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Effects of a Prototype Internet Dissonance-Based Eating Disorder Prevention Program at 1- and 2-Year Follow-up

Eric Stice, Shelley Durant, Paul Rohde, and Heather Shaw

Oregon Research Institute

Abstract

Objective—A group-based eating disorder prevention program wherein young women explore the costs of pursuing the thin ideal reduces eating disorder risk factors and symptoms. However, it can be challenging to identify school clinicians to effectively deliver the intervention. The present study compares the effects of a new Internet-based version of this prevention program, which could facilitate dissemination, to the group-based program and to educational video and educational brochure control conditions at 1- and 2-year follow-up.

Method—Female college students with body dissatisfaction ($N = 107$; M age = 21.6 $SD = 6.6$) were randomized to these four conditions.

Results—Internet participants showed reductions in eating disorder risk factors and symptoms relative to the two control conditions at 1- and 2-year follow-up ($M d = .34$ and $.17$ respectively), but the effects were smaller than parallel comparisons for the group participants ($M d = .48$ and $.43$ respectively). Yet the Internet intervention produced large weight gain prevention effects relative to the two control conditions at 1- and 2-year follow-up ($M d = .80$ and $.73$ respectively), which were larger than the parallel effects for the group intervention ($M d = .19$ and $.47$ respectively).

Conclusions—Although the effects for the Internet versus group intervention were similar at posttest, results suggest that the effects faded more quickly for the Internet intervention. However, the Internet intervention produced large weight gain prevention effects, implying that it might be useful for simultaneously preventing eating disordered behavior and unhealthy weight gain.

Keywords

prevention; Internet; body dissatisfaction; eating disorder symptoms; obesity

Between 10-13% of young women meet DSM-IV (Hudson, Hiripi, Pope, & Kessler, 2007) or DSM-5 criteria for eating disorders (Stice, Marti, & Rohde, 2013b), which are marked by chronicity, relapse, distress, impairment, and future obesity, depression, suicide attempts, anxiety disorders, substance abuse, and mortality (Arcelus, Mitchell, Wales, & Nielsen, 2011; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). Thus, researchers have sought to develop effective eating disorder prevention programs.

Although 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; Stewart, Carter, Drinkwater, Hainsworth, & Fairburn, 2001), more trials conducted by more research teams have provided support for a selective dissonance-based eating disorder prevention program (*Body Project*) in which young women with body image concerns critique the thin ideal in verbal, written, and behavioral exercises (Stice, Shaw, Burton, & Wade, 2006a). Criticizing the thin ideal publically theoretically reduces thin-ideal internalization because people seek to maintain consistency between their behaviors and attitudes, which putatively decreases body dissatisfaction, unhealthy weight control behaviors, negative affect, and eating disorder symptoms.

Participants assigned to the *Body Project* have shown greater reductions in eating disorder risk factors, eating disorder symptoms, functional impairment, and eating disorder onset through 3-year follow-up than participants assigned to assessment-only control conditions or alternative interventions in efficacy trials (e.g., Stice et al., 2006a; Stice, Marti, Spoor, Presnell, & Shaw, 2008). Similar effects have emerged in efficacy trials conducted by independent researchers (Becker, Smith, & Ciao, 2005; Becker et al., 2010; Halliwell & Diedrichs, 2013; Matusek, Wendt, & Wiseman, 2004; Mitchell, Mazzeo, Rausch, & Cooke, 2007). Consistent with the intervention theory for the *Body Project*, reductions in thin-ideal internalization appear to mediate the effects of the intervention on change in the other outcomes (Seidel, Presnell, & Rosenfield, 2009; Stice, Presnell, Gau, & Shaw, 2007a) and participants assigned to versions of this intervention designed to maximize dissonance-induction show greater reductions in eating disorder symptoms than those assigned to versions that minimize dissonance-induction (Green, Scott, Divankova, Gasser, & Pederson, 2005; McMillan, Stice, & Rohde, 2011). Participation in the *Body Project* also eliminated the negative effect of exposure to supermodels on body dissatisfaction in adolescent girls observed in participants who did not complete this prevention program, which was assessed in an ostensibly independent study, reducing the impact of demand characteristics (Halliwell & Diedrichs, 2013). Effectiveness trials indicate that this prevention program produces similar effects when high school and college counselors recruit female students with body image concerns and deliver the intervention under ecologically valid conditions, including significant reductions in eating disorder symptoms that persist through 3-year follow-up (e.g., Stice, Butryn, Rohde, Shaw, & Marti, 2013a; Stice, Rohde, Shaw, & Gau, 2011).

Despite the encouraging evidence-base for the *Body Project*, experience suggests it can be difficult to identify school clinicians who have the time and expertise to competently deliver the program. For instance, in 40% of the high schools approached in an effectiveness trial we were unable to convince even one clinician at the school to receive free training to deliver the intervention and the program and were unable to locate a school clinician with experience leading group-based interventions, despite approaching all school counselors and nurses at each school. Clinician turnover has also caused implementation and sustainability challenges in high schools and colleges. For example, 32% of clinicians trained at eight colleges in our effectiveness trial took positions at another institution or lost their job during

the intervention delivery phase of our trial. Thus, we developed an Internet version of the *Body Project* to overcome these dissemination barriers to facilitate broad implementation given that over 95% of adolescent girls/young women have access to the Internet (Odell et al., 2008). This decision was based on the encouraging results from trials that evaluated the cognitive behavior therapy-based *Student Bodies* Internet eating disorder prevention program, which has reduced eating disorder risk factors in multiple trials (e.g., Celio et al., 2000; Winzelberg et al., 2000; Zabinski et al., 2004). However, this team had to add 8 hours of clinician-led asynchronous chat room interchanges and in-person meetings with the clinician to observe significant reductions in eating disorder symptoms (Low et al., 2006; Taylor et al., 2006). As noted, our effectiveness trials revealed that a key dissemination barrier is that many schools do not have clinicians available to deliver prevention programs, whether in person or via a facilitator-supported Internet-based intervention. Our prototype Internet intervention sought to conserve the key elements of the group dissonance-based *Body Project*. We therefore translated each of the key activities from the *Body Project* into a parallel activity that could be conducted on the Internet (Stice, Rohde, Durant, & Shaw, 2012).

