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Effectiveness of Peer-Led Dissonance-Based Eating Disorder Prevention Groups: Results from Two Randomized Pilot Trials

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Abstract

Objective—The present preliminary trials tested whether undergraduate peer leaders can effectively deliver a dissonance-based eating disorder prevention program, which could facilitate broad dissemination of this efficacious intervention.

Method—In Study 1, female undergraduates (N = 171) were randomized to peer-led groups, clinician-led groups, or an educational brochure control condition. In Study 2, which improved a design limitation of Study 1 by using completely parallel outcome measures across conditions, female undergraduates (N = 148) were randomized to either immediate peer-led groups or a waitlist control condition.

Results—In Study 1, participants in peer- and clinician-led groups showed significantly greater pre-post reductions in risk factors and eating disorder symptoms than controls ($M\ d$ = .64 and .98 respectively), though clinician- versus peer-led groups had higher attendance and competence rating, and produced stronger effects at posttest ($M\ d$ = .32) and at 1-year follow-up ($M\ d$ = .26). In Study 2, participants in peer-led groups showed greater pre-post reductions in all outcomes than waitlist controls ($M\ d$ = .75).

Conclusions—Results provide novel evidence that dissonance-based eating disorder prevention groups led by undergraduate peers are feasible and produce greater reductions in eating disorder risk factors and symptoms than minimal-intervention control conditions, but indicate that effects are smaller for peer- versus clinician-led groups.

Keywords

prevention; body dissatisfaction; eating disorder; dissonance; peer leaders

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The prevalence of DSM-5 eating disorders by age 20 among females is 13% (Stice, Marti, & Rohde, 2013), implying that the lifetime prevalence is even higher because some eating disorders emerge after age 20 (Hudson, Hiripi, Pope, & Kessler, 2007; Wade, Bergin, Tiggemann, Bulik, & Fairburn, 2006). 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., 2012; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). Thus, a public health priority is to develop and disseminate effective eating disorder prevention programs.

Although several prevention programs has produced significant reductions in eating disorder symptoms that persist through at least 6-month follow-up (e.g., Jones et al., 2008; Neumark-Sztainer, Butler, & Palti, 1995; Stewart, Carter, Drinkwater, Hainsworth, & Fairburn, 2001), considerably more empirical support has emerged for a dissonance-based eating disorder prevention program for young women at risk for eating disorders due to body image concerns (Stice, Mazotti, Weibel, & Agras, 2000a). In 4 weekly sessions, participants engage in verbal, written, and behavioral exercises in which they critique the thin-ideal. These activities theoretically produce cognitive dissonance that motivates participants to reduce pursuit of the thin-ideal, leading to decreases in body dissatisfaction, unhealthy weight control behaviors, negative affect, and eating disorder symptoms. Efficacy trials show that this prevention program produces greater reductions in eating disorder risk factors (e.g., thin-ideal internalization, body dissatisfaction, self-reported dieting, and negative affect), eating disorder symptoms, functional impairment, and future eating disorder onset over a 3-year follow-up relative to assessment-only or alternative-intervention control conditions (e.g., Stice et al., 2000a; Stice, Shaw, Burton, & Wade, 2006; Stice, Marti, Spoor, Presnell, & Shaw, 2008). Independent efficacy trials have also found that dissonance-based prevention programs produce greater reductions in risk factors and eating disorder symptoms relative to an assessment-only control condition (Matusek, Wendt, & Wiseman, 2004; Mitchell, Mazzeo, Rausch, & Cooke, 2007) and an alternative intervention (Becker, Smith, & Ciao, 2005).

Effectiveness trials have found that this prevention program produces significant reductions in eating disorder risk factors and symptoms relative to educational video and educational brochure control conditions when high school and college counselors recruit and deliver the intervention under ecologically valid conditions, including significant reductions in symptoms that persist through 3-year follow-up (Stice, Rohde, Durant, & Shaw, 2012; Stice, Rohde, Gau, & Shaw, 2009; Stice, Rohde, Shaw, & Gau, 2011). Although these trials support the efficacy and effectiveness of this intervention, they revealed significant barriers to implementing this program in real-world settings. First, it is often difficult to identify and recruit clinicians at high schools and colleges who have the time and expertise to competently deliver the program; we have been unable to locate a clinician willing to receive free training and supervision to deliver this intervention at 30-40% of the schools we have approached. Second, clinician turnover and lay-offs have caused sustainability problems; 33% of the clinicians we trained at 8 colleges in our effectiveness trial either took a position at another institution or were laid off within 1 year. Third, school clinicians often have very limited time to deliver prevention programs (Gallagher & Taylor, 2011), focusing instead on acute treatment and crisis management, making it difficult to deliver the intervention to all interested students.

One solution to these implementation barriers is to train students in established peer-leader programs at colleges to recruit high-risk female students and deliver the prevention program. Peer-led programs have proven to be an effective method of delivering universal, selected,

and indicated prevention programs (Mellanby, Rees, & Tripp, 2000), with some interventions producing significantly larger effects when delivered by peer leaders versus clinician leaders (e.g., Botvin et al., 1984; Rhee, Belyea, Hunt, & Brasch, 2011). Collaboration with peer-leader programs at colleges would allow broad dissemination of this prevention program, as 80% of US colleges have peer leader health education and prevention programs (Hong et al., 2011). Because the dissonance intervention is based on a scripted manual and in-session discussions are largely driven by group participants, college students with experience leading groups should be well suited to deliver this intervention. In fact, we employed peer leaders as co-facilitators in all 4 of our efficacy trials (e.g., Stice et al., 2000a; Stice et al., 2006). Most importantly, a version of the dissonance-based eating disorder prevention program that was adapted for sorority members significantly reduced thin-ideal internalization, negative affect, and eating disorder symptoms relative to an alternative intervention when sorority peers delivered the intervention (Becker, Wilson, Williams, Kelly, McDaniel, & Elmquist, 2010), though peer-led sorority-adapted groups did not significantly outperform alternative interventions in two other trials (Becker, Bull, Schaumberg, Cauble, & Franco, 2008; Becker, Smith, & Ciao, 2006).

