Dissonance-based Interventions for the Prevention of Eating Disorders: Using Persuasion Principles to Promote Health

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Abstract

The limited efficacy of prior eating disorder (ED) prevention programs led to the development of dissonance-based interventions (DBI) that utilize dissonance-based persuasion principles from social psychology. Although DBIs have been used to change other attitudes and behaviors, only recently have they been applied to ED prevention. This article reviews the theoretical rationale and empirical support for this type of prevention program. Relative to assessment-only controls, DBIs have produced greater reductions in ED risk factors, ED symptoms, future risk for onset of threshold or subthreshold EDs, future risk for obesity onset, and mental health utilization, with some effects persisting through 3-year follow-up. DBIs have also produced significantly stronger effects than alternative interventions for many of these outcomes, though these effects typically fade more quickly. A meta-analysis indicated that the average effects for DBIs were significantly stronger than those for non-DBI ED prevention programs that have been evaluated. DBIs have produced effects when delivered to high-risk samples and unselected samples, as well as in efficacy and effectiveness trials conducted by six independent labs, suggesting that the effects are robust and that DBIs should be considered for the prevention of other problems, such as smoking, substance abuse, HIV, and diabetes care.

Keywords

Eating Disorders; Prevention; Dissonance

Threshold or subthreshold eating disorders (EDs) are experienced by nearly 10% of young women (Lewinsohn, Striegel-Moore, & Seeley, 2000). Characterized by a chronic course, medical problems, and functional impairment, EDs increase risk for future onset of obesity, depression, anxiety disorders, substance abuse, and health problems (Johnson, Cohen, Kasen, & Brook, 2002; Wilson, Becker, & Heffernan, 2003). Because most individuals with EDs do not receive treatment and treatment only results in lasting symptom remission for a minority of patients (Wilson et al., 2003), much effort has focused on developing prevention programs.

Although many types of ED prevention programs have been developed, only 5% of the programs that have been evaluated in controlled trials have produced lasting reductions in current or future ED symptoms (see Stice, Shaw, & Marti, 2007 for a meta-analytic review of prevention trials that reports effect sizes and factors associated with larger effect sizes). Certain programs have produced significant intervention effects for eating pathology that have

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persisted through follow-up (Bearman, Stice, & Chase, 2003; Low et al., 2006; McVey, Lieberman, Voorberg, Wardrope, & Blackmore, 2003a; Neumark-Sztainer et al., 1995; Stewart et al., 2001), including two that significantly reduced risk for future onset of threshold or subthreshold EDs (Stice, Fisher, & Martinez, 2004: Taylor et al., 2006). However, only two interventions have produced significant intervention effects for eating pathology that have replicated in independent labs: dissonance-based interventions (DBIs) (e.g., Becker, Smith, & Ciao, 2006; Matusek, Wendt, & Wiseman, 2004; Mitchell, Mazzeo, Rausch, & Cooke 2007; Stice, Trost, & Chase, 2003), and a healthy weight control intervention (Matusek et al., 2004; Stice, Trost et al., 2003), though the evidence base for the latter intervention is still relatively sparse. Although other programs have been evaluated in multiple trials conducted by the same lab (Jerome, 1991; Low et al., 2006; McVey et al., 2003b; Richman, 1997), it is our understanding that none have produced significant intervention effects for eating pathology in multiple trials and that no other ED prevention programs have been evaluated by independent labs.

ED prevention programs have taken many forms (Stice, Shaw, & Marti, 2007). Initially, programs were primarily psychoeducational, providing information about eating disorders, putative causes of these disorders, and healthy weight control practices through didactic presentations. Later programs typically focused on reducing risk factors, such as pressure to conform to the thin-ideal, body dissatisfaction, dieting, negative affect, and self-esteem deficits, or increasing protective factors, such as critical use of the mass media and stress management skills. The limited success of prior ED prevention programs, coupled with clinical experience suggesting that dissonance-induction exercises were effective in eating disorder treatment and the literature showing that dissonance-induction procedures are effective in changing attitudes and behaviors, prompted the development of DBIs as a strategy for reducing an established attitudinal risk factor for body image and eating disturbances; thin-ideal internalization (Stice, Mazotti, Weibel, & Agras, 2000). The goals of the present article are to (1) provide an overview of dissonance theory, (2) review prior applications of DBI that were designed to change a variety of attitudes and behaviors, (3) discuss the formulation and development of DBI for ED prevention, (4) summarize the results from published and unpublished trials that have evaluated DBI for ED prevention, (5) compare the effects sizes produced by DBI versus non-DBI ED prevention strategies, and (6) consider clinical implications of this body of research.

Dissonance-Theory

Dissonance theory, from social psychology, states that the possession of inconsistent cognitions creates psychological discomfort that motivates people to alter their cognitions to produce greater consistency (Festinger, 1957). Numerous induced-compliance experiments have found that if participants are encouraged to act in a way that is contrary to an original attitude (a counter-attitudinal stance), it ostensibly generates cognitive dissonance that leads people to shift their attitudes to reduce the perceived inconsistency between the original and the new attitude (Leippe, 1994). That is, when participants take a counter-attitudinal stance (e.g., write an essay in favor of increasing tuition at their college), they show attitudinal shift towards the new perspective (e.g., are more in favor of a proposal to increase tuition). There is also evidence that individuals may change their future behavior to reduce cognitive dissonance (Aronson, 1980). Dissonance is maximized when participants feel that they voluntarily assumed the counter-attitudinal stance, because otherwise they attribute their inconsistent behavior to the demands of the situation and little attitudinal change results (Festinger, 1957). In addition, counter-attitudinal acts putatively result in greater dissonance-induction when they are performed in front of an audience (Green, Scott, Diyankova, Gasser, & Pederson, 2005). It has been argued that dissonance-based persuasion approaches are more effective than psychoeducational appeals because attitudinal change in the former is achieved by challenging

a person's self-concept, which is more enduring than change motivated by an external source (providing information) (Aronson, 1980; Dickerson et al., 1992).

Applications of DBIs

DBIs have been used to change a variety of problems, including obesity (Axsom & Cooper, 1981), fear of snakes (Cooper, 1980; Cooper & Axsom, 1982), smoking onset (Killen, 1985), substance use (Barnett, Far, Mauss, & Miller, 1996), substance abuse (Ulrich, 1991), dating aggression (Schumacher & Slep, 2004), chronic illnesses (Leake, Friend, & Wadhwa, 1999), safe sexual practices (Stone et al., 1994), water conservation (Dickerson, Thibodeau, Aronson, & Miller, 1992) and energy conservation (Pallak, Cook, & Sullivan, 1980).