In the present trial, 107 female college students with body image concerns were randomly assigned to the new Internet-based *eBody Project*, the group-based *Body Project*, an educational video control condition, or to an educational brochure control condition. The educational video control condition, which provided information on body image and eating disorders, was included to control for the medium used to deliver the new *eBody Project* and is a more rigorous active comparison condition than the control conditions used in past trials of Internet-based eating disorder prevention programs. The educational brochure control condition was included to allow us to benchmark the effects from this trial against the effects from *Body Project* groups delivered by school counselors in our effectiveness trials that used this control condition. The acute phase report from this trial indicated that *eBody Project* and *Body Project* participants showed greater pre-post reductions in eating disorder risk factors and symptoms than video controls ($M d = .47$ and $.54$ respectively) and brochure controls ($M d = .75$ and $.72$, respectively), with many effects reaching significance in this pilot that was only powered to detect a $d = .65$, which is between a medium and large effect (Stice et al., 2012). Acute phase effects did not differ significantly for Internet versus group participants ($M d = -.13$). Pre-post effect sizes for the *eBody Project* were similar to those previously observed for group-based *Body Project*.

The current report describes effects at 1- and 2-year follow-up. Aim 1 was to test whether the *eBody Project* would produce significantly larger reductions in eating disorder risk factors and symptoms than educational video and brochure control conditions. Aim 2 was to test whether the *eBody Project* produced reductions in outcomes that were similar to those observed for the group *Body Project* conducted by college counselors, which was also expected to produce larger effects than the two control conditions. Aim 3 was to report the effects of the *eBody Project* and *Body Project* interventions on change in body mass index (BMI), given calls for prevention programs that produce significant intervention effects for eating disorder symptoms and unhealthy weight gain (Brownell & Fairburn, 1995; Irving & Neumark-Sztainer, 2002).

Methods

Participants and Procedure

The sample was comprised of 107 young women (M age = 21.6, SD = 6.6) recruited from a local university with a mean body mass index ($BMI = \text{kg/m}^2$) of 23.7 (SD = 4.3). Participants were 7% American Indian/Alaska Native, 12% Asian, 1% African American, 8% Hispanic, 2% Native Hawaiian/Pacific Islander, and 70% European American, which was slightly more diverse than the city from which we sampled (Stice et al., 2012). Parental education, a proxy for socioeconomic status, was 17% high school graduate or less, 18% some college, 38% college graduate, and 27% graduate or professional degree, which was somewhat higher than the education of adults in the city (Stice et al., 2012). This trial focused on women in the late adolescent age range because the peak period of risk for eating disorder onset occurs during this time and because women are at much higher risk for eating disorders than men (Hudson, Hiripi, Pope, & Kessler, 2007; Stice et al., 2013b). Women with body image concerns were selected for this trial because prevention programs that target high-risk individuals produce larger effects than universally offered programs (Stice, Shaw, & Marti, 2007b).

Clinicians from the university psychology clinic were responsible for recruitment, which involved sending email messages to students and hanging posters around campus, that invited all female students with body image concerns to participate in a body acceptance intervention. Interested participants called our lab and were screened over the phone. Participants had to verbally affirm during the phone screen with a staff member that they experience body image concerns to be included. Participants were excluded if they met criteria for current DSM-IV anorexia nervosa, bulimia nervosa, or binge eating disorder. Figure 1 provides information on participant flow through this trial.

Using a random number table, the study coordinator randomly assigned participants to the four conditions. The group-based *Body Project* condition has more participants than the other conditions because the *eBody Project* pilot study was added-on to an ongoing effectiveness trial of the *Body Project*. Participants provided interview and survey data at pretest, posttest (4-6 weeks after the baseline assessment), and at 1- and 2-year follow-ups. Research assistants were all females who had at least a bachelor's degree in psychology and were blinded to participant condition. All staff attended at least 24 hours of training, wherein they received instruction in interview skills, reviewed diagnostic criteria for relevant disorders, observed simulated interviews, and role-played interviews. They also attended annual training workshops. Before collecting data, all assessors were required to demonstrate high inter-rater agreement ($\text{kappa } [k] > .80$) with supervisors using 12 tape-recorded interviews conducted with individuals with and without eating disorders. Ambiguous diagnostic issues were discussed and resolved during consensus meetings, which were held weekly. Participants were paid \$30 for completing the baseline assessment, \$35 for the posttest assessment, and \$40 each for completing the 1- and 2-year follow-ups. Participants were not compensated for completing either of the interventions (online or in the group), or for viewing the educational video or reading the educational brochures. Participants provided consent for this Institutional Review Board-approved project.

eBody Project—Participants were asked to complete an online program that consisted of six modules. In each module, participants engage in written and behavioral activities designed to critique the thin ideal. Each module was developed to take between 30-40 minutes to complete, to keep the total intervention time similar to the 240-minute duration of the group *Body Project*. The participants were given a 3-week period of time to complete the program. The modules were designed to last approximately 35 minutes each because this is the average amount of time women spend playing videogames per session (Winn & Heeter, 2009). Each module included one user-driven self-education exercise, one contest designed to promote accountability for thin ideal perspectives (e.g. posting letters and exercises a community page for other users to view), and one off-line exercise, all of which are designed to induce dissonance regarding pursuing the thin ideal. Table 1 provides the content of each module and compares elements between the online and group-based dissonance interventions to show how nearly all elements were preserved in the online version. One new feature that was added to the *eBody Project* was that participants earned “Body Project Bucks” for completing assignments that could be traded in for small *Body Project* products (e.g., water bottles, umbrellas, shirts) once they completed the program.