Although the sorority program of research has been extremely innovative, no randomized trial has compared the efficacy of peer-led groups to clinician-led groups, which might be considered the gold standard. Neither have peer-led groups been compared to a minimal-intervention control condition, which is useful for determining whether offering peer-led groups is better than offering no intervention at colleges. Past trials of peer-led sorority-adapted grouops have only compared that intervention to other apparently effective interventions making it difficult to determine whether both interventions are effective or whether the passage of time or demand characteristics inherent to prevention trials contributed to reductions in the outcomes. Thus, we conducted a pilot trial that compared the effectiveness of peer-led groups to clinician-led groups and to control participants who received educational brochures on body image and eating disorders. We selected this control condition because educational brochures are a common intervention offered in colleges (Koumans et al., 2005; Mann et al., 1997; West & Graham, 2005). This is the first trial to evaluate the effects of peer-led dissonance eating disorder prevention groups on undergraduate females outside of sororities, allowing us to investigate the feasibility of working with students in peer-leader programs to disseminate this prevention program. We targeted female college students with body image concerns because meta-analyses indicated that prevention programs targeting high-risk individuals tend to produce larger effects than those offered universally (Stice, Shaw, & Marti, 2007) and because young women with body image concerns are at elevated risk for future escalation of eating disorder symptoms and onset of eating disorders (e.g., Johnson & Wardle, 2005; Killen et al., 1996). We tested whether participants who completed either peer- or clinician-led groups showed significantly greater reductions in eating disorder risk factors and symptoms than an educational brochure control condition and whether intervention effects, fidelity ratings, and competence ratings were similar for peer- versus clinician-led groups.

Study 1

Participants and Procedure

Participants were 171 women (*M* age = 20.9, *SD* = 4.0; *M* BMI [kg/m^2] = 23.4, *SD* = 5.1) recruited from two universities in Texas. The sample was 49% European American, 21% Asian, 20% Hispanic, 4% African American, 2% American Indian/Alaska Native, 2% mixed racial heritage, and 1% Native Hawaiian/Pacific Islander, which was fairly representative of the region (49% European American, 5% Asian, 31% Hispanic, 10% African American, 1% American Indian/Alaska Native, 3% mixed racial heritage, 1% Native Hawaiian/Pacific Islander). Average parental education was 16% high school graduate or less, 15% some

college, 38% college graduate, and 30% advanced graduate/professional degree, which was somewhat higher than the education of adults in the region (27% high school graduate or less, 25% some college, 26% college graduate, 15% graduate degree).

From March 2010 to July 2011, participants were recruited using e-mails and posters inviting female undergraduates with body image concerns to participate in a study designed to improve body acceptance. We provided facilitators with text for recruitment e-mails, which they distributed through campus-wide listserves and recruitment fliers, which they posted around campus. Potential participants had to answer yes when asked, "*Do you have body image concerns?*" during a phone screening. Assessors collected informed written consent from participants. The research team 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 the interventions were not sufficient for them. Figure 1 provides information on participant flow through this trial.

Participants were randomly assigned (via random number table) to the clinician-led dissonance groups (n = 55), peer-led dissonance groups (n = 44), or an educational brochure control condition (n = 72). Both dissonance interventions consisted of 4 weekly 1-hour group sessions with 6-8 participants. We confirmed that peer leaders did not suffer from clinically significant body image or eating pathology by having them complete the Eating Disorder Diagnostic Survey (Stice, Telch, & Rizvi, 2000). Pairs of facilitators the group sessions using a scripted intervention manual.

The 7 clinician leaders held doctoral degrees in counseling psychology or clinical psychology or master's degrees in counseling or nutrition science (M age = 33.6, range 27 – 54; 100% European American). Clinician facilitator training involved reading key trials of the dissonance eating disorder prevention program (Stice et al., 2006; 2008) and the scripted manual to become familiar with the intervention, and attending a 4-hour workshop to learn the conceptual rationale and supporting evidence for the intervention, discuss and role-play key elements from the sessions, and discuss process issues, including confidentiality, making referrals, and achieving good homework compliance and retention.

The 8 peer leaders were advanced female undergraduates interested in learning how to deliver this prevention program (M age = 21.5, range 18 – 25; 36% Hispanic, 27% White, 27% Asian, 10% Black). The training for peer leaders was identical to that used with clinicians, with the exception that peer leaders also completed the intervention when delivered by clinician leaders, and each peer-leader team role-played delivery of the entire intervention and observed other peer leaders teams do the same, receiving live clinical supervision (this workshop took 8 hours, based on the approach used by Dr. Becker, who assisted in the initial peer leader training). All sessions were video recorded. Supervisors rated video-recorded sessions for fidelity and competence (see below); these ratings were used as the basis of supervisory feedback sent via email regarding how to improve intervention delivery and fidelity to the scripted manual.

Participants completed assessments at pretest, posttest, and 1-year follow-up. Female assessors, who had a B.A. or M.A. in psychology, were blinded to the condition of participants. Assessors attended 24 hours of training, wherein they received instruction in interview skills, reviewed diagnostic criteria for eating disorders, observed simulated interviews, and role-played interviews. They also attended annual refresher training workshops. They had to demonstrate high 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 were held to resolve

ambiguous diagnostic issues. To maximize retention, participants were paid for completing assessments (between $10 and $35). The institutional review board at each campus approved both Study 1 and Study 2.

