Behaviour Research and Therapy 51 (2013) 862–871

Contents lists available at ScienceDirect

Behaviour Research and Therapy

journal homepage: www.elsevier.com/locate/brat

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

Eric Stice [a,*], Meghan L. Butryn [b], Paul Rohde [a], Heather Shaw [a], C. Nathan Marti [a]

[a] Oregon Research Institute, 1776 Millrace Drive, Eugene, OR 97403, USA
[b] Department of Psychology, Drexel University, 3141 Chestnut St., Philadelphia, PA 19104, USA

ARTICLE INFO

Article history:
Received 1 August 2013
Received in revised form
3 October 2013
Accepted 11 October 2013

Keywords:
Prevention
Body dissatisfaction
Eating disorder
Effectiveness trial
Dissonance

ABSTRACT

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.

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 publically 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

* Corresponding author. Tel.: +1 541 484 2123; fax: +1 541 484 1108.
E-mail addresses: stice@psy.utexas.edu, estice@ori.org (E. Stice).

0005-7967/$ – see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.brat.2013.10.003

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, Spoor, 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; Matusek, 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, Scott, Diyankova, Gasser, & Pederson, 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 homogenous. 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 one[1] 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

[1] Becker and associates have conducted several trials that have compared the effects of a version of the *Body Project* that was adwapted for sorority members to the effects of another eating disorder prevention program when both group-based interventions were delivered by peer leaders (Becker, Bull, Schaumberg, Cauble, & Franco, 2008; Becker, Smith, & Ciao, 2006; Becker et al., 2010). These trials have features of effectiveness research, such as the fact that the interventions were delivered by non-research staff, and have established that peer-leaders can be used to broadly disseminate this prevention program. However, these trials differ from typical effectiveness trials in that they (a) did not evaluate the effects of interventions when delivered by endogenous clinicians under real world service provision settings, (b) recruited from a narrow/targeted segment of population (they focused solely on sorority members rather than college students more broadly), and (c) did not involve any type of usual care control condition that is typically used in colleges (e.g., an educational brochure control condition).

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 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/m^2] = 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

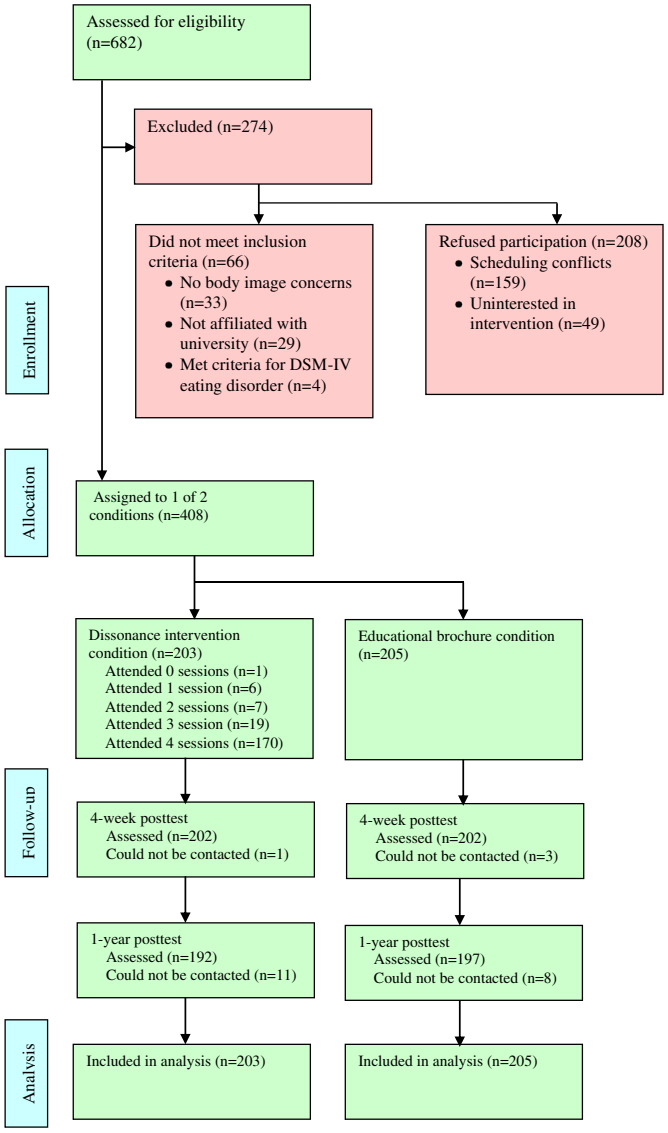

Fig. 1. Participant flow throughout study.

