

Prevention of Eating Disorders: A Review

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1. Introduction

Nearly 10% of young women experience clinical eating disorders (Lewinsohn et al., 2000), and an even greater amount of women experience subclinical eating disorders and risk factors association with eating disorders, such as body dissatisfaction. Eating disorders are associated with a number of negative physical and psychological consequences, increased risk of mortality, and are often severe and debilitating (Thompson & Stice 2001). Of the individuals who experience eating disorder symptoms and their negative consequences, less than 25% will receive treatment (Hudson et al., 2007; Johnson et al., 2002). For those that do receive treatment, treatment effects are limited with only 30% experiencing long-lasting symptom remission (Agras et al., 2000; Fairburn, 2002; Fairburn et al., 2009; Wilson et al., 2003), and approximately 20% drop out (Fairburn 2002). Treatment for eating disorders is also relatively expensive, and most insurance companies will not fund inpatient treatment for individuals with severe eating disorders (Shaw et al., 2009). Therefore, more efforts have been devoted to the development of effective programs for the prevention of eating disorders.

Many types of eating disorder prevention programs have been developed, with some programs producing lasting reductions in current or future eating disorder symptoms and risk factors (Stice, Shaw et al., 2007). This chapter will focus on the importance of the prevention of eating disorders, including features of successful prevention programs. Specific eating disorder prevention strategies covered within this chapter include dissonance based, mirror exposure, healthy weight, motivational interviewing, computer-administered cognitive-behavioral, and other strategies. Most of these strategies have been evaluated in controlled trials and have produced promising reductions in eating disorder symptoms and associated risk factors, with some programs having enough research evidence to be considered empirically supported interventions. Also, new preliminary information will be presented on the ability of prevention programs to create long-lasting systematic reductions in eating disorder symptoms and associated risk factors within large social organizations in order to increase the overall health and well being of members enrolled in the organization. The chapter will conclude with suggested directions for future research on prevention efforts and a brief overview of the eating disorder prevention literature.

2. Importance and clinical utility of prevention

Eating disorders are one of the most common psychiatric problems experienced by females (Lewinsohn et al., 2000) and are characterized by serious eating disturbances, such as

fasting, purging, and binge eating, as well as excessive concern about body shape and weight. They are commonly associated with a number of medical complications including diabetes, hypertension, loss of teeth enamel, osteoporosis, decreased kidney functioning, gastrointestinal bleeding, malnutrition, bowel disease, infertility, stress fractures, obesity and cardiac arrest (Kaye et al., 2003; Keel et al., 2003; Mitchell & Crow, 2006). Eating disorders are also associated with psychosocial functional impairment, and are marked by chronicity and relapse (Fairburn et al., 2000; Newman et al., 1996; Thompson & Stice, 2001). Increased rates of mortality, suicide, future risk for onset of obesity, substance abuse, and mood, anxiety, and personality disorders are also seen in individuals with eating disorders (Becker et al., 1999; Birmingham et al., 2005; Carlat et al., 1997; Franko & Keel, 2006; Hudson et al., 2007; Johnson et al., 2002; Stice et al., 1999).

Prevalence rates of clinical and subclinical levels of eating disorders and associated risk factors have increased over the past several decades and are affecting individuals at younger ages (Feingold & Mazzella, 1998; Muth & Cash, 1997; Park, 2007; Stice 1994; Striegel-Moore & Franko, 2002). Approximately 61% of young adult females experience subclinical eating disorders, including bingeing and purging, and subclinical bulimia nervosa (Mintz & Betz, 1988), and 80-91% report dieting (Striegel-Moore et al., 1990). Males are also increasingly experiencing body dissatisfaction and subclinical eating disorders (Drummond, 2002; O'Dea & Abraham, 2002), and 5-10% of all individuals with clinical eating disorders are male (Carlat & Camargo, 1991; Lucas et al., 1991). This increase in prevalence rates, combined with societal pressures placed on individuals to be thin and a decrease in the ideal body weight promoted by society places individuals at greater risk for experiencing eating disorder risk factors such as thin-ideal internalization, self-objectification, and body dissatisfaction (Stice & Shaw, 1994), further increasing the risk for the development of eating disorders (Tiggemann, 2011). Eating disorder risk factors alone are impairing and can lead to both clinical and subclinical levels of eating disorders. Since research indicates that subclinical levels of eating disorders and associated risk factors can be just as impairing as clinical eating disorders (Hoffman & Brownell, 1997; Thompson et al., 1999), the prevention of subclinical eating disorders and associated risk factors is equally important as the prevention of diagnosable eating disorders.