Interventions

Dissonance intervention—Participants voluntarily engaged in verbal, written, and behavioral exercises in which they critiqued the thin-ideal ideal during sessions and in home exercises (a.k.a., the *Body Project*). In session 1 participants 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, attempt to dissuade facilitators from pursuing the thin-ideal in role-plays, and are assigned more home 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 a role-play in which they challenge thin-ideal statements, discuss personal body image concerns, and are assigned more home exercises (e.g., engage in a behavior that challenges their body image concerns). In session 4 participants discuss home exercises, challenge subtle fat-talk in role-plays, plan how to respond to future anticipated pressures to be thin, 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 (McMillan, Stice, & Rohde, 2011). 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 were asked to print their name on each homework form and sign it before handing it into facilitators, and (c) participants were not told that topics discussed during the sessions were confidential. To increase the level of effort required, (a) home exercises were made more difficult (e.g., participants were asked to generate a greater number of responses to a given question in comparison to the original program) and (b) a higher level of effort was encouraged through greater verbal participation in sessions (e.g., 2 role plays per participant rather than 1).

Educational Brochure Control Condition—Participants received a 2-page brochure from the National Eating Disorders Association that describes negative and positive body image, notes that negative body image increases risk for onset of eating disorders, and offers 10 steps for achieving a positive body image. Brochures were mailed to participants after randomization, which occurred after the pretest assessment. Participants in all conditions were referred to treatment if they met criteria for threshold or subthreshold anorexia nervosa, bulimia nervosa, or binge eating disorder at any follow-up assessment.

Supervision, fidelity ratings, and competence ratings—Supervisors reviewed videorecordings of the first group conducted by clinician and peer facilitators, and a randomly selected 50% of the sessions for the second group facilitators conducted; facilitators were sent brief supervisory e-mail messages that generally praised them for good group management skills and adherence to the script and offered constructive suggestions as necessary. Drs. Rohde and Shaw also independently coded a randomly selected sample of 50% of the sessions for implementation fidelity and facilitator competence using checklists assessing the major exercises and discussion topics for each session. Each component was rated for degree of accurate presentation (10-point scale from “No adherence; the section was skipped” to “Perfect; all material in the section was presented as written”). Facilitator competence was rated using 12 items that assessed various indicators of a competent group facilitator (e.g., leaders express ideas clearly and at an appropriate pace, leaders attempt to allot equal speaking time for all members) using a 10-point scale. Ratings were reviewed

and discrepancies were resolved by consensus. Four sessions were independently rated by 3 raters, resulting in high agreement for fidelity; ICC (3,1) = .92, and facilitator competence; ICC (3,1) = .96.

Measures

Thin-ideal internalization—The 6-item Ideal-Body Stereotype Scale-Revised assessed thin-ideal internalization (Stice et al., 2006). Items used a response format ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Items were averaged for this scale and those described below. This scale 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).

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

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*. The DRES 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 detecting intervention effects (Stice et al., 2008; van Strien et al., 1986).

Negative affect—The 21-item Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988) assessed negative affect.[1] For each item, participants select among 4 responses reflecting increasing levels of symptom severity (0 = no symptom present to 3 = severe symptom present). The BDI has acceptable 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).

Eating disorder symptoms—For participants in the clinician-led groups and the brochure control condition, 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 an overall symptom 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 detecting effects from prevention and treatment interventions, and predictive validity for future onset of depression (Burton & Stice, 2006; Stice et al., 2009). Because this pilot study was an unfunded addition to an ongoing effectiveness trial, eating disorder symptoms among participants in peer-led groups were assessed with the Eating Disorder Diagnostic Survey (Stice, Fisher, & Martinez, 2004; Stice et al., 2000), which is less expensive and time-consuming than conducting diagnostic interviews. The EDDS is a brief self-report screening measure that assessed DSM-IV eating disorder symptoms adapted from EDDI questions. The symptom composite from the EDDS has shown internal consistency (α = .89), 1-week test-retest reliability (*r* = .87), and

[1]We refer to the Beck Depression Inventory (BDI) as a measure of negative affect because the BDI correlates nearly as strongly with self-report anxiety symptom scales (*M r* = .65; Watson & Clark, 1984) as it does with other self-report measures of depressive symptom scales (*M r* = .68; Beck et al., 1988).

convergent validity with the symptom composite from the EDDI (r = .82); eating disorder diagnoses from the EDDS have shown convergent validity with diagnoses from the EDDI (κ = .78-.83) (Stice et al., 2000b, 2004).

Results

Participants in the 3 groups did not significantly differ on demographic variables or pretest outcomes with the exception that the peer-led participants had higher eating disorder symptom scores than the clinician-led participants and brochure controls (F (2,157) = 10.40, p < .001, r = .25; Table 1 provides means and SD for all outcomes at each time point across conditions). This difference in pretest symptoms was potentially due to the use of the self-report survey versus the interview, given that the groups did not differ on other pretest measures. A meta-analytic review found that participants typically score higher on self-report scales relative to diagnostic interviews that assess eating disorder symptoms (Berg, Peterson, Frazier, & Crow, 2011), presumably because the interviewer can define eating disordered behaviors and not record behaviors that do not meet the criteria for eating disorder symptoms. Because analyses tested for differential change over time across condition controlling for pretest levels of the outcomes, our estimate of intervention effects should not be biased by the use of non-parallel measures for 1 outcome. Two participants (1%) did not complete the posttest assessment and 11 (6%) did not complete the 1-year follow-up assessment. Values for the missing data were imputed using an ML-based single imputation method, as this is one of the preferred methods of handling missing data (Schafer & Graham, 2002).

The condition-by-time interaction from an omnibus repeated measures ANOVA model confirmed that change in the outcomes over time differed across all 3 conditions (F [20,1340] = 4.58, p < .001, d = .52). Follow-up repeated measures ANOVA models tested whether there were differential changes in outcomes across the peer-led group, clinician-led group, and control conditions from pretest to posttest and from pretest to 1-year follow-up (condition was a 2-level between-subjects factor and time was a 2-level within-subject factor). Table 1 provides the effect sizes (d) and exact p-values of the time-by-condition interactions from these models. Peer-led and clinician-led group participants showed greater pre to post reductions than controls for thin-ideal internalization, body dissatisfaction, dieting, negative affect, and eating disorder symptoms. Relative to peer-led group participants, clinician-led group participants showed significantly greater pre-to-post reductions in body dissatisfaction, dieting, and negative affect. Clinician-led group participants showed significantly greater pre-to-1-year follow-up reductions in all outcomes relative to controls, but peer-led group participants only showed significantly greater reductions in dieting over 1-year follow-up relative to controls. Clinician-led group participants showed significantly greater pre-to-1-year follow-up reductions in eating disorder symptoms relative to peer-led group participants.