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 an essay 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, & Bohrnstedt, 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–retest 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 3 = 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

consistency (α = .92), inter-rater agreement (ICC r = .93), 1-week test–retest reliability (ICC r = .95), sensitivity to prevention 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-rater agreement for 77 randomly selected participants (ICC = .84), and 1-week test–retest reliability for 75 randomly selected participants (ICC = .95).

Psychosocial Functioning. Psychosocial functioning in the family, peer, school, and work spheres was assessed with items adapted from the Social Adjustment Scale (SAS; Weissman & Bothwell, 1976) using response scales ranging from 1 = *never* to 5 = *always*. The original SAS has shown convergent validity with clinician and collateral ratings ($M r$ = .72), discriminant validity, and treatment sensitivity (Weissman & Bothwell, 1976). The adapted items, which seemed most relevant to young women, have shown internal consistency (α = .77), 1-week test–retest reliability (r = .83), and sensitivity to intervention effects in multiple prevention trials (Stice et al., 2006, 2008); α = .77 at pretest.

Health and mental health care utilization. Service utilization was assessed with an adapted version of the Patterns of Help Seeking Behavior Scale (Lane & Addis, 2005). Participants reported the frequency of care for physical, mental health, eating, and weight problems in the past year at pretest and 1-year follow-up. Health care utilization was defined as the total number of hours speaking to a doctor or nurse in the past month; mental 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.

Table 1
Means and standard deviations for outcomes by condition at pretest, posttest, and 1-year follow-up.

Variable	Pretest	Posttest	1-year follow-up
Thin-ideal internalization			
Brochure controls	3.85 (0.55)	3.80 (0.55)	3.74 (0.65)
Body Project	3.90 (0.58)	3.43 (0.68)	3.53 (0.61)
Body dissatisfaction			
Brochure controls	3.31 (0.70)	3.16 (0.72)	3.09 (0.75)
Body Project	3.40 (0.73)	2.81 (0.76)	2.80 (0.79)
Dieting			
Brochure controls	2.76 (0.87)	2.58 (0.87)	2.56 (0.87)
Body Project	2.87 (0.88)	2.25 (0.90)	2.26 (0.85)
Negative affect			
Brochure controls	11.59 (8.59)	10.43 (8.59)	9.90 (9.2)
Body Project	12.53 (9.07)	7.73 (8.18)	8.06 (8.12)
Eating disorder symptoms			
Brochure controls	10.99 (9.03)	9.53 (10.13)	10.13 (9.96)
Body Project	12.70 (10.53)	7.47 (8.52)	10.47 (21.96)
BMI			
Brochure controls	24.15 (5.36)	24.07 (5.28)	24.28 (5.61)
Body Project	24.72 (4.69)	24.98 (5.22)	25.05 (5.24)
Psychosocial functioning			
Brochure controls	2.22 (0.48)	2.16 (0.49)	2.17 (0.50)
Body Project	2.27 (0.47)	2.05 (0.45)	2.07 (0.49)
Health service utilization			
Brochure controls	1.66 (5.62)	0.86 (2.51)	1.53 (3.75)
Body Project	1.18 (2.16)	0.90 (2.81)	1.07 (2.38)
Mental health service utilization			
Brochure controls	2.03 (5.89)	1.37 (4.39)	1.76 (6.18)
Body Project	1.72 (5.96)	1.41 (3.86)	3.02 (23.73)

Statistical methods

Missing data. Multiple imputation was used to replace missing values following best-practice recommendations (Graham, 2009). Missing data were imputed with the Amelia package of the R project (Honaker, King, & Blackwell, 2010), which uses all available data to impute missing data via a bootstrapping approach. The observed and imputed data were compared to ensure they showed similar distributions (Abayomi, Gelman, & Levy, 2008). Missing data points were replaced with imputed data in 20 data sets, which were analyzed separately. Model parameters and standard errors, which incorporate within and between model parameter variability, were combined following Rubin (1987).

Preliminary analyses. We examined the distribution of variables and evaluated potential sources of non-independence. In the event of skewed or kurtotic distributions, we transformed data so that distributions better approximated normal distributions. We tested whether conditions differed at pretest on outcomes and demographic variables (race, ethnicity, age, year in school, parental education) to test whether randomization created equivalent groups.

