



Implementation of a dissonance-based, eating disorder prevention program in Southern, all-female high schools

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ABSTRACT

Adolescence represents a high-risk period for eating disorder development, and there is great need for effective prevention programs targeted at this population. The Body Project, a dissonance-based eating disorder prevention program, has robust literature showing reductions in body dissatisfaction and eating disorder symptoms. However, many additional factors (i.e., comorbid symptoms, transdiagnostic factors) have not yet been examined in relation to the Body Project. Additionally, there is little known about how to most effectively and broadly disseminate this intervention. The current study ($N = 332$ adolescents) examines eating disorder symptoms, comorbidities, and transdiagnostic risk factors pre- and post-Body Project and at 1-month follow-up. This study is the first examination of the effectiveness of the Body Project implemented within school programming in southern, all-female high schools. Social appearance anxiety, physical and social anxiety sensitivity, rumination, worry, perfectionism, and guilt, but not depression, cognitive anxiety sensitivity, shame, or exercise dependence, decreased pre- to post-intervention and/or 1-month follow-up. These results support the effectiveness of the Body Project in addressing eating disorder symptoms and suggest it may aid in the prevention of comorbid conditions. Additionally, the effectiveness of the intervention was comparable to past investigations, supporting its use in schools across the United States.

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1. Introduction

Eating disorders are characterized by disturbances in eating behaviors that result in impaired functioning (DSM-5; American Psychiatric Association, 2013). Eating disorders are highly prevalent, affecting 13% of females by the age of 20 (Stice, Marti, & Rohde, 2013). The development of eating disorders frequently occurs in adolescence, with the average onset around 16 years of age (Volpe et al., 2015). Additionally, trends indicate a decreasing age of onset for younger generations (Favaro, Caregaro, Tenconi, Bosello, & Santonastaso, 2009). Thus, adolescence represents a critical period for studying the development and prevention of eating disorders.

Several risk factors for the development of eating disorders in adolescents have been identified, including body dissatisfaction, perceived pressure to be thin, thin-ideal internalization, dieting, and body mass index (BMI; Keel & Forney, 2013; Stice, 2002).

One proposed model, the sociocultural model of eating pathology, suggests that a culture that prizes thinness, coupled with societal pressure to be thin (i.e., media and advertisement), leads to adopting the belief that thin bodies are more attractive (i.e., thin-ideal internalization; Stice, 2002). Based on this model, interventions aimed at reducing thin-ideal internalization and body dissatisfaction early can theoretically help prevent the development of eating disorders (Stice, Shaw, Burton, & Wade, 2006). In one such program, the Body Project, participants are asked to speak, write, and act against the thin ideal or other appearance-based pressures imposed by society, called the “appearance ideal” (Stice, Shaw, Becker, & Rohde, 2008). It is theorized that individuals are internally motivated to change their beliefs about the appearance ideal to alleviate resulting cognitive dissonance (i.e., a discrepancy between an individual’s beliefs and actions; Stice et al., 2008).

A strong body of research has shown that the high school version of the Body Project is effective in reducing thin-ideal internalization, body dissatisfaction, dieting, and overall eating disorder symptomatology (Stice, Rohde, Gau, & Shaw, 2009; Stice, Rohde, Shaw, & Gau, 2011). These improvements in body dissatisfaction and eating disorder symptoms were maintained up to 3-year follow-up (e.g., Stice et al., 2011), suggesting that this interven-

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tion has long-term benefits. Depressive symptoms also have been investigated in the context of the high school Body Project, but effectiveness trials suggest the intervention effects were marginal or nonsignificant on depressive symptoms (Stice et al., 2009, 2011).

In addition to body dissatisfaction and thin-ideal internalization, there are several other factors that may contribute to the development of eating disorders. Anxiety is highly comorbid with eating pathology and predates the development of the eating disorder in approximately 75–88% of cases (Swinbourne et al., 2012). Aspects of anxiety that have been linked to eating disorder symptoms include anxiety sensitivity (i.e., the fear of symptoms of anxiety; Taylor, Koch, & Crockett, 1991), social appearance anxiety (i.e., fear of negative evaluation based on one's appearance; Hart et al., 2008), rumination (i.e., repetitive negative thinking about past events), and worry (i.e., repetitive negative thinking about future events; Ansetis, Holm-Denoma, Gordon, Schmidt, & Joiner, 2008; Levinson et al., 2013; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Sala & Levinson, 2016). Eating disorders also commonly co-occur with depression, and depressive symptoms have been shown to prospectively predict eating disorder symptoms (Puccio, Fuller-Tyszkiewicz, Ong, & Krug, 2016).

In addition, other common eating disorder symptoms (i.e., exercise dependence), risk factors (i.e., perfectionism, shame), and transdiagnostic factors (i.e., guilt) have not yet been examined over the course of the high school Body Project, but are important factors in this age range and often co-occur or complicate the presentation of eating disorders (Levinson, Byrne, & Rodebaugh, 2016; Shroff et al., 2006; Stice, 2002; Tyrka, Waldron, Graver, & Brooks-Gunn, 2002). Exercise dependence (i.e., reliance on exercise, similar to other dependencies such as alcohol dependence) is related to lower age of onset for eating disorders and increased eating disorder symptomatology (Shroff et al., 2006). Perfectionism and shame have been shown to prospectively predict the development and maintenance of bulimia nervosa (Levinson et al., 2016; Stice, 2002) and anorexia nervosa (Tyrka et al., 2002). Shame, guilt, perfectionism, and exercise dependence have all been a recent topic of focus not only in the eating disorders field, but also as transdiagnostic risk factors for multiple conditions (e.g., Egan, Wade, & Shafran, 2011), suggesting that these may be important targets for prevention for eating disorders and comorbid conditions.