Among participants assigned to clinician-led groups (n = 55), 45 (82%) attended all 4 sessions, 8 (15%) attended 3 sessions, and 2 (4%) attended 1 session. Among participants assigned to peer-led groups (n = 44), 30 (68%) attended all 4 sessions, 10 (23%) attended 3 sessions, 1 (2%) attended 2 sessions, and 3 (7%) attended 1 session. Thus, attendance was slightly lower in peer-led versus clinician-led groups.[2]

[2]To investigate the possibility that the lower attendance for the peer led versus clinician led groups explained why changes in the outcomes were smaller for the former from pretest to posttest and from pretest to 1-year follow-up, we entered attendance rates for each participant as a covariate in the models. Because this did not change which effects reached significance and did not systematically reduce the magnitude of the differences for the change in the outcomes for peer led versus clinician led groups, results provided little support for the possibility that it was the lower attendance that contributed to the smaller intervention effects for peer led groups.

Independent-samples t-tests were conducted to compare the average facilitator fidelity and competence ratings for the clinician-led groups and peer-led groups. There was no significant difference in the fidelity rating for clinician versus peer leaders (M = 7.44, SD = 0.87 and M = 6.98, SD = 0.56 respectively); t (27) = 1.71, p = .10, r = .30); however, the competence rating was significantly higher for clinician versus peer leaders (M = 7.29, SD = 0.77 and M = 6.26, SD = 0.48 respectively); t (27) = 4.27, p < .001, r = .62).

Study 2

Results suggest that peer-led groups produced significant pre-to-post reductions in all outcomes relative to controls, but the effects were smaller and showed less persistence over 1-year follow-up relative to clinician-led groups. However, the fact that we used a different measure of eating disorder symptoms in the peer led group condition than in the control condition reduces the confidence that can be placed in the conclusion that peer led groups produce reliable reductions for this outcome relative to controls. Thus, we conducted a simple follow-up trial that used the same measure of eating disorder symptoms in both a peer-leader condition and a control condition. We used a waitlist control condition because staff from the peer-leader programs at the universities wanted to offer the prevention program to all interested students. We were unable to include a clinician-leader condition in this follow-up pilot because recruitment had closed for the effectiveness trial that is evaluating clinician led groups. We also refined the training and the intervention script for peer leaders. First, we found that peer leaders often did not have the non-specific group facilitation skills that our seasoned clinician leaders possessed. We therefore created handouts that discussed group facilitation skills to promote in-depth discussions (e.g., increased use of open-ended questions, how to handle participants who expressed pro-thin-ideal statements to the group). We also used more challenging training role-plays in which mock participants portrayed recalcitrant and overly loquacious participants and participants who championed the thin-ideal. Second, we noticed that peer leaders often did not spend the full time allocated to the participant-led discussions that form the core of the dissonance eating disorder prevention intervention. Therefore, we scripted additional discussion points to make it easier for peer leaders to devote the entire recommended amount of time to each discussion topic; we used this adapted peer-leader script for Study 2. It was our hope that these changes would contribute to larger intervention effects from peer-led groups relative to those observed in Study 1.

Participants and Procedure

Participants were 148 young women (M age = 21.0, SD = 4.1; M BMI [kg/m^2] = 23.6, SD = 4.7) recruited from two universities in Texas. The sample was 41% European American, 28% Asian, 17% Hispanic, 7% African American, and 7% mixed racial heritage, which was fairly representative of the region (49% European American, 31% Hispanic, 10% African American, 5% Asian, 1% American Indian/Alaskan Native, 1% Native Hawaiian/Pacific Islander, 3% mixed racial heritage). Average parental education was 25% high school graduate or less, 14% some college, 32% college graduate, and 29% advanced graduate/professional degree, which was somewhat higher than the education of adults in the region (27% high school graduate or less, 25% some college, 26% college graduate, 15% graduate degree).

From October 2011 to October 2012, participants were recruited using the same procedures used in Study 1. Figure 2 provides information on participant flow through Study 2. Participants were randomly assigned (via random number table) to an immediate-intervention condition (n = 80) or a delayed intervention condition (waitlist control) (n = 68). Pairs of facilitators delivered the intervention, which consisted of 4 weekly 1-hour group sessions with 6-8 participants.

The 17 peer leaders were advanced undergraduates interested in learning how to deliver this prevention program (*M* age = 21.2, range 20 – 22; 47% White, 29% Asian, 18% Hispanic, 6% Black; 88% female, 12% male). Peer leaders in Study 2 received the same training as peer leaders in Study 1, with enhancements designed to instill clinical and group facilitation skills. All group sessions were video-recorded. Fidelity and competence ratings were again used to provide email supervision.

Participants completed surveys at pretest and 4-week posttest. The surveys used to assess thin-ideal internalization, body dissatisfaction, dieting, and negative affect in Study 1 were used in Study 2. The EDDS was used to provide a continuous measure of eating disorder symptoms (see Study 1 methods). Participants in the immediate-intervention condition completed the posttest assessment upon completion of the group intervention. Those randomized to the waitlist control condition completed parallel surveys prior to completing the group intervention. To maximize retention, participants were paid for completing each of the two assessments ($10 per assessment, $20 total).

Results

Participants in the 2 conditions did not differ significantly on demographics or any pretest measure. Eleven (7%) participants did not complete the posttest assessment. Values for the missing data were again imputed using an ML-based single imputation method. Table 2 provides means and SD for all outcomes at pre and post for the 2 conditions.

