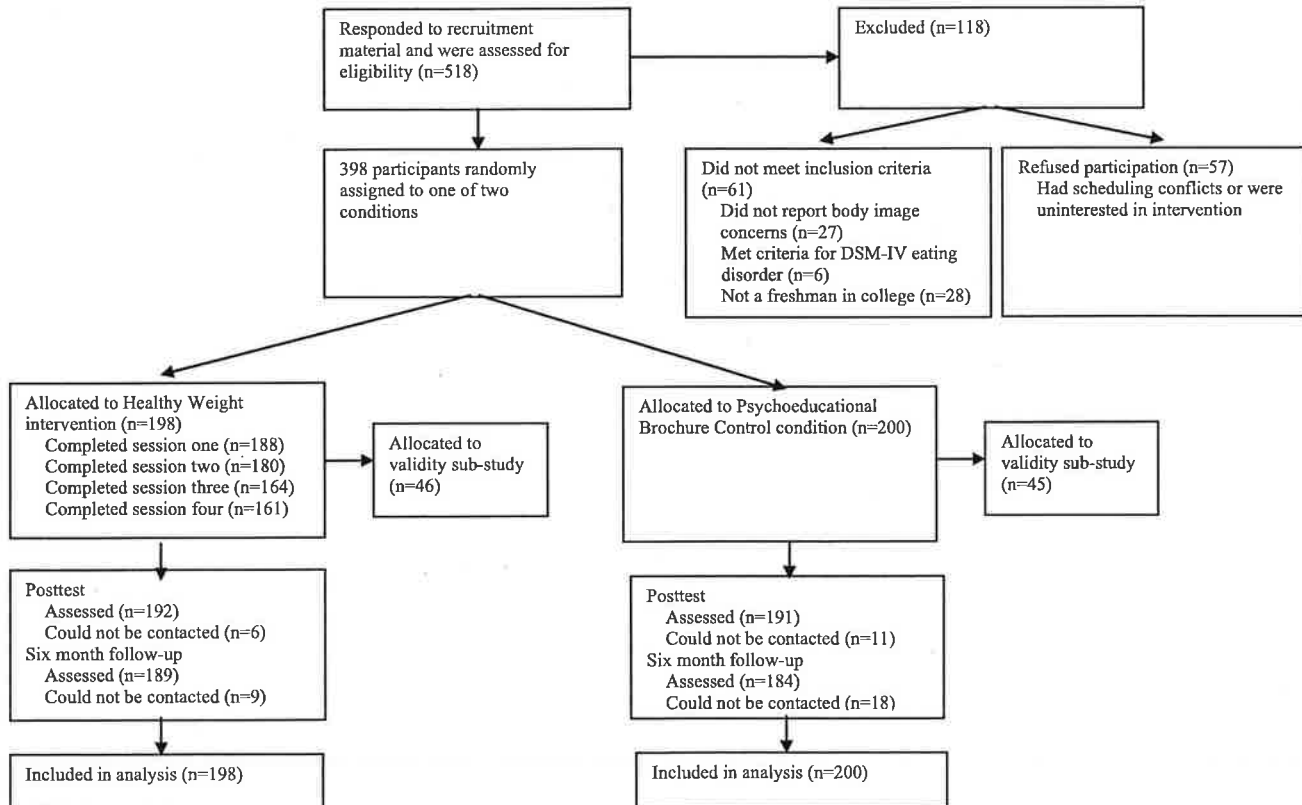


Figure 1. Participant flow throughout the study.