The negative physical and psychological consequences associated with eating disorders, combined with the increase in prevalence rates of eating disorder symptoms and risk factors and the lack of success of treatment programs has made the development and evaluation of programs for the prevention of eating disorders essential. Prevention programs are designed to decrease current and future eating disorder symptoms and associated risk factors in order to reduce or eliminate the subsequent negative consequences. If prevention programs are effective, they can reduce rates of eating disorder symptoms and risk factors, potentially reducing the need for expensive treatment programs.

The clinical utility of prevention programs is reflected in the similarity between prevention and treatment, as the goal of prevention is to prevent the onset or exacerbation of a disorder. However, in order for clinicians to use eating disorder prevention programs in a variety of contexts, research on the effectiveness of these programs is necessary as effectiveness studies allow for the examination of generalizability, variability in participants and settings, and outcome of preventive effects of the intervention. Additionally, effectiveness studies can measure costs of implementing an intervention, including the cost savings of preventing the

numerous negative outcomes associated with disordered eating, and practicability within community agencies.

3. Features of successful prevention programs

Research on prevention programs has identified several factors that may influence program effectiveness, such as program format, participant risk status, age of participants, type of interventionist, and number of sessions (Shaw et al., 2009; Stice, Shaw et al., 2007). Initial eating disorder prevention programs primarily used a psychoeducational or didactic format, but have since developed into interactive formats that focus on reducing eating disorder risk factors in order to subsequently reduce eating disorder symptoms (Stice, Shaw et al., 2008). These psychoeducational programs often primarily provide information about eating disorders including consequences of disordered eating behaviors and risk factors associated with the development of eating disorders (Killen et al., 1993; Moreno & Thelen, 1993; Paxton, 1993). Unfortunately, didactic formats are often less effective in changing attitudes and behaviors than interactive programs that actively engage participants and teach new skills, and alone may not be enough to alter any maladaptive behaviors (Stice & Shaw, 2004; Stice, Shaw et al., 2007; Stice et al., 2003). Therefore, many current prevention programs use more interactive formats which seem to increase program effectiveness.

Prevention programs can be categorized as universal, selective, or indicated (also known as primary, secondary, and tertiary), each depending on the risk status of participants (Gordon, 1983; Marchand et al., 2011). These categories may also influence effectiveness of prevention programs. Universal prevention programs target all individuals within a general population regardless of risk status while selective prevention programs only target individuals at high risk for developing eating disorder symptoms (Shaw et al., 2009; Stice, Shaw et al., 2007). Both universal and selective prevention programs aim to prevent the development of symptoms of a disorder. Indicated programs are aimed at individuals who already have symptoms of a disorder in order to prevent further increases in symptoms. Empirical evidence suggests that universal programs produce smaller effects than selective programs, with some universal prevention programs producing greater effects for the high risk participants than for the entire sample (Kaminski & McNamara, 1996; Killen et al., 1993; Stewart et al., 2001; Stice et al., 2004; Taylor et al., 2006; Weiss & Wertheim, 2005). Selective programs have also been found to produce larger effects for obesity and depression than universal programs (Horowitz & Garber, 2006; Stice, Shaw, & Marti, 2006). It is hypothesized that these differences in outcomes for individuals based on risk status is due to high risk individuals being more motivated to engage in prevention programs to reduce current distress, which may result in greater outcomes for these individuals. Additionally, participants who are low risk may have less room for improvement, resulting in smaller outcome effects.

Participant age also influences the effects of the intervention (Shaw et al., 2009). Programs with participants older than 15 years had larger effects than programs with participants younger than 15. This may be because programs are more effective when implemented during the peak risk period for the emergence of eating disorder symptoms, which has been identified as between the ages of 15 and 19 by prospective studies. Younger individuals may also have less insight and ability to apply the principles and skills learned throughout the program because they are still developing abstract reasoning skills. Additionally, lower levels of eating disorder symptoms in younger individuals may lead to lower effect sizes.

Outcomes of eating disorder prevention programs can also be influenced by the type of interventionist. Research has found that prevention programs conducted by a trained interventionist are more effective than programs conducted by endogenous providers, such as teachers (Shaw et al., 2009; Stice, Shaw et al., 2007). This could be because endogenous providers may have other responsibilities that interfere with the delivery of the prevention program. While programs that are led by endogenous providers are less effective than programs led by trained interventionists, researchers have found that eating disorder prevention programs can be led by individuals who are trained on the protocol and are as effective as programs led by trained professionals (Becker et al., 2006; Becker, Bull et al., 2008; Perez et al., 2010). For example, Perez and colleagues (2010) implemented a dissonance based eating disorder prevention program in a sorority at a large public university led by peer facilitators who had undergone training from a doctoral level psychologist and found the program to be just as effective as programs facilitated by trained doctoral level psychologists.