The condition-by-time interaction from an omnibus repeated measures ANOVA model confirmed that the change in outcomes from pre to post differed across conditions (F [5,142] = 10.27, $p < .001$, $d = 1.20$). Follow-up repeated measures ANOVA models tested if there were differential changes in outcomes between the peer-led group participants and waitlist controls from pre-to-post. Condition-by-time interactions indicated that there were significantly greater reductions for the peer-led group participants versus waitlist controls for thin-ideal internalization, body dissatisfaction, self-reported dieting, negative affect, and eating disorder symptoms. Table 2 provides the effects sizes (d) and significance levels for each contrast.

Among participants assigned to peer-led groups ($n = 80$), 49 (61%) attended all 4 sessions, 10 (13%) attended 3 sessions, 2 (3%) attended 2 sessions, 7 (9%) attended 1 session, and 12 (15%) attended 0 sessions. The average fidelity and competence ratings from the facilitators of peer-led groups were compared to the ratings from the clinician-led groups in Study 1 using independent-samples t-tests. Fidelity ratings were significantly higher for clinician versus peer leaders ($M = 7.44$, $SD = 0.87$ and $M = 6.62$, $SD = 0.50$ respectively); t (31) = 3.38, $p < .01$, $r = 0.52$). Likewise, competence ratings were significantly higher for clinician versus peer leaders ($M = 7.29$, $SD = 0.77$ and $M = 5.92$, $SD = 0.83$ respectively); t (31) = 4.86, $p < .001$, $r = .66$). There were no significant differences in the fidelity or competence ratings for the peer leaders in Study 1 and Study 2.

General Discussion

Study 1 found that the peer-led group participants showed significantly greater reductions in all outcomes than controls, but that most effects did not persist through 1-year follow-up. In contrast, clinician-led group participants showed significantly greater reductions in all outcomes at both posttest and 1-year follow-up. Clinician- versus peer-led group participants also showed significantly greater reductions in certain outcomes at both posttest and follow-up. Moreover, relative to clinician-led groups, peer-led groups had lower attendance and competence ratings, but similar fidelity ratings. Study 2 found that peer-led group

participants showed significantly greater reductions in outcomes than controls, suggesting that the use of non-parallel measures of eating disorder symptoms in Study 1 did not produce misleading inference regarding the effects of peer-led groups on eating disorder symptoms relative to controls.

The average pre-post effect for peer-led groups was a d = .64 for Study 1 and d = .75 for Study 2, which are medium effect sizes that represent clinically meaningful changes in outcomes. Presumably the larger average effect size in Study 2 resulted because we refined the peer-leader training protocol and intervention script, though the use of a waitlist control condition may have contributed to the larger effects. These results make a novel contribution to the literature because these are the first trials to compare peer-led groups against minimal-intervention control conditions. Another novel contribution of the present trials is that they are the first to suggest that the peer-led delivery of an evidence-based eating disorder prevention program with the general university population, rather than a sorority system where attendance was required, is feasible, engaging, and efficacious.

As shown in Table 3, the average between-condition effect for peer-led groups in Studies 1 and 2 (d = .70) compares favorably to the average effect size from our high-school/college efficacy trial wherein graduate students conducted groups (d = .59) and our high school effectiveness trial (d = . 43) wherein school clinicians conducted groups, but is smaller than the average effect size from the clinician-led groups from Study 1 (d = .98). The between-condition effect sizes reflect the degree of change in the outcome from pre to post for intervention participants versus control participants (d = [posttest intervention M – pretest intervention M] – [posttest control M – pretest control M] / pretest control SD). To create a comparable measure of intervention effects across all of the available studies, we also calculated a within-condition measure of change from pretest to posttest (d = [posttest intervention M – pretest intervention M) / pretest intervention SD]) because two trials did not have a control condition (Becker et al., 2010; Perez et al., 2010). The average within-condition effect for the current peer-led groups in Studies 1 and 2 (d = .78) compares favorably to the parallel effects from the high-school/college efficacy trial (d = .82), high school effectiveness trial (d = .56), and sorority-led trials (d = .37 & .55), but is smaller than the average effect size from the clinician-led groups from Study 1 wherein college clinicans delivered the intervention (d = .92). It is important to acknowledge that the effect sizes from the two trials with sorority members may be smaller because participants in those trials were not required to report body image concerns, as they were in the other trials. As noted, a meta-analytic review found that prevention programs delivered to high-risk populations typically produce larger effects than those delivered universally (Stice et al., 2007). The fact that we provided supervision to peer leaders in the present pilot during delivery of the groups, whereas no supervision was provided to peer-leaders in the sorority trials, may have also contribed to the larger effects for peer leaders in the present pilot studies. Further, it is noteworthy that the within-condition effect sizes tend to be larger than the between-condition effect sizes, presumably because regression to the mean artificially inflates the former. This benchmarking comparison is somewhat encouraging, as it suggests that peer-led dissonance groups produce effect sizes that are similar those produced by research clinicians, school clinicians, and sorority peer leaders. The average effect size for peer-led groups was also larger than observed for other eating disorder prevention programs included in a meta-analytic review, which showed a small average pre-post effect (d = .26; Stice et al., 2007).

As noted, Study 1 found that clinician-led group participants showed greater reductions in body dissatisfaction, self-reported dieting, and negative affect at posttest and in eating disoder symptoms at 1-year follow-up than peer-led group participants. The larger magnitude of the clinician-led groups versus peer-led groups in Study 1 was also reflected in

the comparisons of average effect sizes provided previously. These findings are also novel, in that no prior trial has compared the effects of peer- versus clinician-led eating disorder prevention groups. It is perhaps not surprising that clinicians produced larger intervention effects, given that they have considerably more clinical training and years of clinical experience. Clinician facilitators reported an average of 8 years (*SD* = 6.1) of experience working with young adults in a professional mental health role, all had experience conducting prevention interventions, and 89% had experience conducting group interventions. In addition, clinician- versus peer-led groups also had higher attendance, competence ratings, and fidelity ratings, which are factors that may have also contributed to the larger intervention effects for clinician leaders. The present findings suggest that maximal intervention effects will occur for this eating disorder prevention program if clinicians conduct the groups. However, because collaborating with undergraduates from peer-leader programs at universities would dramatically facilitate broad dissemination of this prevention program, the fact that the averge effect sizes are smaller might be offset by ability to more broadly disseminate this intervention. The fact that the average effect from peer-led groups in Study 1 was 35% smaller than the average effect for clinician-led groups, but the average effect from Study 2 for peer-led groups was only 25% smaller implies that the refined script and peer-leader training may have contributed to the larger effects observed in Study 2. This implies that continued refinements of the script and training approach may result in even larger effects for peer-led groups.