Although there is a strong body of literature supporting the effectiveness of the Body Project for the reduction of thin-ideal internalization, body dissatisfaction, and eating disorder symptoms (with the exception of exercise dependence), we could locate no literature testing if the Body Project impacts other risk factors, transdiagnostic factors, or comorbid symptoms beyond depression. Examining the influence of the Body Project on eating disorder risk factors and symptoms may help determine what is accounting for the effectiveness of this intervention not only for the prevention of eating disorders, but also for the prevention of commonly co-occurring factors. Furthermore, this knowledge will provide insight into how to implement further improvements to the program to address as many related factors as possible. Additionally, if the Body Project successfully reduces anxiety, depression, or transdiagnostic risk factors, this prevention program could be used to prevent comorbidities highly related to eating disorders, and strengthens the utility of the program as a transdiagnostic program, capable of preventing onset of multiple comorbid disorders.

There is a clear need to investigate eating disorder comorbidities, risk factors, and transdiagnostic factors over the course of the high school Body Project. Additionally, there is much to be learned about how to most effectively and broadly implement the Body Project. Most past investigations of the high school Body Project have recruited participants with high body dissatisfaction, so less is known about how this intervention may be utilized for a diverse array of female high school students, regardless of level of body

dissatisfaction. Additionally, past iterations of the Body Project typically were held in after-school settings, so it is unknown if this intervention may be effectively implemented in an everyday school setting as part of the class curricula, such as health class. Additionally, most investigations of the effectiveness of the high school Body Project have taken place in the Pacific Northwest (Stice et al., 2009, 2011), limiting understanding of the generalizability of this intervention to other regions of the United States. No research of which we are aware has implemented the Body Project in Southern, private high schools.

One study by Cio, Latner, Brown, Ebnetter, and Becker (2015) examined the Body Project in a representative sample of high school students. However, their study examined the effectiveness of the 2-session, peer-led Body Project intervention designed for college undergraduates, which is considerably different from the 4-session version designed for high school students and delivered by lay-persons (e.g., community volunteers) trained at a 1-day training. Additionally, these facilitators were trained by National Eating Disorder Association (NEDA) staff, who have provided trainings all over the United States to enhance the broad dissemination of the Body Project. This study is the first independent investigation of the implementation of the high school Body Project facilitated by NEDA-trained volunteers as a part of this effort by the Body Project Collaborative to expand the dissemination infrastructure. Therefore, our study represents an extension, testing a dissemination effort of the high school Body Project into a real-world high school setting.

The current study has two primary aims to extend the existing Body Project literature by: (1) investigating previously unexplored eating disorder comorbidities (i.e., anxiety sensitivity, worry, rumination, social appearance anxiety), risk factors (i.e., perfectionism, shame), and transdiagnostic factors (i.e., guilt) over the course of the high school Body Project, and (2) expanding on the generalizability of this intervention by examining its effectiveness when disseminated in a classroom setting, administered by volunteer, trained facilitators, in southern, all-female private high schools. We hypothesize that eating disorder symptoms (global eating disorder symptoms, bulimic symptoms, drive for thinness, body dissatisfaction, exercise dependence), eating disorder comorbidities (depression, anxiety sensitivity, worry, rumination, social appearance anxiety), risk factors (perfectionism, shame), and transdiagnostic factors implicated in eating disorders (guilt) will all be significantly reduced from pre- to post-intervention, and will remain significantly reduced at the 1-month follow-up. Additionally, we hypothesize that the intervention will be comparable in effectiveness to past investigations, despite differences in our sample, facilitators, and the intervention setting.

2. Method

2.1. Participants

Participants were 332 female students at two all-girl private Catholic high schools in the Southern United States. All participants were female and most identified as European-American ($n = 259$, 78.0%). Other ethnicities reported included Black ($n = 12$, 3.6%), Hispanic, ($n = 9$, 2.7%), American Indian or Alaskan Native ($n = 5$, 1.5%), Chinese or Chinese-American ($n = 5$, 1.5%), other Asian origin ($n = 2$, 0.6%), Indian American ($n = 1$, 0.3%), and Multiracial or Biracial ($n = 10$, 3.0%). Twenty-six participants did not report ethnicity. Participants ranged from 14 to 17 years of age ($M = 15.21$, $SD = 0.59$). The majority of individuals in the sample were in the sophomore year of high school ($n = 250$, 75.3%), but the sample consisted of freshmen ($n = 56$, 16.9%), juniors ($n = 1$, 0.3%), and seniors ($n = 1$, 0.3%) as well. Seven participants (2.1%) reported having a prior eat-

Table 1
Participant demographic information.

		n (%)	M (SD)	Range
Age			15.21 (0.59)	14–17
Sex	Female	332 (100.0)		
Grade Level	Freshman	56 (16.9)		
	Sophomore	250 (75.3)		
	Junior	1 (0.3)		
	Senior	1 (0.3)		
	Missing	24 (7.2)		
Ethnicity	Non-Hispanic White	259 (78.0)		
	Asian or Asian-American	8 (2.4)		
	Non-Hispanic Black	12 (3.6)		
	Multiracial or Biracial	10 (3.0)		
	American Indian or Alaskan Native	5 (1.5)		
	Hispanic	9 (2.7)		
	Other/Not listed	3 (0.9)		
	Missing	26 (7.8)		
Previous EDDX	Yes	7 (2.1)		
	No	298 (89.8)		
	Missing	27 (8.1)		

Note. EDDX = Eating disorder diagnosis.

ing disorder diagnosis at the time of the study. Please refer to [Table 1](#) for more details on the sample's demographic information.