Body Project—Participants were asked to engage in verbal, written, and behavioral exercises in which they critiqued the thin ideal during four 1-hour group sessions held on a weekly basis, and in weekly home exercises. For example, in one dissonance inducing activity, participants wrote an essay about the costs associated with pursuing the thin ideal and engaged in a counter-attitudinal role-play in which they attempted to dissuade facilitators from pursuing the thin ideal. Groups typically consisted of 7-9 participants. Clinicians from the university psychology clinic worked in pairs to deliver the scripted intervention. During training, facilitators read the manual thoroughly to become familiar with the intervention, and attended a 4-hour workshop in which they learned the conceptual rationale and supporting evidence for the intervention, discussed the key elements of the sessions, role-played delivery of session activities, and discussed process issues (e.g., making referrals). Sessions were video-recorded and reviewed by Drs. Rohde and Shaw for general guidance in competence and adherence to the scripted manual. Facilitators received supervision based on the video-recordings during delivery of their first two groups. Fifty percent of the video-recorded sessions were rated for fidelity and competence.

Educational video control condition—Participants were sent an online link to view a 55-minute documentary called *Dying to be Thin*, which focused on eating disorders, body dissatisfaction, and body acceptance. Topics include the cultural pressures to be thin, physical and emotional consequences of subscribing to this ideal, and treatment/recovery from eating disorders. This material was provided through presentations from experts and the personal stories of survivors of eating disorders. Participants were sent the link to a web page where they could view the video for free.

Educational brochure control condition—Participants received a 2-page brochure produced by the National Eating Disorders Association that describes negative and positive body image, notes that negative body image is associated with increased risk for onset of eating disorders, and offers 10 steps for achieving a positive body image. Participants in this

condition were sent the brochure in the mail after randomization, which occurred after the baseline 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 during any assessment.

Measures

Thin-ideal internalization—The Ideal-Body Stereotype Scale-Revised assessed thin-ideal internalization (Stice et al., 2008). Items used a response format ranging from 1 = *strongly disagree* to 5 = *strongly agree* and were averaged for this scale and those described below. It has shown internal consistency ($\alpha = .91$), 2-week test-retest reliability ($r = .80$), predictive validity for bulimic symptom onset, and sensitivity to detecting intervention effects (Stice et al., 2008; $\alpha = .78$ at pretest).

Body dissatisfaction—Items from the Satisfaction and Dissatisfaction with Body Parts Scale (Berscheid, Walster, & Bohrnstedt, 1973) assessed dissatisfaction with nine body parts using a response scale ranging from 1 = *extremely satisfied* to 6 = *extremely dissatisfied*. It has shown internal consistency ($\alpha = .94$), 3-week test-retest reliability ($r = .90$), predictive validity for bulimic symptom onset, and sensitivity to detecting intervention effects (Stice et al., 2008; $\alpha = .91$ at pretest).

Dieting—The Dutch Restrained Eating Scale (van Strien, Frijters, van Staveren, Defares, & Deurenberg, 1986) assesses the frequency of various dieting behaviors using a response scale ranging from 1 = *never* to 5 = *always*. It has shown internal consistency ($\alpha = .95$), 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, Sysko, Roberto, & Allison, 2010; Stice et al., 2008; van Strien et al., 1986; $\alpha = .92$ at pretest).

Depressive affect—The 21-item Beck Depression Inventory (Beck et al., 1988) assessed depressive affect using a response scale ranging from no symptoms (0) to severe symptoms (2). It has shown internal consistency ($\alpha = .73-.95$), test-retest reliability ($r = .60-.90$), and convergent validity with clinician ratings of depressive symptoms ($M r = .75$; Beck et al., 1988; $\alpha = .94$ at pretest).

Eating pathology—The Eating Disorder Diagnostic Interview assessed DSM-IV eating disorder symptoms. Items assessing symptoms in the past month were summed to form an overall eating disorder symptom composite. This composite has shown internal consistency ($\alpha = .92$), 1-week test-retest reliability ($r = .90$), inter-rater agreement (ICC $r = .93$), sensitivity to detecting effects of eating disorder prevention and treatment interventions, and predictive validity for future onset of depression (Burton & Stice, 2006; Stice et al., 2011).

Body mass—BMI was used to reflect height-adjusted weight (Pietrobelli et al., 1998). After removal of shoes and coats, height was measured to the nearest mm using stadiometers and weight was assessed to the nearest 0.1 kg using digital scales. Two measures of each were obtained and averaged. BMI correlates with direct measures of body fat such as dual

energy x-ray absorptiometry ($r = .80 - .90$) and health measures such as blood pressure, adverse lipoprotein profiles, and diabetes mellitus (Pietrobelli et al., 1998).