Limitations

Although these preliminary trials are the first to compare the efficacy of peer-led groups to both clinician-led groups and a non-intervention control condition, there were limitations that should be considered when interpreting the findings. First, because we did not have funds for an interview-based evaluation of the peer-led groups, it was necessary to use a self-report survey to assess eating disorder symptoms for participants who completed peer-led groups in Study 1, versus an interview for the two other conditions in Study 1. Although previous trials that used self-report measures (e.g., Becker et al., 2005, 2010; McMillan et al., 2011; Mitchell et al., 2007; Perez et al., 2010; Stice et al., 2000a) have generally replicated effects from the few trials that used diagnostic interviews to assess eating disorder symptoms (Stice et al., 2006, 2009), it would have been preferable to have used semi-structured interviews to assess eating disorder symptoms in all conditions in Study 1. It would have also been ideal if we had been able to include a clinician-leader condition in Study 2 in which eating disorder symptoms were assessed by self-report survey. Second, the educational brochure and waitlist control conditions did not control for expectations, demand characteristics, or non-specific factors (e.g., group support). However, this seemed reasonable for these preliminary trials given that the dissonance eating disorder prevention program has been found to significantly outperform healthy weight control interventions, a media literacy intervention, an expressive writing intervention, an educational video, and a low-dissonance version of this intervention (Becker et al., 2005; 2010; Green, Scott, Divankova, Gasser, & Pederson, 2005; McMillan et al., 2011; Stice et al., 2006, 2012). Third, the length of follow-up was relatively short (1 year in Study 1). However, this too seemed acceptable for these pilot trials because multiple trials have found that significant intervention effects persist through 3-year follow-up (Stice et al., 2008, 2011).

Implications for Prevention and Future Research

Results suggest that participants who completed dissonance eating disorder prevention groups led by students from peer-leader health education programs showed significantly larger reductions in eating disorder risk factors and symptoms than minimal intervention controls, extending results from pioneering uncontrolled trials of sorority-led dissonance eating disorder prevention groups (Becker et al., 2005; 2010; Perez et al., 2010) to the

broader college population. Further, the benchmarking comparisons suggested that the effects from peer-led groups approach the magnitude of effects produced by research clinicians and school-based clinicians, and compare favorably to the effects produced by peer-led sorority-adapted groups. However, results clearly indicated that clinician-led groups produced larger and more persistent intervention effects than peer-led groups, implying that it will be vital to continue to improve selection, training, and supervision of peer leaders.

Collectively, findings from these pilot trials and others suggest that it may be feasible to collaborate with students from peer leader programs that exist at the majority of US universities to disseminate this empirically supported eating disorder prevention program on a broad basis if systematic efforts are made to refine selection, training, and supervision of peer leaders. Delivering eating disorder prevention programs through peer-leader programs would address one of the key dissemination barriers, dependence on school clinicians to deliver the intervention. We have found that peer leaders are motivated and competent facilitators, and do not face the time constraints common among university clinicians that prohibit them from disseminating the program more broadly. We hope that with continued refinement and empirical support, collaborating with peer-leaders will facilitate the broad dissemination of this brief yet effective eating disorder prevention program.

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- We test effectiveness of peer-led dissonance-based eating disorder prevention program.
- Compared effectiveness of peer- and clinician-led groups to control conditions.
- Peer- and clinician-led groups showed greater reductions in all outcomes than controls.
- Clinician- versus peer-led groups showed greater reductions in certain outcomes.