In one early example, Killen (1985) used role plays in which adolescents practiced skills for refusing offers to try cigarettes to reduce the risk for smoking initiation (also referred to as strategic self-presentation). Another clever study provided strong experimental evidence that dissonance-induction procedures are responsible for bringing about attitudinal change. Specifically, Aronson, Fried, and Stone (1991) found that participants assigned to a condition in which they prepared and delivered a speech promoting condom use showed greater increases in intentions to use condoms in the future than participants assigned to prepare, but not deliver, the same speech. DBIs have also been found to produce lasting behavioral change, as longitudinal studies have shown that a public commitment manipulation can lead people to reduce their energy consumption for six months or more (e.g., Pallak et al., 1980).

Formulation and Development of DBIs for ED prevention

As noted, the experience suggesting that dissonance-induction exercises were helpful in the treatment of anorexia nervosa and the evidence that dissonance-induction procedures can change attitudes and behaviors prompted the development of DBIs as a strategy for reducing one risk factor for eating pathology: thin-ideal internalization (Stice et al., 2000). Thin ideal-internalization, or the degree to which an individual endorses or "buys into" the thin standard of female beauty, was targeted because it is an established risk factor for EDs. It was reasoned that this theory could be used to reduce a risk factor for ED by having young women who had internalized the thin-ideal espoused in Western culture argue against this idea in verbal, written, and behavioral exercises. Theoretically, the consequent psychological discomfort, or dissonance, could be resolved by reducing the endorsement of the thin-ideal. According to the dual pathway model of bulimia nervosa (Stice, 1994), a reduction in thin-ideal internalization should reduce body dissatisfaction, negative affect, ineffective dieting, and ED symptoms. The etiologic model posits that thin-ideal internalization, perceived pressure to be thin, and elevated body mass lead to body dissatisfaction. Body dissatisfaction, in turn, results in elevated dieting and negative affect, which theoretically increases the risk for onset of binge eating and BN. This model shares similarities with other etiologic models, such as Heatherton and Polivy's (1992) spiral model, which posits that body dissatisfaction, dieting, negative affect, and low self-esteem increase risk for binge eating; this model also asserts that there are reciprocal relations among dieting, negative affect and bulimic behaviors. The dual pathway model also shares similarities with Fairburn's (1997) cognitive behavioral model of BN, which proposes that overvaluation of weight/shape leads to dieting which increases the risk for binge eating. These binge eating episodes putatively magnify shape and weight concerns, thereby encouraging further dieting and more extreme compensatory behaviors. Others have suggested that thin-ideal internalization is related to the development of binge eating disorder and anorexia nervosa (Fairburn, Shafran, & Cooper, 1999; Vogeltanz-Holm et al., 2000).

Prospective studies have provided support for the dual pathway model (Stice, 2001) and constituent risk factors (Field et al., 1999; Killen et al., 1996; Stice et al., 1998; Vogeltanz-Holm et al., 2000; Wertheim, Koerner, & Paxton 2001). More importantly, experiments that

have decreased the risk factors in this model, including body dissatisfaction and negative affect, resulted in subsequent decreases in bulimic pathology (Bearman et al., 2003; Burton, Stice, Bearman, & Rohde, 2007). One exception, however, is that individuals who were randomly assigned to low-calorie diets show decreased, rather than increased, bulimic symptoms relative to waitlist controls (Burton & Stice, 2006; Presnell & Stice, 2003; Groesz & Stice, 2006). The conflicting findings regarding dieting may have occurred because self-report dietary restraint scales used in the prospective studies are not valid measures of dietary restriction (Bathalon et al., 2000; Martin et al., 2005; Rolls et al., 1997; Stice, Fisher, & Lowe, 2004; Sysko et al., 2005). It is not surprising that the experimental studies that were examining individuals who were engaging in the energy deficit-dieting necessary for weight loss (as confirmed by actual weight loss) produced qualitatively different findings than the prospective studies, which were not actually investigating individuals who were engaging in energy-deficit dieting.

Other general principles guided the development of DBIs. First, didactic presentation was minimized, because it is less effective than interactive techniques (Stice & Shaw, 2004). Second, between-session homework was used to expand the overall amount of time engaging in dissonance-inducing activities. Third, motivational enhancement exercises (Miller, 1983) were used to maximize one's incentive to use the new skills (e.g., reviewing costs of body image concerns as a group). Fourth, group activities were included to foster social support and group cohesion. It is also important to note that the development of DBIs has been an iterative process. Qualitative input from participants and facilitators regarding the intervention has been collected in the trials and used to improve the scripted manual for the next evaluation. For example, handouts conveying information to younger students based on feedback received in qualitative exit interviews have been incorporated.

Because selective ED prevention programs produce larger intervention effects than universal programs (Stice & Shaw, 2004), young women and adolescent girls with body image concerns have typically been allowed to self-select into the programs, as body dissatisfaction is an established risk factor for future eating pathology (Stice, 2002). Participants have been recruited with flyers, emails, mailings, newspaper advertisements, web pages, and class announcements that have invited young women with body image concerns to participate in a trial of a body acceptance class. However, in several trials DBIs were delivered to unselected populations, such as members of a particular sorority or randomly selected female college students. To our knowledge, all of the trials described below excluded individuals with DSM-IV anorexia nervosa, bulimia nervosa, and binge eating disorder.

DBIs for ED prevention encourage adolescent girls and young women who subscribe to the thin-ideal to critique it in a series of verbal, written, and behavioral group-based exercises. These activities are theorized to produce dissonance, which is resolved by reducing subscription to the thin-ideal, putatively resulting in improvements in body dissatisfaction, negative affect, ineffective dieting, and ED symptoms. DBIs also can be conceptualized as a form of strategic self-presentation (Killen, 1985; Leake, Friend, & Wadhwa, 1999; Stone et al., 1994), which attempt to promote adaptive behavior by having participants model that particular behavior in a group setting (e.g., substance use refusal skills). Certain exercises in DBIs can be viewed from a cognitive-behavioral perspective as providing an opportunity to disconfirm maladaptive cognitions (Roehrig et al., 2006).

The original DBI involved three 1-hour group sessions and was evaluated in the first four trials conducted by Stice and colleagues. An expanded four 1-hour session version of this intervention was developed for an effectiveness trial (Stice, Rohde & Tepp, 2007), to make it easier for school-based interventionists to cover all of the material. Other versions of DBIs have also been developed, including versions involving two 2-hour sessions evaluated by Becker and associates and by Green, a six 45-minute session version evaluated by Mitchell,

and a single 2-hour session version evaluated by Matusek. Detailed manuals for the various versions of this intervention are available from the authors by request (see also Stice & Presnell, 2007). The content of the most recent 4-session DBI that was developed by Stice and associates is summarized below.

