Published in final edited form as:

Int J Eat Disord. 2014 July ; 47(5): 483–494. doi:10.1002/eat.22253.

Dissonance-Based Prevention of Eating Disorder Risk Factors in Middle School Girls: Results from Two Pilot Trials

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Abstract

Objective—Although several eating disorder prevention programs reduce eating disorder risk factors and symptoms for female high school and college students, few efficacious prevention programs exist for female middle school students, despite the fact that body image and eating disturbances often emerge then. Two pilot trials evaluated a new dissonance-based eating disorder prevention program for middle school girls with body image concerns.

Methods—Female middle school students with body dissatisfaction from two sites (Study 1: $N = 81$, M age = 12.1, $SD = 0.9$; Study 2: $N = 52$, M age = 12.5, $SD = 0.8$) were randomized to a dissonance intervention (*MS Body Project*) or educational brochure control; Study 2 included a 3-month follow-up.

Results—Intervention participants showed significant posttest reductions in only one of six variables with both Studies 1 and 2 (i.e., pressure to be thin and negative affect, respectively), though posttest effect sizes suggested medium reductions in eating disorder risk factors and symptoms (Study 1 $M d = 0.40$; Study 2 $M d = 0.65$); reductions at 3-month follow-up in Study 2 were not evident ($M d = 0.19$).

Conclusions—Results suggest that this new middle school version of the *Body Project* is producing medium magnitude reductions in eating disorder risk factors at posttest but that effects

are showing limited persistence. Continued refinement and evaluation of this intervention appears warranted to develop more effective prevention programs for this age group.

Keywords

prevention; eating disorder; early adolescence; body dissatisfaction; dissonance

Eating disorders in young women are prevalent and debilitating. The prevalence of DSM-5 eating disorders by age 20 among females is 13%¹, and eating disorders are marked by chronicity, functional impairment, and future obesity, internalizing disorders, suicidality, and morbidity.² However, few individuals with eating disorders seek eating disorder treatment (20% with threshold disorders; 3% with eating disorder-not otherwise specified).² Thus, a significant public health priority is to develop and disseminate effective eating disorder prevention programs.

Eating disorder symptoms tend to emerge between 16–20 years of age (e.g., peak risk periods are 19–20 years for anorexia nervosa, 16–20 years for bulimia nervosa, 18–20 years for binge eating disorder).¹ However, although rates of threshold eating disorders are low prior to age 16, symptoms of pathological eating behaviors are present as early as middle school.³ In addition, established risk factors for eating disorders, including thin-ideal internalization, body dissatisfaction, dieting, and negative affect, are often present in late childhood and early adolescence.^{4, 5} Thus, researchers have suggested that it would be useful to implement prevention programs during this developmental period.^{3, 5}

Unfortunately, eating disorder prevention programs for young adolescents have shown limited effects. Some programs have not significantly reduced risk factors⁶ or produced significant effects for only one eating disorder risk factor.⁷ Others report initial significant effects on multiple eating disorder risk factors but found that effects were not sustained at follow-up.⁸ A few programs offered to young adolescents have demonstrated intervention effects on multiple eating disorder risk factors with some changes being sustained up to 1-year post-intervention.^{9, 10, 11, 12} Halliwell and Diedrichs¹³ found that a brief (four 20-minute sessions) dissonance-based eating disorder prevention program for 12–13 year-old girls produced significantly greater pre-post reductions in thin-ideal internalization ($d = 0.49$) and body dissatisfaction ($d = 0.40$) but not dieting, relative to waitlist controls. However, a meta-analysis of eating disorder prevention programs¹⁴ found significantly larger effects for older adolescents (i.e., 15 years of age or older) versus younger adolescents for eating pathology ($M d = 0.35$ vs 0.18), body dissatisfaction ($M d = 0.30$ vs 0.16), thin-ideal internalization ($M d = 0.47$ vs 0.22), and negative affect ($M d = 0.35$ vs 0.14), suggesting difficulty in preventing eating pathology this early. In addition, to our knowledge, no eating disorder prevention program conducted with a middle school population has produced reductions in eating disorder symptoms.

The eating disorder prevention program with the strongest evidence base for older adolescent women is a selective dissonance-based intervention (the *Body Project*) in which young women with body image concerns voluntarily critique the thin ideal in verbal, written, and behavioral exercises.¹⁵ Criticizing the thin ideal in a group setting theoretically produces cognitive dissonance for participants who have internalized the thin ideal, leading

to a reduced pursuit of this ideal, which in turn putatively decreases body dissatisfaction, unhealthy weight control behaviors, negative affect, and eating disorder symptoms, as well as future eating disorder onset. Efficacy trials show that the *Body Project* produces larger reductions in eating disorder risk factors and eating disorder symptoms (M pre-post $d = 0.82$) relative to assessment-only or alternative intervention.^{15, 16} Critically, the *Body Project* significantly reduced onset of sub/full threshold eating disorders through 3-year follow-up relative to assessment-only controls (incidence 6% vs 15% respectively; $d = 0.50$).¹⁶ Efficacy trials conducted by independent teams have also found that dissonance-based eating disorder prevention programs produce greater reductions in risk factors and eating disorder symptoms than assessment-only controls and alternative interventions.^{17, 18, 19} Effectiveness trials confirm that the *Body Project* produces similar effects when high school and college counselors recruit at risk young women and deliver the program in real-world settings relative to participants in educational brochure and video control conditions (M pre-post $d = 0.58$), including significant reductions in eating disorder symptoms that persist through 3-year follow-up (M pre-3-year follow-up $d = 0.30$).^{20, 21}