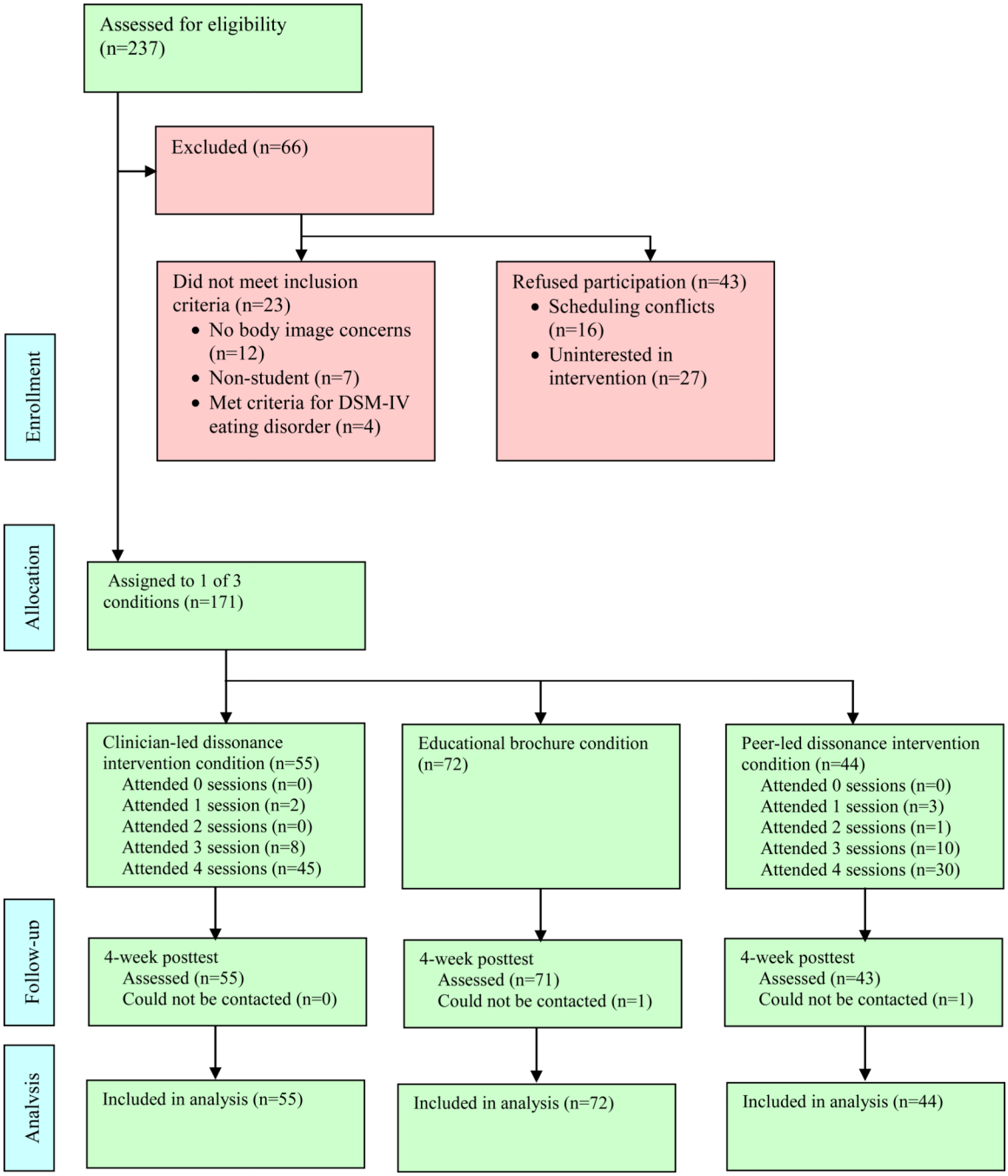

Figure 1. Participant Flow Throughout Study 1

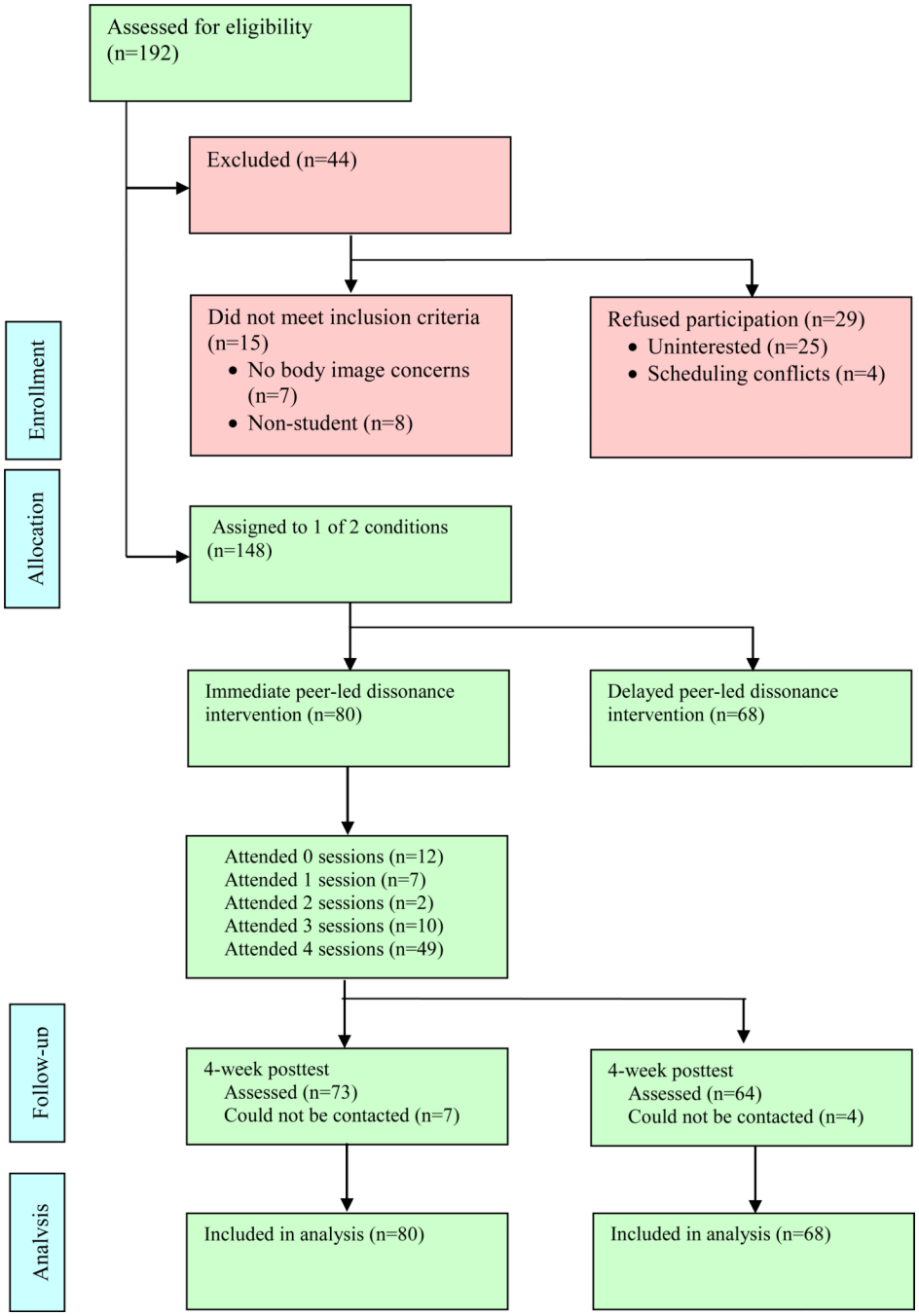

Figure 2. Participant Flow Throughout Study 2

Table 1

Study 1. Table 1a. Means and standard deviations for outcomes from the 3 conditions at pretest, posttest, and 1-year follow-up