Table 1
Description of the Healthy Weight 2 Intervention

Session	Description
1	Participants are told that making small lasting healthy changes to dietary intake and physical activity to bring their energy intake into balance with their energy output, and thus achieve and maintain a healthier body weight and body satisfaction, should reduce unhealthy weight control behaviors that increase risk for obesity and eating disorders. They make public voluntary commitment to making lasting healthy changes to their diet and activity level. Participants are told that this class is about pursuing the healthy-ideal (not the thin-ideal) through lifestyle changes that produce energy homeostasis (not transient dieting). Principles for improving dietary intake are discussed (substituting unhealthy foods with healthy ones, starting meals with high-water content/high-fiber foods, reducing portion sizes, limiting food variety per meal, not having unhealthy foods in the living environment). Next, principles for increasing physical activity are discussed (scheduling in exercise, adding incidental exercise to current routine, being creative about adding activity). Each then publically commits to making a healthy change to their dietary intake and physical activity, which reinforce lifestyle changes and foster self-efficacy. Over the next week, participants complete a 3-day food and exercise diary to identify ways to make small improvements in their diet and activity levels.
2	To enhance motivation, participants brainstorm benefits of maintaining a healthy body weight. Participants then review the eating and exercise diaries and the dietary and exercise changes made during the past week. To further enhance motivation, participants then discuss the importance of exercise and list the benefits of regular activity. Participants discuss ways to incorporate regular activity into their schedules, with an emphasis on overcoming challenges. They are cautioned against using unhealthy weight control behaviors (e.g., cigarettes) and are encouraged to focus on body shape instead of weight. The homework assignment is to list 10 personally meaningful reasons for pursuing the healthy ideal, to complete the eating and exercise diaries, to make one additional improvement to both their diet and activity level in the following week, and to continue the individual changes selected in the first session.
3	For motivational purposes, participants share the top reasons for pursuing the healthy ideal generated for homework. They then discuss the successes and barriers they encountered when trying to improve dietary intake and make public commitments to making further healthy alterations to their diet in the next week. They are encouraged to substitute an unhealthy food in their diet with a fruit or vegetable. Emotional eating is discussed and alternative methods for coping are brainstormed. Then they share changes in their activity level during the past week and commit to make additional healthy changes to their activity level in the next week. The importance of variety in exercise and balancing cardiovascular, strength, and flexibility training are emphasized. Homework consists of continuing to complete the eating and exercise diaries, making one additional improvement in both diet and activity domains, and maintaining previous changes.
4	To enhance motivation, participants share the benefits of attaining a healthy weight and the positive effects of being in the group. They discuss the successes and problems they encountered when trying to improve dietary intake and activity levels, and make public commitments to further healthy changes to their diet and exercise levels that they will maintain for the next 6 months. Members provide support for each other and suggest ways to overcome barriers created by resistance to change and the college environment. To reduce risk for relapse, participants discuss future obstacles that might arise that would cause them to stop the healthy lifestyle changes, differentiating a "lapse" from a "relapse" in terms of health behavior change. They share their reasons for signing up for the group and what they had hoped to accomplish. They are asked to e-mail the facilitators regarding their progress in making lifestyle changes in the upcoming week.

ciation, 1994) eating disorder symptoms. Items assessing symptoms in the past month were summed.¹ The symptom composite showed internal consistency ($\alpha = .84$), interrater agreement (ICC $r = .93$), and 1-week test-retest reliability (ICC $r = .95$) in this study, as well as sensitivity to detect intervention effects (Stice et al., 2008). Age-adjusted BMI percentile was used to reflect height-adjusted weight, which correlates with direct measures of body fat ($r = .80-.90$) (Pietrobelli et al., 1998). The Block Food Frequency Questionnaire (Block, Hartman, & Naughton, 1990) assessed frequency of consumption of specific food types over the past 2 weeks; this scale has shown 2-week test-retest reliability ($M r = .69$) and correlated ($r = .57$) with 4-day food record estimates for energy intake (Block & Subar, 1992). The Dutch Restrained Eating Scale (van Strien, Frijters, van Staveren, Defares, & Deurenberg, 1986) assesses the frequency of dieting behaviors; this scale has shown internal consistency ($\alpha = .95$), 2-week test-retest reliability ($r = .82$), and convergent validity with self-reported caloric intake (but not objectively measured caloric intake; Stice, Fisher, & Lowe, 2004; van Strien et al., 1986). The Paffenbarger Activity Questionnaire (Paffenbarger, Wing, & Hyde, 1978) assessed physical activity during the past 2 weeks; this scale has

shown 1-month test-retest reliability ($r = .72$) and convergent validity with physical activity records ($r = .28-.86$; Ainsworth, Leon, Richardson, Jacobs, & Paffenbarger, 1993). The Body Dissatisfaction Scale (adapted from Berscheid, Walster, & Bohmstedt, 1973) assessed discontent with nine body parts; this scale has shown internal consistency ($\alpha = .94$), 3-week test-retest reliability ($r = .90$), and predictive validity for eating disorder onset (Stice, Marti, & Durant, 2011). Sixteen items assessing major depressive symptoms were drawn from the Schedule for Affective Disorders and Schizophrenia for School-Age Children (Kaufman, Birmaher, Brent, Rao, & Ryan, 1996), a semistructured diagnostic interview;