Model building. Linear mixed effects models, which accommodate multilevel data structures and unevenly spaced longitudinal data, were fit with the lme function in the nlme package from the R project (Pinheiro & Bates, 2000, 2013). Prior to model-building, we examined intervention groups and study sites as a source of non-independence, which we modeled as level-3 grouping factors in a multilevel structure, in which level-1 units were time points, and level-2 units were participants (Raudenbush & Bryk, 2002). We fit unconditional means models with person nested within group and unconditional means models with person nested within site. For models evaluating group effects, controls 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 elevation 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

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 (67%) 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 × 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 × 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 × 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.

Table 2
Intervention effects for primary outcomes.

Outcome	Parameter	Coefficient	95% Confidence Interval	*r*	*p*
Thin-ideal internalization	Intercept	0.76	(0.57, 0.94)	.38	<.001
	Pretest thin-ideal internalization	0.80	(0.76, 0.85)	.87	<.001
	Time	−0.08	(0.14, −0.02)	−.13	.012
	Condition	0.01	(0.07, 0.09)	.01	.788
	Time × condition	−0.33	(0.42, −0.24)	−.34	<.001
Body dissatisfaction	Intercept	0.71	(0.56, 0.87)	.42	<.001
	Pretest body dissatisfaction	0.78	(0.74, 0.83)	.88	<.001
	Time	−0.18	(0.26, −0.10)	−.22	<.001
	Condition	0.02	(0.07, 0.12)	.02	.668
	Time × condition	−0.41	(0.52, −0.30)	−.34	<.001
Dieting	Intercept	0.53	(0.40, 0.65)	.38	<.001
	Pretest dieting	0.81	(0.77, 0.85)	.90	<.001
	Time	−0.18	(0.27, −0.10)	−.22	<.001
	Condition	0.02	(0.08, 0.12)	.02	.700
	Time × condition	−0.41	(0.52, −0.29)	−.33	<.001
Negative affect	Intercept	0.37	(0.22, 0.51)	.25	<.001
	Pretest negative affect	0.84	(0.79, 0.89)	.86	<.001
	Time	−0.2	(0.30, −0.11)	−.21	<.001
	Condition	0.01	(0.10, 0.13)	.01	.805
	Time × condition	−0.36	(0.49, −0.23)	−.26	<.001
Eating disorder symptoms	Intercept	0.46	(0.33, 0.59)	.33	<.001
	Pretest eating disorder symptoms	0.79	(0.74, 0.84)	.85	<.001
	Time	−0.15	(0.24, −0.07)	−.18	<.001
	Condition	0.02	(0.08, 0.13)	.02	.637
	Time × condition	−0.33	(0.45, −0.22)	−.27	<.001

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

Table 3
Intervention effects for secondary outcomes.

Outcome	Parameter	Coefficient	95% Confidence Interval	r	p
BMI	Intercept	0.25	(−0.08, 0.57)	0.08	0.134
	Pretest BMI	0.99	(0.98, 1.00)	0.99	<0.001
	Time	0.01	(−0.15, 0.17)	0.01	0.904
	Condition	0.01	(−0.19, 0.20)	0.00	0.946
	Time × condition	0.18	(−0.05, 0.41)	0.08	0.123
Psychosocial functioning	Intercept	0.51	(0.41, 0.61)	0.46	<0.001
	Pretest social functioning	0.77	(0.73, 0.81)	0.89	<0.001
	Time	−0.05	(−0.10, 0.00)	−0.09	0.075
	Condition	0.01	(−0.05, 0.07)	0.02	0.685
	Time × condition	−0.16	(−0.23, −0.09)	−0.21	<0.001
Health service utilization	Intercept	0.27	(0.19, 0.36)	0.31	<0.001
	Pretest health service utilization	0.49	(0.45, 0.54)	0.72	<0.001
	Time	−0.11	(−0.21, −0.02)	−0.11	0.024
	Condition	−0.01	(−0.12, 0.11)	−0.01	0.896
	Time × condition	−0.02	(−0.16, 0.12)	−0.01	0.802
Mental health service utilization	Intercept	0.16	(0.07, 0.24)	0.17	<0.001
	Pretest mental health service utilization	0.66	(0.62, 0.71)	0.86	<0.001
	Time	−0.07	(−0.17, 0.04)	−0.06	0.203
	Condition	−0.02	(−0.14, 0.10)	−0.02	0.752
	Time × condition	0.05	(−0.10, 0.20)	0.03	0.512

those from the large-scale efficacy trial (Stice et al., 2006), which observed an average $d = .41$ at posttest and 1-year follow-up.