Although research indicates that the *Body Project* is efficacious and effective for female college and high school students, three lines of evidence suggest it would be important to develop a new version of the *Body Project* specifically designed for female middle school students. First, we collapsed data from two large trials involving female college and high school students to characterize intervention participants who showed eating disorder onset despite completing the *Body Project*, as an improved understanding of factors predicting poor response might allow us to improve the program's effectiveness.²² Results indicated that, relative to intervention participants who remained disorder-free, *Body Project* participants who later developed a DSM-5 eating disorder showed greater thin-ideal internalization, body dissatisfaction, negative affect, and eating disorder symptoms at baseline. Thus, implementing eating disorder prevention programs at an earlier developmental period before risk factors and symptoms become deeply ensconced may be more effective.

Second, we examined developmental changes in eating disorder risk factors and symptoms from ages 12 to 20 to inform the timing of prevention delivery,²³ using data from a prospective study in which participants completed diagnostic interviews and surveys annually from age 12 to 20.¹ Results suggested that key risk factors (i.e., body dissatisfaction, thin-ideal internalization, negative affectivity, dieting) were already evident by age 13 and escalated only slightly thereafter, implying that it would be useful to have efficacious eating disorder prevention programs for females aged 12 to 14. These data also suggested that we should refine the *Body Project* to focus on reducing body dissatisfaction and negative affectivity, which were already elevated by age 13, in addition to reducing thin-ideal internalization, which is the original foci of the *Body Project*.

Third, we conducted an initial within-subjects evaluation of the *Body Project* with female middle school students and found no significant pre-post reductions in thin-ideal internalization, body dissatisfaction, dieting, negative affect, or eating disorder symptoms assessed by questionnaire ($M d = 0.09$). Thus, our initial pilot study suggested the need to develop a version that was adapted for use with female early adolescents versus the version

that has been effective for female high school and college students. We believed this was because the activities and vocabulary level were not adapted to be appealing and comprehensible to younger adolescents and because some of the in-session and home practice assignments required advanced cognitive abilities (e.g., abstract reasoning, planning) which do not routinely develop until late adolescence.²⁴

Given these initial results, we concluded it would be necessary to substantially revise the *Body Project* to make it more age-appropriate. Because middle school group participants appeared distracted by the end of the hour-long sessions and had trouble clearly understanding and utilizing the intervention concepts, we converted the program to six 45-minute sessions that were simplified and more interactive. All key components of the original *Body Project* that we felt were age-appropriate were retained; a comparison of the components of this revised intervention relative to the original *Body Project* is shown in Table 1.

This report describes two pilot studies evaluating the new 6-session intervention, which we labeled *MS Body Project* (MS for middle school). In the first pilot, 81 female middle school students randomized to the *MS Body Project* or assessment control condition were assessed at pretest and posttest. In the second pilot, 52 female middle school students were similarly randomized to the *MS Body Project* or assessment control condition but were assessed at 3-month follow-up, in addition to pretest and posttest. We targeted students with body image concerns because prevention programs targeting higher-risk individuals tend to produce larger effects than those offered universally¹⁴ and because young women with body image concerns are at elevated risk for eating disorder symptoms.⁴ Given the limited statistical power of these pilot studies, we focused both on the magnitude of effect sizes and statistical significance when interpreting study results.

Study 1

Participants and Procedure

Participants were 81 female students (M age = 12.1, SD = 0.9; M self-reported BMI [kg/m²] = 20.5, SD = 4.6) recruited from middle schools (one in Texas, two in Oregon; M enrollment = 560; 51% female; 33% 6th grade; 38% 7th grade, 24% 8th grade, 5% not reported). The sample was 44% European American, 7% Asian, 25% Hispanic, 9% African American, 1% Native Hawaiian/Pacific Islander, and 14% mixed heritage/unknown, which was fairly representative of the three schools (56% European American, 6% Asian, 26% Hispanic, 7% African American, 1% American Indian/Alaska Native, 1% Native Hawaiian/Pacific Islander). Average parental education was 19% high school graduate or less, 17% some college, 28% college graduate, and 36% advanced graduate/professional degree, which was somewhat higher than the education of adults in the regions (22% high school graduate or less, 20% some college, 27% college graduate, 21% graduate degree).

From October, 2011 to April, 2012, group facilitators attended classes at the middle schools to briefly describe the group (a body acceptance class for girls) and the research study, and invited interested girls to have their parents complete the consent form. Assessors collected informed written assent/consent from interested students and their parents prior to having

participants complete the pretest survey. Though not formally assessed, no participants appeared to meet criteria for DSM-IV anorexia nervosa or bulimia nervosa, which is consistent with the very low prevalence of eating disorders for this age group. Participants were assessed by survey twice, at pretest and posttest; they received a small amount (\$5–10) for completing each survey. Research assistants administered surveys in private settings at the school. Participants were randomly assigned (via coin toss) to the *MS Body Project* groups ($n = 41$) or control ($n = 40$). Figure 1 provides information on participant flow through this trial.