¹ Items assessing the behavioral (e.g., frequency of binge eating episodes, vomiting, laxative/diuretic use, fasting, and excessive exercise) and attitudinal (e.g., fear of weight gain, overvaluation of weight/shape, feelings of depression or guilt about overeating) features of anorexia nervosa, bulimia nervosa, and binge eating disorder over the past month were summed to form the overall symptom composite. This symptom composite was normalized with a log base₁₀ transformation, though raw items are reported in Table 2.

this symptom composite has shown internal consistency ($\alpha = .75$), 1-week test-retest reliability ($r = .93$), and interrater agreement ($r = .85$; Stice, Rohde, Gau, & Wade, 2010). Participants reported the amount of pressure to be thin that they perceived from family, friends, dating partners, and the media on the eight-item Perceived Sociocultural Pressure Scale (Stice, Marti, & Durant, 2011); this scale has shown internal consistency ($\alpha = .88$), 2-week test-retest reliability ($r = .93$), and predictive validity for increases in bulimic symptoms (Stice, Marti, & Durant, 2011).² A randomly selected 88 participants completed an objective biological measure of energy expenditure and caloric intake to validate self-reported physical activity and energy intake. Doubly labeled water (DLW) was used to estimate energy expenditure and intake over a 2-week period (see Stice, Durant, Burger, & Schoeller, 2011).

Results

In total, 67% of *Healthy Weight 2* participants attended all four sessions, 18% attended three sessions, 5% attended two sessions, and 10% attended one session. Implementation fidelity ratings (1–10 scale) had a mean of 7.3 ($SD = 0.62$). Facilitator competence ratings (10-point scale) had a mean of 7.3 ($SD = 0.75$).³ DLW-estimated intake correlated with reported intake ($r = .36$, $p = .001$), and DLW-estimated expenditure correlated with reported expenditure ($r = .22$, $p = .05$); however, the magnitude of these relations imply that these self-reported measures should be interpreted with care.

Random effects analysis of covariance models, with pretest values of the dependent variable as covariates, tested for intervention effects. If group or Group \times Time effects were even marginal ($p < .10$), we tested for intervention effects at posttest and 6-month follow-up, as it is often the case that significant intervention differences exist with marginal omnibus tests. We used multiple-imputation to account for missing data. Missing data were imputed using the Amelia package of the R project. We created 20 imputed data sets and used SAS PROC MIXED to analyze each data set and MIANALYZE to generate inferential statistics, where parameters are averaged across the results of the 20 analyses, and the standard errors combine within- and between-analysis variability. Table 2 provides average means and standard deviations for the 20 imputed data sets. Table 3 presents results for the outcomes. For the eating disorder symptom outcome, there were significant effects for group, time, and the Group \times Time interaction; follow-up contrasts examining the effects of condition at each time point, controlling for pretest values of the outcome, found that the intervention participants showed significantly fewer eating disorder symptoms than controls at posttest ($p = .003$, $d = 0.30$) but not at 6-month follow-up (*ns*). There was a marginal Group \times Time interaction for BMI; follow-up contrasts indicated that intervention participants showed significantly lower BMI than controls at 6-month follow-up ($p = .035$, $d = 0.21$) but no significant differences at posttest (*ns*).⁴ There were no significant effects for depressive symptoms or caloric intake. There was a marginal main effect indicating less dieting in the intervention group; follow-up contrasts found that relative to controls, intervention participants showed marginally less dieting at posttest ($p = .071$, $d = 0.18$) and significantly less dieting at 6 months ($p = .040$, $d = 0.21$). There was a significant time and group effect for body dissatisfaction; follow-up contrasts indicated that intervention participants

showed significantly lower body dissatisfaction than controls at posttest ($p = .012$, $d = 0.25$) but not at 6-month follow-up (*ns*). There was a significant Group \times Time interaction for physical activity; follow-up contrasts indicated that intervention participants reported significantly higher amounts of physical activity than controls at posttest ($p = .010$, $d = 0.26$) but not at 6-month follow-up (*ns*).