Results

Preliminary Analyses

Participants in the four conditions did not significantly differ on demographic factors or baseline study outcomes. Five participants (4.6%) did not complete either the 1- or 2-year assessments. We used maximum likelihood to impute missing data, as it produces more accurate parameter estimates than alternative approaches to handling missing data, such as casewise deletion or last observation carried forward (Schafer & Graham, 2002). Acceptability of the *eBody Project* was high; 17/19 users (89%) completed all 6 modules (1 completed 5 modules and 1 completed 2). User logs indicated that the average time to complete the sessions was 27 minutes. In the *Body Project* condition 79% of participants attended all 4 sessions, 18% attended 3 sessions, and 3% attended 1 session. If a participant missed a session, a brief (10-15 min) individual session was conducted to review missed material when possible. Of the 8 participants who missed one or more session, 5 completed a make-up session.¹ Our earlier report confirmed that fidelity and competence was good for *Body Project* facilitators (Stice et al., 2012).

The condition $\times$ time interaction from an omnibus repeated measures MANOVA model confirmed that change in all outcomes over time differed across conditions ($F [54,1554.7] = 1.43, p = .02, d = .41$). Follow-up repeated measures ANOVA models tested whether there were differential changes in outcomes across each pair of conditions from baseline to 1-year follow-up and baseline to 2-year follow-up (in each model, condition was a 2-level between-subjects factor and time was a 2-level within-subject factor). Table 2 provides Ms and SDs for all outcomes across time points and conditions. Table 3 provides the effect sizes and significance levels for the time $\times$ conditions interactions that tested for differential change in the outcomes across conditions. This preliminary trial only had a power of .80 to detect a $d = .65$ or greater, which is between a medium and large effect (Cohen, 1988). Given the limited power of this pilot we focused more attention on effect sizes than significance level.

eBody Project versus educational brochure control participants at 1-year follow-up showed large intervention effects for depressive affect ($d = .69$) and BMI ($d = .75$), a medium intervention effect for body dissatisfaction ($d = .58$), small intervention effects for dieting ($d = .37$) and eating disorder symptoms ($d = .33$), and a trivial effect for thin-ideal internalization ($d = -.09$). Compared brochure controls by 2-year follow-up, *eBody Project* participants showed large intervention effects for BMI ($d = .93$), a medium intervention effect for dieting ($d = .50$), a small intervention effect for body dissatisfaction ($d = .19$), and trivial effects for change in depressive affect ($d = .06$) and eating disorder symptoms ($d = .$

¹The number of sessions each participant attended for the *Body Project* did not correlate significantly with change in any of the outcomes over the follow-up period. However, the number of modules that each participant completed from the *eBody Project* did show a significant negative correlation with change in body dissatisfaction at 2-year follow-up ($r = -.56, p = .013$), a marginally significant negative correlation with change in eating disorder symptoms by 2-year follow-up ($r = -.45, p = .052$), and a marginally significant negative correlation for eating disorder symptoms at 1-year follow-up ($r = -.42, p = .071$). No other changes in outcomes were significantly correlated with *eBody Project* completion rates.

09). Thin-ideal internalization decreased more in educational brochure controls than *eBody Project* participants ($d = -.28$).

eBody Project versus educational video control participants at 1-year follow-up showed a large effect for reductions in BMI ($d = .84$), medium effects for body dissatisfaction ($d = .57$) and dieting ($d = .50$), small effects for depressive affect ($d = .36$) and eating disorder symptoms ($d = .19$), and a trivial difference in change in thin-ideal internalization ($d = -.11$). In comparison to video controls at 2-year follow-up, *eBody Project* participants showed a large effect for dieting ($d = .69$), a medium effect for BMI ($d = .53$), small effects for body dissatisfaction ($d = .21$) and eating disorder symptoms ($d = .26$), and trivial differences in change in thin-ideal internalization ($d = -.16$) and depressive affect ($d = .13$).

Body Project versus educational brochure control participants at 1-year follow-up showed large effects for body dissatisfaction ($d = .67$) and dieting ($d = .64$), medium effects for depressive affect ($d = .52$) and thin-ideal internalization ($d = .41$), a small effect for eating disorder symptoms ($d = .26$), and trivial differences in change in BMI ($d = .11$). For this same contrast at 2-year follow-up, there were medium effects for body dissatisfaction ($d = .57$), dieting ($d = .50$), and BMI ($d = .54$), small effects for depressive affect ($d = .33$) and eating disorder symptoms ($d = .33$), and a trivial difference in change in thin-ideal internalization ($d = .14$).

Body Project versus educational video control participants at 1-year follow-up showed large effects for body dissatisfaction ($d = .72$) and dieting ($d = .83$), small effects for thin-ideal internalization ($d = .35$), depressive affect ($d = .24$), and BMI ($d = .26$), and trivial effects for eating disorder symptoms ($d = .16$). For this same contrast at 2-year follow-up, there were large effects for body dissatisfaction ($d = .60$) and dieting ($d = .72$), medium effects for eating disorder symptoms ($d = .57$) and BMI ($d = .40$), and small effects for thin-ideal internalization ($d = .22$) and depressive affect ($d = .39$).

Body Project versus *eBody Project* participants at 1-year follow-up showed a medium effect for thin-ideal internalization ($d = .41$) and a small effect for dieting ($d = .22$), but only trivial differential change in body dissatisfaction ($d = .16$), depressive affect ($d = -.01$), and eating disorder symptoms ($d = .06$). There was a medium effect for change in BMI favoring the *eBody Project* over the *Body Project* ($d = -.42$). By 2-year follow-up, *Body Project* versus *eBody Project* participants showed a medium effect for body dissatisfaction ($d = .40$), small effects for thin-ideal internalization ($d = .33$), depressive affect ($d = .29$), and eating disorder symptoms ($d = .25$), but only trivial differences in change in dieting ($d = -.01$) and BMI ($d = -.01$).