Three group leaders (one in Texas, two in Oregon; all female and of European American descent) conducted 6 groups. The Texas group leader (second author) has a Ph.D. in clinical psychology; one Oregon group leader has a master's degree in school counseling and the second was in the process of completing her master's degree in school counseling. Group leaders were selected on the basis of training and experience in working with this age group and their interest in reducing risk for future eating disorders in middle school girls. Facilitator training involved reading key trials of the *Body Project* program^{15, 16} and the *MS Body Project* scripted intervention manual, and attending a 4-hour workshop (the Texas leader came to Oregon for this training) to learn the rationale and evidence for the intervention, role-play key elements from the sessions, and discuss process issues, including making referrals, home practice compliance, and retention. All sessions were videorecorded and reviewed by either Drs. Rohde or Shaw for supervision (which was provided by email) and for intervention refinement. The institutional review board at each research site approved both studies.

Interventions

MS Body Project—This adaptation of the *Body Project* included key dissonance-induction features (e.g., ensuring voluntary participation, creating public accountability, requiring significant effort), and consisted of 6 weekly 45-min sessions in which groups of 5–8 participants ($M = 6.8$) voluntarily take a counter-attitudinal stance critiquing the thin-ideal by engaging in verbal, written, and behavioral exercises, both during the session and in home activities. We developed several activities to make the program less didactic, including: (a) showing a video illustrating airbrushing; (b) a Thin-Ideal Game that engaged participants to learn about airbrushing and changes in the beauty ideal across time; (c) a dart game that was integrated into role plays to make it more active; (d) a home exercise in which girls make a Healthy Beauty Magazine Cover; and (e) a video which members create a news report advising others about how to resist the thin-ideal. To more visually and concretely explain the key program concepts, we added the “Thin-Ideal” box, for group members to record and store hurtful body-related comments, and its counterpart, the “Healthy Beauty” box, which was used in subsequent sessions to store anti-thin-ideal and pro-healthy beauty comments. In addition, we removed (a) an exercise that required participants to do something they normally would not do because of body image concerns, as it seemed to require too much self-reflection and awareness, and (b) discussion regarding future pressures to be thin due to lack of perceived relevance. The session content is described in Table 1 (when two sessions are listed, the exercise is assigned in the first session and reviewed in the second). Facilitators sent messages to participants between

sessions to remind them of the time/date of the next session and to complete the home practice. They were also encouraged to conduct make-up sessions for girls who missed a session, as done in our previous trials. Facilitators recorded attendance and completion of home practice assignments at each session.

Control Condition—Participants received a 2-page brochure from the National Eating Disorders Association that described negative and positive body image, noted that negative body image increases risk for onset of eating disorders, and offered 10 steps for achieving a positive body image. Brochures were given to participants after randomization. Any participants in either condition who exhibited signs of an eating disorder during an assessment (or during group for *MS Body Project* participants) would have been referred to treatment, but this did not occur in either pilot study.

Measures

Thin-ideal internalization—The 8-item Ideal-Body Stereotype Scale-Revised assessed thin-ideal internalization.¹⁵ Items used a response format ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Items were averaged for this scale and those described below, with the exception of eating disorder symptoms, which are a sum score composite measure. This scale has shown internal consistency ($\alpha = 0.86$), 2-week test-retest reliability ($r = 0.80$), and predictive validity for future increases in body dissatisfaction in an early adolescent (middle school) females.²⁵ Internal consistency in the present study was $\alpha = 0.87$.

Perceived pressure to be thin—The Perceived Sociocultural Pressure Scale assessed perceived pressure to be thin from family, friends, dating partners, and the media.²⁶ This 8-item scale has shown internal consistency ($\alpha = 0.85$), 2-week test-retest reliability ($r = 0.93$), and predictive validity for predicted future increases in body dissatisfaction and onset of binge eating in early adolescent females.^{25, 26} Internal consistency in the present study was $\alpha = 0.90$.

Body dissatisfaction—Items from the Satisfaction and Dissatisfaction with Body Parts Scale²⁷ 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 ($\alpha = 0.94$), 3-week test-retest reliability ($r = 0.90$), predictive validity for bulimic symptom onset in a sample of middle adolescent females.²⁶ Internal consistency in the present study was $\alpha = 0.93$.

Dieting—The 10-item Dutch Restrained Eating Scale (DRES)²⁸ assessed the frequency of dieting behaviors using a response scale ranging from 1 = *never* to 5 = *always*. The DRES has shown internal consistency ($\alpha = 0.95$), 2-week test-retest reliability ($r = 0.82$), predictive validity for onset of binge eating and obesity in early and middle adolescence females.²⁶ Internal consistency in the present study was $\alpha = 0.93$.

Negative affect—Negative affect was assessed with the sadness, guilt, and fear/anxiety subscales (15 items) of the Positive Affect and Negative Affect Scale-for Children (PANAS-C).²⁹ Participants reported the extent to which they had felt various negative emotional

states (e.g., sad). The PANAS-C negative affect scale has shown internal consistency ($\alpha = 0.94$ and 0.92) in development and replication samples of students in grades 4 through 8.²⁹ Internal consistency in the present study was $\alpha = 0.92$.