Moderator analyses revealed three significant interactions. First, pretest eating disorder symptoms moderated the intervention effects on eating disorder symptoms: The Intervention \times Eating Disorder Symptom interaction was significant ($p = .003$, $d = 0.30$), and the Intervention \times Time \times Eating Disorder Symptom interaction was marginal ($p = .072$, $d = 0.18$). Follow-up analyses compared simple slopes of the outcome at posttest and 6-month follow-up for participants at 1 *SD* above and below the pretest eating disorder symptom mean. Intervention participants showed significantly lower eating disorder symptoms than controls at 6-month follow-up ($p < .001$, $d = 0.42$) for participants with initial elevations in eating disorder symptoms; no other simple slope comparisons were significant. Second, pretest pressure to be thin moderated the intervention effects on eating disorder symptoms: The Intervention \times Time \times Pressure To Be Thin interaction was significant ($p = .017$, $d = 0.24$). Follow-up analyses found that intervention participants showed significantly lower eating disorder symptoms than controls at posttest follow-up than controls ($p = .003$, $d = 0.30$) for participants at 1 *SD* above the pretest mean on pressure to be thin: No other simple slope comparisons were significant. Third, pretest eating disorder symptoms moderated the intervention effects on BMI: The Intervention \times Time \times Eating Disorder Symptom interaction was significant ($p = .037$, $d = 0.21$). Follow-up analyses found that intervention participants showed significantly lower BMI scores than controls at 6-month follow-up ($p = .015$, $d = 0.25$) for participants at 1 *SD* above the mean in pretest eating disorder symptoms; no other simple slope comparisons were significant.

Discussion

Healthy Weight 2 participants showed greater reductions in eating disorder symptoms at posttest (but not at 6-month follow-up). This is noteworthy, as only a few programs have reduced interview-assessed *DSM-IV* eating disorder symptoms; other programs targeting both eating pathology and obesity

² Note that we asked participants to report on attitudes and behaviors since the last assessment at posttest and at 6-month follow-up.

³ Implementation fidelity scores ranged from 3 to 9 (only 6.7% of the components had less than "fair" adherence, defined as a score of < 5). Facilitator competence scores ranged from 4 to 10 (only 5.6% of items were rated less than "good/average" competence, defined as a score of 5 or less). Mean values for individual fidelity and competence items showed limited variability (range = 6.4–8.0 for fidelity and 6.9–8.0 for competence ratings).

⁴ It should be noted that there was no evidence that the intervention resulted in unhealthy weight loss. Whereas three controls transitioned from above a BMI of 18 at baseline to slightly below during follow-up, only two intervention participants made this transition. Further, the absolute reduction in weight for these five participants was 0.80 kg at follow-up and 0.88 kg at 6 months.

Table 2
Means (and Standard Deviations) for Outcomes in the Control and Intervention Conditions

Variable	Condition	Pretest	Posttest	6 months
		M (SD)	M (SD)	M (SD)
Primary				
Eating disorder symptoms	Control	10.44 (8.63)	8.27 (9.38)	6.43 (6.96)
	Intervention	10.22 (10.95)	6.11 (6.51)	6.05 (7.13)
BMI	Control	23.99 (4.48)	24.09 (4.51)	24.21 (4.56)
	Intervention	23.51 (4.14)	23.62 (4.14)	23.53 (4.13)
Secondary				
Body dissatisfaction	Control	3.37 (0.67)	3.23 (0.73)	3.04 (0.74)
	Intervention	3.37 (0.71)	3.09 (0.81)	2.97 (0.88)
Depressive symptoms	Control	1.40 (0.45)	1.15 (0.24)	1.21 (0.37)
	Intervention	1.43 (0.44)	1.12 (0.23)	1.21 (0.39)
Dieting	Control	2.98 (0.79)	2.87 (0.76)	2.74 (0.84)
	Intervention	2.88 (0.78)	2.69 (0.75)	2.54 (0.84)
Dietary intake	Control	1,357.14 (491.04)	1,285.47 (497.27)	1,300.90 (520.17)
	Intervention	1,344.39 (643.84)	1,205.83 (463.94)	1,239.40 (487.86)
Physical activity	Control	7,356.36 (6,437.07)	6,401.69 (5,759.14)	6,357.44 (5,627.12)
	Intervention	6,085.46 (4,203.74)	7,018.53 (4,566.51)	5,665.06 (4,587.22)

