BRIEF REPORT

High- and Low-Level Dissonance-Based Eating Disorder Prevention Programs With Young Women With Body Image Concerns: An Experimental Trial

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Objective: As cognitive dissonance is theorized to contribute to the effects of dissonance-based eating disorder prevention programs, we evaluated a high-dissonance version of this program against a low-dissonance version and a wait-list control condition to provide an experimental test of the mechanism of intervention effects. ***Method:*** Female college students ($N = 124$, mean age $= 20.9$ years, $SD = 3.9$) with body image concerns were randomized to the 3 conditions. The high-dissonance program was designed to maximize dissonance induction, and the low-dissonance program was designed to minimize it; the substantive content of the 2 programs was matched. ***Results:*** Relative to controls, those in the high-dissonance condition showed significantly greater reductions in thin-ideal internalization, body dissatisfaction, dieting, and eating disorder symptoms by posttest, and those in the low-dissonance condition showed significantly greater reductions in the first 3 outcomes by posttest, with most of these effects persisting to 3-month follow-up. High-dissonance participants showed significantly greater reductions in eating disorder symptoms than low-dissonance participants did by posttest, but this effect was nonsignificant by 3-month follow-up. ***Conclusions:*** Results suggest that dissonance induction contributes to intervention effects but imply that the intervention content, nonspecific factors, and demand characteristics play a much more potent role in producing effects.

Keywords: eating disorder, prevention, dissonance, mechanism of effect

Efficacy and effectiveness trials indicate that a dissonance-based prevention program decreases eating disorder risk factors (thin-ideal internalization, body dissatisfaction, dieting, negative affect), eating disorder symptoms, functional impairment, and risk for future eating disorder onset relative to alternative interventions and assessment-only controls, with some effects persisting at 3-year follow-up (Becker, Smith, & Ciao, 2006; Matusek, Wendt, & Wiseman, 2004; Mitchell, Mazzeo, Rausch, & Cooke, 2007; Roehrig, Thompson, Brannick, & van den Berg, 2006; Stice, Marti, Spoor, Presnell, & Shaw, 2008; Stice, Rohde, Gau, & Shaw, 2009; Stice, Shaw, Burton, & Wade, 2006). In this program, young women with body image concerns engage in verbal, written, and behavioral exercises in which they critique the thin ideal; these activities theoretically result in psychological discomfort (cognitive dissonance) that motivates participants to reduce thin-ideal internalization, which in turn decreases body dissatisfaction, dieting, negative affect, and eating disorder symptoms.

Although this eating disorder prevention program has a strong evidence base, it is important to test the mediators hypothesized to produce these effects because this may allow further refinement of the intervention. In line with the intervention theory, Stice, Presnell, Gau, and Shaw (2007) found that the dissonance intervention produced reductions in outcomes (body dissatisfaction, dieting, negative affect, eating disorder symptoms) and the mediator (thin-ideal internalization), change in the mediator predicted change in outcomes, intervention effects became significantly weaker when change in the mediator was controlled, and change in the mediator typically occurred before change in the outcomes.

It is also important to examine the mechanisms theorized to produce intervention effects, as this too may lead to intervention refinement. To test the notion that dissonance induction contributes to the effects of this intervention, Green, Scott, Diyankova, Gasser, and Pederson (2005) compared a condition in which dissonance induction was maximized (high dissonance) to a condition in which dissonance induction was minimized (low dissonance) and to an assessment-only control condition. The high-dissonance condition was designed to increase effort expenditure during and between sessions, public accountability of the counterattitudinal expressions, and the perception that participation was voluntary, as these factors increase dissonance induction (Green et al., 2005). The low-dissonance condition was designed to reduce effort expenditure, perceived accountability, and the perception that participation was voluntary. Unselected (non-high-risk) female college students were randomized to the high-dissonance group, low-dissonance group, or assessment-only control condition. Participants in the high-dissonance condition showed significantly lower

eating disorder symptoms than participants in the low-dissonance condition did at posttest. However, because Green et al. did not conduct a pretest assessment, they could not determine whether this difference was present at baseline. Further, high- and low-dissonance participants did not show significantly lower symptoms than controls did at posttest. This is troubling, because most trials have found such effects for dissonance interventions. Potential explanations for this lack of replication include the use of an unselected sample, a shortened version of the program, and a posttest-only design that precluded a test of differential change across conditions.