Eating disorder symptoms—Eating disorder symptoms were assessed with the Eating Disorder Diagnostic Survey,³⁰ a 23-item self-report measure that assessed DSM-IV eating disorder symptoms adapted from the Eating Disorder Examination (EDE).³¹ The EDDS symptom composite has shown internal consistency ($\alpha = 0.89$), 1-week test-retest reliability ($r = 0.87$), and convergent validity with an interviewer-based symptom composite in samples that have included early, middle, and late adolescent females ($r = 0.82$).³⁰ Internal consistency in the present study was $\alpha = 0.89$. To correct for high levels of skew the scale was log normalized for analysis.

Statistical Methods

Missing data—Rates of missing data for study outcomes were 0% at pretest and 6% at posttest. Multiple imputation was used to replace missing values following best-practice recommendations.³² Missing data were imputed using the IVEWare software, which uses all available data to impute missing data via a sequential regression approach. The observed and imputed data were compared to ensure they showed similar distributions. Missing data points were replaced with imputed data in 20 data sets, which were analyzed separately. Model parameters and standard errors, which incorporate within and between model parameter variability, were combined following Rubin.³³

Preliminary analyses—We examined the distribution of variables and potential sources of non-independence. We tested whether conditions differed at pretest on outcomes and demographic variables (race, ethnicity, age, year in school, and parental education) to test whether randomization created equivalent groups. Intervention participants showed statistically significantly higher baseline measures of body dissatisfaction ($d = 0.71$). Statistical models comparing group differences on study outcomes account for this baseline difference.

Analytic Models—Mixed effects analysis of covariance (ANCOVA) models, with baseline measure of the outcome as a covariate and study condition as a two level predictor (1 = *MS Body Project*, 0 = control) were fit with the PROC MIXED procedure. To accommodate the partially nested structure of the data, controls were treated as a group of one and condition specified as a random effect. If the variance of the random condition effect was estimated at zero non-nested models were run. Effect sizes from nested models were estimated with a partial point biserial correlation coefficient and effect sizes from non-nested models with eta-square. All effect sizes were then converted to Cohen's d , which can be interpreted as a small, medium, or large effect at values of 0.20, 0.50, and .0.80, respectively.

Results

Table 2 provides means and SDs for all outcomes at both timepoints for both conditions. Participants in the *MS Body Project* attended an average of 4.5 sessions (2 participants had

one make-up session, which was included as attending that session); all participants attended at least 1 session. Participants completed 76% of their home practice assessments for the sessions they attended (range = 25–100%).

The ANCOVA models tested whether there were differences in average levels in outcomes between the *MS Body Project* group and controls at posttest, controlling for pretest differences. Table 2 provides the test statistics from these analyses, p -values, and effect sizes (d) from these models. Compared to controls, *MS Body Project* participants showed significantly greater pre to post reductions in pressure to be thin ($p = 0.01$), which represented a large magnitude effect ($d = 0.80$). Condition differences for the other variables were nonsignificant, though results for thin-ideal internalization, body dissatisfaction, dieting, and self-reported eating disorder symptoms reflected small to medium effects; the effect for negative affect was negligible. The average effect size for all variables was $d = 0.40$, which reflects a medium effect.

Study 2

Results from the first pilot provided modest support for posttest effects for the *MS Body Project* intervention. In an effort to improve the intervention, we increased its focus on dieting by adding a “Top-3 anti-quick-diets list” and removed the discussion of reasons for signing up for the class, since group members had trouble articulating, or were reluctant to share, their reasons. We conducted a pilot trial of the new refined intervention, and included a 3-month follow-up assessment to investigate whether effects persisted over time.

Participants and Procedure

Participants were 52 female students (M age = 12.5, $SD = 0.8$; M self-reported BMI [kg/m²] = 23.0, $SD = 5.7$) recruited from two middle schools (one in Texas and one in Oregon; M enrollment = 476; 52% female; 29% 6th grade; 48% 7th grade, 23% 8th grade). The sample was 48% European American, 2% Asian, 27% Hispanic, 10% African American, 2% Native Hawaiian/Pacific Islander, and 12% mixed heritage/unknown, which was fairly representative of the two schools (48% European American, 6% Asian, 31% Hispanic, 10% African American, 1% American Indian/Alaska Native, 1% Native Hawaiian/Pacific Islander, 3% mixed racial heritage). Average parental education was 25% high school graduate or less, 12% some college, 35% college graduate, and 28% advanced graduate/professional degree, which was somewhat higher than average for the regions.

From October, 2012 to April, 2013, participants were recruited using the same procedures as Study 1. No student appeared to meet criteria for DSM-IV anorexia nervosa, bulimia nervosa, or binge eating disorder at pretest. Participants were assessed at pretest, posttest, and 3 months after the intervention; they received a small amount (\$5–10) for completing each survey. Surveys were administered by project research assistants in private settings at the school; assessors were blind to study condition at posttest and 3-month follow-up. Participants were randomly assigned (via coin toss) to the *MS Body Project* groups ($n = 27$) or control condition ($n = 25$). Figure 2 provides information on participant flow through this trial.