The number of sessions used during the intervention has also been examined in order to determine if fewer sessions using the same materials are as effective as programs with a greater number of sessions. Researchers had postulated that more sessions would increase program effectiveness by increasing the length of time participants have to reflect on the program content between sessions as well as giving participants more time to practice the new skills learned during the program (Stice, Shaw et al., 2007). While previous researchers had concluded that brief single-session prevention programs were not sufficient to produce lasting attitudinal and behavioral change (Martz & Bazzini, 1999), it appears that programs with fewer sessions prove to be just as effective in reducing eating disorder symptoms and associated risk factors as longer programs containing multiple sessions (Stice, Shaw et al., 2007).

4. Eating disorder prevention strategies

Evaluations of current prevention programs are providing encouraging results. For example, a meta-analysis of eating disorder prevention programs revealed that 51% of eating disorder prevention programs reduced risk factors associated with disordered eating, and 29% reduced current or future eating disorder symptoms (Stice, Shaw et al., 2007). Some programs have produced reductions in eating disorder symptoms and associated risk factors that persisted through follow-up assessments. For example, Becker and colleagues (2005) evaluated the effects of a dissonance based prevention program in a college sorority and found that significant reductions in eating disorder symptoms and associated risk factors including body dissatisfaction and thin-ideal internalization were maintained at a 1-year follow-up assessment. These results from the same program conducted within a different sorority have been replicated by other researchers (Perez et al., 2010). Also, Low and colleagues (2006) examined the effects of a computer-administered prevention program that used a combination of interactive and psychoeducational techniques and found that significant reductions in eating disorder symptoms were maintained at an 8-month follow-up assessment. Other programs have reduced the risk of future onset of clinical and subclinical eating disorders (Stice et al., 2004). In fact, an evaluation of a computer based eating disorder prevention program conducted by Taylor et al., (2006) indicated that this program prevented the onset of eating disorders in high risk groups in addition to reducing weight and shape concerns.

These results support the benefits of eating disorder prevention programs. Research on prevention programs has resulted in the development of several different prevention strategies that utilize different formats and approaches to prevention. Some of these programs have been extensively researched and have gained empirical support, while others need further research in order to determine their effectiveness in preventing eating disorders. The main types of studies on prevention programs are presented in Table 1. Next, specific eating disorder prevention strategies will be discussed in detail including program format, different versions of the program, and research supporting the effectiveness of the program.

Types of Studies
Dissonance based studies
Health weight based studies
Mirror exposure based studies
Motivational interviewing based studies
Computer-administered cognitive behavioral based studies
Other

Table 1. Main types of studies.

4.1 Dissonance based

Dissonance based eating disorder prevention programs are one of the most extensively studied and empirically supported forms of eating disorder prevention (Stice, Shaw et al., 2008). Dissonance based interventions were developed using principles from Festinger's cognitive-dissonance theory (1957). Cognitive dissonance is a state in which incongruent thoughts, beliefs, or attitudes create psychological discomfort or tension (Brehm & Cohen, 1962; Festinger 1957). This discomfort may motivate individuals to change their thoughts, beliefs, or attitudes in order to restore a sense of internal consistency (Beauvois & Joule, 1999). Based on this theory, dissonance based eating disorder prevention programs seek to create dissonance in individuals about eating disorder risk factors such as thin-ideal internalization and body dissatisfaction. This is accomplished through a series of verbal, written, and behavioral exercises that encourage participants to critique a particular eating disorder risk factor in order to create dissonance. Dissonance based prevention programs have been used for preventing a variety of problems including obesity (Axsom & Cooper, 1985), snake phobia (Cooper, 1980), smoking onset (Killen, 1985), substance use (Barnett et al., 1996), substance abuse (Ulrich, 1991), and dating aggression (Schumacher & Slep, 2004).

Many current dissonance eating disorder prevention programs are based on the dual pathway model (Stice et al., 1996), an empirically supported etiologic model which suggests that sociocultural pressures to have a thin body promote thin-ideal internalization, which predicts body dissatisfaction, negative affect, and dieting. Body dissatisfaction, negative affect and dieting in turn foster eating disorder symptoms. Therefore, many current dissonance based eating disorder prevention programs attempt to create cognitive dissonance about the thin ideal, as it occurs early in the causal chain and can potentially lead to eating disorder symptoms. Once participants engage in counter-attitudinal activities in