Given the importance of investigating the mechanisms of effect for this program and the intriguing results of Green et al. (2005), we sought to extend these findings using a design that addressed some of the limitations of the original trial. First, we used a sample at high risk for eating pathology by virtue of body dissatisfaction. Second, we modified the full four-session version of the dissonance intervention. The high-dissonance condition involved manipulations to increase level of effort in and between sessions, accountability for counter thin-ideal statements, and the perception that participation was voluntary. The low-dissonance condition involved manipulations designed to reduce effort expenditure, public accountability, and the perception that participation was voluntary. Third, we used a repeated-measures design to test for differential change in outcomes over follow-up. We hypothesized that high-dissonance participants would show greater decreases in thin-ideal internalization, body dissatisfaction, dieting, negative affect, and eating disorder symptoms than would low-dissonance participants, thereby implying that dissonance induction contributed to the intervention effects. We also hypothesized that high-dissonance and low-dissonance participants would show larger reductions in outcomes than wait-list controls would, because gaining knowledge about the costs of pursuing the thin ideal, as well as nonspecific factors (e.g., the expectation that participation in an intervention would improve body satisfaction, demand characteristics inherent to controlled trials, support from group members and facilitators), should contribute to intervention effects.

Method

Participants and Procedure

Participants were 124 female undergraduates ranging in age from 18 to 50 years ($M = 20.9$ years, $SD = 3.9$). The sample was 8% Asian, 2% Black, 6% Hispanic, 76% White, and 8% specifying other or mixed racial heritage. Participants were recruited with fliers and e-mail messages that invited female undergraduates with body image concerns to participate in a trial evaluating body acceptance interventions. For inclusion, students had to answer affirmatively when asked "Do you have body image concerns?" during a phone screen.[1] Baseline data indicated that no participant met criteria for an eating disorder. Participants were randomized to a high-dissonance intervention ($n = 44$), low-dissonance intervention ($n = 39$), or wait-list control group ($n = 41$) via coin tosses by the project coordinator (see Figure 1). Both interventions consisted of four weekly 1-hr group sessions and home exercises. Female undergraduates conducted groups. Scripted manuals were developed for both interventions. Participants completed a survey at pretest, intervention termination (posttest), and 3-month follow-up. Of the 124 participants, 92% and 81% completed the posttest and 3-month follow-up, respectively; attrition did not differ across conditions. Participants gave written consent and were paid $10 for each survey they completed. The local institutional review board approved this study.

Dissonance interventions: Common elements. Session 1 activities included introductions, group rules and expectations, defining the thin ideal, discussion of costs of pursuing the thin ideal, and homework assignment. Session 2 activities included homework debriefing, role-plays wherein participants challenged thin-ideal statements made by facilitators, and homework assignment. Session 3 activities included homework debriefing, role-plays wherein participants made quick comebacks to brief thin-ideal statements made by facilitators, discussion of motivations for signing up for the body acceptance group, and homework assignment. Session 4 activities included homework debriefing, discussion of possible responses to fat-talk statements (subtle statements that perpetuate the thin ideal), brainstorming about future pressures to be thin and how to avoid or respond, and discussion of an independent home "exit" exercise.

High-dissonance intervention. In an effort to increase perception that participation was voluntary, at the start of sessions participants were (a) reminded that participation was voluntary, (b) given the option of completing readings on their own that covered the topics discussed in that session, and (c) told that homework was not required. Accountability was increased by (a) videotaping sessions, (b) asking participants to print their name on each homework form and sign it before handing it into the group facilitator, and (c) not telling participants that things said in the group were confidential. The level of effort required was increased by (a) making homework assignments more difficult (e.g., participants were asked to generate a greater number of responses to a given question than were low-dissonance participants) and (b) encouraging a higher level of effort through greater verbal participation in sessions.