Session 1

Participants are informed that this intervention is based on the idea that discussing the costs of the thin-ideal for women perpetuated by our society can improve their body satisfaction. They are asked if they would be willing to try this approach and verbal affirmation of their voluntary commitment is solicited from each participant. This initial session is interactive with participant-driven discussions of the definition and origins of the thin-ideal, how it is perpetuated, the impact of messages about the thin-ideal from family, peers, dating partners, and the media, and how corporations profit from women's' adoption of this unrealistic standard. The importance of attendance and completing the home exercises is emphasized. Participants are asked if they would be willing to write a letter to a hypothetical younger girl that discusses the costs associated with pursuit of the thin-ideal before the next session. They are also asked to engage in a self-affirmation exercise at home wherein they examine their reflection in a full-length mirror and record positive aspects of themselves (including physical, behavioral, emotional, and social features), but no negative thoughts. They are asked to bring their completed forms to discuss at the next session.

Session 2

This session begins by reviewing the materials covered in the first session and discussing their reactions to writing the letter concerning the costs of pursuing the thin-ideal and the main costs that each participant generated. Each participant is then asked to discuss the self-affirmation mirror exercise and the feelings and thoughts she had during the exercise. They are asked to share what they like about themselves with the group. Next, a counter-attitudinal role-play is conducted, in which each participant attempts to dissuade the group leaders from pursuing the thin-ideal. The facilitator plays various roles, ranging from a regular dieter to a person with anorexia nervosa. For homework, participants are asked to (1) provide three examples from their lives concerning pressures to be thin that they have encountered and to generate verbal challenges to these pressures and (2) to produce a top-10 list of things girls/women can do to resist the thin-ideal (e.g., what can they avoid, say, do, or learn to battle this ideal). They are asked to bring the two homework forms to the next session for discussion.

Session 3

After an overview of the previous session, each participant is asked to discuss an example from their own lives concerning pressure to be thin and how they might verbally challenge these pressures. Second, they role-play making counter thin-ideal statements to resist pressure from peers. Third, participants discuss the reasons they signed up for the class and identify some of their own body-related concerns. They are then asked to challenge themselves with a behavioral experiment relating to body image concerns in the next week (e.g., wearing shorts if they have been afraid of doing so because of body dissatisfaction). Next, each participant is asked to share items from their top-10 list of things girls/women can do to resist the thin-ideal. For a second homework assignment, participants are asked to enact one of their activism behaviors during the next week. They are asked to bring the two homework forms to the last session for discussion.

Session 4

After reviewing the main points from the last session, each participant is asked to share her experiences with her behavioral challenge and her reactions to this exercise. They are

encouraged to continue to challenge themselves and their body-related concerns in the future. Second, participants' experiences with the body activism exercise are discussed. Then, more subtle ways in which the thin-ideal often gets perpetuated are discussed (e.g., complimenting a friend on weight loss, joining in when friends complain about their bodies). Participants are given a list of these types of subtle statements and asked to identify how each perpetuates the thin-ideal. Difficulties participants might encounter in resisting the thin-ideal are discussed, as well as how each could be addressed. To further increase awareness, the facilitator explores future pressures to conform to the thin-ideal that participants are likely to face in the future and generate ways of dealing with those pressures. Next, group members discuss how to talk about one's body in a positive, rather than a negative, way. Participants are also asked to do two exit exercises over the next week. First, they are asked if they are willing to write a letter to another hypothetical younger girl that instructs her how to avoid developing body image concerns. Second they are asked to select a self-affirmation exercise to complete at home as an exit exercise (e.g., when given a compliment, rather than objecting, "No, I'm so fat," practice saying "Thank you"). Participants are asked to email the facilitator about their experiences with these exercises.

Review of Trials that have Evaluated DBIs for ED Prevention

To our knowledge, DBIs for ED prevention have received empirical support in trials conducted by six independent labs (Becker, Smith, & Ciao, 2005; Green et al., 2005; Matusek, Wendt, & Wiseman, 2004; Mitchell, Mazzeo, Rausch, & Cooke, 2007; Roehrig et al., 2006; Stice et al., 2001). Many of these have been efficacy trials evaluating the impact of DBIs when research staff recruited participants and trained professionals delivered the intervention. However, several effectiveness trials have tested whether DBIs produce effects when endogenous providers (e.g., school personnel, peer-leaders) are responsible for recruitment and intervention delivery. Effectiveness trials are important because they test whether the intervention produces effects when endogenous providers deliver the intervention in an ecologically valid fashion (Hoagwood et al., 1995). Trials evaluating DBIs are reviewed below.

Stice and Associates

In a preliminary efficacy trial 30 high-risk young women (M age = 18) with self-identified body image concerns were assigned to 3-sessions of DBI or waitlist control (Stice et al., 2000). Compared with controls, DBI participants showed greater decreases in thin-ideal internalization, body dissatisfaction, negative affect, and BN symptoms from pretest to posttest. All effects, except for negative affect, remained significant through 1-month follow-up. The DBI appeared to prevent a significant increase in BN symptoms observed in controls, which is noteworthy because such prophylactic effects are rare.

A second efficacy trial improved upon the first by using a larger sample, random assignment, and an active control condition (Stice et al., 2001). DBI was compared to an active control group in an effort to rule out the possibility that expectancies or demand characteristics accounted for intervention effects. A healthy weight control intervention was selected because past trials of programs with this content had not typically produced effects (Killen et al., 1993; Smolak, Levine & Schermer, 1998). In the healthy weight intervention, participants were told that body image concerns result from an incomplete understanding of effective weight control behaviors. The intervention provided information about nutrition and exercise and used behavioral change techniques to help participants design individualized healthy diet and exercise programs. Eighty-seven high-risk young women (M age = 19) with self-identified body image concerns were randomized to the two interventions. DBI participants again showed significant decreases in thin-ideal internalization, body dissatisfaction, dieting, negative affect, and BN symptoms from pretest to posttest and pretest to 1-month follow-up. The reductions

in thin-ideal internalization and body dissatisfaction were significantly stronger in DBI than in healthy weight, providing some evidence that the DBI was superior to an alternate intervention in certain domains. Unexpectedly, healthy weight participants also showed decreases in the remaining outcomes. Participants assigned to assessment-only control conditions in past trials did not show decreases in these outcomes, which suggests that the healthy weight effects cannot easily be attributed to a measurement artifact or regression to the mean. The fact that earlier ED prevention programs almost never produced reductions in ED pathology suggested that healthy weight effects cannot be easily attributed to expectancies or demand characteristics. It seemed more likely that an alternative effective program was inadvertently developed. Other healthy lifestyle interventions have been found to produce reductions in binge eating (Levine, Marcus, & Moulton, 1996; Wadden, Foster, & Letizia, 1994).