which they critique the thin-ideal proposed by society and voluntarily take a stance against it, they are more likely to become faced with an internal conflict between their own internalized acceptance of the thin-ideal and the arguments they generated to counter the pressures to attain this thin-ideal, therefore experiencing the psychological discomfort that results from cognitive dissonance. They may then be motivated to alter their own thin-ideal internalization in order to reduce or eliminate this discomfort. This reduction of internalization of the thin-ideal in turn leads to decreases in other eating disorder risk factors and eating disorder symptoms. Research on the effects of dissonance based prevention programs that target thin-ideal internalization has provided evidence that supports the idea that reductions in thin-ideal internalization mediate the effects of the change in body dissatisfaction and eating disorder symptoms (Seidel et al., 2009; Stice, Marti et al., 2011; Stice, Presnell et al., 2007), and should therefore be targeted first within prevention programs. However, a recent study on the integration of thin-ideal internalization and self-objectification within a dissonance based eating disorder prevention program revealed that thin-ideal internalization and self-objectification are equally predictive of one another in the causal chain of eating disorder development, suggesting that both variables should be targeted equally within prevention programs in order to further increase reductions in eating disorder symptoms and risk factors and sustain these reductions for longer periods of time (Kroon Van Diest & Perez, 2011).

The original dissonance based eating disorder prevention program developed by Stice and colleagues (2000) was designed to include three one-hour group sessions. During the first session, the thin-ideal was defined followed by discussions on the origin of the thin-ideal, how it is perpetuated, different sources of pressures encouraging women to conform to the thin-ideal, and who benefits from the thin-ideal. Participants were asked to write a one-page counterattitudinal statement about the costs associated with attaining the thin-ideal as homework to be discussed during the next session. The second session began with a review of the first session and a discussion of the homework assignment. Role plays were conducted allowing participants to attempt to dissuade each other from pursuing the thin-ideal. Participants were asked to engage in a mirror exposure task as homework, recording physical and non-physical characteristics they liked about themselves to be discussed during the next session. The third and final session began with a review of the previous session and a discussion of the mirror exposure homework activity. Discussions about difficulties in resisting the thin-ideal and how to overcome these difficulties, as well as ways participants may be unknowingly promoting the thin-ideal were conducted. The session concluded by encouraging participants to challenge themselves to engage in behavioral challenges relating to body image concerns. An expanded four one-hour session version of the same program was later developed (Stice, Shaw et al., 2008). Other versions of dissonance based eating disorder prevention programs have since been developed, including a two two-hour session format developed by Becker and colleagues (2005) developed for use in college sororities, a six 45-minute session format developed by Mitchell and colleagues (2007), and a one two-hour session format developed by Matusek and colleagues (2004). Manuals are available for each of the various versions.

Although there are slightly different formats for dissonance based eating disorder prevention programs, most current programs assign homework between sessions in order to increase the amount of time participants are engaging in activities that increase dissonance.

Also, most dissonance based programs minimize the use of didactic techniques, as they are less effective than interactive techniques in changing thoughts and behaviors (Stice & Shaw, 2004; Stice, Shaw et al., 2007; Stice et al., 2003). It is also common for dissonance based prevention programs to promote adaptive behavior by encouraging participants to model certain behaviors in groups during sessions as a form of strategic self-presentation. Some of the exercises used in dissonance based prevention programs are viewed as an opportunity to combat maladaptive cognitions through a cognitive-behavioral perspective, and group activities are often used to foster social support and group cohesion.

Other techniques used in dissonance based eating disorder prevention programs are less universal and have only been used by a small number of researchers. Specifically, incentive for participants to use the new skills they learn during sessions is increased through the use of motivational enhancement exercises, such as group discussions of the costs of body image concerns (Stice, Shaw et al., 2008). Also, input about the intervention has been collected from participants and facilitators during some trials in order to improve manuals and the program for future trials. For example, handouts conveying information about the program to younger participants were incorporated into the program based on feedback received in previous trials from individuals who have already participated in the intervention. While these techniques have been utilized by Stice and colleagues, it may prove beneficial for other groups of researchers assessing dissonance based eating disorder prevention programs to begin using these strategies as well which may increase program effectiveness.