2.2. Measures

2.2.1. Eating disorder symptoms

2.2.1.1. General eating disorder symptoms. The Eating Disorder Examination-Questionnaire (EDE-Q; [Fairburn & Beglin, 1994](#)) is a 41-item self-report measure of eating disorder-related attitudes and behaviors in the past 28 days, using a 7-point Likert-type scale (0 = no days/not at all to 6 = everyday/markedly). Example items are: "Have you experienced a loss of control over eating?" and "Have you had a definite desire for your stomach to be flat?" The current study used the global score, calculated by averaging all items on each subscale, to assess eating disorder symptoms. Scores on the EDE-Q have demonstrated good reliability and validity and good internal consistency among community women ([Mond, Hay, Rodgers, Owen, & Beumont, 2004](#)). In the current study, internal consistency was excellent at all three time points (α s = .95–.96).

2.2.1.2. Drive for thinness, body dissatisfaction, and bulimic symptoms. The Eating Disorder Inventory-2 (EDI-2; [Garner, Olmstead, & Polivy, 1983](#)) is a 91-item self-report questionnaire designed to measure psychological features commonly associated with eating disorders. Three of the 11 subscales were used for this study: Drive for Thinness, Body Dissatisfaction, and Bulimia. Items are rated on a 6-point Likert-type scale (1 = never, 6 = always). Scores for drive for thinness, body dissatisfaction, and bulimic symptoms were calculated by summing items on each subscale. Example items include: "I think that my stomach is too big" and "I am terrified of gaining weight." Scores on the EDI-2 have been demonstrated to have good internal consistency and good convergent and discriminant validity among adolescent girls and women ([Garner et al., 1983](#)). In the current sample, the EDI-2 subscales displayed good internal consistencies at each time point (α s = .83–.89).

2.2.1.3. Thin-ideal internalization. The Ideal-Body Stereotype Scale-Revised (IBSS-R; [Stice, Fisher, & Martinez, 2004](#)) is an 8-item self-report scale used as a measure of thin-ideal internalization. Women were asked to rate items (e.g., "Slender women are more attractive," "Women with long legs are more attractive") on a 1

(*strongly agree*) to 5 (*strongly disagree*) Likert scale. Scores were calculated by averaging all items on the scale. Scores on the IBSS-R have demonstrated good test-retest reliability and predictive validity among adolescent girls ([Stice et al., 2004](#)). In the current study, the IBSS-R displayed excellent internal consistency at each time point (α s = .92–.96).

2.2.1.4. Exercise dependence. The Exercise Dependence Scale-Revised (EDS-R; [Hausenblas & Downs, 2002](#)) is a 21-item measure of excessive exercise and contains seven subscales. Example items are "I would rather exercise than spend time with family/friends" and "I continually increase my exercise intensity to achieve the desired effects/benefits." Items are rated along a 6-point Likert scale ranging from 1 (*never*) to 6 (*always*) and items are summed. In the current study, the global score was used to assess excessive exercise. Scores on the EDS-R have good psychometric properties in young adult samples ([Downs, Hausenblas, & Nigg, 2004](#)). In the current study, internal consistency was excellent at each of the three time points (α s = .95–.97).

2.2.2. Eating disorder comorbidities

2.2.2.1. Anxiety sensitivity. The Anxiety Sensitivity Index Version 3.0 (ASI-3; [Taylor et al., 2007](#)) is an 18-item measure that measures fear of symptoms of anxiety. It includes three subscales: Physical Concerns (e.g., "It scares me when my heart beats rapidly"), Cognitive Concerns (e.g., "When my thoughts seem to speed up, I worry that I might be going crazy"), and Social Concerns (e.g., "I worry that other people will notice my anxiety"). Items are rated on a 5-point Likert-type scale (0 = *very little*, 4 = *very much*) and are summed. Scores on the ASI-3 have good convergent, discriminant, and factorial validity in nonclinical samples ([Taylor et al., 2007](#)). In the current study, internal consistencies for the three subscales ranged from good to excellent at each time point (α s = .83–.95).

2.2.2.2. Appearance anxiety. The Social Appearance Anxiety Scale (SAAS; [Hart et al., 2008](#)) is a 16-item measure designed to assess anxiety about being negatively evaluated because of one's overall appearance, including body shape. Example items are: "I worry people will judge the way I look negatively" and "I am concerned that people think I am not good looking." Items are rated along a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to

5 (*strongly agree*) and summed. Scores on the SAAS have demonstrated high test-retest reliability, good internal consistency, and divergent validity in college students (Hart et al., 2008). In the current study, the SAAS displayed excellent internal consistency at each time point ($\alpha s = .97$).

2.2.2.3. Worry. The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item self-report questionnaire that measures worry. Example items are: “I am always worrying about something” and “As soon as I finish one task I start to worry about everything else I have to do.” Items are rated along a 5-point Likert-type scale ranging from 1 (*not at all typical of me*) to 5 (*very typical of me*) and items are summed. Scores on the PSWQ has demonstrated good validity and reliability in both clinical and non-clinical samples (Meyer et al., 1990). In the current study, internal consistency was excellent at the three time points ($\alpha s = .93-.94$).

