An effectiveness trial of a new enhanced dissonance eating disorder prevention program among female college students

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A B S T R A C T

Objective: Efficacy trials indicate that a dissonance-based prevention program in which female high school and college students with body image concerns critique the thin-ideal reduced risk factors, eating disorder symptoms, and future eating disorder onset, but weaker effects emerged from an effectiveness trial wherein high school clinicians recruited students and delivered the program under real-world conditions. The present effectiveness trial tested whether a new enhanced dissonance version of this program produced larger effects when college clinicians recruited students and delivered the intervention using improved procedures to select, train, and supervise clinicians.

Method: Young women recruited from seven universities across the US (N = 408, M age = 21.6, SD = 5.64) were randomized to the dissonance intervention or an educational brochure control condition.

Results: Dissonance participants showed significantly greater decreases in risk factors (thin-ideal internalization, body dissatisfaction, dieting, negative affect) and eating disorder symptoms versus controls at posttest and 1-year follow-up, resulting in medium average effect size (d = .60). Dissonance participants also reported significant improvements in psychosocial functioning, but not reduced health care utilization or unhealthy weight gain.

Conclusions: This novel multisite effectiveness trial with college clinicians found that the enhanced dissonance version of this program and the improved facilitator selection/training procedures produced average effects that were 83% larger than effects observed in the high school effectiveness trial.

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Approximately 10–13% of young women meet DSM-IV (Hudson, Hiripi, Pope, & Kessler, 2007; Wade, Bergin, Tiggemann, Bulik, & Fairburn, 2006) or DSM-5 criteria for eating disorders (Stice, Marti, & Rohde, 2013). Eating disorders are marked by chronicity, relapse, distress, functional impairment, and risk for future obesity, depression, suicide attempts, anxiety disorders, substance abuse, and mortality (Arcelus, Mitchell, Wales, & Nielsen, 2011; Crow et al., 2009; Stice et al., 2013; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011; Wilson, Becker, & Heffernan, 2003). Thus, it is vital to develop and disseminate effective eating disorder prevention programs.

Several prevention programs have produced significant reductions in eating disorder symptoms that persist through at least 6-month follow-up in single trials (Jones et al., 2008; McVey, Tweed, & Blackmore, 2007; Neumark-Sztainer, Butler, & Palti, 1995; Stewart, Carter, Drinkwater, Hainsworth, & Fairburn, 2001). Yet more support has emerged from several independent labs for a selective dissonance-based eating disorder prevention program (the Body Project), in which young women with body image concerns voluntarily critique the thin ideal in verbal, written, and behavioral exercises in session and in home exercises (Stice, Mazotti, Weibel, & Agras, 2000). Criticizing the thin ideal publicly in this group-based program theoretically reduces thin-ideal internalization because humans seek to maintain consistency between their behaviors and attitudes. This reduced subscription to the thin ideal putatively decreases body dissatisfaction, unhealthy weight control behaviors, negative affect, eating disorder symptoms, and future eating disorder onset. This intervention targets young women with body dissatisfaction because it is an established risk factor for future eating pathology (e.g., Johnson & Wardle, 2005; Killen et al., 1996).

Efficacy trials have shown that the Body Project produces greater reductions in eating disorder risk factors (thin-ideal internalization, body dissatisfaction, dieting, and negative affect), eating disorder

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symptoms, functional impairment, mental health service utilization, and eating disorder onset over a 3-year follow-up relative to assessment-only control conditions and three alternative interventions (e.g., Stice, Marti, Spoer, Presnell, & Shaw, 2008; Stice et al., 2000; Stice, Rohde, Durant, & Shaw, 2012; Stice, Shaw, Burton, & Wade, 2006). Efficacy trials conducted by independent teams have also found that dissonance-based eating disorder prevention programs produce greater reductions in risk factors and eating disorder symptoms than assessment-only control conditions (Halliwell & Diedrichs, 2013; Matussek, Wendt, & Wiseman, 2004; Mitchell, Mazzeo, Rausch, & Cooke, 2007) and alternative interventions (Becker, Smith, & Ciao, 2005). It appears to be the only eating disorder prevention program that has produced intervention effects that have independently replicated and has significantly outperformed alternative interventions.