Low-dissonance intervention. The voluntary nature of in-session participation was reduced by telling students that verbal participation in the sessions was expected for each individual, and participants were not given the option of completing independent reading instead of completing the sessions.[2] Effort expenditure was reduced by decreasing opportunities for verbal participation in discussions and by making homework easier. Sessions were not videotaped, which reduced accountability. Also, participants (a)

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[1] This recruitment approach attracted high-risk young women with elevated body dissatisfaction and thin-ideal internalization; mean body dissatisfaction scores ($M = 3.4$, $SD = 0.81$) and thin-ideal internalization scores ($M = 3.7$, $SD = 0.53$) for participants were higher than mean scores on these variables from an age-matched, community-recruited sample of female adolescents ($M = 2.9$, $SD = 0.85$; $M = 3.4$, $SD = 0.71$, respectively; for sample description, see Stice, Marti, Shaw, & Jaconis, 2009). Parenthetically, the mean body dissatisfaction and thin-ideal internalization scores were almost identical to those observed in a prior eating disorder prevention trial (Stice et al., 2006) that targeted high-risk young women with body image concerns ($M = 3.5$, $SD = 0.83$; $M = 3.7$, $SD = 0.52$, respectively).

[2] It should be noted that consent forms clearly stated that participation was voluntary and, further, that participants could discontinue participation at any time without recourse.
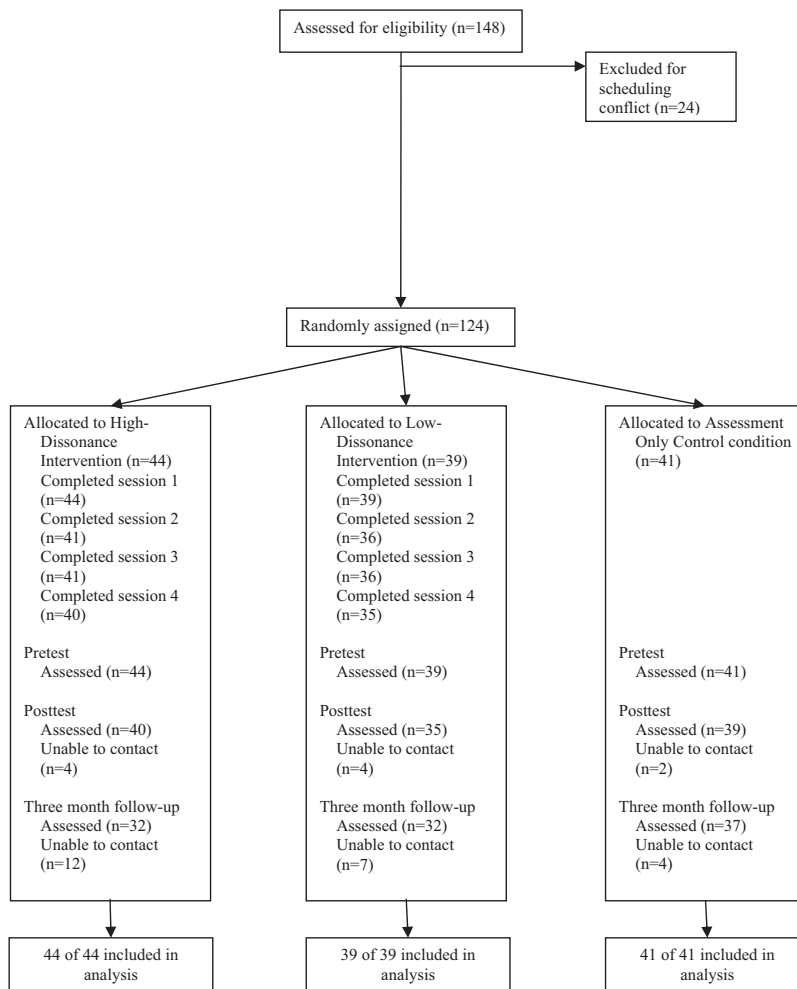
Figure 1. Flow of participants through each stage of the study.

were told that all comments made by group members were confidential, (b) given fewer opportunities to express their attitudes, and (c) did not sign or turn in their homework assignments.