2.2.2.4. Rumination. The Repetitive Thinking Questionnaire- Trait (RTQ; McEvoy, Mahoney, & Moulds, 2010) was designed to assess rumination and worry. In this study, a 10-item short version of the RTQ (McEvoy et al., 2017) was used, which contains 10 items from the original Repetitive Negative Thinking Factor. Scores on this version have excellent internal validity, a high level of predictive utility and internal reliability, and is significantly associated with measures of anger, shame, distress and anxiety among adolescents (McEvoy et al., 2017). Example items are: “You have thoughts or images that are difficult to forget” and “You have thoughts or images about the situation and wish it would go better.” In the current study, one item, “You have thoughts or images about all your shortcomings, failings, faults, mistakes,” was excluded due to an error in creating the survey. The final measure used in this study included the remaining nine items. Items are rated along a 5-point Likert-type scale ranging from 1 (*not true at all*) to 5 (*very true*) and summed. The RTQ displayed excellent internal consistency at each time point in the current study ($\alpha s = .95-.96$).

2.2.2.5. Depression. The Beck Depression Inventory II (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item measure of depressive symptoms in adults and adolescents. The item assessing suicidal thoughts or wishes was not included due to stipulations by the University of Louisville Institutional Review Board, which required us to remove this item due to safety concerns. An example item is: “I do not consider myself as worthwhile and useful as I used to be.” Items are rated along a Likert-type scale ranging from 0 to 3, with higher scores indicating higher levels of the symptoms of depression. Items are summed. Scores on the BDI-II has demonstrated good internal consistency, convergent, discriminant, and construct validity, and test-retest reliability among adults and adolescents (Beck, Steer, & Carbin, 1988, 1996). Internal consistency for the BDI-II at all three time points in the current study was excellent ($\alpha s = .94-.96$).

2.2.3. Eating disorder risk and transdiagnostic factors

2.2.3.1. Perfectionism. The Frost Multidimensional Perfectionism Scale (FMPS; Frost, Marten, Lahart, & Rosenblate, 1990) is a 35-item inventory that measures several dimensional aspects of perfectionism: Concern over Mistakes (e.g., “I should be upset if I make a mistake”), Doubts about Actions (e.g., “It takes me a long time to do something ‘right’”), Parental Criticism (e.g., “My parents never tried to understand my mistakes”), Parental Expectations (e.g., “My parents set very high standards for me”), Personal Standards (e.g., “I set higher goals than most people”), and Organization (e.g., “I am a neat person”). Items are rated along a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

In this study, we used the Maladaptive Evaluative Concerns (MEC) subscale and Pure Personal Standards (PPS) subscale to mea-

sure maladaptive perfectionism and high standards, respectively. The MEC subscale sums items from the Concern over Mistakes, Doubts about Actions, Parental Criticism, and Parental Expectations subscales to assess critical self-evaluation and perceptions of parentally influenced perfectionism. The MEC is related to maladaptive psychological functioning, such as self-concealment and depression (DiBartolo, Li, & Frost, 2008). The PPS was developed by DiBartolo, Frost, Chang, LaSota, and Grills (2004) to measure high personal expectations, and is related to adaptive outcomes (DiBartolo et al., 2004). The PPS is scored by summing five of the original seven items from the Personal Standards subscale, excluding two items that reflect maladaptive expectations. Internal consistency for the PPS subscale was good ($\alpha s = .84-.89$) and the internal consistency for the MEC subscale was excellent ($\alpha s = .95-.96$) at all the time points in the current study.

2.2.3.2. Shame and guilt. The State Shame and Guilt Scale (SSGS; Marschall, Sanftner, & Tangney, 1994) is a 15-item self-report measure of state shame and guilt symptoms, using a 5-point Likert-type scale ranging from 1 (*not feeling this way at all*) to 5 (*feeling this way very strongly*). In the current study, the Shame and Guilt subscales were used. An example item from the Guilt subscale is: “I cannot stop thinking about something bad I have done.” An example item from the Shame subscale is: “I feel like I am a bad person.” Subscale items are summed. Scores on the SSGS have demonstrated good predictive and convergent validity among university students (Marschall et al., 1994). In the current study, the Shame ($\alpha s = .87-.92$) and Guilt ($\alpha s = .90-.94$) subscales displayed good to excellent internal consistencies at each time point.

2.3. Procedure

All procedures were approved by the University of Louisville Institutional Review Board. Schools who participated were contacted by a community advocate for eating disorders seeking to implement a program to increase body satisfaction among their students. Both schools that participated were private all-girls high schools. After the schools decided to implement the Body Project, permission was requested from school officials to be able to collect data on the dissemination effort. Schools received a \$200 gift card for participation in the research aspect of the project per year per school, which students elected to donate to a body activism charity or put towards body advocacy activities in their school. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

The Body Project was delivered over four weeks by facilitators who were trained at a 1-day training provided by the National Eating Disorder Association using the Body Project manual. The facilitators were community volunteers from a variety of backgrounds, including therapists, nurses, students, and volunteer community members. No school staff served as facilitators. All facilitators were trained by trainers sent by the National Eating Disorder Association, including a master trainer. Trainings were one day (eight hours) in length. Some facilitators ran the intervention multiple times, while some ran the intervention only one time. These facilitators ran the intervention shortly after training.

Body Project sessions (with 8–12 students per group) were offered during regularly scheduled health courses, and they were completely voluntary. Students had the option to complete other work for their health course if they did not wish to participate in the sessions. Only one student opted out of the Body Project, due to having a prior eating disorder diagnosis. Sessions were not recorded for fidelity.

Participation in the research study (data collection) was also voluntary. Consent was obtained from parents using an informed consent form, and assent was also actively obtained from the

Table 2
Means and standard deviations of the study measures.