It is difficult to discern whether the larger effects emerged in the present effectiveness trial because we (a) used the new enhanced dissonance version of the *Body Project,* (b) improved selection, training, and supervision procedures with clinicians, (c) worked with college clinicians who had greater expertise delivering group-based interventions than their high school counterparts, or (d) intervened with college rather than high school students. As such, results imply that it would be important to use the new enhanced dissonance script; employ the new selection, training, and supervision procedures; and work with clinicians who have the training and mandate to prevent mental health disorders. Although it was possible that the present trial produced larger effects than the high school effectiveness trial because the current participants were at higher risk, the average eating disorder symptoms score at pretest was 11.8 ($SD = 9.8$) in the college sample versus 10.3 ($SD = 11.9$) in the high school sample (a non-significant difference), suggesting that the two samples were similar in this regard.

More broadly, the average effect size for eating disorder risk factors and symptoms through 1-year follow-up ($M\ d = .45$) compares favorably with the parallel average effect size ($M\ d = .28$) for the other eating disorder prevention programs that have produced significant intervention effects on eating disorder symptoms through at least 6-month follow-up (Jones et al., 2008; McVey et al., 2007; Neumark-Sztainer et al., 1995; Stewart et al., 2001), particularly given that these latter studies were all efficacy trials that used assessment-only control conditions in which participants did not even receive educational material about body image concerns and eating disorders. This suggests that dissonance-based prevention programs are more effective in reducing eating disorder symptoms than alternative interventions which contain similar content components but lack the dissonance-induction element.

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 ecologically valid outcome that represents a key area of eating disorder-related 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

Table 4
Effect sizes (Cohen's *d*) for change in outcome in the intervention group relative to the brochure control group.

Outcome	Pre-to-post	Pre-to-1-year follow-up
Thin-ideal internalization	−0.77	−0.48
Body dissatisfaction	−0.64	−0.54
Dieting	−0.50	−0.47
Negative affect	−0.53	−0.38
Eating disorder symptoms	−0.54	−0.40
Psychosocial functioning	−0.34	−0.32

multi-component 8-month school intervention attended the 12-week peer support group, McVey et al., 2007). However, neither attendance nor home exercise completion in the present study predicted change in the outcomes.

The third aim was to examine whether intervention fidelity and therapeutic competence predicted change in the primary outcomes among *Body Project* participants when a fairly large sample of natural providers (i.e., 27 clinicians across 7 universities) provided the intervention. Contrary to expectations, neither adherence nor competence correlated with change in the primary outcomes. There has been an emphasis on assessing treatment fidelity to accurately interpret treatment effects and improve the science of behavioral research (Gearing et al., 2011) and some data indicate that fidelity to an empirically based treatment is essential for producing effects in real world settings. For example, treatment fidelity was poor when community therapists implemented multisystemic therapy without ongoing supervision from experts and low fidelity scores were associated with poorer outcomes (Henggeler, Melton, Brondino, Scherer, & Hanley, 1997). Few studies have examined whether therapist competence predicts treatment outcome, and results are often nonsignificant (e.g., Barber et al., 2006), potentially due to the difficulty of reliably rating competence (Hogue et al., 2008). A meta-analysis found that neither fidelity nor competence significantly predicted change in outcomes for individual psychotherapy (Webb, DeRubeis, & Barber, 2010), prompting the authors to note that these effect sizes may have been limited by measurement unreliability and restricted ranges due to careful therapist selection and supervision. Even less research has examined fidelity in prevention research (Mihalic, 2004). However, there is increasing recognition that the monitoring of fidelity is necessary for the effective dissemination of prevention programs (e.g., Elliott & Mihalic, 2004) and some indication that prevention programs are only effective when implemented with high fidelity (Kam, Greenberg, & Walls, 2003). Facilitators in the present study received a high level of supervision, and adherence and competence scores did not have much variance, potentially contributing to the lack of relations with change in outcomes.