High-dissonance groups were videotaped, and one low-dissonance group was audiotaped. Half of the high-dissonance sessions were randomly selected and reviewed. We decided not to record more than one low-dissonance group for fidelity and competence ratings, because recording the sessions is one feature we used in the high-dissonance intervention to promote greater accountability and thus dissonance induction. Supervisors reviewed the recorded sessions and provided e-mail feedback to the facilitators. Sessions were coded for implementation fidelity and facilitator competence with scales from prior trials (Stice et al., 2008). Sessions were independently rated by two individuals, resulting in high agreement for fidelity, intraclass correlation (2, 1) = .87, and competence, intraclass correlation (2, 1) = .79.

Measures

Thin-ideal internalization was assessed with the Ideal-Body Stereotype Scale–Revised, which has shown internal consistency (α = .91), test–retest reliability (r = .80), predictive validity, and sensitivity to detecting intervention effects (Stice et al., 2006). Items used response options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*; sample item: "Slender women are more attractive"). Items were averaged for this scale and those described below, unless indicated otherwise. Body dissatisfaction was assessed with items from the Satisfaction and Dissatisfaction With Body Parts Scale (Berscheid, Walster, & Bohrnstedt, 1973) that assessed dissatisfaction with nine body parts (e.g., stomach, thighs, hips). Response options ranged from 0 (*extremely satisfied*) to 6 (*extremely dissatisfied*). This scale has shown internal consistency (α = .94), test–retest reliability (r = .90), predictive validity, and sensitivity to detecting intervention effects (Stice et al., 2006). The Dutch Restrained Eating Scale (van Strien, Frijters, van Staveren, Defares, & Deurenberg, 1986) assesses the frequency of various dieting behaviors; response options range from 1 (*never*) to 5 (*always*). This scale has shown internal consistency (α = .95), 2-week test–retest reliability (r = .82), convergent validity with self-reported caloric intake (but not objectively measured caloric intake), predictive validity for bulimic symptom onset, and sensitivity to detecting intervention effects (Stice et al., 2006; van Strien et al., 1986; α = .91 at Time 1). Negative affect was assessed with

the sadness, guilt, and fear/anxiety subscales from the Positive Affect and Negative Affect Scale–Revised; this scale has shown internal consistency ($\alpha = .95$), test–retest reliability ($r = .78$), convergent validity, and predictive validity (Stice et al., 2006; Watson & Clark, 1992). Participants report the extent to which they had felt various negative emotional states using response options ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). Eating disorder symptoms were assessed with the Eating Disorder Diagnostic Scale, which has shown high agreement with interview-assessed eating disorders (mean $\kappa = .83$), internal consistency ($\alpha = .89$), test–retest reliability ($r = .87$), predictive validity, and sensitivity to detecting intervention effects (Stice, Fisher, & Martinez, 2004). Items were summed to form an overall eating disorder symptom composite (except items assessing height, weight, and birth control pill use).

Results

Attendance was similar across high- versus low-dissonance groups; 90% versus 95% attended two of four sessions and 70% versus 72% attended all four sessions, respectively. Homework completion was similar for high- versus low-dissonance groups; 89% versus 90% completed half of the homework and 70% versus 71% completed all homework, respectively.[3] On 10-point rating scales, implementation fidelity had a mean of 7.1 (range = 5–8) and facilitator competence had a mean of 6.8 (range = 5–8). Attendance, homework completion rates, fidelity, and competence were similar to those for past trials (Stice, Rohde, et al., 2009). Participants in the three conditions did not differ on outcomes or demographic factors at pretest. Full information maximum likelihood estimation was used to impute missing data.