	T1	T2	T3
Outcome (n)	M (SD)		
Global eating disorder symptoms (197)*+	36.64 (2.02)	28.23 (1.93)	26.77 (1.99)
Bulimia (213)+	13.45 (5.90)	12.91 (5.65)	11.75 (5.04)
Drive for thinness (213)*+	20.28 (8.66)	18.99 (8.56)	17.37 (8.83)
Body dissatisfaction (211)*	28.44 (9.86)	26.43 (10.01)	26.21 (10.36)
Thin-ideal internalization (201)*	3.10 (0.84)	2.84 (1.02)	2.84 (1.04)
Exercise dependence (211)	37.83 (17.79)	36.02 (18.33)	36.49 (19.44)
Depression (108)	14.17 (13.06)	12.62 (13.93)	10.76 (13.74)
Cognitive anxiety sensitivity (216)	4.07 (5.45)	3.69 (5.82)	3.06 (5.21)
Physical anxiety sensitivity (216)+	5.06 (5.30)	4.43 (5.60)	3.54 (5.08)
Social anxiety sensitivity (214)*+	8.90 (6.05)	7.67 (6.39)	7.67 (6.07)
Social appearance anxiety (211)*+	42.71 (17.49)	38.19 (17.87)	37.13 (17.86)
Rumination (192)*+	24.93 (10.46)	21.51 (10.55)	20.35 (10.69)
Worry (205)*+	56.44 (15.19)	52.17 (15.52)	50.16 (15.05)
High standards perfectionism (202)*+	16.69 (4.97)	15.60 (5.23)	15.03 (5.72)
Maladaptive perfectionism (198)*+	59.77 (19.80)	56.18 (20.23)	52.96 (21.53)
Shame (117)	9.92 (5.16)	9.54 (5.32)	9.00 (5.21)
Guilt (114)+	10.47 (5.42)	10.06 (5.58)	8.84 (5.16)

Note. * = significant reduction from T1-T2, $p < .003$; + = significant reduction from T1-T3, $p < .003$ as determined by the Bonferroni post-hoc test. T1 = first time point (pre-workshop), T2 = second time point (post-workshop), T3 = third time point (1-month follow-up).

students, which required a signature. Questionnaires were administered before starting the Body Project program, immediately upon completion of the program, and at 1-month follow-up. All questionnaires (as described above) were sent via participant-provided email and were administered online to be completed in leisure time. Questionnaires were completed via RedCap (Harris et al., 2009), a secure online questionnaire service, and data collection was not supervised. We had a 96% completion rate for pre- and post-intervention questionnaires. Once all questionnaires were completed, participants were debriefed. Finally, although formal acceptability data were not collected, students reported enjoying sessions and learning about how the appearance ideal affects them.

2.4. Data analytic procedure

A repeated-measures ANOVA was used to investigate differences between pre-, post-, and 1-month follow-up measures (thin-ideal internalization, eating disorder symptoms, anxiety sensitivity, social appearance anxiety, worry, rumination, depressive symptoms, shame, guilt, perfectionism, and exercise dependence). A post-hoc Bonferroni correction was used for multiple comparisons. The cut-off value after this correction is $p = 0.003$. Results without the Bonferroni correction are reported in footnote.¹

3. Results

See Table 2 for means and standard deviations of each variable at all three time points (pre-, post-, and 1-month follow-up).

3.1. Eating disorder symptoms

3.1.1. Global eating disorder symptoms

For global eating disorder symptoms, the repeated-measures ANOVA revealed a main effect of time, $F(2, 392) = 12.33, p < .001$,

¹ The change in bulimic symptoms from post-intervention to one-month follow-up would be significant at $p = .026$. The change in body dissatisfaction from pre-intervention to one-month follow-up would be significant at $p = .019$. The change in thin-ideal internalization from pre-intervention to one-month follow-up would be significant at $p = .004$. For depressive symptoms, the main effect of time would be significant at $p = .019, \eta^2 = .031$. For cognitive anxiety sensitivity, the main effect of time would be significant at $p = .044, \eta^2 = .014$. The change in physical anxiety sensitivity from pre-intervention to post-intervention would be significant at $p = .015$.

$\eta^2 = .059$. Post-hoc pairwise comparisons indicated that Time 1 global eating disorder symptoms ($M = 36.64, SD = 2.02$) were significantly greater than Time 2 ($M = 28.23, SD = 1.93$), $p < .001$, and Time 3 ($M = 26.77, SD = 1.99$), $p < .001$, global eating disorder symptoms. There was not a significant difference between Time 2 and Time 3 global eating disorder symptoms, $p > .003$.

3.1.2. Bulimic symptoms

For bulimic symptoms, there was a main effect of time, $F(2, 424) = 8.63, p < .001, \eta^2 = .039$. Post hoc pairwise comparisons indicated that Time 1 bulimic symptoms ($M = 13.45, SD = 5.90$), were significantly greater than Time 3 bulimic symptoms ($M = 11.75, SD = 5.04$), $p = .002$. There was not a significant difference between Time 1 and Time 2 or Time 2 and Time 3 bulimic symptoms, $p > .003$.

3.1.3. Body dissatisfaction

For body dissatisfaction, there was a main effect of time, $F(2, 420) = 5.99, p = .003, \eta^2 = .028$. Post-hoc pairwise comparisons indicated that Time 1 body dissatisfaction ($M = 28.44, SD = 9.86$) was significantly greater than Time 2 body dissatisfaction ($M = 26.43, SD = 10.01$), $p < .001$. There was not a significant difference between Time 1 and Time 3 or Time 2 and Time 3 body dissatisfaction, $p > .003$.