Because the positive effects for the healthy weight intervention were challenging to interpret, a third efficacy trial compared DBI to both the healthy weight intervention and a waitlist control condition (Stice et al., 2003). This trial improved upon past trials as the follow-up was extended to 6 months, a larger sample was recruited, and the intervention occurred during the period of peak risk for eating pathology onset. The waitlist control condition was included to permit a less ambiguous interpretation of the findings. In this trial, 148 high-risk female adolescents (M age = 17) with self-identified body image concerns were randomized to the three conditions. Participants in both interventions reported significantly greater reductions in negative affect and bulimic symptoms at posttest and follow-ups relative to controls, although no effects were observed for thin-ideal internalization, body dissatisfaction or dieting in this contrast. Relative to healthy weight participants, DBI participants tended to show greater reductions in internalization, body dissatisfaction, negative affect, and bulimic symptoms from pretest to posttest and for thin-ideal internalization and body dissatisfaction from pretest to follow-up.

Given the apparent effects of the healthy weight intervention, it was enhanced by increasing the use of behavioral weight control techniques and incorporating persuasion principles (e.g., foot in the door approach, strategic self-presentation, and motivational enhancement techniques), and compared against the DBI in a large efficacy trial. In this trial, 481 female adolescents with self-identified body image concerns (*M* age=17) were randomized to DBI, healthy weight, an expressive writing control condition, or an assessment-only control condition. It improved upon earlier trials by using blinded diagnostic interviews, a larger sample, enhanced facilitator training, and a longer, 3-year follow-up.

A report on the effects through 1-year follow-up found that, relative to assessment-only controls, DBI participants showed significantly greater reductions in thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms at posttest and 6-month follow-up, and in thin-ideal internalization, dieting, and bulimic symptoms at 1-year follow-up (Stice, Shaw, Burton, & Wade, 2006). Compared to expressive writing controls, DBI participants showed greater reductions in thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms at posttest, in body dissatisfaction, dieting, negative affect, and bulimic symptoms at 6-month follow-up, and in dieting at 1-year follow-up. Relative to healthy weight participants, DBI participants showed significantly greater reductions in thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms at posttest and in negative affect at 6-month and 1-year follow-ups. Healthy weight participants showed significantly lower risk for onset of binge eating and compensatory behaviors relative to DBI participants through 1-year follow-up. Risk for obesity onset during the 1-year follow-up period was significantly lower for DBI participants (3%) and healthy weight participants (1%) relative to expressive writing (9%) and assessment-only (12%) controls.

A second report examined the effects of the DBI through 2- and 3-year follow-up (Stice, Marti, Spoor, Presnell, & Shaw, 2008). Relative to assessment-only controls and sometimes relative to expressive-writing controls, DBI participants showed significantly greater decreases in thin-ideal internalization, body dissatisfaction, negative affect, and eating disorder symptoms, and psychosocial impairment at 2-year follow-up and greater decreases in body dissatisfaction, negative affect, and psychosocial impairment at 3-year follow-up. DBI participants showed significantly lower risk for onset of threshold or subthreshold eating disorders over the 3-year follow-up period relative to assessment only controls (6% versus 15%). This finding suggests that for every 100 adolescent females who receive this intervention, 9 fewer cases should occur during the subsequent 3-years (a 60% reduction in the number of expected cases). The fact that several effects persisted through 3-year follow-up suggests that DBIs can produce enduring effects. However, relative to the same control conditions, healthy weight participants showed significantly greater decreases in thin-ideal internalization, body dissatisfaction, negative affect, eating disorder symptoms, and psychosocial impairment, less increases in relative weight, and lower risk for obesity onset at 2- and/or 3-year follow-up, implying that another intervention that draws upon social psychology principles produces enduring effects as well. Relative to healthy weight participants, dissonance participants showed significantly greater reductions in thin-ideal internalization, body dissatisfaction, dieting, negative affect, and eating disorder symptoms at posttest, in negative affect at 6-month and 1-year follow-up, and in psychosocial impairment by 3-year follow-up. In contrast, relative to dissonance participants, healthy weight participants showed significantly greater reduction in risk for obesity onset by 1-year follow-up and significantly less weight gain through 3-year follow-up. Overall, this pattern of findings suggests that the dissonance intervention produces stronger effects for eating pathology and risk factors, whereas the healthy weight intervention produces stronger weight gain prevention effects.

Another report investigated mediators hypothesized to account for the intervention effects of the DBI and healthy weight (Stice, Presnell et al., 2007). Because the DBIs use dissonance-induction exercises to reduce thin-ideal internalization, we hypothesized that a reduction in internalization would mediate the effects of this intervention on the outcomes that are downstream from this variable in the dual pathway model (Stice, 1994). We treated thin-ideal internalization as the sole mediator because the DBI primarily focuses on this attitudinal risk factor. Linear growth models indicated that the DBI produced significantly greater reductions in outcomes (body dissatisfaction, dieting, negative affect, bulimic symptoms) and the mediator (thin-ideal internalization) relative to the expressive writing control condition from pre to post based on weekly assessments during the interventions. Change in the mediator consistently predicted change in outcomes. Meaningful change in the mediator (.5 SD reduction) occurred before a similar change in the outcomes for 61-70% of participants. In addition, the effects of DBI versus expressive writing became significantly weaker when change in the thin-ideal internalization during the intervention was statistically controlled. Models indicated that the healthy weight intervention produced significantly greater reductions in outcomes (body dissatisfaction, negative affect, bulimic symptoms) and increases in the hypothesized mediators (healthy eating and physical activity) relative to the expressive writing control condition from pre to post based on the weekly assessments. Although meaningful change in mediators occurred before change in outcomes for 88-96% of participants, change in the mediator rarely predicted change in outcomes and the healthy weight intervention effects did not become significantly weaker when change in the mediator was controlled. The DBI had much weaker effects on changes in healthy eating and physical activity than the healthy weight intervention and the healthy weight intervention had much weaker effects on thin-ideal internalization than the DBI, which provides evidence of the specificity of the mediators. Collectively, results provided support for the hypothesized mediator of the DBI, but only partial support for the hypothesized mediators of the healthy weight intervention. It may have been difficult to document that changes in healthy eating and physical activity mediated the effects

of the healthy weight intervention because self-reported intake and exercise are notoriously inaccurate (e.g., Lichtman et al., 1992).