There were trivial differences in change in outcomes for educational video versus educational brochure control participants. The exceptions were that the former showed small intervention effects for depressive affect ($d = .38$) and eating disorder symptoms ($d = .23$) at 1-year follow-up.

Discussion

Although this pilot trial was only powered to detect medium-to-large intervention effects, it was encouraging that the prototype *eBody Project* produced a few effects for eating disorder risk factors and symptoms that were medium-to-large at 1- and 2-year follow-up, including statistically significant intervention effects for reported dieting and depressive affect. However, the average effects at 1- and 2-year follow-up for reductions in the outcomes were small ($M d = .34$ and $.17$ respectively). The former effect compares favorably to the average effect for eating disorder risk factors observed for the Internet-based *Student Bodies* in the only trial in which effects for these outcomes were reported at 1-year follow-up ($M d = .24$; Taylor et al., 2006). We could not locate trials that reported longer follow-up effects for *Student Bodies*. The fact that our average effect at 1-year follow-up is somewhat larger than has been observed for *Student Bodies* is noteworthy because the latter intervention includes 8 hours of therapist-led chat room interchanges and in-person meetings, which significantly increase the cost and complexity of dissemination.

In contrast, the effects for eating disorder risk factors and symptoms for the group *Body Project* were larger at 1- and 2-year follow-up ($M d = .48$ and $.43$ respectively). Indeed, even in this pilot, *Body Project* participants showed significantly greater reductions in body dissatisfaction, reported dieting, depressive affect, and eating disorder symptoms than controls at 1- or 2-year follow-up, which represented medium to large effects. These average effects for the *Body Project* from the present trial were similar to the average effects at 1- and 2-year follow-up from the major efficacy trial ($M d = .26$ and $.50$ respectively; Stice et al., 2006, 2008), but larger than comparable effects from the high school effectiveness trial in which school clinicians delivered the intervention ($M d = .14$ and $.10$ respectively; Stice et al., 2011), potentially because high school clinicians had less experience leading group-based interventions. Although the clinicians who delivered the *Body Project* in the present trial were primarily graduate students who worked in the university psychology clinic, most had experience delivering group-based interventions, whereas the high school clinicians often did not have this experience. It seems unlikely that differential clinical experience of facilitators explains the fact that the *Body Project* tends to produce larger effects than other eating disorder prevention programs, because numerous trials of other eating disorder prevention programs have often had graduate students or experienced clinicians deliver the interventions. Thus, while the acute effects from this trial suggested that the *eBody Project* produced effects that were similar in magnitude to the *Body Project* effects (Stice et al., 2012), results from the present report indicate that the group *Body Project* generally produces more clinically meaningful intervention effects that show greater persistence over time if delivered by experienced clinicians, but that the *eBody Project* produces effects that are similar to those observed by clinicians with less expertise.

One potential explanation for why the effects for key outcomes such as thin-ideal internalization were weaker for the *eBody Project* versus the *Body Project* is that participants may feel greater public accountability when they critique the thin ideal in a group of peers, versus online, potentially because they continue to see these peers outside of the group setting or have the potential to do so, whereas they are more anonymous when they critique the thin ideal on the Internet. This interpretation suggests that it may be more

difficult to capture the public accountability that putatively increases the effects of dissonance-inducing behavior via the Internet because people may feel more anonymous. The weaker reductions in thin-ideal internalization, a key mediator of the effects of this intervention, may explain the weaker effects for the other eating disorder risk factors and symptoms observed for the Internet version of this program. The average effect for thin-ideal internalization was smaller for the *eBody Project* than for the *Body Project* ($d = -.16$ vs. $.28$ respectively), echoing the pattern of findings for the average effects for the downstream outcomes for these two interventions ($d = .36$ vs. $.50$ respectively), which lines up with this interpretation. Although it may seem problematic for the intervention theory that the *eBody Project* intervention reduced outcomes at 1- and 2-year follow-ups, but did not reduce thin-ideal internalization, this intervention did reduce thin-ideal internalization at posttest ($M d = .52$), which might have mediated the effects on the downstream outcomes, such as dieting and eating disorder symptoms. Alternatively, changes in other factors, such as body dissatisfaction, might play a more important role in mediating the intervention effects on downstream outcomes, as been suggested by Seidel and associates (2009). Future research should test whether the mediators of that account for the effects for these two versions of the *Body Project* are similar or different.

A second potential explanation for the weaker effects of the Internet versus the group intervention is that participants spent an average of only 2.7 hours completing the *eBody Project* modules versus an average of 3.7 hours of group meetings for the *Body Project* intervention. This interpretation implies that if the *eBody Project* were modified so that participants spend more time completing dissonance-inducing activities on line, the effects of the intervention might be enhanced. In this context it is important to note that meta-analyses indicate that the average posttest effect for Internet interventions ranged from $d = .41$ -. $.60$ for health/mental health problems and found no significant difference in effects for Internet versus in-person versions of the same intervention (Andersson & Cuijpers, 2009; Barak et al., 2008; Spek et al., 2007).