Limitations

When interpreting the present findings it is important to consider limitations of this study. First, the educational brochure control conditions did not control for expectations, demand characteristics, or non-specific factors (e.g., group support). This seemed reasonable given that the *Body Project* has been found to significantly outperform healthy weight control interventions, a media literacy intervention, an educational video condition, an expressive writing intervention, and a low-dissonance version of this intervention (Becker et al., 2005, 2010; Green et al., 2005; McMillan et al., 2011; Stice et al., 2006, 2012). Second, despite the fact that this sample was more heterogeneous than those used in past trials, we had a limited number of several ethnic groups, suggesting that findings should not be generalized to those groups that were not well-represented in our sample. Third, because we only worked in state and private 4-year colleges, findings should be generalized with caution to other types of colleges, such as community colleges.

Implications for prevention and future research

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 clinicans 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.

Acknowledgments

This study was supported by Grant MH086582 from the National Institute of Mental Health.

We thank Shelley Durant, Stephanie Kerrigan, Madeline Kirch, and Emily Wade for being exemplary project coordinators for the various study sites.

References

Abayomi, K., Gelman, A., & Levy, M. (2008). Diagnostics for multivariate imputations. *Journal of the Royal Statistical Society: Series C (Applied Statistics), 57*, 273–291. http://dx.doi.org/10.1111/j.1467-9876.2007.00613.x.

Arcelus, J., Mitchell, A., Wales, J., & Nielsen, S. (2011). Mortality rates in patients with anorexia nervosa and other eating disorders: a meta-analysis of 36 studies. *Archives of General Psychiatry, 68*, 724–731. http://dx.doi.org/10.1001/archgenpsychiatry.2011.74.

Barber, J., Gallop, R., Crits-Christoph, P., Frank, A., Thase, M., Weiss, R., et al. (2006). The role of therapist adherence, therapist competence, and alliance in predicting outcome of individual drug counseling: results from the National Institute on Drug Abuse Collaborative Cocaine Treatment Study. *Psychotherapy Research, 16*, 229–240.

Beck, A., Steer, R., & Garbin, M. (1988). Psychometric properties of the Beck Depression Inventory: twenty-five years later. *Clinical Psychology Review, 8*, 77–100. http://dx.doi.org/10.1016/0272-7358(88)90050-5.

Becker, C., Bull, S., Schaumberg, K., Cauble, A., & Franco, A. (2008). Effectiveness of peer-led eating disorders prevention: a replication trial. *Journal of Consulting and Clinical Psychology, 76*, 347–354. http://dx.doi.org/10.1016/j.brat.2013.01.004.

Becker, C., Smith, L., & Ciao, A. (2005). Reducing eating disorder risk factors in sorority members: a randomized trial. *Behavior Therapy, 36*, 245–254. http://dx.doi.org/10.1016/S0005-7894(05)80073-5.

Becker, C., Smith, L., & Ciao, A. (2006). Peer facilitated eating disorders prevention: a randomized effectiveness trial of cognitive dissonance and media advocacy. *Journal of Counseling Psychology, 53*, 550–555. http://dx.doi.org/10.1037/0022-0167.53.4.550.

Becker, C., Wilson, C., Williams, A., Kelly, M., McDaniel, L., & Elmquist, J. (2010). Peer-facilitated cognitive dissonance versus healthy weight eating disorders prevention: a randomized comparison. *Body Image, 7*, 280–288. http://dx.doi.org/10.1016/j.bodyim.2010.06.004.

Berscheid, E., Walster, E., & Bohrnstedt, G. (1973). The happy American body: a survey report. *Psychology Today, 7*, 119–131. Retrieved from http://www.psychologytoday.com/.

Burton, E., & Stice, E. (2006). Evaluation of a healthy-weight treatment program for bulimia nervosa: a preliminary randomized trial. *Behaviour Research and Therapy, 44*, 1727–1738. http://dx.doi.org/10.1016/j.brat.2005.12.008.

Clarke, G. (1995). Improving the transition from basic efficacy research to effectiveness studies: methodological issues and procedures. *Journal of Consulting and Clinical Psychology, 63*, 718–725. http://dx.doi.org/10.1037/0022-006X.63.5.718.

Crow, S., Peterson, C., Swanson, S., Raymond, N., Specker, S., Eckert, E., et al. (2009). Increased mortality in bulimia nervosa and other eating disorders. *American Journal of Psychiatry, 166*, 1342–1346. http://dx.doi.org/10.1176/appi.ajp.2009.09020247.