Recruitment for a large effectiveness trial of the DBI was recently completed (Stice, Rohde, & Tepp, 2007). This study, which is one of the first effectiveness trials of an ED prevention program to date, tested whether the DBI produces effects when school counselors, nurses, and teachers are responsible for recruitment and intervention delivery in real world high school settings under ecologically valid conditions using minimal exclusionary criteria. Three hundred and six female adolescents with self-identified body image concerns were randomly assigned to the DBI or a psychoeducational brochure control condition and are being followed over a 3-year period. Analyses of available data indicate that DBI participants have shown significantly greater reductions in thin-ideal internalization, body dissatisfaction, dieting, and eating disorder symptoms than control participants from pre to post. The effects for thin-ideal internalization, body dissatisfaction, dieting, and eating disorder symptoms remained significant at 1-year follow-up and the effects at 2-year follow-up are similar in magnitude. Of particular note, DBI participants showed significantly less increases in relative weight (BMI) than controls by 2-year follow-up. The effects from this effectiveness trial compare favorably to the average effects observed in our large efficacy trial (e.g., the effect for eating pathology at 1-year follow-up [$r = .17$] is similar to the effect from our efficacy trial [$r = .20$]). We suspect that somewhat smaller effects emerged in the effectiveness trial because the typical facilitator only delivered the DBI twice, whereas a single facilitator delivered the DBI 18 times in the efficacy trial, which allowed her to maximize both fidelity and competence. Nonetheless, both effects are larger than the average effect for eating disorder symptoms from a meta-analytic review of efficacy trials of ED prevention programs ($r = .13$; Stice, Shaw, & Marti, 2007). Ratings of audiotaped sessions verified that endogenous providers implement this intervention with high fidelity and competence after receiving a 4-hour training session and weekly supervision. These results suggest that the DBI produces meaningful effects for eating disorder symptoms when endogenous providers recruit participants and deliver the intervention under real-world conditions.

Becker and Associates

Becker and colleagues have conducted three trials of adapted versions of the DBI initially developed by Stice and colleagues (2000). The first pilot trial ($N = 24$) targeted college sorority members with elevated body dissatisfaction scores (Becker et al., 2002). Participants were randomized to either two 2-hour sessions of DBI or a media advocacy intervention. The authors sought to tease apart the content of the DBI from its theoretically dissonance-producing nature. Thus, the content of media advocacy was similar to that of DBI, but replaced dissonance-producing activities (e.g., writing and role plays) with videos that targeted the role of the media in the maintenance of the thin-ideal. A psychologist and undergraduate co-facilitators led all groups. Both interventions reduced dieting, eating pathology, and body dissatisfaction at one-month follow-up. DBI also resulted in decreased thin-ideal internalization and yielded a significantly greater reduction in body dissatisfaction than the media advocacy intervention. This preliminary trial provided some support for the importance of the interactive, dissonance-producing activities.

Because participants in the initial pilot study thought that all sorority members could benefit from the program, a second trial (Becker et al., 2005) targeted all members from the campus sororities, including those without significant body image concerns. Members (N=161) were randomly assigned to DBI, media advocacy, or waitlist. A psychologist and two undergraduate student co-leaders facilitated all groups. Results suggested that both interventions produced greater reductions in dieting, body dissatisfaction, and ED symptoms at one-month follow-up relative to controls, but that only DBI produced significantly greater reductions in thin-ideal

internalization relative to controls. DBI did not, however, produce significantly larger effects relative to media advocacy for any of the outcomes. This trial provided initial evidence that both lower- and higher-risk members benefited from both interventions relative to waitlist controls. Becker and colleagues proposed that the success of both interventions could be due to the fact that media advocacy also had some interactive components and was not purely didactic.

The third study evaluated the effectiveness of both DBI and media advocacy when administered on a semi-mandatory basis to sorority members (Becker et al., 2006) and delivered by trained peer-leaders. Ninety new sorority members from the six campus sororities were randomized to either DBI or media advocacy as part of new member orientation. All new members were required to participate unless excused by their individual sorority. Because it would have been unethical to mandate participation in the study, new members could attend the groups without participating in the voluntary study, which consisted of questionnaire completion. All members, however, agreed to participate. Twelve groups that mixed new members from different sororities were conducted by peer-leaders. Peer-leaders were sorority members who participated in one of the prior trials and completed 9-hours of additional training. Although both interventions reduced bulimic pathology at 8-month follow-up, DBI resulted in significantly greater improvements in thin-ideal internalization, body dissatisfaction, and dieting than media advocacy. Thus, these results converge with those from the Becker and associates (2002) trial in providing some evidence that DBI produced greater reductions in certain outcomes relative to an active alternative intervention. It appears that Becker et al. (2005) did not replicate this finding because the three trials used different follow-up lengths. In the (2006) trial media advocacy produced a significant change at 7-weeks that was similar in magnitude to the results of the (2005) trial at one month follow-up. The media advocacy effects however, faded by 8-month follow-up. In contrast, the effects of DBI from this latter trial remained significant at 8-month follow-up. Thus, both trials found similar effects for both interventions at short-term follow-up, but only the DBI maintained the effect longer-term for outcomes in the third trial. Interestingly, peer-leaders who completed both DBI and media advocacy interventions felt that the former was preferable because it was more participatory. In media advocacy, participants watched a 1-hour video about thin ideal media messages and engaged in 30 minutes of discussion, versus DBI in which participants completed a writing assignment, role-plays, counter-attitudinal mirror exercise, and generated verbal challenges to personal experiences of being pressured to be thin for nearly 4 hours.

Matusek and Associates

Matusek and colleagues (2004) conducted a trial to evaluate adapted versions of the DBI and healthy weight interventions developed by Stice and colleagues (2001). Female college students with self-identified body image concerns ($N = 84$) were randomly assigned to a single 2-hour session of DBI or healthy weight, or to a waitlist control. Results indicated that both the DBI and healthy weight conditions resulted in significantly greater improvements in thin-ideal internalization and ED symptoms, but not body dissatisfaction or negative affect, relative to control participants. However, there were no significant differences between the two active interventions in this trial. We consider this study to be an effectiveness trial because health educators who worked at the college delivered the interventions.

Green and associates

Green and associates (2005) investigated whether dissonance induction was responsible for the positive effects of the DBI by comparing a high-dissonance condition in which dissonance induction was maximized to a low-dissonance condition in which the dissonance induction was minimized. The high-dissonance condition included techniques to ensure a high-level of

effort expenditure, public attitude expression, and the perception that participation was voluntary; three factors hypothesized to enhance cognitive dissonance. The low-dissonance condition involved modifications thought to produce a low level of effort expenditure, belief that attitudes would be kept private, and the perception that participation was not voluntary. Both interventions consisted of two 2-hour sessions. A randomly selected sample of female college students who were not required to report body image concerns ($N = 155$) were randomly assigned to a high-dissonance, low-dissonance, or assessment-only control condition. Participants in the high-dissonance condition showed significantly lower ED attitudes and behaviors than those in the low-dissonance condition at post-test, although no differences were found between participants in either intervention relative to assessment-only controls. Symptom status did not moderate intervention effects. These results should be interpreted with caution because they did not conduct a pretest assessment, which makes it difficult to discern if the groups differed on the outcomes variables at baseline and limited the power to detect effects because the analyses could not focus on within-person change over time. The finding that high-dissonance participants did not differ from controls at posttest is inconsistent with findings from other trials that have used pre-post designs.