Interventions

Two group leaders (one in Texas, one in Oregon), both from Pilot Study 1, conducted the four groups in this study. The number of participants per *MS Body Project* group ranged from 6 to 8 ($M = 6.8$). No additional facilitator training occurred but both facilitators had been actively supervised throughout Study 1. All group sessions were videorecorded and Drs. Rohde or Shaw continued to review all recordings, providing email supervision and noting any additional areas for intervention refinement. The session content shown in Table 1 reflects the made to the *MS Body Project* program after Study 1.

Measures

The questionnaire survey was identical to Study 1.

Statistical Methods

Missing data—Rates of missing data for study outcomes were 0% at pretest, 0% at posttest, and 4% at 3-month follow-up. Twenty fully-imputed data sets were generated using the IVEWare software as described in Study 1.

Preliminary analyses—We examined the distribution of variables and potential sources of non-independence. We tested whether conditions differed at pretest on outcomes and demographic variables (race, ethnicity, age, year in school, and parental education) to test whether randomization created equivalent groups. No statistically significant differences at pretest on outcomes or demographics were found (at $p < 0.05$).

Analytic Models—Mixed effects analyses of covariance (ANCOVA) models were used to accommodate the partially nested structure of the data, as described in Study 1. Rates of missing data were 0% at both pretest and posttest, thus observed data was used. Imputed datasets were used to examine change in study outcomes at the 3-month follow-up.

Results

Table 3 provides means and SDs for all outcomes at each timepoint for both conditions. Participants in the *MS Body Project* group condition attended an average of 5.5 sessions (4 participants had one make-up session, which was included as attending that session); all participants attended 3 or more sessions. Participants completed 68% of their home practice assessments for the sessions they attended (range = 0–100%).

The ANCOVA models tested whether there were differences in average levels in outcomes between the *MS Body Project* group and controls at posttest and at 3-month follow-up, controlling for pretest differences. Table 3 provides the test statistics from these analyses, p -values, and effect sizes (d) from these models. Compared to controls, *MS Body Project* participants showed significantly greater pre to post reductions in negative affect ($p = 0.04$), which represented a medium magnitude effect ($d = 0.60$). Though the remaining variables at posttest were nonsignificant, they reflected small to large magnitude effects, and the average effect size for all variables at posttest was $d = 0.65$, which reflects a medium-large effect. At 3-month follow-up, however, none of the condition differences were statistically significant and the average effect size was $d = 0.19$, which reflected a small effect.

General Discussion

Data from both Studies 1 and 2 suggest that the *MS Body Project* was engaging but that it is not achieving consistently significant reductions in eating disorder risk factors at posttest. In Study 1, only one statistically significant posttest effect was found (perceived pressure to be thin), though indications were present for additional small-medium magnitude reductions in thin-ideal internalization, dieting, body dissatisfaction, and eating disorder symptoms. Overall, the mean Study 1 effect size ($d = 0.40$) suggested a small-medium effect. In Study 2, only one effect was statistically significant (negative affect, which had no effect in Study 1), though medium-to-large posttest effects were also found for dieting, and eating disorder symptoms, with small effects for thin-ideal internalization, pressure to be thin, and body dissatisfaction. Overall, the mean Study 2 effect size ($d = 0.65$) suggested a medium-large effect size reduction in variables. In the study most similar to the present report, Halliwell and Deidrichs¹³ found fairly comparable effects for a brief dissonance-based eating disorder prevention program for measures of thin-ideal internalization and body dissatisfaction ($d = 0.49$ and 0.40 , respectively) at posttest, with no effects for self-reported dieting.

By three months post-intervention, no significant effects for *MS Body Project* in Study 2 remained, with the average effect being $d = 0.19$, suggesting small magnitude effects. These results raise the question why the intervention effects did not persist. The means in Table 3 suggest that control participants showed continued reductions from posttest to follow-up, perhaps due to regression to the mean, whereas *MS Body Project* participants reported slight increases in the outcomes at 3-month follow-up for four of the variables. Efforts are needed to improve the maintenance of its effects, perhaps by further simplifying the concepts to increase comprehension, modifying exercises to enhance dissonance induction (e.g., more directly emphasizing challenging the thin ideal in the school and home environments rather than society more broadly), and by improving homework compliance via parental notification of home exercises assessments using weekly email reminders and a simple webpage that describes the assignments and contains pdf versions of each practice exercise. Our assumption is that these changes will produce larger posttest effects and greater likelihood for change in the home environment, both of which will enhance the maintenance of program changes.

To contextualize the present findings, we provide effect size data from previous *Body Project* research with older female adolescents (Table 4), which reports effects from the efficacy trial of 481 college and high school students,¹⁵ the high school effectiveness trial ($N = 306$),²⁰ and the college effectiveness trial ($N = 408$).²¹ As can be seen, effects were approximately twice as large in Study 2 as in Study 1, presumably due to improvements in the intervention or to increased experience in the group facilitators. Also, the effects for Study 2 were on average higher in magnitude to results obtained in the high school effectiveness trial, and approached the level of effects from both the efficacy trial and the college effectiveness trial. Conversely, mean effects in Study 1 were approximately half that achieved in the efficacy and effectiveness trials. These comparisons, especially for Study 2, provide the most compelling support for the *MS Body Project* intervention, as the *Body Project* program has produced positive long-term preventive results with both high school and college young women.