Elliott, D., & Mihalic, S. (2004). Issues in disseminating and replicating effective prevention programs. *Prevention Science, 5*, 47–53.

Flay, B. (1986). Efficacy and effectiveness trials (and other phases of research) in the development of health promotion programs. *Preventive Medicine, 15*, 451–474. http://dx.doi.org/10.1016/0091-7435(86)90024-1.

Foster, S., Rollefson, M., Doksum, T., Noonan, D., Robinson, G., & Teich, J. (2005). *School mental health services in the United States 2002–2003*. DHHS Pub. No. (SMA) 05–4068. Rockville, MD: Center for Mental Health Services, Substance Abuse and Mental Health Services Administration.

Gallagher, R., & Taylor, R. (2011). *National Survey of Counseling Center Directors 2011*. Monograph Series Number 8T. Pittsburgh, PA: The International Association of Counseling Services, Inc. Retrieved from http://www.iacsinc.org/2011%20NSCCD.pdf.

Gearing, R., El-Bassel, N., Ghesquiere, A., Baldwin, S., Gillies, J., & Ngeow, E. (2011). Major ingredients of fidelity: a review and scientific guide to improving quality of intervention research implementation. *Clinical Psychology Review, 31*, 79–88.

Graham, J. (2009). Missing data analysis: making it work in the real world. *Annual Review of Psychology, 60*, 549–576. http://dx.doi.org/10.1146/annurev.psych.58.110405.085530.

Green, M., Scott, N., Diyankova, I., Gasser, C., & Pederson, E. (2005). Eating disorder prevention: an experimental comparison of high level dissonance, low level dissonance, and no-treatment control. *Eating Disorders, 13*, 157–169. http://dx.doi.org/10.1037/a0024351.

Halliwell, E., & Diedrichs, P. (2013). Brief report: testing a dissonance body image intervention among young girls. *Healthy Psychology*.

Henggeler, S., Melton, G., Brondino, M., Scherer, D., & Hanley, J. (1997). Multisystemic therapy with violent and chronic juvenile offenders and their families: the role of treatment fidelity in successful dissemination. *Journal of Consulting and Clinical Psychology, 65*, 821–833.

Hoagwood, K., & Olin, S. (2002). The NIMH blueprint for change report: research priorities in child and adolescent mental health. *Journal of the American Academy of Child & Adolescent Psychiatry, 41*, 760–767. http://dx.doi.org/10.1097/00004583-200207000-00006.

Hogue, A., Henderson, C., Dauber, S., Barajas, P., Fried, A., & Liddle, H. (2008). Treatment adherence, competence, and outcome in individual and family therapy for adolescent behavior problems. *Journal of Consulting and Clinical Psychology, 76*, 544–555.

Honaker, J., King, G., & Blackwell, M. (2010). *Amelia II: A program for missing data (Version 1.2–18) [Computer program and manual]*. Retrieved November 4, 2010, from http://cran.r-project.org/web/packages/Amelia/Amelia.pdf.

Hudson, J., Hiripi, E., Pope, H., & Kessler, R. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological Psychiatry, 61*, 348–358. http://dx.doi.org/10.1016/j.biopsych.2006.03.040.

Johnson, F., & Wardle, J. (2005). Dietary restraint, body dissatisfaction, and psychological distress: a prospective analysis. *Journal of Abnormal Psychology, 114*, 119–124. http://dx.doi.org/10.1037/0021-843X.114.1.119.

Jones, M., Luce, K., Osborne, M., Taylor, K., Cunning, D., Doyle, A., et al. (2008). Randomized, controlled trial of an Internet-facilitated intervention for reducing binge eating and overweight in adolescents. *Pediatrics, 121*, 453–462. http://dx.doi.org/10.1542/peds.2007-1173.

Kam, C., Greenberg, M., & Walls, C. (2003). Examining the role of implementation quality in school-based prevention using the PATHS curriculum. *Prevention Science, 4*, 55–63.

Killen, J., Taylor, C., Hayward, C., Haydel, K., Wilson, D., Hammer, L., et al. (1996). Weight concerns influence the development of eating disorders: a 4-year prospective study. *Journal of Consulting and Clinical Psychology, 64*, 936–940. http://dx.doi.org/10.1037/0022-006X.64.5.936.