Note. BMI = body mass index.

have only reduced selected eating disorder symptoms, and the *Healthy Weight 2* intervention was only 4 hr in duration, which is much shorter than the 16–26 hr of duration of other prevention programs targeting these dual outcomes. Intervention participants also showed smaller increases in BMI at 6-month follow-up (but not at posttest), which is notable, as it suggests that behavioral changes made after intervention termination contributed to the reduced risk for unhealthy weight gain, implying maintenance of healthy lifestyle changes. The fact that this prevention program produced significant intervention effects for both eating disorder symptoms and BMI is encouraging, as only three other prevention programs have reduced risk for eating disorder symptoms and unhealthy weight gain. However, the eating disorder symptom effect was not significant at 6-month follow-up, and the BMI effect was not significant at posttest, suggesting a limited persistent of effects. It may have been difficult to show an effect at posttest because weight change can be quite slow. Further, the fact that the original 3-hr *Healthy Weight* intervention produced larger and more persisting effects for eating disorder symptoms and BMI (Stice et al., 2008) implies that adding principles to facilitate healthy dietary and exercise changes, largely drawn from nutrition research, did not improve intervention effects. The lack of such guidelines in the original *Healthy Weight* intervention may have put more of the onus of change on each participant, increasing personal investment in and motivation to maintain the selected dietary and exercise changes. However, it is equally possible that the effects were weaker because the mean eating disorder symptom score at baseline was nearly half a standard deviation lower and because participants were 1.4 years older on average relative to the past trial (Stice et al., 2008), implying participants in the present trial were at lower risk. The limited effects in the present trial were apparently not due to limited statistical power.

Intervention versus control participants reported increased exercise at posttest, reduced dieting at posttest (marginally) and

6-month follow-up, and reduced body dissatisfaction at posttest, but there were no intervention effects for depression or reported caloric intake. Although the effect for physical activity was encouraging, it should be interpreted with care given the validity of self-reported activity. The significant decrease in reported dieting was consistent with the *Healthy Weight 2* goal of lasting lifestyle changes in dietary intake and physical activity, rather than transient dieting. The pattern of findings suggests that the improved body satisfaction at posttest may have resulted from increased physical activity or the therapeutic effects of working toward making healthy lifestyle changes, rather than actual weight loss. It is reassuring that an intervention that promoted lasting reductions in caloric intake and increases in physical activity did not produce iatrogenic effects. Further, the overall pattern of findings also suggests that the reduced eating disorder symptoms and ineffective transient weight loss dieting behaviors, as well as the increased physical activity and body satisfaction at posttest, may have contributed to the reductions in BMI by 6-month follow-up. The fact that there were significant reductions in both reported dieting and BMI by 6-month follow-up may imply that this intervention will reduce risk for onset of threshold/subthreshold eating disorders over longer term follow-up.

Moderator analyses indicated that intervention effects on eating disorder symptoms were stronger for participants with initially greater symptoms and pressure to be thin. The former finding suggests that gradually improving dietary intake and increasing activity allows young women to discontinue unhealthy eating disordered behaviors that may be used for the purposes of weight control. Likewise, this intervention may help young women who perceive elevated pressure to be thin to engage in healthier weight control behaviors, rather than escalate pathological eating behaviors aimed at weight control. This interpretation also fits with the evidence that the *Healthy Weight 2* intervention reduced weight gain for participants with initially elevated eating disorder symptoms but not for those with initially low eating disorder symptoms. Results collectively imply that there may be an intriguing interplay