Although the *Body Project* produced larger and more enduring effects than the *eBody Project* for eating disorder risk factors and symptoms over follow-up, the latter intervention produced large weight gain prevention effects that persisted through 1- and 2-year follow-up ($M d = .80$ and $.73$ respectively), which were much larger than the weight gain prevention effects from the *Body Project* ($M d = .19$ and $.47$ respectively). These weight gain prevention effects compare favorably to the average weight gain prevention effects produced by obesity prevention programs documented in a meta-analytic review ($M d = .08$; Stice, Shaw, & Marti, 2006b). Prevention programs that have produced significant intervention effects for eating disorder symptoms and unhealthy weight gain have generated much smaller intervention effects for BMI over long-term follow-up. For instance, the group-based *Healthy Weight* intervention produced an average d of only $.12$ by 3-year follow-up (Stice et al., 2008).

One speculation is that the differential weight gain prevention effects may have occurred because the *Body Project* was more effective in promoting rejection of the thin ideal and body acceptance at any weight than the *eBody Project*, which did not produce persisting reductions in thin-ideal internalization. It is possible that this led the *eBody Project*

participants to turn to lifestyle modification to address their body image concerns, such as reducing intake of energy dense foods or increasing exercise. Perhaps the group-based discussions that occur in the *Body Project* regarding the costs of pursuing the thin ideal are more effective in reducing pursuit of this ideal than the parallel computer-based exercises that were developed for the *eBody Project*. Although it will be necessary to replicate this weight gain prevention effect in a larger trial and investigate the hypothesized factors that may give rise to these differential effects on weight gain prevention, these effects are encouraging given the importance of developing prevention programs that produce intervention effects for both eating pathology and obesity (Brownell & Fairburn, 1995; Irving & Neumark-Sztainer, 2002).

Limitations

It is important to consider the study limitations when interpreting the findings. First, the cell sizes per condition in this preliminary trial were small, which prevented us from detecting small-to-medium effects that might have been detected in a fully powered trial. Thus, it will be important to replicate the results in a larger sample. Second, only 30% of the sample was from ethnic minority groups. Thus, results should be generalized to ethnic minority groups with care. Although the *Body Project* has produced similar effects for Latino, Asian, and European American participants (Rodriguez, Marchand, Ng, & Stice, 2008), the sample was too small in this pilot study for similar analyses with the *eBody Project*. Third, individuals received some financial compensation as research participants and it is possible that dissonance induction and intervention effects would be stronger if individuals completed the program completely due to intrinsic motivation. Fourth, we did not test whether the *eBody Project* or the *Body Project* resulted in significantly greater reductions in eating disorder onset over follow-up because the small cell sizes for this pilot did not provide sufficient power for these analyses.

Conclusions and Directions for Future Research

Results suggest that the new Internet-based *eBody Project* was able to use dissonance-induction procedures to reduce eating disorder risk factors and symptoms. However, findings from this preliminary trial suggest that it might be best to implement the group-based *Body Project* over the Internet-based *eBody Project* if the objective is to reduce eating disorder risk factors and symptoms that persist over long-term follow-up. Although the Internet intervention would be considerably more cost effective, this present preliminary trial suggests that it produces weaker effects for these outcomes over longer-term follow-up. In contrast, if the objective is to reduce eating disorder risk factors and symptoms, as well as unhealthy weight gain, the *eBody Project* might be a reasonable option. Hopefully with continued enhancement, this Internet intervention will produce even larger effects for these dual outcomes in future trials.

With regard to directions for future research, it will be important to consider how the *eBody Project* could be modified to produce larger and more persisting effects. First, we have developed a dissonance-based educational video game for each of the six modules to increase the overall intervention duration, with the hope that it will improve the effects. Second, we no longer allow participants to purchase *Body Project* products with the *Body*

Project Bucks that they earn for completing elements of the intervention because these incentives could reduce cognitive dissonance induction, as they provide an external justification for engaging in the anti-thin-ideal activities. In addition, the expense of providing these products would significantly increase the cost and complexity of broadly disseminating this prevention program. Third, we considered omitting the social media component, wherein participants create a user profile, post copies of their anti-thin-ideal letters and videos, and vote for the best postings, as this component also would complicate broad dissemination and renders the intervention effects dependent on the particular participants who are involved with the social media element of the program. For now, we have retained this feature because it is theoretically important for promoting public accountability for the anti-thin-ideal perspectives assumed by participants (one of the key components for dissonance induction) and new users are simply added to the social media network. However, it will be important to confirm that this feature of the intervention adds to the efficacy of the program.

The findings from this pilot trial imply that it would be useful to conduct a fully powered effectiveness trial of the refined *eBody Project* intervention relative to the group-based *Body Project* and a relevant control condition. Such a trial could investigate which version of this prevention program is more engaging and more effective, as well as investigate individual difference factors that identify participants for whom one or the other intervention is superior in these dimensions. It should also include an analysis of whether the *eBody Project* is more cost effective than the *Body Project* in reducing eating disorder onset and associated treatment expenses. Further, a fully powered evaluation of the *eBody Project* intervention should investigate whether degree of utilization of the various web-delivered components that are designed to increase dissonance (e.g., using the social media element and posting of anti-thin ideal exercises) is related to larger reductions in the outcomes. With continued refinements based on future randomized trials and qualitative input from participants, we hope to develop an even more effective stand-alone Internet-based eating disorder prevention program, which has the potential to dramatically extend the reach of this empirically supported intervention and reduce the population prevalence of eating disorders.