Lane, J., & Addis, M. (2005). Male gender role conflict and patterns of help seeking in Costa Rica and the United States. *Psychology of Men and Masculinity, 6*, 155–168. http://dx.doi.org/10.1037/1524-9220.6.3.155.

Lewinsohn, P., Striegel-Moore, R., & Seeley, J. (2000). Epidemiology and natural course of eating disorders in young women from adolescence to young adulthood. *Journal of the American Academy of Child and Adolescent Psychiatry, 39*, 1284–1292. http://dx.doi.org/10.1097/00004583-200010000-00016.

Lipsey, M., & Wilson, D. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage.

Matusek, J., Wendt, S., & Wiseman, C. (2004). Dissonance thin-ideal and didactic healthy behavior eating disorder prevention programs: results from a controlled trial. *International Journal of Eating Disorders, 36*, 376–388. http://dx.doi.org/10.1002/eat.20059.

McMillan, W., Stice, E., & Rohde, P. (2011). High- and low-level dissonance-based eating disorder prevention programs with young women with body image concerns: an experimental trial. *Journal of Consulting and Clinical Psychology, 79*, 129–134. http://dx.doi.org/10.1037/a0022143.

McVey, G. L., Lieberman, M., Voorberg, N., Wardrope, D., & Blackmore, E. (2003). School-based peer support groups: a new approach to the prevention of disordered eating. *Eating Disorders: Journal of Treatment and Prevention, 11*, 187–195.

McVey, G., Tweed, S., & Blackmore, E. (2007). Healthy schools-healthy kids: a controlled evaluation of a comprehensive eating disorder prevention program. *Body Image, 4*, 115–136. http://dx.doi.org/10.1016/j.bodyim.2007.01.004.

Mihalic, S. (2004). The importance of implementation fidelity. *Emotional and Behavioral Disorders in Youth, 4*, 83–105.

Mitchell, K., Mazzeo, S., Rausch, S., & Cooke, K. (2007). Innovative interventions for disordered eating: evaluating dissonance-based and yoga interventions. *International Journal of Eating Disorders, 40*, 120–128. http://dx.doi.org/10.1002/eat.20282.

Neumark-Sztainer, D., Butler, R., & Palti, H. (1995). Eating disturbances among adolescent girls: evaluation of a school-based primary prevention program. *Journal of Nutrition Education, 27*, 24–31. http://dx.doi.org/10.1016/S0022-3182(12)80262-7.

Newton, N., Conrod, P., Teesson, M., & Faggiano, F. (2012). School-based alcohol and other drug prevention. In J. Verster, K. Brady, & M. Galanter (Eds.), *Drug abuse and addiction in medical illness: Causes, consequences, and treatment* (pp. 545–560). New York: Springer.

Pinheiro, J., & Bates, D. (2000). *Mixed-effects models in S and S-PLUS*. New York, NY: Springer-Verlag.

Pinheiro, J., & Bates, D. (2013). *nlme (Version 3.1–108) [Computer program and manual]*. Retrieved January 16, 2013, from http://cran.r-project.org/web/packages/nlme/nlme.pdf.

Raudenbush, S., & Bryk, A. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: SAGE.

Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys*. New York: John Wiley & Sons, Inc.

Seidel, A., Presnell, K., & Rosenfield, D. (2009). Mediators in the dissonance eating disorder prevention program. *Behaviour Research and Therapy, 47*, 645–653. http://dx.doi.org/10.1016/j.brat.2009.04.007.

Singer, J., & Willett, J. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York: Oxford University Press.

Stewart, D., Carter, J., Drinkwater, J., Hainsworth, J., & Fairburn, C. (2001). Modification of eating attitudes and behavior in adolescent girls: a controlled study. *International Journal of Eating Disorders, 29*, 107–118. http://dx.doi.org/10.1002/1098-108X(200103)29:2<107::AID-EAT1000>3.0.CO;2–1.

Stice, E., Marti, C., & Rohde, P. (2013). Prevalence, incidence, impairment, and course of the proposed DSM-5 eating disorder diagnoses in an 8-year prospective community study of young women. *Journal of Abnormal Psychology*. http://dx.doi.org/10.1037/a0030679.

Stice, E., Marti, C., Spoor, S., Presnell, K., & Shaw, H. (2008). Dissonance and healthy weight eating disorder prevention programs: long-term effects from a randomized efficacy trial. *Journal of Consulting and Clinical Psychology, 76*, 329–340. http://dx.doi.org/10.1037/0022-006X.76.2.329.