Roehrig and associates

Roehrig and associates (2006) conducted a dismantling study to elucidate the active ingredients of the DBI. In this study, the authors tested whether a version of the intervention that consisted solely of the dissonance-inducing activities produced weaker effects than the full version of this intervention, which included dissonance plus activities that the authors considered psychoeducational and behavioral, but was equal in duration. High-risk female college students with elevated thin-ideal internalization and body dissatisfaction scores on a screening scale ($N = 78$) were randomized to the two interventions. Both interventions produced significant but comparable reductions in body dissatisfaction, dieting, and bulimic symptoms. Results suggest that the dissonance-inducing activities may be primarily responsible for the effectiveness of the DBI, although these findings should be interpreted cautiously because a posttest only design was used.

Mitchell and Associates

Mitchell and associates (2007) recruited 93 undergraduate women with self-identified body image concerns and randomly assigned them to a six-session DBI, yoga group, or assessment only control group. They found that DBI participants showed decreases in disordered eating symptoms, drive for thinness, body dissatisfaction, and alexithymia compared to the control group. No effects were observed for the yoga group. It was also noteworthy that significantly more participants dropped from the yoga condition (34%) than from the DBI condition (9%).

Meta-Analytic Comparison of DBIs versus Non-DBIs ED Prevention Programs

To place the effects produced by DBIs in a broader context, we tested whether DBI ED prevention programs produced significantly larger effects on average than non-DBI ED prevention programs in a recent meta-analytic review (Stice, Shaw, & Marti, 2007). We focused on effect sizes from trials that compared prevention programs to assessment-only control groups because none of the non-DBI prevention programs were compared to placebo or alternative interventions such as the healthy weight program. Analyses would have produced misleading findings if we averaged across studies that used qualitatively different control conditions (i.e., dissonance content would have been confounded with type of comparison conditions). Thus, the effects sizes for the 7 trials listed in Table 1 that compared DBIs to a waitlist or assessment-only control conditions were coded as the DBI effect sizes in this meta-analysis. All other 55 trials from ED prevention programs that were compared to waitlist or

assessment-only control conditions in controlled trials from our recent meta-analytic review (Stice, Shaw, & Marti, 2007) were coded as the non-DBI programs.

We tested for differences in pretest to posttest effects (mean duration 15.1 weeks) and in pretest to follow-up effects (average duration of follow-up length was 3.9 months) for the following outcomes that were most commonly assessed in the trials: thin-ideal internalization, body dissatisfaction, dieting, negative affect, and eating pathology. It was not possible to include effect sizes for outcomes that were included in only a small subset of studies, such as relative body weight (Body Mass Index), because reliable estimates of average effect could not be computed. See Stice, Shaw, and Marti (2007) for details of the meta-analytic procedures.

Table 1 lists the pretest to posttest and pretest to follow-up effect size estimates (correlation coefficients [r]) for tests of differential change in the outcomes for DBI versus each of the comparison groups used in existing trials. Following the convention used in prior meta-analytic reviews (e.g., Stice, Shaw, & Marti, 2007), the average follow-up effect was reported for studies that collected data at multiple follow-up points. Because we were unable to calculate effect sizes reflecting differential change for trials that did not include a pretest measure, there are no effect sizes reported for the Green et al. and Roehrig et al. trials. For all of the trials conducted by the present authors, these are actual effect sizes from the analyses. For the remaining trials we estimated the effect sizes by converting Cohen's d (an alternative effect size metric) to r with the formula provided by Rosenthal (1991), calculating Cohen's d with the means and standard deviations reported in the article, which were then converted to r using the Rosenthal formula, or estimating effect sizes from the exact p-values reported by the authors using the formulas provided by Rosenthal (1991). Cohen's (1988) criteria for small ($r = .10$), medium ($r = .30$) and large ($r = .50$) correlation coefficients were used, which correspond to d values of .20, .50 and .80 respectively. The effect sizes ranged from small to large and the average posttest effect size ($r = .22$) was medium. In meta-analyses, r's are first converted to z scores to avoid problematic standard error estimates (Hedges & Olkin, 1985).

We estimated random effects models to test whether the mean effect size for the DBI programs differed from the mean effect sizes from the non-DBI prevention programs. We report the z test statistic and corresponding probability (p) value for this test statistic from these models, along with the mean (M) effect size for DBI and non-DBI programs and the corresponding p-values that tested whether each mean value differed from zero. Results indicated that compared to non-DBI programs, the DBI programs produced significantly larger intervention effects for thin-ideal internalization ($z = 2.22$, $p < .05$; $M\ r = .28$, $p < .001$ and $M\ r = .15$, $p < .001$ respectively), body dissatisfaction ($z = 2.10$, $p < .05$; $M\ r = .24$, $p < .001$ and $M\ r = .13$, $p < .001$ respectively), dieting ($z = 2.78$, $p < .01$; $M\ r = .25$, $p < .001$ and $M\ r = .11$, $p < .001$ respectively), and negative affect ($z = 2.39$, $p < .05$; $M\ r = .21$, $p < .001$ and $M\ r = .10$, $p < .001$ respectively) from pretest to posttest, but not from pretest to follow-up. In addition, DBIs produced significantly larger effects for ED symptoms than non-DBIs from pretest to posttest ($z = 3.11$, $p < .01$; $M\ r = .25$, $p < .001$ and $M\ r = .11$, $p < .001$ respectively) and from pretest to follow-up ($z = 2.44$, $p < .05$; $M\ r = .21$, $p < .001$ and $M\ r = .11$, $p < .001$ respectively). Thus, this meta-analysis indicated that DBIs produced significantly stronger effects than non-DBIs for all four of the outcomes examined from pretest to posttest and stronger effects for eating pathology from pretest to follow-up. The fact that DBIs were significantly more effective in reducing risk factors, such as thin-ideal internalization and body dissatisfaction, which putatively mediate the effects of many prevention programs, may partially explain why DBIs produced significantly larger effects for eating pathology. DBIs did not produce significantly stronger effects than non-DBI for the risk factors over follow-up because those effects tend to fade over time.