In support of the theory for this program, reductions in thin-ideal internalization appear to mediate the effects of the Body Project on change in the other outcomes (Seidel, Presnell, & Rosenfield, 2009; Stice, Presnell, Gau, & Shaw, 2007). In line with the thesis that dissonance induction contributes to intervention effects, participants assigned to high-versus low-dissonance versions of this program showed significantly greater reductions in eating disorder symptoms (Green et al., 2005; McMillan, Stice, & Rohde, 2011), though intervention content and non-specific factors clearly contribute to intervention effects.

Given the empirical support for the Body Project from efficacy trials, the next step is to conduct effectiveness trials of this prevention program. Efficacy trials test whether preventive interventions produce effects under carefully controlled experimental conditions, in which the research clinicians are thoroughly trained and supervised, the intervention is delivered in adequately staffed settings, and the participants are homogeneous. In contrast, effectiveness trials test whether interventions produce effects when delivered by endogenous clinicians (e.g., school counselors) who receive less supervision under real world conditions in natural service provision settings with heterogeneous populations (Flay, 1986). Scholars have stressed the importance of confirming whether interventions that are efficacious in tightly controlled trials affect outcomes in effectiveness trials involving endogenous clinicians working in real-world settings (Clarke, 1995; Hoagwood & Olin, 2002; Weisz, Donenberg, Han, & Kauneckis, 1995). Effectiveness trials can also provide information concerning the degree of training and supervision necessary to achieve intervention effects and reveal problems that must be resolved before the prevention program can be successfully disseminated.

To date, only one1 effectiveness trial has evaluated the Body Project when endogenous clinicians recruit participants and deliver the intervention in traditional service settings (Stice, Rohde, Gau, & Shaw, 2009; Stice, Rohde, Shaw, & Gau, 2011). It focused on clinicians in high schools because mid-adolescence is a period in which eating disordered symptoms emerge (Lewinsohn, Striegel-Moore, & Seeley, 2000; Stice et al., 2013) and school-based prevention programs are an effective way to reach adolescents (Newton, Conrod, Teesson, & Faggiano, 2012). The Body Project produced significant reductions in eating disorder risk factors and symptoms relative to an educational brochure control condition when high school clinicians recruited female students with body image concerns and delivered the intervention under ecologically valid conditions in schools, including significant reductions in eating disorder symptoms that persisted through 3-year follow-up (Stice et al., 2009, 2011). However, the average effect size was 32% smaller than observed in our large efficacy trial (Stice et al., 2006, 2008) and unlike the efficacy trial, the Body Project did not significantly reduce health care utilization and eating disorder onset over 3-year follow-up relative to controls.

Although the high school effectiveness trial represents an important step in this research program, there are several reasons why it is crucial to conduct effectiveness trials of eating disorder prevention programs in colleges. First, eating disorders typically emerge during this time (Hudson et al., 2007; Stice et al., 2013). Second, colleges represent a large population that can be reached with eating disorder prevention programs because there are over 10 million female college students (U.S. Department of Education, 2008). Third, our first effectiveness trial revealed that high schools have a limited infrastructure to support delivery of mental health prevention programs, which may have constrained the intervention effects in that setting. In contrast, college health and counseling clinics typically have an established and well-functioning infrastructure that is much more conducive to delivering prevention programs (Foster et al., 2005; Gallagher & Taylor, 2011). Whereas high schools generally lack staff with adequate training in delivery of group-based prevention programs and time to deliver these programs, colleges typically have student health or counseling centers with clinicians who have experience delivering group interventions and an explicit mandate to offer services that addresses student health and mental health problems. Fourth, it is vital to conduct effectiveness trials with both high schools and colleges, because the original efficacy trials involved both types of schools and the nature of the providers, institutions, and students are quite different in these two settings.