3.1.4. Drive for thinness

For drive for thinness, there was a main effect of time, $F(2, 424) = 11.31, p < .001, \eta^2 = .051$. Post-hoc pairwise comparisons indicated that Time 1 drive for thinness ($M = 20.28, SD = 8.66$) was significantly greater than Time 2 ($M = 18.99, SD = 8.56$), $p < .001$, and Time 3 ($M = 17.37, SD = 8.83$), $p < .001$, drive for thinness. There was not a significant difference between Time 2 and Time 3 drive for thinness, $p > .003$.

3.1.5. Thin-ideal internalization

For thin-ideal internalization, there was a main effect of time, $F(2, 400) = 7.66, p = .001, \eta^2 = .037$. Post-hoc pairwise comparisons indicated that Time 1 thin-ideal internalization ($M = 3.10, SD = 0.06$) was significantly greater than Time 2 thin-ideal internalization ($M = 2.84, SD = 0.07$), $p < .001$. There was not a significant difference between Time 1 and Time 3 or Time 2 and Time 3 thin-ideal internalization, $p > .003$.

3.1.6. Exercise dependence

For exercise dependence, there was no significant main effect of time, $F(2, 420) = 0.094$, $p > .003$.

3.2. Comorbidities

3.2.1. Depressive symptoms

For depressive symptoms, there was no significant main effect of time, $F(2, 214) = 3.42$, $p > .003$.

3.2.2. Cognitive anxiety sensitivity

For cognitive anxiety sensitivity, there was no significant main effect of time, $F(2, 430) = 3.15$, $p > .003$.

3.2.3. Physical anxiety sensitivity

For physical anxiety sensitivity, there was a main effect of time, $F(2, 430) = 8.32$, $p < .001$, $\eta^2 = .037$. Post-hoc pairwise comparisons indicated that Time 1 physical anxiety sensitivity ($M = 5.06$, $SD = 5.30$) was significantly greater than Time 3 physical anxiety sensitivity ($M = 3.54$, $SD = 5.08$), $p = .001$. There was not a significant difference between Time 1 and Time 2 or Time 2 and Time 3 physical anxiety sensitivity, $p > .003$.

3.2.4. Social anxiety sensitivity

For social anxiety sensitivity, there was a main effect of time, $F(2, 426) = 13.00$, $p < .001$, $\eta^2 = .058$. Post-hoc pairwise comparisons indicated that Time 1 social anxiety sensitivity ($M = 8.90$, $SD = 6.05$) was significantly greater than Time 2 ($M = 7.67$, $SD = 6.39$), $p < .001$, and Time 3 ($M = 6.38$, $SD = 6.07$), $p < .001$, social anxiety sensitivity. There was not a significant difference between Time 2 and Time 3 social anxiety sensitivity, $p > .003$.

3.2.5. Social appearance anxiety

For social appearance anxiety, there was a main effect of time, $F(2, 420) = 10.39$, $p < .001$, $\eta^2 = .047$. Post-hoc pairwise comparisons indicated that Time 1 social appearance anxiety ($M = 42.71$, $SD = 17.50$) was significantly greater than Time 2 ($M = 38.19$, $SD = 17.87$), $p < .001$, and Time 3 ($M = 37.13$, $SD = 17.86$), $p = .001$, social appearance anxiety. There was not a significant difference between Time 2 and Time 3 social appearance anxiety, $p > .003$.

3.2.6. Worry

For worry, there was a main effect of time, $F(2, 408) = 15.32$, $p < .001$, $\eta^2 = .070$. Post-hoc pairwise comparisons indicated that Time 1 worry ($M = 56.44$, $SD = 15.19$) was significantly greater than Time 2 ($M = 52.17$, $SD = 15.52$), $p < .001$, and Time 3 ($M = 50.16$, $SD = 15.05$), $p < .001$, worry. There was not a significant difference between Time 2 and Time 3 worry, $p > .003$.

3.2.7. Rumination

For rumination, there was a main effect of time, $F(2, 382) = 18.02$, $p < .001$, $\eta^2 = .086$. Post-hoc pairwise comparisons indicated that Time 1 rumination ($M = 24.93$, $SD = 10.46$) was significantly greater than Time 2 ($M = 21.51$, $SD = 10.55$), $p < .001$, and Time 3 ($M = 20.35$, $SD = 10.69$), $p < .001$, rumination. There was not a significant difference between Time 2 and Time 3 rumination, $p > .003$.

3.3. Risk and transdiagnostic factors

3.3.1. High standards

For high standards, there was a main effect of time, $F(2, 402) = 7.21$, $p = .001$, $\eta^2 = .035$. Post-hoc pairwise comparisons indicated that Time 1 high standards ($M = 16.69$, $SD = 4.97$) were significantly greater than Time 2 ($M = 15.60$, $SD = 5.23$), $p < .001$, and Time 3 ($M = 15.03$, $SD = 5.72$), $p = .003$, high standards. There

was not a significant difference between Time 2 and Time 3 high standards, $p > .003$.

3.3.2. Maladaptive perfectionism

For maladaptive perfectionism, there was a main effect of time, $F(2, 394) = 8.69$, $p < .001$, $\eta^2 = .042$. Post-hoc pairwise comparisons indicated that Time 1 maladaptive perfectionism ($M = 59.77$, $SD = 19.80$) was significantly greater than Time 2 ($M = 56.18$, $SD = 20.23$), $p = .001$, and Time 3 ($M = 52.96$, $SD = 21.53$), $p = .001$, maladaptive perfectionism. There was not a significant difference between Time 2 and Time 3 maladaptive perfectionism, $p > .003$.