One possible explanation for the somewhat lower effects in the current pilot studies is that the middle school participants may have been at lower risk at baseline by virtue of less body dissatisfaction. Comparing mean levels of baseline body dissatisfaction suggests that rates were slightly lower in the current participants ($M = 2.9$, $SD = 0.9$) compared to both the high school ($M = 3.3$, $SD = 0.8$) and college ($M = 3.4$, $SD = 0.7$) effectiveness trial samples. Given that higher risk levels are generally associated with stronger intervention effects,¹⁴ this difference of approximately one-half standard deviation may partially account for outcome differences across the samples.

To put the present findings into an even broader context, average effects in Studies 1 and 2 (i.e., $d = 0.40$ and 0.65) were more than twice the level found for average posttest effects for other eating disorder prevention programs for similar aged adolescents across available studies (i.e., meta-analysis $M d = 0.18$ for those younger than 15 years of age), as shown in the lower portion of Table 4. Comparing effects for specific risk factors, suggests the *MS Body Project* may have the strongest effects for reductions in body dissatisfaction, dieting, and self-reported eating disorder symptoms. It is also informative to compare the present results to similar effects for other eating disorder prevention programs with this age group that appear most effective. As noted, the present findings were similar to those reported by Halliwell and Deidrichs¹³ for a brief dissonance-based program ($M d = 0.45$). Of the two programs that intervened with middle schools girls and obtained effects that persisted beyond intervention, McVey and colleagues¹⁰ reported significant but small posttest effects for a 10-session intervention on dieting and body esteem ($M d = 0.28$), and Richardson and Paxton¹² reported medium magnitude effects for a 3-session intervention on thin-ideal internalization, body dissatisfaction, and dieting ($M d = 0.51$). In sum, posttest effects for *MS Body Project* across Studies 1 and 2 appear significantly better than average and comparable to those achieved by the most effective programs currently available for this age group.

Acceptability of the *MS Body Project* was generally very good, with middle school students attending an average of 83% of sessions, which is somewhat lower than universal prevention programs provided to middle school students (e.g., 96%¹⁰). It is possible that lower attendance in Study 1 (4.5 vs. 5.5 in Study 2) contributed to its smaller effects. Conversely, *MS Body Project* engagement was much higher than for programs that were self-directed or optional (e.g., only 27% of high school students assigned to a 16-week Internet-facilitated intervention used the program for 8 or more weeks³⁷ and only 58% of middle school girls randomized to a multi-component 8-month school intervention attended the 12-week peer support group³⁸).

When interpreting the present findings it is important to consider the various study limitations. First, these were two pilot studies with small samples and results need to be replicated with much larger samples. Second, the control conditions did not reflect the effects of expectations, demand characteristics, or nonspecific factors (e.g., group support). This decision seemed reasonable for the initial pilot studies. Third, eating disorder symptom results were based on self-report questionnaire only. We had attempted to use long-distance telephone interviews in Study 2 but became concerned that middle school students might be reluctant to report disordered eating behaviors when talking with someone they have never

met before (who in some cases was calling from another state). This suspicion was confirmed by evidence that the Eating Disorder Diagnostic Scale symptom composite had shown strong convergent validity with the gold-standard in-person Eating Disorder Examination symptom composite ($r = .82$),³⁹ but showed weak convergent validity with the phone-based Eating Disorder Examination symptom composite ($r = .13$) in Study 2. In addition, our assessors speculated that some participants might not have had privacy during the phone interviews (e.g., a sibling, parent, or friend may have been nearby during the interviews). These considerations prompted us to decide it was best to not include data that were of such questionable validity. Fourth, the intervention group in Study 1 had significantly more body dissatisfaction at baseline, and baseline differences on other outcome measures appeared elevated (albeit nonsignificantly) in the intervention condition. There is a possibility that randomization failed to equate Study 1 groups at baseline and that some of the effects in the first pilot were attributable to greater regression to the mean among *MS Body Project* participants compared to controls. Fifth, the duration of follow-up in Study 2 was quite short.

The present results suggest that the dissonance-based *MS Body Project* in its current form is engaging but is not yet producing a broad range of significant large magnitude reductions in eating disorder risk factors or symptoms. Nonetheless, based on the strong evidence-base for the *Body Project* for female college and high school students, the limited number of effective eating disorder prevention programs for early adolescent females, the developmental epidemiology of eating disorders and their risk factors, the improvements in effect sizes from Study 1 to 2, and the fact that *MS Body Project* is achieving results that are either comparable or superior to other prevention programs with this age group, support exists for further refinement and evaluation of the *MS Body Project*. Efforts are needed to continue improving the program to enhance the maintenance of effects post-intervention and longer term follow-up is necessary. If girls who complete the brief *MS Body Project* group intervention can achieve reductions in eating disorder risk factors that are maintained into the peak risk period for eating disorder onset, it could potentially reduce the prevalence of these extremely debilitating and costly disorders.

Acknowledgments

This work was partially supported by a research grant from the National Institute of Mental Health (MH097720; Eric Stice, Principal Investigator). Thanks go to the project research assistants, the Corvallis (OR) and Galveston (TX) School Districts, and the participants who made this study possible.

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Figure 1.
Participant Flow Throughout Study 1

Figure 2.
Participant Flow Throughout Study 2

Table 1

Contents of the Original *Body Project* Intervention Compared to the *MS Body Project* Intervention.