Our experience with the high school effectiveness trial suggested several opportunities for improving effect sizes when endogenous clinicians deliver this prevention program under real world conditions. First, we used an enhanced training wherein facilitators performed more extended role-plays of the intervention and received feedback on how to improve their delivery, in contrast to the more didactic training used in the high school effectiveness trial. Second, we improved the supervision in two ways; we reviewed videotapes of the first group conducted by facilitators and rated sessions for intervention fidelity and therapeutic competence, which was used to provide more detailed supervision. In the high school effectiveness trial, supervision was based on reviews of audiotaped sessions (which provide no visual information or the session or participants) and not on fidelity and competence ratings. Third, we used a new enhanced dissonance version of the Body Project designed to increase the voluntary nature of participation, the level of required effort, and accountability for taking an anti-thin-ideal perspective, as these factors increase dissonance induction (Green et al., 2005). Accordingly, we initiated the first effectiveness trial to evaluate the Body Project when college clinicians recruit young women at risk for eating pathology and deliver the intervention under ecologically valid conditions at universities. To maximize effects, we worked with clinicians from universities who had more clinical experience, improved the selection, training, and supervision of the
clinicians, and used a new enhanced-dissonance version of the Body Project. Another novel feature of the present trial is that it is the first multisite trial of a dissonance eating disorder prevention program, which should enhance generalizability. Aim 1 was to examine the effects of the intervention on the primary outcomes of eating disorder risk factors and symptoms at posttest and 1-year follow-up when the Body Project was delivered under real-world conditions by clinicians responsible for mental health treatment at the colleges. Aim 2 was to examine intervention effects on the secondary outcomes of body mass index (BMI), unhealthy weight gain, psychosocial functioning, and health care utilization. Given the increasing recognition that fidelity is necessary for successfully disseminating prevention programs (Elliott & Mihalic, 2004) and the paucity of data on provider factors in effectiveness research, Aim 3 was to test whether intervention fidelity and therapeutic competence predicted the degree of change in the primary outcomes among participants in the Body Project condition.

Methods

Needs assessment

The first author conducted unstructured qualitative interviews with clinicians at four college mental health clinics, as part of a preliminary needs assessment to determine whether eating disorders are common presenting problems and whether college clinicians are involved in educational outreach or prevention efforts targeting eating disorders. These interviews indicated that college clinicians devote a large proportion of their resources to eating disorders treatment. These clinicians recognized that implementing an effective prevention program would reduce the number of hours of eating disorder treatment and leave more resources to address other physical and mental health problems. These interviews also confirmed that conducting prevention programming is standard practice for most of these centers. Colleges typically use educational programming to prevent eating disorders, which are ineffective (Stice, Shaw, & Marti, 2007): the possibility of replacing that programming with an intervention that has demonstrated effectiveness was appealing to these college clinicians.

Participants and procedure

Participants were 408 young women (M age = 21.6, SD = 5.6; M BMI [kg/m²] = 24.4, SD = 5.0) recruited from 7 universities in Oregon, Texas, and Pennsylvania. Female undergraduate and graduate students, as well as university staff, could enroll if they had body image concerns. The sample was 58% European American, 17% Asian, 13% Hispanic, 7% African American, 4% American Indian/Alaska Native, and 1% Native Hawaiian/Pacific Islander, making this the most ethnically diverse trial of the Body Project intervention. The ethnic composition of the sample closely matched the demographics at these universities (59% European American, 9% Asian, 12% Hispanic, 7% African American, 2% American Indian/Alaska Native, 1% Native Hawaiian/Pacific Islander, and 10% other/mixed). Average parental education was 14% high school graduate or less, 25% some college, 32% college graduate, and 28% advanced graduate/professional degree.

From October 2009 to October 2011 facilitators recruited participants using e-mails and posters inviting women with body image concerns to participate in a trial designed to improve body acceptance. We provided text for recruitment e-mails, which were distributed through list-serves, and recruitment fliers, which were posted around campus. Schools typically used these recruitment procedures until there were enough participants for random assignment to the two conditions each semester or quarter, rather than attempting to contact all female students. Participants had to answer yes when asked, “Do you have body image concerns?” during phone screening with research staff. Assessors collected informed written consent. Research staff excluded individuals who met criteria for DSM-IV anorexia nervosa, bulimia nervosa, or binge eating disorder at pretest. The 4 students who met criteria for these disorders were encouraged to seek treatment, provided with referrals, and told that these interventions were not sufficient for them. Fig. 1 provides data on participant flow through this trial. Participants were randomly assigned to the Body Project (n = 203) or an educational brochure control condition (n = 205) via a random number table. The Body Project consisted of 4 weekly 1-h group sessions with 5–9 participants. Facilitators delivered the intervention using a scripted manual.