Implications from this Collection of Trials

A number of important implications emerge from the body of research evaluating DBIs for ED prevention. First, the fact that DBIs produced significant reductions in ED symptoms and risk factors in six independent labs suggests that the effects of DBIs are replicable. Although not all effects replicated in all trials, to our knowledge no other prevention program has produced effects in ED symptoms and risk factors in trials conducted by multiple independent labs. This replication is especially noteworthy because several labs received no direct training in the intervention from the developers of the original DBI. It is also striking that the various trials evaluated somewhat different versions of DBIs, but that virtually all versions produced effects. DBIs appear, however, to result in smaller effects when presented in one single session compared to multiple sessions, which may account for some of the inconsistent findings. Other prevention programs that have been subject to replication attempts (McVey, et al., 2003a; Low et al., 2006) have not produce significant effects for eating pathology in the replication trials, which were conducted by the same labs (McVey et al., 2003b; Taylor et al., 2006). These findings extend the work of other prevention researchers to suggest that incorporating social psychological principles that challenge the self-concept and internalized beliefs can lead to attitudinal and behavioral changes that reduce ED risk factors and pathology.

Second, it is noteworthy that DBIs produced positive effects when delivered to both general (universal) and high-risk (selected) samples and that several universal trials found similar effects for low and high-risk subgroups (Becker et al., 2005; Green et al., 2005). Although this may seem inconsistent with meta-analytic reviews indicating that selected programs produce stronger effects than universal programs (Fingeret, et al., 2006; Stice & Shaw, 2004; Stice, Shaw, & Marti, 2006), it is important to note that the meta-analytic reviews did not test whether the *same program* was less effective for universal versus selected populations, but rather found that programs offered to the latter produced larger effects than those offered to the former. These results suggest that DBIs may be appropriate for a variety of populations. Although most DBIs focused on selected samples, certain investigators favor universal programs because they may more effectively challenge the broader sociocultural environment that purportedly contributes to the development and persistence of EDs (Levine & Smolak, 2006). For instance, a targeted school-based program may fail if a participant's efforts to resist unhealthy dieting are thwarted by peers engaging in pursuit of the thin-ideal. Others prefer universal programs because they believe that risk factors are normally distributed in the population and that the largest proportion of cases will emerge from low-to-moderate risk, not high-risk, groups (Austin, 2001). Finally, Becker and associates found that particular social systems (e.g., sororities) prefer to see ED programs administered to all members because programming is viewed as serving multiple goals. They found that sororities reject programs that target only high-risk members because they would like a program that also fosters stronger group cohesion. In another ongoing study by Becker and associates, a department of athletics similarly rejected a targeted approach because they wanted the program to facilitate team building and they did not want to single out high-risk teams.

Third, it was reassuring that DBIs produced effects when delivered by both trained research staff and endogenous providers (e.g., health educators in Matusek et al., 2004 and school nurses and counselors in Stice, Rohde et al., 2008), although the effects tended to be somewhat smaller in the effectiveness trials. Even more encouraging is the evidence that DBIs produced effects when delivered by undergraduate peer leaders (Becker et al., 2006). Thus, it appears that, given appropriate training, this intervention can be effectively delivered by a range of facilitators – an essential criterion for dissemination. The Becker trials also provide evidence that a DBI can be successfully disseminated within a larger system, is perceived as useful by the members, and can be implemented by endogenous providers within that system. Currently, this DBI is

being disseminated on a national level by several major sorority systems at numerous universities.

Fourth, it is reassuring that DBIs produced positive effects in multiple studies where participants did not receive compensation (e.g., Becker et al., 2005; 2006; Matusek et al., 2004), which suggests financial incentives are not necessary for participant recruitment and do not undermine the effects of DBIs. However, it is important to note that researchers have only compensated participants for completing the assessment (e.g., $10 for surveys and $15 for interviews); to our knowledge no participants have been paid for attending the DBI sessions.

Although the vast majority of participants voluntarily signed up to participate in the trials, it was interesting that DBIs also produced positive results in the one trial in which attendance was largely mandatory (Becker et al., 2006). One interpretation of this finding is that some factor other than dissonance accounts for the positive results (i.e., that strategic self-presentation is a key element), however, another interpretation is that participants viewed their initial attendance as mandatory, but their active participation as voluntary. Specifically, at the start of the DBI, participants are informed that they will benefit more if they participate in the group, followed by a verbal commitment to voluntarily do so. Audiotape review of the sessions indicates that all participants in Becker et al. (2006) agreed to give the intervention "a try and really participate." Thus, it seems plausible that the voluntary commitment phase of the intervention created a sense that true participation was voluntary.

Also noteworthy, DBIs produced significantly stronger effects relative to four alternate interventions (Becker et al., 2006; Green et al., 2005; Mitchell et al., 2007; Stice et al., 2003; Stice, Shaw, Burton et al., 2006). Although effects were limited to certain outcomes and generally did not persist over longer follow-up, these results represent the most rigorous test of an intervention, namely, comparison to an alternate intervention which controls for demand characteristics, expectancies, and non-specific treatment factors. To our knowledge, only DBIs and the healthy weight program have produced significantly stronger effects relative to alternative prevention programs or placebo interventions.

Also encouraging, evidence suggests that DBIs impact other clinically meaningful outcomes, including reduced mental health care utilization and obesity. Although these findings need to be replicated, the evidence that DBIs reduced risk for obesity onset (Stice, Shaw et al., 2006) and weight gain (Stice, Rohde et al., 2008) relative to assessment-only controls is noteworthy because no obesity prevention program has reduced risk for future obesity onset over a long-term follow-up (Stice, Shaw, & Marti, 2006). The evidence that a DBI produced a four-fold reduction in risk for onset of threshold/subthreshold bulimia nervosa over a 3-year period was also encouraging because prophylactic effects are extremely rare in the prevention literature (Horowitz & Graber, 2006; Stice, Shaw, & Marti, 2006, 2008).

Limitations

There are several limitations that should be considered when interpreting the findings from these trials. First, the follow-up periods of most trials were fairly brief. Two studies provided evidence that DBIs produce effects that are significant at 2- and 3-year follow-ups, but most effects appear to fade sooner. Although it may be unrealistic to expect 2-4 hour interventions to produce more enduring effects, it is important to document the duration of the effects and isolate factors that are associated with effects that persist longer. Future trials should also investigate whether increasing the number and duration of intervention sessions, using in-person or internet-based booster sessions, adjunctive interventions (e.g., an internet-based support group), or an intervention component targeting parents improves effects. Second, although it was encouraging that a DBI reduced risk for onset of clinically significant and enduring eating pathology over a 3-year follow-up, this evidence has only emerged in the one

large trial that conducted a long-term follow-up. It will be vital to replicate this effect, because this is arguably the most important outcome for ED prevention programs and only two other ED prevention programs have been found to reduce the risk for future onset of threshold or subthreshold EDs (Stice, Fisher, & Martinez, 2004: Taylor et al., 2006). Third, effects for the intervention on individual outcomes have not been consistently replicated. The greatest degree of replication was found for reductions in thin ideal internalization and eating pathology, which provides support for the intervention theory of DBIs. The least consistently replicated findings have been for dieting, which might be due to the fact that these measures are not valid indicates of objectively measured dietary restriction. Fourth, the findings from two of the trials should be interpreted with caution because they did not conduct pretest assessments (Green et al, 2005; Roehrig et al, 2006). Another limitation is that only one trial (Stice, Rohde et al., 2008) assessed fidelity with multiple raters with documented inter-rater agreement.