Dissonance based eating disorder prevention programs have been thoroughly studied, mostly providing medium to large effect sizes in outcome. Numerous studies examining the efficacy of these programs have provided evidence of significant reductions in thin-ideal internalization, body dissatisfaction, and eating disorder symptoms in high risk adolescent girls (Stice et al., 2001; Stice, Marti et al., 2008; Stice et al., 2000; Stice, Shaw, Burten, et al., 2006; Stice et al., 2003), college women, and sororities (Becker et al., 2006; Becker, Bull et al., 2008; Perez et al., 2010). When compared to control groups, dissonance prevention programs have produced greater reductions in eating disorder symptoms and risk factors, such as body dissatisfaction, bulimic pathology and dietary restraint, future risk for onset of clinical and subclinical eating disorders and obesity (Becker, Ciao et al., 2008; Mitchell et al., 2007; Roehrig et al., 2006; Stice et al., 2003; Stice, Marti et al., 2008; Stice, Shaw et al., 2008; Wade et al., 2009), with some of these reductions continuing through a 3-year follow-up assessment (Stice, Marti et al., 2008; Stice et al., 2000; Stice, Shaw, Burton et al., 2006; Stice, Shaw et al., 2008). These results have been replicated in Hispanic, and Asian American samples, with no significant differences in outcomes when compared to a sample of White participants who had undergone the same intervention (Rodriguez et al., 2008). Dissonance prevention programs have also been found to reduce eating disorder symptoms and risk factors in dissemination research in college students (Becker, Bull et al., 2008; Becker et al., 2006; Perez et al., 2010), and high school students (Stice et al., 2009; Stice, Rohde et al. 2011).

4.2 Mirror exposure

Body dissatisfaction is commonly associated with eating disorders and has consistently been identified as a major risk factor for the development, maintenance, and relapse of eating disorders (Cash & Deagle, 1997; Fairburn, Peveler et al., 1993; Fairburn, Stice et al., 1993; Freeman et al., 1985; Killen et al., 1996; Post & Crowther, 1987; Ricciardelli et al., 1997; Stice,

2002). Therefore, prevention programs that focus on improving body image are important for reducing eating disorder symptoms. Mirror exposure exercises, a form of body exposure, are a central component to prevention programs targeting body dissatisfaction. For mirror exposure exercises, individuals are instructed to stand in front of a mirror while systematically looking at each part of their body for an extended period of time. Many mirror exposure techniques involve include verbal interaction including challenging and feedback from a therapist (Delinsky & Wilson, 2006; Key et al., 2002; Vocks et al., 2007).

While the procedure for mirror exposure is relatively uniform, there are different ways of completing a mirror exposure exercise; each with slightly different instructions for participants. Vocks and colleagues (2007) conducted mirror exposure exercises in two separate sessions lasting for 40 minutes in which participants were instructed on what body parts to look at. In contrast, Delinsky and Wilson (2006) asked participants to describe themselves from head to toe systematically rather than instructing them on which body part to look at. Participants were asked to refrain from dwelling on or skipping any body parts and using critical language. During the second session, participants were asked to select clothing to wear that would cause them to face their fears about their appearance while challenging them to be nonjudgmental towards themselves. Behavioral homework assignments designed to eliminate body monitoring and avoidance were also given between sessions. Other researchers have followed similar protocols with alterations in the length of each exposure session (Key et al., 2002).

Mirror exposure has also been included as a component within some dissonance based eating disorder prevention programs (Becker et al 2005; Perez et al., 2010; Stice et al., 2000). Mirror exposure was given as a homework assignment between sessions to increase the amount of time spent on the prevention program as well as to encourage discussion about the activity during the subsequent session. For the assignment, participants were instructed to stand in front of a full length mirror in as little clothing as they were comfortable wearing and no cosmetic products. While viewing themselves in the mirror, they were instructed to list all positive physical and non-physical attributes they like about themselves. During the second session of the program, a discussion was held where participants shared non-physical attributes they liked about themselves that they had identified during the exposure task.

Mirror exposure has also been used in conjunction with other forms of therapy for eating disorder treatment. For example, mirror exposure has been incorporated in cognitive-behavioral therapy for body dissatisfaction (Cash, 1997). Wilson (1999, 2004), has incorporated mindfulness training, a component of dialectical behavior therapy (Linehan, 1993), into cognitive-behavioral therapy that uses mirror exposure. Studies have supported the effectiveness of the use of mirror exposure in conjunction with cognitive-behavioral therapy (Butters & Cash, 1987; Cash & Lavalley, 1997; Grant & Cash 1995).

It has been suggested that the tendency of individuals with eating disorders to overestimate the size of their body (Cash & Deagle, 1997; Skrzypek et al., 2001) may be one of the underlying mechanism responsible for the effectiveness of mirror exposure techniques (Vocks et al., 2007). This is because individuals receive feedback about their true body size throughout the exposure technique, resulting in body acceptance and decreased fear of weight gain. In fact, several studies have shown that overestimation of body size can be reduced through mirror exposure techniques (Fernandez & Vandereycken, 1994; Norris, 1984; Rushford & Ostermeyer, 1997). A second hypothesized explanation for the