The 27 facilitators held bachelors (26%), masters (48%), or doctoral (26%) degrees in psychology, counseling, nutrition, or a related field. Most were female (89%), 97% were European American, and 59% were 26–35 years of age. Facilitator training involved reading key trials of the Body Project (Stice et al., 2006, 2008) and the scripted manual, and attending a 4-h workshop to learn the

Fig. 1. Participant flow throughout study.
intervention rationale and supporting evidence, role-play intervention components, and discuss process issues (e.g., homework compliance and retention).

Participants completed assessments at pretest, posttest, and 1-year follow-up. They were paid $30, $35, and $40 for completing these three assessments, respectively. Female assessors, who had a B.A. or M.A. in psychology, were blinded to condition. Assessors attended 24 h of training, wherein they received instruction in interview skills, reviewed eating disorder diagnostic criteria, observed simulated interviews, and role-played interviews. They also attended annual refresher trainings. They had to demonstrate inter-rater agreement (kappa [k] > .80) with supervisors using 12 audio-recorded interviews conducted with individuals with and without eating disorders before collecting data. Weekly consensus meetings resolved diagnostic ambiguities. The institutional review board at each campus approved this project.

Interventions

**Body Project.** In session 1 participants volunteer to participate verbally in the session, collectively define the thin-ideal, discuss costs of pursuing this ideal, and are assigned home exercises (e.g., write a letter about the costs associated with pursuing the thin-ideal). In session 2 participants discuss each home exercise, dissuade facilitators from pursuing the thin-ideal in role-plays, and are assigned more exercises (e.g., generate a top-10 list of things young women can do to challenge the thin-ideal). In session 3 participants discuss home exercises, conduct role-plays challenging thin-ideal statements, discuss personal body image concerns, and are assigned home exercises (e.g., engage in a behavior that challenges their body image concerns). In session 4 participants discuss home exercises, plan for future pressures to be thin, discuss perceived benefits of the group, and are assigned exit home exercises (e.g., write a letter to a younger adolescent girl about avoiding development of body image concerns). Several adaptations were made to the intervention to enhance dissonance induction. To underscore the voluntary nature of the intervention, participants were (a) reminded that participation was voluntary at the start of each session and (b) told that homework was not required. To increase accountability (a) sessions were video-recorded (vs. audio-recorded), (b) participants printed and signed their name on each homework form, and (c) participants were not told that topics discussed in sessions were confidential. To increase the level of effort (a) homework assignments were made more difficult (e.g., participants were asked to generate more responses to a given question) and (b) a higher level of effort was encouraged in sessions (e.g., two role plays per participant rather than one).

**Educational brochure control condition.** Participants in the control condition received a 2-page brochure from the National Eating Disorders Association describing negative and positive body image, noting that negative body image increases risk for eating disorder onset, and offering 10 steps for achieving a positive body image. They also received a 3-page brochure from the American Psychological Association describing the eating disorders and factors associated with the development of these disorders. Brochures were sent to participants after randomization, which occurred after the pretest assessment. Participants in both conditions also were given a referral list of local mental health treatment providers with expertise in eating disorders at each assessment.

**Supervision, fidelity ratings, and competence ratings.** Supervisors reviewed videotapes of a facilitator’s first group and a randomly selected 50% of the remaining sessions. Facilitators were sent supervisory e-mail messages that praised them for positive behaviors and offered constructive suggestions. Drs. Rohde, Shaw, or Butryn independently coded a randomly selected 50% of sessions for intervention fidelity and competence. Key components of each session were rated for degree of accurate presentation (10-point scale from 1 = “No adherence; the section was skipped” to 10 = “Perfect; all material in the section was presented as written”; a score of 7 was “good”). Facilitator competence was rated with 12 items (e.g., leaders express ideas clearly and at an appropriate pace, leaders attempt to provide equal speaking time for all members) using a 10-point scale with five individualized behavioral anchors for each item (e.g., 2 = “Poor; leaders are difficult to follow and session proceeds at an uncomfortable pace” 10 = “Superior; leaders are unusually articulate and express ideas in way that all group members understand; perfect pace”; a score of 6 was considered “Good/average”). Pairs of supervisors independently rated half of the sessions selected for rating; ratings were reviewed and discrepancies resolved by consensus. Inter-rater agreement was good for fidelity (ICC = .65) and competence (ICC = .72).