3.3.3. Shame

For shame, there was no significant main effect of time, $F(2, 232) = 2.15$, $p > .003$.

3.3.4. Guilt

For guilt, there was a main effect of time, $F(2, 226) = 6.24$, $p = .002$, $\eta^2 = .052$. Post-hoc pairwise comparisons indicated that Time 1 guilt ($M = 10.47$, $SD = 5.42$) was significantly greater than Time 3 guilt ($M = 8.84$, $SD = 5.16$), $p < .001$. There was not a significant difference between Time 1 and Time 2 or Time 2 and Time 3 guilt, $p > .003$.

4. Discussion

In the current study, we examined common eating disorder comorbidities, risk factors, and transdiagnostic factors over the course of a 4-session high school Body Project prevention program disseminated in a real-world setting. We found that social appearance anxiety, physical and social anxiety sensitivity, rumination, worry, perfectionism, and guilt all decreased from pre-intervention to post-intervention or 1-month follow-up, consistent with our predictions. However, four outcomes of interest (depression, cognitive anxiety sensitivity, shame, and exercise dependence) did not decrease over the course of the intervention. Additionally, as hypothesized, our results support past research conducted by Stice and colleagues (Stice et al., 2009, 2011), suggesting that eating disorder symptoms, thin-ideal internalization, and body dissatisfaction decreased across the intervention. These findings support the effectiveness of using the Body Project for eating disorder prevention in high school females, which is of special importance because this population is at increased risk for eating disorder development. Finally, we examined the dissemination of the Body Project in a classroom setting facilitated by trained community volunteers in a sample of female students at southern, private high schools. The effectiveness was comparable (i.e., similar effect sizes; $r_s = .20-.28$; $d_s = 0.15-0.39$; Stice et al., 2009, 2011) to past investigations outside of school settings with a sample of students with elevated body dissatisfaction. This result suggests that we may increase the feasibility of broadly implementing this intervention by disseminating the Body Project by NEDA-trained facilitators as a part of school curricula across the United States.

This study adds to the evidence on the effectiveness of the Body Project for addressing eating disorder symptoms, comorbidities, and risk and transdiagnostic factors. Specifically, we found that global eating disorder symptoms, drive for thinness, social appearance anxiety, social anxiety sensitivity, rumination, worry, high standards, and maladaptive perfectionism significantly decreased from pre- to post-intervention and at the 1-month follow up. These findings suggest that the Body Project may not only be applicable to the prevention of eating disorders, but also symptoms that cut across disorders, and may be useful in decreasing transdiagnostic symptoms of psychopathology. As such, these findings support the effectiveness of this intervention in addressing core symptoms of eating disorders, and also may aid in the prevention of other

comorbid conditions, such as anxiety. The Body Project intervention may be effective for the reduction of various types of anxiety because many of the interventions involve similar protocols as in anxiety interventions (e.g., practicing body-related experiences that might previously be avoided; Jansen et al., 2008). Additionally, participants may find their peers are struggling with the same pressures they may feel. Realizing the ubiquity of these feelings may reduce negative social comparison, which is associated with anxiety, especially social anxiety (Dijkstra, Lindenberg, & Veenstra, 2008). Anxiety is one of the most common mental health conditions among adolescents, with approximately 31.9% of high school students reporting an anxiety disorder (Merikangas et al., 2010). Future research should explore the specific mechanisms underlying how the Body Project impacts anxiety and other transdiagnostic factors.

Body dissatisfaction and thin-ideal internalization were significantly decreased from pre- to post-intervention, but not at 1-month follow-up. This finding is contrary to past research, which found that decreases in body dissatisfaction and thin-ideal internalization remained significant up to two years post-intervention (Stice et al., 2009, 2011). Future research will want to examine these outcomes across longer follow-up periods to examine if the effects of the high school Body Project as facilitated by trained-volunteers in classroom settings endure after the intervention. Finally, guilt, physical anxiety sensitivity, and bulimic symptoms significantly decreased from pre-intervention to 1-month follow-up, but were not significantly decreased directly after the intervention. These findings may be due to sleeper effects (i.e., some messages in the intervention may have delayed impacts on participants' attitudes).

Although many comorbidities, risk factors, and transdiagnostic factors decreased across the intervention, it should also be noted that four outcomes did not change from pre-to-post intervention or at 1-month follow-up: depressive symptoms, cognitive anxiety sensitivity, exercise dependence, and shame. The Body Project is a dissonance-based intervention heavily focused on body image and the "appearance ideal." There are no exercises in the intervention that explicitly address factors related to depression or anxiety sensitivity; thus, it is understandable that these outcomes did not change. For example, an exposure component is typically needed to decrease anxiety, and the Body Project currently does not have activities that would expose individuals to anxiety sensitivity concerns. Our finding that depressive symptoms did not change significantly over the course of the Body Project is consistent with past effectiveness investigations (Stice et al., 2009, 2011). These authors suggest that the Body Project targets negative affect more so than depressive symptoms (Stice et al., 2009), as efficacy trials saw reductions in negative affect (Stice et al., 2006). Consistent with our findings, the Body Project may be more likely to reduce transdiagnostic risk factors related to body image (e.g., social appearance anxiety, perfectionism), rather than generalized symptoms of comorbid conditions (i.e., depression, cognitive anxiety sensitivity).