An omnibus repeated-measures MANCOVA model tested whether there were significantly differential changes in the five outcomes across conditions over the full study period. The Time × Condition interaction indicated significantly differential change, Wilks's $\lambda = .78$, $F(20, 790) = 3.12$, $p < .001$. We conducted follow-up analysis of variance models that tested whether participants in each of the dissonance conditions experienced greater reductions over time in thin-ideal internalization, body dissatisfaction, dieting, negative affect, and eating disorder symptoms relative to wait-list control participants and relative to one another. See Table 1 for means and standard deviations for outcomes across groups. See Table 2 for the effect sizes (Cohen's d) for the Time × Condition interactions and significance levels. High-dissonance participants showed significantly greater reductions in thin-ideal internalization, body dissatisfaction, dieting, and eating disorder symptoms than did controls from pretest to posttest; all effects except for eating disorder symptoms persisted through 3-month follow-up. Low-dissonance participants showed significantly greater reductions in thin-ideal internalization, body dissatisfaction, and dieting than wait-list controls did from pretest to posttest; all effects except body dissatisfaction persisted through 3-month follow-up. High-dissonance versus low-dissonance participants showed significantly greater reductions in eating disorder symptoms from pretest to posttest, but no effects persisted through 3-month follow-up (though the effects for thin-ideal internalization were marginal).

Discussion

The high-dissonance program reduced thin-ideal internalization, body dissatisfaction, dieting, and eating disorder symptoms relative to those of controls, though the latter effect did not persist through 3-month follow-up. Effect sizes for the significant intervention effects were medium to large and generally replicate results from earlier trials (e.g., Becker et al., 2006; Stice et al., 2006). The null effect for eating disorder symptoms at 3-month follow-up is in contrast to results from past trials and may be due to the fact that we used a survey (vs. an interview) to measure symptoms in the current trial, which has reduced sensitivity (Stice et al., 2004).

There was limited support for the hypothesis that the high-dissonance program would outperform the low-dissonance program. On the one hand, the high- versus low-dissonance intervention did not produce significantly greater reductions in thin-ideal internalization, body dissatisfaction, dieting, or negative affect. The absence of significantly greater reductions in thin-ideal internalization is of particular note because it provides little evidence that the high-dissonance program produced greater cognitive dissonance, which should have theoretically produced greater reduction in thin-ideal internalization (though the effect for thin-ideal internalization was marginal by 3-month follow-up). On the other hand, the high-dissonance program produced significantly greater reductions in eating disorder symptoms at posttest. This dovetails with results from Green et al. (2005) and significant effects for four of the five outcomes (vs. three for the low-dissonance program). Further, the average effect size was larger for the high-dissonance ($d = 0.64$) than the low-dissonance program ($d = 0.45$); the average effect for the high- versus low-dissonance contrasts was $d = 0.23$, which is a small effect size. In balance, although results provide some evidence that dissonance induction contributes to intervention effects, it appears that the general intervention content (e.g., the review of the costs of pursuing the thin ideal, body acceptance exercises), nonspecific factors (e.g., the installation of hope, expectancies, normalization of the person's experience, group support), and demand characteristics inherent to prevention trials contributed more to intervention effects. Yet it should be noted that the dissonance program has significantly outperformed credible alternative active interventions (Becker et al., 2006; Stice et al., 2006), which implies that nonspecific factors and demand characteristics are not solely responsible for the effects of this intervention.

A secondary objective was to determine whether the high-dissonance prevention program produces larger effects than the original dissonance program. Although we did not include an original dissonance intervention condition in the present trial, which would have permitted stronger inferences, we compared the effect sizes for the high-dissonance intervention from the current trial against those for the original dissonance intervention, drawn

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[3] In the high-dissonance intervention, pre-to-post change in the outcomes did not correlate significantly with session attendance ($r = -.13$ to .22) or homework completion ($r = .05$ to .28). Likewise, in the low-dissonance intervention the pre-to-post change in the outcomes did not correlate significantly with session attendance ($r = -.05$ to .36) or homework completion ($r = .05$ to .29).