**Attendance and homework completion.** For each session, attendance was recorded as absent, partial attendance (less than half of session), full attendance (at least half of session), or make-up session. Each homework assignment was recorded as not completed, some/partial completion, full completion, or did not bring materials.

**Measures**

**Thin-ideal internalization.** The 6-item Ideal-Body Stereotype Scale-Revised assessed thin-ideal internalization (Stice et al., 2006) using a response format ranging from 1 = strongly disagree to 5 = strongly agree. Items were averaged for this scale and those described below. It has shown internal consistency (α = .91), 2-week test–retest reliability (r = .80), predictive validity for bulimic symptom onset, and sensitivity to detecting intervention effects (Stice et al., 2008). The Cronbach’s α was low for the scale at pretest (α = .64); the item, Shapely women are more attractive, did not elicit responses consistent with the other items and was dropped. The remaining 5 items exhibited improved internal consistency (α = .78).

**Body dissatisfaction.** Items from the Satisfaction and Dissatisfaction with Body Parts Scale (Berscheid, Walster, & Bohlmann, 1973) assessed satisfaction with 9 body parts with a response scale ranging from 1 = extremely satisfied to 6 = extremely dissatisfied. It has shown internal consistency (α = .94), 3-week test–retest reliability (r = .90), predictive validity for bulimic symptom onset, and sensitivity to intervention effects (Stice et al., 2008); α = .89 at pretest.

**Dieting.** The 10-item Dutch Restrained Eating Scale (DRES; van Strien, Frijters, Van Staveren, Defares, & Deurenberg, 1986) assessed the frequency of dieting behaviors using a response scale ranging from 1 = never to 5 = always. It has shown internal consistency (α = .95), 2-week test–test reliability (r = .82), convergent validity with self-reported caloric intake (but not objectively measured caloric intake), predictive validity for bulimic symptom onset, and sensitivity to intervention effects (Stice et al., 2008; van Strien et al., 1986); α = .92 at pretest.

**Negative affect.** The 21-item Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988) assessed negative affect using response options ranging from 0 = no symptoms present to 5 = severe symptoms. It has shown internal consistency (α = .73 to .95), test–retest reliability (r = .60 to .90), and convergent validity with clinician ratings of depressive symptoms (M r = .75; Beck et al., 1988); α = .92 at pretest.