Table 3
Intervention Effects on Primary and Secondary Outcomes

Variable	Model component	Parameter	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>d</i>
Eating disorder symptoms	Fixed	Intercept	4.34	0.69	6.29	.000	0.63
		Pretest eating disorder symptoms	0.30	0.08	3.73	.000	0.37
		Quadratic pretest eating disorder symptoms	0.00	0.00	2.11	.035	0.21
		Group	-1.97	0.65	-3.02	.003	-0.30
		6-month	-1.84	0.58	-3.15	.002	-0.32
BMI	Fixed	Group × 6-Month	1.78	0.83	2.15	.032	0.22
		Intercept	0.56	0.22	2.48	.013	0.25
		Pretest BMI	0.98	0.01	109.44	.000	10.97
		Group	-0.00	0.10	-0.03	.975	-0.00
		6-month	0.11	0.09	1.28	.203	0.13
Body dissatisfaction	Fixed	Group × 6-Month	-0.20	0.12	-1.69	.092	-0.17
		Intercept	0.45	0.12	3.58	.000	0.36
		Pretest body dissatisfaction	0.83	0.04	23.52	.000	2.36
		Group	-0.14	0.06	-2.52	.012	-0.25
		6-month	-0.19	0.04	-4.66	.000	-0.47
Depressive symptoms	Fixed	Group × 6-Month	0.08	0.06	1.41	.160	0.14
		Intercept	1.17	0.14	8.61	.000	0.86
		Pretest depressive symptoms	-0.31	0.17	-1.78	.075	-0.18
		Quadratic pretest depressive symptoms	0.19	0.05	3.73	.000	0.37
		Group	-0.03	0.03	-1.22	.222	-0.12
DiETING	Fixed	6-month	0.06	0.02	2.59	.010	0.26
		Group × 6-Month	0.03	0.03	0.84	.401	0.08
		Intercept	0.69	0.10	6.76	.000	0.68
		Pretest dieting	0.73	0.03	23.47	.000	2.35
		Group	-0.10	0.06	-1.81	.071	-0.18
Caloric intake	Fixed	6-month	-0.13	0.04	-2.91	.004	-0.29
		Group × 6-Month	-0.02	0.06	-0.28	.783	-0.03
		Intercept	385.33	76.98	5.01	.000	0.50
		Pretest BFFQ	0.77	0.08	9.54	.000	0.96
		Quadratic pretest BFFQ	-0.00	0.00	-3.59	.000	-0.36
Physical activity	Fixed	Group	-59.70	40.81	-1.46	.144	-0.15
		6-month	15.43	37.11	0.42	.678	0.04
		Group × 6-Month	18.14	51.71	0.35	.726	0.04
		Intercept	2,971.90	409.56	7.26	.000	0.73
		Pretest Paffenbarger Activity Questionnaire	0.47	0.03	14.13	.000	1.42
		Group	1,209.40	464.44	2.60	.010	0.26
		6-month	-40.61	435.09	-0.09	.926	-0.01
		Group × 6-Month	-1,312.86	616.39	-2.13	.034	-0.21
		Intercept	2,660,155				
		Residual	17,641,829				

Note. BMI = body mass index; BFFQ = Block Food Frequency Questionnaire.

between eating disorder symptoms and unhealthy weight gain in young women with body image concerns.

It is important to consider the study limitations. First, our validity sub-study indicated that self-reported dietary intake and activity showed modest correlations with biologically estimated total energy intake and total energy expenditure, converging with a broad literature on the limited validity of self-reported dietary intake and activity level. Second, the sample included college students who were predominantly White, suggesting that care should be taken in generalizing the results to more ethnically and educationally diverse populations, who also suffer from eating disorders and who show elevated obesity prevalence. Third, the sample consisted solely of young women, implying that results should not be generalized to young men.

With regard to clinical implications, the fact that a very brief group intervention resulted in intervention effects for both eating disorder symptoms and weight gain is novel, as other programs

that have attempted to affect both outcomes have produced limited effects for *DSM-IV* eating disorder symptoms. However, prior to dissemination, it will be vital to enhance the efficacy of this intervention, potentially by increasing its duration, which would provide even more time for healthy behavior change. We also suspect that adding dissonance-induction procedures to produce greater internalization of healthy lifestyle goals and lasting behavior change could contribute to larger effects. Further, the fact that the *Healthy Weight 2* intervention produced a larger unhealthy weight gain effect for the subset of young women with elevated eating disorder symptoms suggests that another way to improve the efficacy of this intervention would be to target young women with both body image concerns and subthreshold eating disorder symptoms. Finally, it may be advantageous to design interventions that reduce negative affect, unlike the present intervention, as it is a risk factor for both weight gain and eating disordered behaviors (Stice, Marti, & Durant, 2011). Although clearly encouraging, this interven-

tion may, with continued refinement, succeed in more robustly preventing both eating pathology and obesity.

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