effectiveness of mirror exposure is that this technique addresses negative feelings or affect the individual has about their body (Cash, 2004; Thompson et al., 1999). Individuals with eating disorders have been found to show greater increases in negative emotions towards their bodies than healthy controls when experiencing exposure to their bodies (Tuschen-Caffier et al., 2003). Therefore, it is suggested that with repeated exposure to one's body, negative emotions towards the body will be reduced through the habituation process. Research on the effect of mirror exposure in reducing negative emotions has supported this theory by indicating that negative affect or emotions towards the body was reduced through repeated mirror exposure exercises in individuals with eating disorders (Hilbert et al., 2002; Vocks et al., 2007). A final potential explanation for the effectiveness of mirror exposure techniques is that this exercise addresses negative body-related cognitions and assumptions associated with eating disorders, such as "I have to lose weight because I am too fat" (Cash & Deagle, 1997; Vocks et al., 2007). Studies have shown that individuals with eating disorders tend to have more negative cognitions about weight and shape when looking at themselves in full-length mirrors than healthy controls (Cooper & Fairburn, 1992; Hilbert & Tuschen-Caffier, 2005). This idea that mirror exposure leads to reductions in negative body-related cognitions has been supported in a study by Hilbert et al. (2002), who found that when body exposure was repeated on two separate days with patients with an eating disorder, negative cognitions were less frequent in the second session than in the first. However, cognitions were only measured one time during the entire exposure exercise in this study. Another study on the effectiveness of mirror exposure exercises in reducing negative cognitions conducted by Vocks et al. (2007), found that mirror exposure for 40 minutes did not reduce negative cognitions related to the body. The conflicting results from these studies suggests that further investigation is needed in order to determine if mirror exposure is effective in reducing negative cognitions about weight and shape associated with eating disorders.

Mirror exposure alone has been shown to be an effective way to reduce body image disturbances (Delinsky & Wilson, 2006). An examination of the effects of mirror exposure in a sample of undergraduate women indicated that mirror exposure produced a decrease in body image avoidance, weight and shape concerns, dieting and depression, and an increase in body satisfaction, with these improvements being maintained at a 1-month follow-up assessment (Delinsky & Wilson, 2006). Mirror exposure has also been found to enhance outcomes of obesity (Jansen et al., 2008) and eating disorder treatment (Key et al., 2002). Research on the effects of mirror exposure when used as a component in a dissonance based prevention program via a dismantling study indicated that mirror exposure moderates the effects of the prevention program (Ramirez et al., 2011). Additionally, participants who completed the mirror exposure assignment as part of the dissonance intervention showed higher body acceptance and body likability than participants who did not complete the assignment with these effects being sustained at a 1-year follow-up assessment. This evidence suggests that while mirror exposure alone can be an effective way to reduce body image disturbances and eating disorder symptoms, it may be more effective when used in conjunction with other techniques in a prevention program.

4.3 Healthy weight

In healthy weight eating disorder prevention programs, individuals are guided in creating permanent healthy lasting lifestyle changes, including lower fat intake and regular moderate exercise in order to achieve a healthy body weight and increase body satisfaction

(Matusek et al., 2004; Stice et al., 2001; Stice et al., 2003). Specifically, participants are educated about the importance of healthy eating practices and regular exercise. Differences between complete and incomplete nutrition, effective and ineffective dieting, and moderate and extreme forms of exercise, as well as dangers associated with poor eating behaviors are also highlighted. Participants are also given more detailed instructions on how to develop and maintain a healthy diet. Discussions on healthy lifestyle changes and relapse prevention are guided by facilitators at the end of this intervention.

The original healthy weight intervention, developed by Stice et al. (2001), was designed to incorporate three one-hour group sessions. In the first session, participants were informed that the purpose of the intervention was to help them create a healthy lifestyle that would incorporate a balanced diet and regular exercise which would result in weight control and body satisfaction. Participants then discussed their individual diet and exercise goals within the group. Goals were then reframed into a healthy weight management plan, including nutritional information in order to make dietary changes to achieve dieting goals. A homework assignment of developing an exercise plan to share during the next session was given at the conclusion of the first session. The second session began with a review of the previous session and a discussion of physical exercise and the development of regular exercise routines, including a review of each participant's plan developed for the homework assignment. The group then discussed possible problems with the plans, reasons for other programs failing, and ways to incorporate behavior modification techniques to maintain goals. Participants were asked to keep a food diary and set specific diet goals for the homework assignment that would be discussed at the next session. The third and final session began with a review of the second session, followed by participant reviews of problem areas identified while keeping the food diary. Problem areas with individual diet goals were also discussed. Factors that led to the failure of previous diet programs were discussed in order for participants to avoid these factors, as well as the inclusion of behavior modification techniques to maintain diet goals. The session was concluded with the presentation of additional nutritional information relevant to individual diet plans. This program has also been conducted using a single session format (Matusek et al., 2004), and a 4-session format (Stice et al., 2009), and has been disseminated by endogenous providers and professional facilitators.