Original <i>Body Project</i> group intervention	<i>MS Body Project</i> group intervention
Voluntary commitment (at start of every session)	Voluntary commitment (at start of every module)
	Setting the Stage (Session 1 [S1]) record hurtful/mean body-related comment subjects have heard; store in “Thin-Ideal” box
Definition of the thin-ideal (Session 1 [S1]) select pictures of models; discuss definition and history of the thin-ideal	Definition of the thin-ideal (S1) select pictures of models; discuss definition and history of the thin-ideal. View Dove Evolution video to illustrate photoshopping
	Thin-ideal game (S1) identify alterations in 4 photoshopped images (compared to unairbrushed photos) and identify time periods for 4 images of female beauty
Costs of pursuing the thin-ideal (S1) generate costs of pursuing the thin-ideal; identify who benefits from the ideal	Costs of pursuing the thin-ideal (S1) generate costs of pursuing the thin-ideal; identify who benefits from the ideal
Cost letter (S1–2) write letter to younger girl about costs of the thin-ideal; letter is read to group and videotaped	Cost letter (S1–2) write letter to younger girl about the costs of the thin-ideal; letter is read to the group and videotaped
Mirror self-affirmation exercise (S1–2) stand in front of mirror and write down 10 positive qualities about themselves; read their list to group	Mirror self-affirmation exercise (S1–2) stand in front of mirror and write down 6 positive qualities about themselves; read their list aloud to group. Store statements in “Healthy Beauty” box
Discouraging pursuit of thin-ideal role-plays (S2) dissuade facilitator from pursuing thin-ideal	Discouraging pursuit of thin-ideal role-plays (S2) dissuade facilitator from pursuing thin-ideal
Verbal challenges home exercise (S2–3) pick real-life examples of pressures to be thin; create a verbal challenge to each pressure; participants read to the group	
	Top-3 List Why Diets are Bad (S2–3) list reasons quick weight loss diets are bad. Store statements in “Healthy Beauty” box
Quick comebacks to thin-ideal statements (S3) role-play wherein participants generate anti-thin-ideal comebacks in response to thin-ideal statements made by facilitators	Quick comebacks to thin-ideal statements Dart Game (S3) use dart board to select thin-ideal statements that are read by the facilitators and then rebutted by the girl
Top-10 body activism list home exercise (S2–3) create top-10 list of ways to resist the thin-ideal (body activism)	Top-3 body activism list home exercise (S3–4) create top-3 list of things girls can do to resist thin-ideal (body activism)
Body activism home exercise (S3–4) do a body activism activity on their own, sharing results with the group	Body activism home exercise (S3–4) do a body activism activity on their own, sharing results with the group
Reasons for signing up for class (S3) share main reason for joining class (to obtain group feedback and develop focus for behavioral challenge)	
Behavioral challenge (S3–4) do something they normally wouldn't do because of body image concerns (e.g., wear shorts); write a brief report to the group of how it went	
	Healthy Beauty Image Magazine Cover exercise (S3–4) create a magazine cover with photos/drawings and pieces of advice that promote Healthy Beauty
Challenging fat talk (S4) review subtle thin-ideal statements, discuss how they promote the thin-ideal and how to challenge	Challenging fat talk (S4) review subtle thin-ideal statements, discuss how they promote the thin-ideal and how to challenge
	Video News Report exercise (S4–5) complete a script for a news report on “The Costs of the Thin-Ideal: How Girls Like You and Me Can Fight Against It”
	Videorecord News Report (S5) practice and record news report defining thin-ideal, stating costs, and giving advice on how to fight it
Future pressures to be thin (S4) provide examples of future pressures to be thin and develop response plan	
Group Body Activism at your School (S4) design group-based act of body activism to be completed after group ends	Group Body Activism at your School (S5–6) design and complete a group-based act of body activism at school

Original <i>Body Project</i> group intervention	<i>MS Body Project</i> group intervention
Voluntary commitment (at start of every session)	Voluntary commitment (at start of every module)
Helping the next generation letter (S4) write letter to young girl about avoiding body image concerns; email to facilitator	Letter to Yourself (S5–6) write letter telling yourself how to avoid developing body image concerns
	Review News Report (S6) view video created by participants
Self-affirmation exercise (S4) commit to engaging in some sort of self-affirmation exercise with a friend, sibling, etc.	Self-affirmation exercise (S6) commit to engaging in some sort of self-affirmation exercise with a friend, sibling, etc. and post this commitment on a “Healthy Beauty” poster hung in the room
	Destroy Thin-Ideal Statements & Distribute Pro-Healthy Beauty Statements (S6) distribute/destroy statements from “Thin-Ideal” box; distribute and read statements from “Healthy Beauty” box
Benefits of group and closing (S4) review new knowledge, changes to attitudes, and benefits of participation	Benefits of group and closing (S6) review new knowledge, attitude change, benefits of participation. Show news report again

Study 1 Results.