**Eating disorder symptoms.** The semi-structured Eating Disorder Diagnostic Interview (EDDI) assessed DSM-IV eating disorder symptoms. Items assessing symptoms in the past month were summed to form a composite. This composite has shown internal
items, which seemed most relevant to young women, have shown
project (Pinheiro & Bates, 2000, 2013). Prior to model-building, we
data, were
mographic variables (race, ethnicity, age, year in school, parental
whether conditions differed at pretest on outcomes and de-
of skewed or kurtotic distributions, we transformed data so that
values following best-practice recommendations (Graham, 2009).
was defined as the total number of hours speaking to a doctor or nurse in the past month; mental health care utili-
psychological Functioning. Psychosocial functioning in the family,
which seemed most relevant to young women, have shown internal
and evaluated potential sources of non-independence. In the event
whether intervention groups and study sites as a source of non-
and 1-year follow-up. Health care utilization was defined as the total number of hours speaking to a psychiatrist, a therapist, psychologist, or other counselor, or attending a support group. Statistical methods
Missing data. Multiple imputation was used to replace missing
frequency of care for physical, mental health, eating, and weight
issues with women aged 15–19 years in two intervention trials (Stice et al., 2006, 2008); α = .77 at pretest.
Psychosocial functioning and lifestyle. Service utilization was assessed with an adapted version of the Patterns of Help Seeking Behavior Scale (Lane & Addis, 2005). Participants reported the
variable and treatment interventions, and predictive validity for future onset of depression (Burton & Stice, 2006; Stice et al., 2009). The symptom composite showed internal consistency at pretest (α = .74), inter-
both were treated as groups of one. The significance of the level-3 variance was assessed using a
deviance test that compared models with and without level-3 variance; if the variance component was not significant, it is
removed. Following Singer and Willett (2003) when constructing the longitudinal portion of the models we (a) examined empirical growth plots; (b) fit an unconditional means model; (c) fit an unconditional
linear growth model; (d) fit unconditional non-linear models; (e) compare models of longitudinal change from the previous two steps using the Akaike Information Criterion (AIC); and (f) fit level-2 predictors and cross-level interactions. The longitudinal change model assessed elevation change (i.e., mean difference) between pretest and follow-up time points (posttest and 1-year follow-up). The longitudinal elevation and slope change model added a slope parameter to the previous model that represented change in the outcome following the intervention. We tested whether time was better represented with a natural-log and quadratic change terms.
The longitudinal elevation change model consistently had the lowest AIC values and was thus used to model time and is hence simply referred to as time. Longitudinal change in this model is
dummy coded (pretest = 0, posttest time points = 1), serving to contrast pretest values with the average across follow-up time points. The final Aim 1 model-building step added the pretest
outcome value, condition (Body Project condition = 1), and time × condition interaction. If this interaction was significant and negative, it indicated a greater decrease in the outcome among intervention versus control participants from pretest to follow-up. Aim 2 model-building used a parallel approach. The final Aim 3 model-building step (focused solely on Body Project participants) added pretest outcome, fidelity or competence ratings, and time × fidelity or time × competence interactions. Effect sizes in all aims were estimated by converting t values to Pearson’s r (Lipsey & Wilson, 2001).
Unhealthy weight transition. We tested whether there were differences in unhealthy weight transitions by examining differences in overweight (BMI > 25) or obesity (BMI > 30) onset across
conditions. These cut-points for overweight and obesity correspond to BMI values that are associated with significantly increased risk for weight-related medical problems such as diabetes mellitus (World

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pretest</th>
<th>Posttest</th>
<th>1-year follow-up</th>
</tr>
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<tr>
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<td></td>
<td></td>
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<td>3.85 (0.55)</td>
<td>3.80 (0.55)</td>
<td>3.74 (0.65)</td>
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<td>3.43 (0.68)</td>
<td>3.53 (0.61)</td>
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<td>3.31 (0.70)</td>
<td>3.16 (0.72)</td>
<td>3.09 (0.75)</td>
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<td>3.40 (0.73)</td>
<td>2.81 (0.76)</td>
<td>2.80 (0.79)</td>
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<td>Dieting</td>
<td>2.76 (0.87)</td>
<td>2.58 (0.87)</td>
<td>2.56 (0.87)</td>
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<td>2.25 (0.90)</td>
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<td>Negative affect</td>
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<td>7.73 (8.18)</td>
<td>8.06 (8.12)</td>
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<td>Eating disorder symptoms</td>
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<td>9.53 (10.13)</td>
<td>10.13 (9.96)</td>
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<td>7.47 (8.52)</td>
<td>10.47 (21.96)</td>
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<td>24.07 (5.28)</td>
<td>24.28 (5.61)</td>
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<td>25.05 (5.24)</td>
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<td>1.53 (3.75)</td>
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<td>1.72 (5.96)</td>
<td>1.41 (3.86)</td>
<td>3.02 (23.73)</td>
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Health Organization, 2000). We coded participants as having an unhealthy weight transition if they were (a) healthy weight as baseline and overweight at a follow-up assessment, (b) healthy weight as baseline and obese at a follow-up assessment, or (c) overweight as baseline and obese at a follow-up assessment. Unhealthy weight transition was regressed on condition in a logistic regression model.

Results

Preliminary analyses. The distributions of our dependent variables approximated normality, with the exceptions of negative affect, eating disorder symptoms, health care utilization, and mental health care utilization. We applied natural log transformations to these variables. Participants in the intervention and brochure control conditions did not differ significantly on demographics or pretest values of the outcomes; Table 1 provides means and SD for outcomes at each time point across conditions. Data were complete at pretest, 1% were missing at posttest, and 8% were missing at the 1-year follow-up.