Conclusion and Directions for Future Research

In sum, DBIs appear to represent a promising new direction for ED prevention. They have produced intervention effects for ED symptoms and risk factors relative to an assessment-only control condition in four trials conducted by six independent labs. DBIs were also superior to four alternative interventions in multiple trials, and produced certain effects that persisted through 3-year follow-up. DBIs also have been found to produce prophylactic effects, reducing the risk for increases in bulimic symptoms in one trial and the risk for obesity onset and bulimic pathology onset in a second trial.

Based on these trials, it appears that the DBI has received enough empirical support to be termed *efficacious*, setting it apart from other ED prevention programs. According to guidelines set by the American Psychological Association (1995), an intervention that produces significantly stronger effects than a waitlist or measurement-only control condition in at least two trials conducted by independent labs and significantly stronger effects than a placebo or alternative treatment can be considered empirically supported. Because the healthy weight intervention has also received enough empirical support to be considered efficacious, it is tempting to consider combining these two interventions, as an integrated program may yield larger effects. However, at this point there is insufficient evidence to suggest these approaches should be integrated, as more independent replications of the healthy weight intervention are necessary. It could be that the social psychological principles incorporated into both the DBI and healthy weight programs are the important features that have contributed to the success of both programs. More research is needed to tease apart the specific components of each program that make them successful. Future research should also focus on methods to enhance the magnitude and persistence of the effects of DBIs, particularly prophylactic effects.

Although there were inconsistencies across trials and effects tend to fade over follow-up, which occurs in virtually all ED prevention programs (Stice, Shaw, & Marti, 2007), we believe the present findings suggest that it may be fruitful to disseminate DBIs, because no other ED prevention program has received this degree of empirical support. The brevity of DBI and its structured nature have facilitated the dissemination of this program to date. Becker has successfully integrated DBIs into an annual sorority program on one campus, and currently is working with a large national sorority to disseminate DBIs at other universities. Research will also need to examine how best to train facilitators. For instance, research might test whether a written intervention manual, a computer administered training program, clinical workshops, or extended supervision protocols are most effective in training future facilitators. It will also be important to identify barriers to dissemination, which will need to be overcome.

Our goal in this paper was to discuss DBIs as a general prevention approach, and to summarize trials that have evaluated DBIs for ED prevention. DBIs have received support in ED

prevention and in the prevention of other problem behaviors, including obesity, smoking, substance use, substance abuse, phobias, dating aggression, unsafe sexual practices, and excessive use of water and energy. We hope that researchers consider incorporating dissonance principles in future prevention efforts for a variety of outcomes. For example, if the DBIs are found to effectively prevent onset of obesity in young women with body image concerns, it will be useful to determine if it can be adapted to prevent obesity in other populations. It is possible that DBIs can also be used to promote other health behaviors, such as diabetes care, compliance to medication regiments, and use of safety devices such as seatbelts and helmets. Lastly, whereas our research efforts have focused on incorporating DBIs into prevention interventions, dissonance principles may also enhance the effectiveness of treatment interventions for various public health and mental health problems.

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Table 1

Effect sizes for dissonance interventions compared with control interventions

Study	Comparison	Thin-ideal Internalization	Body Dissatisfaction	Dieting	Negative Affect	Eating Pathology	Length of Follow-up
Becker, Jilka et al, 2002	DBI vs. Media advocacy	.48*(.46*)	.47*(.40*)	.22 (.10)	--	.35 (.24)	1-mo.
Becker, Smith, & Ciao, 2005	DBI vs. Media advocacy	.09 (.06)	.11 (.00)	.11 (.03)	--	.19*(.09)	1-mo.
Becker, Smith, & Ciao, 2005	DBI vs. Waitlist	.19 (.22*)	.32*(.36*)	.18 (.26*)	--	.33*(.41*)	1-mo.
Becker, Smith, & Ciao, 2006	DBI vs. Media advocacy	.26*(.24*)	.09 (.20*)	.14 (.26*)	--	.00 (.00)	8-mo.
Matusek et al.,2004	DBI vs. Healthy weight	−.06	.07	--	.07	−.12	1-mo.
Matusek et al.,2004	DBI vs. Waitlist	.42*	.16	--	.00	.30*	1-mo.
Mitchell et al., 2007	DBI vs. Assess. only	.00	.28*	.00	.22	.17*	Pre-post
Mitchell et al., 2007	DBI vs. Yoga	.11	.20*	.08	.06	.23*	Pre-post
Stice, Mazotti, et al., 2000	DBI vs. Waitlist	.40*(.43*)	.46*(.42*)	.36(.27)	.42*(.32)	.37*(.37*)	1-mo.
Stice, Chase et al, 2001	DBI vs. Healthy weight	.30*(.40*)	.22 (.03)	.15 (.08)	.08 (.01)	.03 (.06)	1-mo.
Stice, Trost, et al., 2003	DBI vs. Healthy weight	.24*(.07)	.23*(.11)	.17 (.06)	.27*(.20*)	.23*(.06)	6-mo.
Stice, Trost, et al., 2003	DBI vs. Waitlist	.24 (.15)	.23(.13)	.17 (.09)	.27*(.26*)	.23*(.21*)	6-mo.
Stice, Shaw, et al., 2006	DBI vs. Healthy weight	.16*(.06)	.18*(.03)	.26*(.06)	.13*(.11*)	.11*(.04)	1-yr.
Stice, Shaw, et al., 2006	DBI vs. Expressive writing	.31 (.04)	.37*(.10)	.26*(.12*)	.26*(.08)	.23*(.09)	1-yr.
Stice, Shaw, et al., 2006	DBI vs. Assess. only	.38*(.13)	.35*(.08)	.27*(.17*)	.24*(.08)	.17*(.20*)	1-yr.
Stice, Rohde et al, 2007	DBI vs. Psychoed. brochure	.25*(.09)	.23*(.08)	.25*(.11)	.18*(.11)	.27*(.15*)	3-yr.

Effect sizes (r) at posttest are reported first and effect sizes for follow-up are reported in parentheses when available

*
= significant effect.