Table 2

Means and standard deviations for outcomes from the two conditions at pretest and posttest						
Thin-ideal internalization	Pressure to be thin	Body dissatisfaction	Dieting	Negative affect	Eating disorder symptoms ¹	
<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	
<i>MS Body Project groups</i>						
Pretest	3.11 (0.54)	3.08 (0.89)	2.58 (1.05)	2.14 (0.90)	15.27 (13.44)	
Posttest	2.75 (0.66)	2.30 (0.71)	2.05 (0.93)	1.90 (0.74)	11.05 (11.73)	
<i>Controls</i>						
Pretest	3.05 (0.43)	2.69 (0.87)	2.10 (0.88)	1.83 (0.70)	12.65 (15.01)	
Posttest	2.85 (0.72)	2.61 (0.84)	2.00 (0.87)	1.71 (0.73)	11.63 (11.83)	
Effect sizes (Cohen's <i>d</i>) and significance levels for condition effects from ANCOVA models comparing the two conditions						
<i>t</i> -value ²	-0.95	-2.65	-1.58	-1.84	-0.02	-1.47
<i>p</i> -value	0.34	0.01	0.11	0.06	0.98	0.14
Effect size (<i>d</i>)	0.29	0.80	0.55	0.43	0.01	0.33

¹ Non-transformed count of symptoms reported, and log-transformed values used for statistical tests.

² Results based on 20 imputed data sets. *T*-value associated with the test of pooled estimates for the condition effect from ANCOVA models. Thin ideal, pressure to be thin, body dissatisfaction, and negative affect based on nested models with 46 groups, all other measures based on non-nested ANCOVA models with 81 individuals.

Study 2 Results.

Table 3

Means and standard deviations for outcomes from the two conditions at pretest, posttest, and 3-month follow-up.						
Thin-ideal internalization	Pressure to be thin	Body dissatisfaction	Dieting	Negative affect	Eating disorder symptoms ¹	
<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	
<i>MS Body Project</i> groups						
Pretest	2.77 (0.78)	2.70 (0.74)	2.38 (0.83)	2.03 (0.69)	16.93 (12.14)	
Posttest	2.34 (1.04)	2.16 (1.03)	1.70 (0.82)	1.71 (0.69)	8.26 (10.48)	
Follow-up	2.68 (0.89)	2.48 (0.95)	1.80 (0.81)	1.66 (0.65)	9.48 (9.17)	
Controls						
Pretest	2.84 (0.70)	2.68 (0.82)	2.94 (1.03)	2.01 (0.76)	12.08 (11.58)	
Posttest	2.58 (0.71)	2.33 (0.77)	2.94 (1.01)	1.81 (0.81)	13.52 (15.32)	
Follow-up	2.59 (0.82)	2.24 (0.89)	2.62 (0.93)	1.54 (0.89)	7.94 (7.77)	
Effect sizes (Cohen's <i>d</i>) and significance levels for condition effects from ANCOVA models comparing the two conditions						
Pretest to Posttest						
<i>f</i> -value ²	0.72	0.91	1.53	5.02	4.47	3.82
<i>p</i> -value	0.45	0.34	0.22	0.09	0.04	0.14
Effect size (<i>d</i>)	0.34	0.27	0.35	0.90	0.60	0.78
Pretest to 3-Month Follow-up						
<i>t</i> -value ³	0.37	1.03	-0.53	0.33	-0.30	-0.12
<i>p</i> -value	0.71	0.30	0.59	0.74	0.76	0.91
Effect size (<i>d</i>)	0.15	0.35	0.16	0.10	0.12	0.05

¹ Means and standard deviations are observed at pretest and posttest and averaged across 20 imputed data sets at follow-up. Non-transformed count of symptoms reported, and log-transformed values used for statistical tests.

² Results based on observed data. *F*-value associated with test of the condition effect from ANCOVA models. Thin ideal, dieting, and eating disorder symptoms based on nested ANCOVA models with 27 groups, all other measures based on non-nested ANCOVA models with 52 individuals.

³ Results based on 20 imputed data sets. *T*-value associated with the test of pooled estimates for the condition effect from ANCOVA models. Thin ideal and negative affect based on nested ANCOVA models with 27 groups, all other measures based on non-nested ANCOVA models with 52 individuals.

Table 4

Comparison of Effect Sizes (Cohen’s *d*) Reflecting Pretest to Posttest Change in the Two Pilot Studies Relative to Effects from Prior Trials with Older Female Participants and Meta-Analytic Results for Younger Adolescents

	Thin-ideal internalization	Body dissatisfaction	Dieting	Negative affect	ED symptoms ^a	<i>M</i> effect size
Present Report						
Middle School Pilot Study 1	0.24	0.39	0.43	0.05	0.33	0.29
Middle School Pilot Study 2	0.34	0.35	0.90	0.60	0.78	0.59
Prior <i>Body Project</i> Research						
Efficacy trial ¹	0.82	0.75	0.56	0.49	0.59	0.64
High school effectiveness trial ²	0.43	0.58	0.41	0.24	0.43	0.42
College effectiveness trial ³	0.77	0.64	0.50	0.53	0.60	0.61
Meta-Analytic results ⁴						
Participants < 15 yrs of age	0.22	0.16	0.24	0.12	0.14	0.18

¹ = Stice et al., 2006;
² = Stice et al., 2009.
³ = Stice et al., 2013b.
⁴ = Stice et al., 2007

ED = eating disorder; NA = not applicable (not assessed)

^a Eating disorder symptoms assessed by self-report questionnaire in the pilot studies, by interview in the prior *Body Project* research, and primarily by self-report questionnaires in the meta-analysis.