Stice, E., Mazotti, L., Weibel, D., & Agras, W. S. (2000). Dissonance prevention program decreases thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms: a preliminary experiment. *International Journal of Eating Disorders, 27*, 206–217. http://dx.doi.org/10.1002/(SICI)1098-108X(200003)27:2<206::AID-EAT9>3.0.CO;2-D.

Stice, E., Presnell, K., Gau, J., & Shaw, H. (2007). Testing mediators of intervention effects in randomized controlled trials: an evaluation of two eating disorder prevention programs. *Journal of Consulting and Clinical Psychology, 75*, 20–32.

Stice, E., Rohde, P., Durant, S., & Shaw, H. (2012). A preliminary trial of a prototype Internet dissonance-based eating disorder prevention program for young women with body image concerns. *Journal of Consulting and Clinical Psychology, 80*, 907–916. http://dx.doi.org/10.1037/a0028016.

Stice, E., Rohde, P., Gau, J., & Shaw, H. (2009). An effectiveness trial of a dissonance-based eating disorder prevention program for high-risk adolescent girls. *Journal of Consulting and Clinical Psychology, 77*, 825–834. http://dx.doi.org/10.1037/a0016132.

Stice, E., Rohde, P., Shaw, H., & Gau, J. (2011). An effectiveness trial of a selected dissonance-based eating disorder prevention program for female high school students: long-term effects. *Journal of Consulting and Clinical Psychology, 79*, 500–508. http://dx.doi.org/10.1037/a0024351.

Stice, E., Shaw, H., Burton, E., & Wade, E. (2006). Dissonance and healthy weight eating disorder prevention programs: a randomized efficacy trial. *Journal of Consulting and Clinical Psychology, 74*, 263–275. http://dx.doi.org/10.1037/0022-006X.74.2.263.

Stice, E., Shaw, H., & Marti, C. (2007). A meta-analytic review of eating disorder prevention programs: encouraging findings. *Annual Review of*

Clinical Psychology, 3, 233–257. http://dx.doi.org/10.1146/annurev.clinpsy.3.022806.091447.

van Strien, T., Frijters, J., Van Staveren, W., Defares, P., & Deurenberg, P. (1986). The predictive validity of the Dutch Restrained Eating Scale. *International Journal of Eating Disorders, 5*, 747–755. http://dx.doi.org/10.1002/1098-108X(198605)5:4<747::AID-EAT2260050413>3.0.CO;2–6.

Swanson, S., Crow, S., Le Grange, D., Swendsen, J., & Merikangas, K. (2011). Prevalence and correlates of eating disorders in adolescents: results from the national comorbidity survey replication adolescent supplement. *Archives of General Psychiatry, 68*, 714–723. http://dx.doi.org/10.1001/archgenpsychiatry.2011.22.

U.S. Department of Education. (2008). *Digest of educational statistics, 2007*. National Center for Education Statistics.

Wade, T., Bergin, J., Tiggemann, M., Bulik, C., & Fairburn, C. (2006). Prevalence and long-term course of lifetime eating disorders in an adult Australian twin cohort. *Australian and New Zealand Journal of Psychiatry, 40*, 121–128. http://dx.doi.org/10.1111/j.1440-1614.2006.01758.x.

Webb, C., DeRubeis, R., & Barber, J. (2010). Therapist adherence/competence and treatment outcome: a meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*, 200–211.

Weissman, M., & Bothwell, S. (1976). Assessment of social adjustment by patient self-report. *Archives of General Psychiatry, 33*, 1111–1115. http://dx.doi.org/10.1001/archpsyc.1976.01770090101010.

Weisz, J., Donenberg, G., Han, S., & Kauneckis, D. (1995). Child and adolescent psychotherapy outcomes in experiments versus clinics: why the disparity? *Journal of Abnormal Child Psychology, 23*, 83–106. http://dx.doi.org/10.1007/BF01447046.

Wilson, G., Becker, C., & Heffernan, K. (2003). Eating disorders. In E. J. Mash, & R. A. Barkley (Eds.), *Child psychopathology* (2nd ed.). (pp. 687–715) New York: Guilford.

World Health Organization. (2000). *Obesity: Preventing and managing the global epidemic*. WHO Technical Report Series No. 894. Geneva: World Health Organization.