This prevention strategy is more psychoeducational than interactive, as is mostly comprised of facilitators providing information and having group discussions on healthy lifestyle practices and includes less interactive group activities commonly used in other prevention programs. The healthy weight program was originally designed as a placebo control condition in a randomized trial examining the effectiveness of a dissonance based eating disorder prevention program and was not expected to produce significant reductions in eating disorder symptoms, partly due to the didactic format of the program (Stice et al., 2001). Since the program was designed only as a control condition, researchers were surprised to find that participants in the healthy weight program showed decreases in body dissatisfaction, dieting behaviors, negative affect, and bulimic symptoms. These results were similar to participants in the dissonance program, although effect sizes were smaller for the healthy weight group.

An 8-session version of this strategy facilitated by master's level graduate students has been evaluated as a treatment for individuals with clinical and subclinical bulimia nervosa (Burton & Stice, 2006). Results indicate that compared to a control group, individuals who

participated in the treatment program showed significant decreases in bulimic symptoms and experienced some weight loss. Importantly, these results were observed at a 3-month follow-up assessment. This evidence suggests that healthy weight programs may also be used as a cost effective treatment for bulimia nervosa, as well as a form of prevention of eating disorders.

Studies have shown that this strategy decreases body dissatisfaction, dieting, negative affect, and eating disorder symptoms that are larger than reductions seen in wait list control groups (Matusek et al., 2004; Stice et al., 2001; Stice et al., 2003). These reductions have been found to persist through 1-year follow-up assessments (Stice, Shaw, Burton et al., 2006). Additionally, this program was found to reduce the onset of eating disorders and obesity at a 3-year follow-up (Stice, Marti et al., 2008). Research has also found that when reduced to a single session workshop rather than the multiple session approach previously used, the intervention still produced decreases in thin-ideal internalization, body dissatisfaction and disordered eating symptoms at a follow-up assessment (Matusek et al., 2004; Stice et al., 2001). While these effects are promising, they often have smaller effect sizes than other prevention programs, such as dissonance based programs. This supports research indicating that programs that are mostly psychoeducational in nature are less effective than interactive programs.

4.4 Motivational interviewing

Motivational interviewing, developed by Miller and Rollnick (2002), is a client-centered method used to enhance intrinsic motivation to change. This approach was created to enhance motivation for recovery in populations of individuals who are ambivalent about change, such as individuals with eating disorders. The primary goal of motivational interviewing is to encourage individuals to increase their readiness to change in an attempt to ensure that skill building will occur when the individual is most receptive to change. It is important for facilitators to be nonjudgmental, warm, and empathic, while showing genuine interest in the individuals' experience of the problem (Geller & Dunn, 2011).

Motivational interviewing has been used as a component in dissonance based eating disorder prevention programs (Stice, Shaw et al., 2008) and healthy weight eating disorder prevention programs (Stice, Presnell et al., 2011) to enhance motivation for behavioral change and maximize one's incentive to use the new skills learned during the intervention. For example, reviewing costs of body image concerns has been used as a motivational group activity within a dissonance based prevention program (Stice, Shaw et al., 2008), and motivational exercises of having participants identify benefits of striving for a healthy lifestyle and discuss positive benefits from the intervention were used in an obesity prevention program (Stice, Marti et al., 2008). Motivational interviewing has also been used in the treatment of eating disorders as an aid to clinicians in enhancing readiness for change and adapting interventions to a patient's current status of readiness to change (Stice, Shaw et al., 2008).

While a few program facilitators have incorporated motivational interviewing within some forms of prevention programs, the technique is not frequently used as a component within prevention programs. Also, no dismantling studies have been conducted with prevention programs that incorporate motivational interviewing within them in order to determine

what additional benefits motivational interviewing may provide. Therefore, little research on the effectiveness of motivational interviewing in preventing eating disorder symptoms exists. Most of the effectiveness research on the use of motivational interviewing and eating disorders has been with treatment rather than prevention, with preliminary evidence being promising (Cassin et al., 2008; Dunn et al., 2006; Feld et al., 2001; Treasure et al., 1999). It is possible that motivational interviewing could potentially be used for the prevention of disordered eating by motivating individuals to be willing to change certain risk factors they may be experiencing, such as thin-ideal internalization and body image dissatisfaction. However, like mirror exposure, motivational interviewing may produce the greatest reductions in eating disorder symptoms and associated risk factors when used in combination with other interventions such as dissonance based programs.