	Thin-ideal internalization	Body dissatisfaction	Dieting	Negative affect	Eating disorder symptoms[1]
Peer-led intervention	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Pretest	3.67 (0.52)	3.11 (0.77)	2.79 (0.96)	11.09 (7.83)	21.96 (11.03)
Posttest	3.19 (0.67)	2.59 (0.76)	2.23 (0.81)	7.99 (7.12)	16.11 (9.70)
1-year	3.38 (0.67)	2.72 (0.76)	2.26 (0.87)	8.12 (8.20)	22.09 (10.30)
Clinician-led intervention					
Pretest	3.89 (0.45)	3.31 (0.79)	2.93 (0.90)	12.00 (8.04)	15.16 (10.70)
Posttest	3.32 (0.62)	2.57 (0.71)	2.08 (0.85)	6.19 (5.49)	7.44 (7.57)
1-year	3.56 (0.54)	2.75 (0.80)	2.38 (0.89)	6.62 (5.71)	9.34 (7.93)
Brochure controls					
Pretest	3.81 (0.45)	3.30 (0.68)	2.77 (0.87)	11.33 (9.10)	12.40 (9.53)
Posttest	3.72 (0.55)	3.22 (0.71)	2.60 (0.88)	10.49 (9.03)	9.92 (6.92)
1-year	3.66 (0.61)	3.10 (0.79)	2.60 (0.87)	10.78 (9.91)	10.55 (8.56)

Study 1. Table 1b. Pre-posttest effect sizes (Cohen's d) and significance levels for by the time × condition interactions in repeated measures ANOVA models comparing the conditions

Peer vs. brochure control	0.70*** (p<.001)	0.92*** (p<.001)	0.66*** (p=.001)	0.43* (p=.02)	0.50** (p=.009)
Clinician vs. brochure control	0.97 *** (p<.001)	1.28*** (p<.001)	1.16*** (p<.001)	0.79*** (p<.001)	0.69*** (p<.001)
Clinician vs. peer	0.13 (p=.55)	0.40* (p=.05)	0.43* (p=.04)	0.41* (p=.05)	0.25 (p=.23)

Study 1. Table 1c.. Pretest to 1-year follow-up effect sizes (Cohen's d) and significance levels for by the time × condition interactions in repeated measures ANOVA models comparing the conditions

Peer vs. brochure control	0.24 (p=.21)	0.29 (p=.12)	0.44* (p=.02)	0.36 (p=.06)	-0.21 (p=.27)
Clinician vs. brochure control	0.36* (p=.05)	0.57** (p=.002)	0.49** (p=.007)	0.66*** (p<.001)	0.42* (p=.02)
Clinician vs. peer	0.06 (p=.75)	0.26 (p=.21)	0.01 (p=.97)	0.30 (p=.14)	0.65** (p=.002)

[1] Eating disorder symptoms was assessed with the Eating Disorder Diagnostic Interview for participants in the clinician-led condition and brochure control condition, but with the Eating Disorder Diagnostic Survey for participants in the peer-led condition.

* Significant at $p<0.05$;

** Significant at $p<0.01$;

*** Significant at $p<0.001$

Table 2

Study 2. Means and standard deviations for outcomes from the posttest two conditions at pretest and posttest					
	Thin-ideal internalization	**Body dissatisfaction**	**Dieting**	**Negative affect**	**Eating disorder symptoms[1]**
Immediate peer-led groups	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Pretest	3.95 (.45)	3.39 (.65)	3.01 (.74)	12.03 (8.54)	25.28 (9.52)
Posttest	3.41 (.63)	2.67 (.78)	2.16 (.74)	5.77 (6.80)	20.41 (8.95)
Waitlist controls					
Pretest	3.90 (.41)	3.39 (.61)	3.09 (.72)	11.75 (8.31)	24.90 (9.75)
Posttest	3.82 (.52)	3.21 (.75)	2.87 (.89)	10.95 (9.50)	23.71 (8.56)

Study 2. Effect sizes (Cohen's d) and significance levels for by the time × condition interactions in repeated measures ANOVA models comparing the conditions					
Immediate peer-led vs. waitlist controls	.83*** ($p < .001$)	.84*** ($p < .001$)	.91*** ($p < .001$)	.77*** ($p = .001$)	.40* ($p = .02$)

[1] Eating disorder symptoms was assessed with the Eating Disorder Diagnostic Survey

* Significant at $p<0.05$;

*** Significant at $p<0.001$

Table 3

Comparison of Effect Sizes (Cohen's d) reflecting pretest to posttest change for peer-led groups in the present trials relative to effects from clinician-led groups and sorority-led groups

	Thin-ideal internalization	Body dissatisfaction	Dieting	Negative affect	Eating disorder symptoms	M effect size
						Pre to post within subjects comparison
Intervention vs. brochure control/waitlist control condition effect sizes						
Study 1 Peer-led trial	0.70	0.92	0.66	0.43	0.50	0.64
Study 1 clinician-led groups	0.97	1.28	1.16	0.79	0.69	0.98
Study 2 Peer-led trial	0.83	0.84	0.91	0.77	0.40	0.75
Efficacy trial[1]	0.82	0.75	0.56	0.49	0.34	0.59
High School Effectiveness trial[2]	0.43	0.58	0.41	0.24	0.49	0.43
Pre to post within condition effect sizes						
Study 1 Peer-led trial	0.92	0.68	0.58	0.40	0.53	0.62
Study 1 clinician-led groups	1.27	0.94	0.94	0.72	0.72	0.92
Study 2 Peer-led trial	1.20	1.11	1.15	0.73	0.51	0.94
Efficacy trial[1]	1.24	0.72	0.80	0.73	0.60	0.82
High School Effectiveness trial[2]	0.71	0.52	0.62	0.50	0.47	0.56
Perez et al., 2010	0.61	0.37	0.29	N/A	0.22	0.37
Becker et al., 2010	0.79	0.46	0.56	0.45	0.47	0.55

[1] = Stice et al., 2006;

[2] = Stice et al., 2009.