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Figure 1. Participant Flow Throughout the Study

Table 1

Content of Group <i>Body Project</i>	Content of <i>eBody Project</i>
Introduction and overview (Session1 [S1])	Introduction and overview (Module1 [M1])
Voluntary commitment (at start of every session)	Voluntary commitment (at start of every module)
Definition of the thin ideal (S1) Participants select magazine pictures of models; discuss definition and history of the thin ideal.	Definition of the thin ideal: Online self-education (M1) Users select images of models and questions about the definition and history of the thin ideal are posed.
Costs of pursuing the thin ideal (S1) Participants generate costs of pursuing the thin ideal; identify who benefits from the ideal.	Costs of pursuing the thin ideal: Online contest (M1-2) Users generate top-10 list of costs of pursuing the thin ideal, post online in M2, and vote for best list; winners receive BP bucks.
	Trivial pursuit: Online self-education (M1) Users play multiple-choice trivia game to learn the symptoms and costs of eating disorders, earning BP bucks for correct answers.
Letter to younger girl (S1-2) Users write a letter to a younger girl about the costs of the thin ideal; letter is read aloud to the group and videotaped with an option to post it online.	Letter to younger girl: Offline exercise (M1-2) Users write a letter to a younger girl about the costs of the thin ideal, post the letter or a video of themselves reading the letter online, and vote for the best posting; winners receive BP bucks.
Role-play to discourage pursuit of thin ideal (S2) Participants take turns dissuading the facilitator (posing as a dieter or eating disordered individual) from pursuing thin ideal.	Discouraging the thin ideal: Online self-education (M2) Users argue someone out of pursuing the thin ideal through a virtual texting interchange.
	Costs of eating disorders: Online exercise (M2) Users write a story about someone with an eating disorder, post the story, and vote for the best story; winners receive BP bucks.
Mirror self-affirmation exercise (S1-2) Participants stand in front of mirror and write down positive qualities about themselves; read their list aloud to group.	Mirror mirror on the wall: Offline exercise (M2-3) Users stand in front of mirror, write positive features, post online, vote for best posting; winners receive BP bucks.
Quick comebacks to thin-ideal statements (S3) Role-play wherein participants challenge thin-ideal statements made by facilitators, generating anti-thin ideal comebacks.	Challenging thin-ideal quips: Online self-education (M3) Users generate quick comebacks to thin-ideal statements and earn BP bucks for quick responses.
Top-10 body activism list home exercise (S2) Participants create top-10 list of things women can do to resist thin ideal.	Body activism: Online self-education (M3) Users make top-10 lists of body activism activities, earning BP bucks for each idea.
Body activism home exercise (S3-4) Participants do at least one body activism activity on their own, sharing results with the group.	Body activism: Online self-education (M3-4) Users do at least one body activism activity and post written or video report online, vote on others' posting; winners received BP bucks.
Verbal challenges home exercise (S2-3) Participants pick three real-life examples of pressures to be thin and create a verbal challenge to each pressure. Participants read to the group and are videotaped.	Rewind response letter: Offline exercise (M4) Users write letter to someone who said hurtful thin-ideal comment to them and how they could have responded; users are encourage to respond in an assertive manner in the future to such comments.
Self-affirmation exercise (S4) Participants make commitment to engage in some sort of self-affirmation exercise with a friend, sibling, etc.	Self-affirmation exercise: Offline exercise (M4) Users generate 5 self-affirmation exercises and commit to engage in them with a friend, sibling, etc.
Behavioral challenge (S3-4) Participants asked to do something they normally wouldn't do because of body image concerns (e.g., wear shorts) and write a brief report to the group of how it went.	Behavioral challenge: Offline exercise (M4-5) Users asked to do something that they normally wouldn't do because of body image concerns, post a brief written/video report online, vote for best report; winners receive BP bucks.
Letter to younger girl (S4) Participants write letter to a younger girl about ways to avoid body image concerns and send to facilitator via email.	Helping the next generation letter: Offline exercise (M5-6) Users write letter to a younger girl about avoiding body image concerns, post the letter or video, vote on best posting; winners receive BP bucks.
	Anti-thin ideal commercial: Offline exercise (M5-6) Users make short, 1-2 minute commercials and post them online, vote on best commercial; winners receive BP bucks.
Challenging fat talk (S4)	

Content of Group <i>Body Project</i>	Content of <i>eBody Project</i>
Participants get a list of subtle thin-ideal statements and discuss how this promotes the thin ideal and ways to stop this.	
Future pressures to be thin (S4) Participants provide examples of future pressures to follow the thin ideal and how they will respond to them.	Planning ahead: Online self-education (M6) Circumstances that can cause body image concerns are presented (e.g., senior prom) and users develop a response plan for each.
	Passing along the wisdom: Offline exercise (M6) Users are asked to talk to a real person about the program and tell this person what they learned (e.g., a friend or parent).

Note: S stands for session (e.g., session 1) and M stands for module (e.g., module 1).

Table 2
Means and standard deviations for outcomes from the four conditions at pretest, posttest, 1- and 2-year follow-up