Participants in the Body Project group condition attended an average of 3.4 sessions (SD = 0.95); 62% attended all 4 sessions and 5% attended less than 2 sessions. Most participants (87%) received an individual make-up session if they missed a session. The average number of make-up sessions was 0.31 (SD = 0.58). Participants completed 87% of the assigned home exercises. Neither attendance or homework completion predicted change in the outcomes, potentially due to ceiling effects.

Our evaluation of group as a potential level-3 random variable indicated no significant variability across groups in mean levels of the outcomes. However, there was significant variability in the dieting and eating disorder symptoms outcomes across sites. All outcomes were modeled as two-level models in which time points were nested within individuals with the exception of dieting and eating disorder symptoms, which had a level-3 random effect for site.

Results for Aim 1 are presented in Table 2. There was a significant effect for the condition \times time term for thin-ideal internalization (t(385) = −7.21, p < .001), body dissatisfaction (t(392) = −7.12, p < .001), dieting (t(391) = −6.88, p < .001), negative affect (t(398) = −5.28, p < .001), and eating disorder symptoms (t(395) = −5.62, p < .001). In each case, the interaction indicated that the decrease between pretest and the two follow-up measures was greater for Body Project participants than brochure control participants.

Results for Aim 2 are presented in Table 3. There was a significant condition \times time effect for psychosocial functioning (t(393) = −4.25, p < .001), indicating greater improvements in intervention versus control participants over follow-up. However, the condition \times time effect was not significant for BMI (t(394) = 1.54, p = .123), health care utilization (t(395) = −0.25, p = .802), or mental health care utilization (t(388) = 0.66, p = .512). Further, there were no differences between conditions in terms of unhealthy weight transitions (z = 1.54, p = .124).

Regarding treatment fidelity and facilitator competence, mean fidelity was 7.37 (SD = 0.63) and mean competence was 7.12 (SD = 0.80) on the 1–10 point scales, suggesting that on average all key concepts of the various session sections were presented with good or very good therapist competence. We computed the percentage of ratings that were considered inadequate (ratings lower than 4 on a 10-point scale) and found very low rates of either problematic fidelity (1.6%) or competence (2.3%). Neither fidelity nor competence interacted with time, providing no evidence that the change in outcomes were associated with either fidelity or competence.

Discussion

This is the first effectiveness trial that evaluated the Body Project when endogenous college clinicians recruit high-risk female college students for this selective eating disorder prevention program and deliver it under ecologically valid conditions in typical service provision settings. It is also the first multisite trial of a dissonance-based eating disorder prevention program, which should increase the generalizability of the findings. Results indicated that the Body Project produced significantly greater reductions in eating disorder risk factors and symptoms than observed in educational brochure controls. The effect sizes (Table 4) indicate that these effects were clinically significant at posttest, accounting for an average of more than half a standard deviation change in the outcomes (M d = .60), and remained so at 1-year follow-up, accounting for almost half a standard deviation in change in the outcomes (M d = .45). As such, this study extends the findings from the only other effectiveness trial, which evaluated whether the Body Project significantly outperformed an educational brochure control condition when high school clinicians recruited female students and delivered the prevention program in typical service provision settings (Stice et al., 2009, 2011). Critically, the present trial indicated that the average effect for the primary outcomes was a d = .53 at posttest and 1-year follow-up. This is 83% larger than the parallel effects observed in the high school effectiveness trial (Stice et al., 2009), which observed an average d = .29 at posttest and 1-year follow-up. It is also noteworthy that the present effects were 41% larger than
Results also provided evidence that the Body Project produced significant improvements in psychosocial functioning relative to the control condition. This is important because it suggests that this brief group-based intervention improved functioning in the family, peer, school, and work domains, producing effects that persisted through at least 1-year follow-up. It is possible that the reductions in body dissatisfaction, negative affect, and eating disorder symptoms from participating in the Body Project increased the participant’s comfort in social engagement and ability to focus on school and/or work, which improved relations with family, peers, teachers, and co-workers that account for the improved functioning in these domains. This finding is novel in that only one previous trial has found improvements in psychosocial functioning from an eating disorder prevention program: The Body Project improved psychosocial functioning through 3-year follow-up relative to assessment-only controls and two alternative active interventions in our large efficacy trial (Stice et al., 2008). The fact that the previous high school effectiveness trial did not observe significant effects for psychosocial functioning (Stice et al., 2011), suggests that the steps we took to improve intervention effects from the Body Project in the present trial may have contributed to improved effects regarding this psychologically valid outcome that represents a key aspect of eating disordered impairment.