Additionally, unhealthy exercise behaviors are not explicitly addressed in the high school version of this intervention. Indeed, in Body Project interventions targeting college females, separate manuals have been designed for college athletes that address sport-specific appearance ideals, acknowledging that a more rigorous and different approach may be needed for such symptoms (Becker, McDaniel, Bull, Powell, & McIntyre, 2012). This finding suggests that additional interventions specifically targeted at exercise dependence may be needed, even within non-athlete populations. In addition, although a reduction in mean shame was observed from baseline to follow-up, it was not significant. These findings may be because shame is often tied to individual's core beliefs (e.g., "I am worthless"; Lee, Scragg, & Turner, 2001), which can be difficult to effectively address in only four sessions, especially with an inter-

vention that is not specifically designed to address shame. Adding prevention exercises to the Body Project that require participants to verbalize situations in which they felt shame (especially related to eating or body image), may be an important step for recognition and processing feelings of shame (Tangney, 2011).

This independent replication study further supports past research that has been conducted on the Body Project, with eating disorder symptoms, body dissatisfaction, and thin-ideal internalization all showing significant reductions. This finding is important because our sample is a representative sample of high school students, compared to most investigations of the high school Body Project trials that have recruited students specifically with elevated body dissatisfaction (e.g., Stice et al., 2009), which suggests that the effectiveness of the Body Project may be generalizable to all high school females, not just high-risk populations. This study is also the first examinations of the Body Project in high schools in the Southern United States, which suggests this intervention is broadly applicable to the high school students in the United States, not just the northern regions, where the Body Project has been primarily studied. Also, this is one of the first studies to investigate the Body Project in a classroom setting with a representative sample of high school students (with the exception of Ciao et al., 2015), as compared to conducting it with individuals with elevated body image concerns outside of a school setting. This finding is especially important because disseminating the Body Project in schools can drastically increase the number of individuals who may be reached by this intervention. Finally, community volunteers trained by NEDA trainers facilitated the intervention, which supports the effectiveness of the Body Project Collaborative's new infrastructure for training facilitators, designed to be a more sustainable model to broadly disseminate the Body Project.

The current study is not without limitations. Firstly, this study was not experimental, and there is no control group to which these results can be compared. Thus, we cannot claim causality of the intervention on these outcomes. Though lack of a control group is a limitation, we did not include a control group because our goal was to test a real-world dissemination of the Body Project into High School Programming, in which a control group would not be feasible. Despite the lack of a control group, the effect sizes of the current study are comparable to past effectiveness trials of the high school Body Project that included a control group ($r_s = .20-.28$; $d_s = .15-.39$; Stice et al., 2011, 2009). The effect sizes in the current study ($\eta^2_s = .014-.086$) are in a similar small-to-medium range as these trials (Cohen, 1973; Richardson, 2011), suggesting that the program is feasible to disseminate and likely produces similar outcomes as in well-controlled experimental studies, adding to the strong support for the Body Project.

Additionally, the high school version of the Body Project is inherently limited because it has only been validated in female groups. Therefore, these results are not applicable for male high school students, and it is unknown whether this intervention would apply to individuals who do not identify as male or female. However, the development of male and mixed-gender groups is underway, such as in the college version of the Body Project (Kilpela et al., 2016). Further, our sample was from two all-girls private schools, which were primarily European American, and thus, the results of this study may not be generalizable to females in public high schools, co-ed high schools, or females from minority populations. Another limitation is that the final follow-up questionnaire was administered 1-month following the last session. It is unclear whether the observed reduction in eating disorder comorbidities and risk and transdiagnostic factors is maintained over a longer time period than one month. Future research should test dissemination efforts with longer follow-up time periods. Finally, Body Project sessions were not recorded for fidelity, and some of the facilitators disseminated the intervention for the first time, so it cannot be confirmed that

the intervention was conducted with exact accordance to the script. However, they did implement the program very shortly after their training.

Future research should focus on examining this dissonance-based intervention in other high school settings (e.g., co-ed high school, high schools with more diverse ethnic and socioeconomic compositions) with comparison to a control group. Establishing if the Body Project is effective in reducing these comorbidities, risk factors, and transdiagnostic factors in more diverse populations aids in better understanding the generalizability of the intervention. Additionally, research should examine what aspects of the intervention may be targeting these comorbid symptoms and risk factors and explore mechanisms of change for these outcomes. Finally, it is important to continue examining other factors that have been shown to contribute to eating disorder risk or maintenance in future research on the Body Project, such as fear of food and fear of weight gain (Levinson et al., 2017), to maximize the effectiveness of the program.

4.1. Conclusions

This study provides important insight into the effectiveness of a dissonance-based intervention for the prevention of eating disorders in high school females. We add an additional replication of findings from Stice et al. (2011) that body dissatisfaction and thin-ideal internalization decreased from pre- to post-Body Project. In addition, we extended these findings and found that the Body Project also reduces other eating disorder comorbidities (physical and social anxiety sensitivity, worry, rumination, social appearance anxiety), risk factors (perfectionism), and transdiagnostic factors (guilt) that were previously unexplored. Further, many of these improvements were maintained over one-month follow-up, showing prospective evidence of the effectiveness of the Body Project after the program ends. There are some symptoms for which the intervention does not appear to be effective in addressing, such as depressive symptoms, shame, cognitive anxiety sensitivity, and exercise dependence. Such symptoms may require different interventions. Finally, our findings support the effectiveness of this intervention when disseminated by NEDA-trained volunteer facilitators in a classroom setting in southern, all-female high schools. Future research should continue to explore for whom and how the Body Project is most beneficial in order to maximize its effectiveness in high school students. Overall, this independent replication study supports the effectiveness of this dissonance-based intervention for the prevention of eating disorders in female high school students across the United States and extends its effectiveness in addressing other comorbidities, risk factors, and transdiagnostic factors.

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