	Thin-ideal internalization		Body dissatisfaction		Dieting		Depressive affect		Eating disorder symptoms		BMI	
	M (SD)		M (SD)		M (SD)		M (SD)		M (SD)		M (SD)	
<i>eBody Project</i>												
Pretest	3.75 (0.50)		3.23 (0.56)		2.62 (0.82)		10.32 (5.24)		8.84 (7.62)		23.11 (2.67)	
Posttest	3.37 (0.60)		2.78 (0.78)		2.04 (0.83)		6.00 (5.40)		5.95 (4.54)		23.19 (2.53)	
1-year	3.61 (0.66)		2.82 (0.72)		2.19 (0.86)		5.53 (5.53)		6.84 (6.52)		22.85 (2.29)	
2-year	3.55 (0.69)		3.04 (0.83)		2.09 (0.84)		7.19 (6.38)		7.00 (7.77)		23.06 (2.45)	
<i>Body Project</i>												
Pretest	3.83 (0.42)		3.44 (0.74)		2.72 (0.93)		13.90 (10.68)		12.92 (13.96)		24.22 (4.60)	
Posttest	3.47 (0.53)		2.88 (0.89)		2.17 (0.98)		9.21 (10.40)		6.90 (8.37)		24.33 (4.51)	
1-year	3.42 (0.50)		2.93 (0.79)		2.10 (0.85)		9.35 (8.83)		10.23 (16.28)		24.74 (5.15)	
2-year	3.39 (0.68)		2.93 (0.81)		2.21 (0.93)		7.87 (6.88)		8.77 (11.10)		24.25 (4.51)	
<i>Brochure controls</i>												
Pretest	3.88 (0.43)		3.26 (0.65)		2.68 (0.72)		11.65 (6.24)		10.20 (7.19)		23.75 (5.02)	
Posttest	3.84 (0.52)		3.33 (0.66)		2.57 (0.88)		10.95 (7.48)		10.25 (11.02)		23.78 (5.38)	
1-year	3.69 (0.48)		3.23 (0.59)		2.58 (0.82)		11.80 (9.55)		11.55 (14.08)		24.49 (5.15)	
2-year	3.52 (0.46)		3.21 (0.82)		2.59 (0.91)		8.80 (8.65)		9.25 (8.75)		24.90 (5.60)	
<i>Video controls</i>												
Pretest	3.79 (0.51)		3.17 (0.87)		2.52 (0.93)		9.24 (7.36)		7.48 (7.75)		23.53 (4.42)	
Posttest	3.68 (0.54)		3.01 (0.86)		2.30 (1.01)		7.78 (6.98)		5.66 (6.34)		23.65 (4.58)	
1-year	3.59 (0.57)		3.17 (0.80)		2.48 (0.83)		6.52 (5.99)		6.79 (5.88)		24.55 (5.00)	
2-year	3.49 (0.55)		3.16 (0.72)		2.55 (0.81)		6.86 (5.88)		7.69 (7.59)		24.42 (5.21)	

Table 3
Effect sizes (d) and significance levels for by the time $\times$ condition interactions in repeated measures ANOVA models comparing the conditions

	Thin-ideal internalization	Body dissatisfaction	Dieting	Depressive affect	Eating disorder symptoms	BMI	M effect sizes
Pre to 1-year							
<i>eBody Project</i> vs. brochure control	-0.09 ($p=.79$)	0.58 ($p=.09$)	0.37 ($p=.28$)	0.69 ($p=.04$)	0.33 ($p=.32$)	.75 ($p=.03$)	0.44
<i>eBody Project</i> vs. video control	-0.11 ($p=.70$)	0.57 ($p=.057$)	0.50 ($p=.10$)	0.36 ($p=.23$)	0.19 ($p=.51$)	.84 ($p=.01$)	0.39
<i>Body Project</i> vs. brochure control	0.41 ($p=.13$)	0.67 ($p=.014$)	0.64 ($p=.02$)	0.52 ($p=.05$)	0.26 ($p=.33$)	0.11 ($p=.67$)	0.44
<i>Body Project</i> vs. video control	0.35 ($p=.16$)	0.72 ($p=.01$)	0.83 ($p=.001$)	0.24 ($p=.33$)	0.16 ($p=.53$)	0.26 ($p=.29$)	0.43
<i>eBody Project</i> vs. <i>Body Project</i>	0.41 ($p=.13$)	0.16 ($p=.57$)	0.22 ($p=.41$)	-0.01 ($p=.91$)	0.06 ($p=.86$)	-.42 ($p=.12$)	0.07
<i>Video</i> vs. <i>brochure control</i>	0.06 ($p=.86$)	-0.01 ($p=.89$)	-0.09 ($p=.75$)	0.38 ($p=.20$)	0.23 ($p=.44$)	.17 ($p=.56$)	0.12
Pre to 2-year							
<i>eBody Project</i> vs. brochure control	-0.28 ($p=.41$)	0.19 ($p=.57$)	0.50 ($p=.14$)	0.06 ($p=.84$)	0.09 ($p=.77$)	.93 ($p=.01$)	0.25
<i>eBody Project</i> vs. video control	-0.16 ($p=.60$)	0.21 ($p=.49$)	0.69 ($p=.02$)	0.13 ($p=.65$)	0.26 ($p=.38$)	.53 ($p=.08$)	0.28
<i>Body Project</i> vs. brochure control	0.14 ($p=.60$)	0.57 ($p=.04$)	0.50 ($p=.06$)	0.33 ($p=.22$)	0.33 ($p=.22$)	.54 ($p=.05$)	0.40
<i>Body Project</i> vs. video control	0.22 ($p=.38$)	0.60 ($p=.02$)	0.72 ($p=.005$)	0.39 ($p=.12$)	0.57 ($p=.03$)	.40 ($p=.11$)	0.48
<i>eBody Project</i> vs. <i>Body Project</i>	0.33 ($p=.22$)	0.40 ($p=.14$)	-0.01 ($p=.91$)	0.29 ($p=.29$)	0.25 ($p=.36$)	-.01 ($p=.90$)	0.21
<i>Video</i> vs. <i>brochure control</i>	-0.09 ($p=.74$)	-0.01 ($p=.88$)	-0.17 ($p=.57$)	-0.06 ($p=.85$)	-0.14 ($p=.64$)	.16 ($p=.59$)	-0.05