However, the Body Project did not significantly reduce onset of overweight/obesity or health care utilization. This intervention significantly reduced obesity onset and health care utilization in the prior high school/college efficacy trial (Stice et al., 2006), but not in the prior high school effectiveness trial (Stice et al., 2011). The pattern of findings suggests that although the intervention typically reduces eating disorder symptoms, including binge eating, this prevention effect does not translate into measureable reductions in unhealthy weight gain. It also implies that it is particularly challenging to reduce health and mental health care utilization with brief prevention programs. To our knowledge, only two eating disorder prevention programs have significantly reduced unhealthy weight gain (c.f., Jones et al., 2008; Stice et al., 2006, 2008) and no other eating disorder prevention program has significantly reduced health care utilization.

One factor that may have contributed to the robust intervention effects was the high attendance and home exercise completion. Mean attendance was 3.4 sessions and 62% of participants attended all 4 Body Project sessions with only 5% attending less than 2 sessions. Further, 67% of intervention participants completed make-up sessions if they missed a session, which reviewed intervention material and instructions for the home exercises before the next session. Participants also completed 87% of the home exercises. Attendance and home exercise completion in this college effectiveness trial were roughly comparable to the high school effectiveness trial (Stice et al., 2009). Attendance in both Body Project trials was lower than in a trial of a universal prevention delivered as part of the middle-school curriculum (96%; McVey, Lieberman, Voorberg, Wardrope, & Blackmore, 2003) and a trial of a mandated universal prevention program offered to sorority members (90%; Becker et al., 2008); we could not locate other trials that reported attendance rates. Attendance or engagement data were not provided for prior prevention programs that produced enduring reductions in eating disorder symptoms, but relatively brief (6- to 10-week) universal prevention programs embedded into normal classroom settings appear to achieve high delivery rates (e.g., Neumark-Sztainer et al., 1995; Stewart et al., 2001), whereas programs that were self-directed or optional have much lower rates of receipt (e.g., only 27% of participants assigned to a 16-week Internet-facilitated intervention used components of the program for 8 or more weeks and 31% failed to log onto the program at all, Jones et al., 2008; only 58% of girls randomized to a
The current results suggest that the dissonance-based Body Project can produce clinically meaningful and persistent reductions in eating disorder risk factors and symptoms, and improvements in psychosocial functioning when college clinicians recruit at-risk young women and deliver this prevention program in extant campus service provision settings. It might be prudent to use the new enhanced dissonance version of the Body Project, work with college clinicians, who seem better positioned to implement a group-based prevention program than high school clinicians, deliver the intervention to high-risk college students, and use the new improved facilitator selection, training, and supervision procedures described herein given that it is not possible to determine which of these factors contributed to the larger effects in this trial. Although the latter may increase the cost of implementation, it seems justified, given the stronger and more widespread intervention effects found in the present trial.

One important direction for future research is to evaluate additional methods for enhancing the effects of the Body Project even further under real-world service provision settings. For instance, it might be useful for participants to discuss the health and emotional costs of engaging in eating disordered behaviors (e.g., binge eating, use of compensatory behaviors) to foster dissonance regarding engaging in these behaviors. Future research should also compare participants who complete the Body Project but still show future onset of an eating disorder to intervention participants who do not, in an effort to identify pre-existing or residual risk factors that need to be targeted to further increase the yield of prevention efforts. Lastly, it would be useful to create a dissonance-based eating disorder prevention program that can be implemented in early adolescence, as risk factors often escalate during this developmental period.

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References