Table 1
Means and Standard Deviations for Outcomes From the Three Conditions at Each Assessment

Outcome and condition	Pretest M (SD)	Posttest (1 month) M (SD)	3-month follow-up M (SD)
Thin-ideal internalization			
High dissonance	3.73 (0.48)	3.07 (0.73)	3.16 (0.79)
Low dissonance	3.74 (0.48)	3.27 (0.67)	3.44 (0.52)
Wait-list control	3.77 (0.64)	3.80 (0.61)	3.72 (0.58)
Body dissatisfaction			
High dissonance	3.47 (0.78)	3.01 (0.78)	3.20 (0.76)
Low dissonance	3.46 (0.69)	2.99 (0.60)	3.34 (0.86)
Wait-list control	3.24 (0.96)	3.34 (0.94)	3.31 (0.96)
Dieting behaviors			
High dissonance	2.86 (0.73)	2.26 (0.74)	2.41 (0.80)
Low dissonance	2.89 (0.78)	2.40 (0.86)	2.31 (0.87)
Wait-list control	3.01 (0.93)	3.00 (0.92)	2.92 (0.90)
Negative affect			
High dissonance	2.10 (0.84)	1.77 (0.59)	1.98 (1.02)
Low dissonance	2.18 (0.69)	1.96 (0.74)	2.13 (0.91)
Wait-list control	2.19 (0.88)	2.11 (0.91)	2.11 (0.80)
Eating disorder symptoms			
High dissonance	23.41 (11.29)	16.95 (9.74)	16.53 (9.71)
Low dissonance	21.29 (13.19)	19.35 (12.36)	17.69 (15.96)
Wait-list control	24.72 (13.94)	24.21 (13.89)	21.52 (12.44)

Note. The possible range for thin-ideal internalization, dieting behaviors, and negative affect is 1–5. The possible range for body dissatisfaction is 0–6. The possible range for eating disorder symptoms is 1–109. M = mean; SD = standard deviation.

from Stice et al., (2006). We focused on pre-to-post effect sizes because the trials had different follow-up assessment points. The average pre-to-post effect size was larger for the high-dissonance intervention than the original dissonance intervention (d = 0.83 and 0.59, respectively), suggesting that the high-dissonance prevention program may be more efficacious.

Study limitations should be noted. First, the high-dissonance intervention differed from the low-dissonance intervention on a variety of dimensions, making it difficult to infer that differences in outcomes for these two interventions were driven by greater dissonance induction. Second, the fact that we did not include a direct measure of dissonance (psychological discomfort) also limits our ability to infer that greater dissonance induction drove differential effects for the high- versus low-dissonance interventions, though dissonance induction is typically inferred from attitudinal change in dissonance experiments (Festinger, 1957), as was

done herein. Third, the scales used in this trial were relatively short and therefore had limited content validity. Fourth, the sample was relatively small and thus limited our ability to detect small effects.

Results suggest it might be useful to incorporate the dissonance-induction elements from the high-dissonance program to create a second-generation, enhanced-dissonance eating disorder prevention program. Although we suspect it would not be wise to incorporate some of the elements into an enhanced-dissonance intervention, such as not mentioning confidentiality or allowing participants to do independent readings in lieu of the group sessions, we believe it is possible to improve the effects of this prevention program. It might also be useful for future trials to identify which specific components of the dissonance intervention (e.g., counterattitudinal essays, letter to adolescent girl) are most effective in producing intervention effects via dismantling-type studies (cf. Roehrig et al., 2006).

Table 2
Effect Sizes (d) and Significance Levels for the Time × Condition Interactions

Interaction	Thin-ideal internalization	Body dissatisfaction	Dieting behaviors	Negative affect	Eating disorder symptoms
		Pretest to posttest			
High × Control	1.32 (<.001)***	0.89 (<.001)***	0.92 (<.001)***	0.38 (.085)	0.66 (.003)**
Low × Control	0.97 (<.001)***	0.90 (<.001)***	0.79 (<.001)***	0.22 (.340)	0.14 (.524)
Low × High	0.33 (.147)	0.02 (.983)	0.18 (.416)	0.21 (.348)	0.47 (.037)*
		Pretest to 3-month follow-up			
High × Control	0.85 (<.001)***	0.46 (.038)*	0.51 (.023)*	0.06 (.785)	0.36 (.107)
Low × Control	0.51 (.027)*	0.25 (.274)	0.67 (.004)**	0.06 (.831)	0.03 (.888)
Low × High	0.41 (.070)	0.17 (.442)	0.18 (.432)	0.11 (.644)	0.25 (.270)

* $p < .05$.   ** $p < .01$.   *** $p < .001$.

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