4.5 Computer-administered cognitive-behavioral

This strategy is a computer-administered prevention program that is modeled after self-help eating disorder treatment programs and based on cognitive-behavioral body dissatisfaction interventions (Butters & Cash, 1987). The program is designed to reduce body dissatisfaction and reduce weight and shape concerns in order to subsequently reduce eating disorder symptoms (Winzelberg et al., 1998). The program includes psychoeducational formats that provide information on eating disorders, healthy weight control behaviors, and nutrition, as well as interactive formats using an unstructured email support interchange that allows participants to express their emotional reactions to the program and interact anonymously with other participants.

The program is conducted as a structured 8-week intervention conducted via the internet. The program utilized interactive software that had text, audio, and video components. The program commences with a description of the development and consequences of eating disorders. Each week a primary focus was placed on improving overall body image, including discussions about cultural ideals of beauty, the role the media plays in cultural standards of beauty, and cognitive-behavioral strategies for improving body satisfaction. Participants were given mandatory and optional assignments to complete each week, such as on-line self monitoring journals and behavior change exercises. Participants were required to post a message to the discussion group each week regarding the psychoeducational material that was the focus of that week in addition to answering or commenting on at least one other message. Group discussions were designed to allow participants to receive and provide emotional support and discuss reactions to the program content. Participants who missed assignments or discussions were contacted via email and encouraged to complete the assignments.

Computer-administered eating disorder prevention programs are more cost effective than other forms of prevention programs (Winzelberg et al., 2000). They are also standardized and are more easily delivered than in-person programs, making them more easily disseminated. Computer-administered programs are also more flexible, allowing participants to use them at their own convenience without scheduling conflicts, and can be used frequently and for shorter time periods. Further, the interactive software utilized in current computer-administered prevention programs allows for a more personal experience and can be more easily tailored to meet individual needs. Evidence suggests that programs conducted without a therapist, such as computer-administered programs, based on

cognitive-behavioral principles are effective in reducing symptoms in subclinical populations (Fairburn & Carter, 1997). While this program may be cheaper and easier to implement than other programs, the rate of attrition for this particular program may be higher than other programs (Winzelberg et al., 1998).

This strategy has successfully reduced eating disorder risk factors such as body dissatisfaction (Low et al., 2006). These results have been replicated in multiple trials conducted by the same lab group. When compared to control groups, participants showed significantly lower bulimic pathology and lower body dissatisfaction at an 8-month follow-up assessment. This program has also been found to significantly reduce eating disorder risk factors including weight and shape concerns, and the onset of eating disorders in participants with higher body mass indexes in at-risk college women (Taylor et al., 2006). While this program has produced reductions in body dissatisfaction and eating disorder symptoms, the effects are less than other prevention programs that are more interactive such as the dissonance based prevention programs.

4.6 Other prevention strategies

There are a few additional prevention strategies that have been developed, but with minimal empirical support. For example, Neumark-Sztainer and colleagues (1995) developed and evaluated a psychoeducational program that includes social-cognitive principles for behavior change that had minimal outcome effects. This program is a 10-session school based program facilitated by a health educator aimed at changing attitudes and behaviors about nutrition, weight control, improving body image and self image, and promoting greater control over social pressures regarding dieting and excessive eating. Significant reductions in weight control behaviors, dieting, and binge eating were observed at a 6-month follow-up, but these reductions were not sustained at the 2-year follow up. Also, no significant reductions in body dissatisfaction or negative affect were observed at any assessments.

A couple of other psychoeducational prevention programs have produced similar results. Stice, Orjada, and Tristan (2006), evaluated a 15-week psychoeducational college course on eating disorders and found that when compared to a control group, participants showed significantly greater reductions in thin-ideal internalization, body dissatisfaction, dieting and eating disorder symptoms at post-intervention and 6-month follow-up assessments. While these results are promising for a psychoeducational intervention, they have not been replicated by other researchers to provide additional support. Additionally, Stewart and colleagues (2001) evaluated a different psychoeducational program that addresses body dissatisfaction, societal pressures to be thin, changes associated with puberty, development of eating disorders, self-esteem, and dieting. This program produced small reductions in dietary restraint and attitudes about shape and weight at a post-intervention assessment, but these reductions were not maintained at the 6-month follow-up assessment.

Finally, McVey and Davis (2002) developed an interactive program conducted using peer-support groups. This 10-session program focuses on promoting critical media use, body acceptance, healthy weight control behaviors, and stress management skills. Evaluations of this program have indicated that this intervention produced increases in weight related esteem and decreases in dieting in middle school girls when compared to a control group at

post-intervention and 3-month follow-up assessments. However, a subsequent evaluation of this program was unable to replicate these positive results (McVey et al., 2003).

5. Using prevention programs in social organizations to create systematic changes

Women routinely report feeling pressure to attain a thin-ideal body type from peers, family, and society (Perez et al., 2010). The use of social organizations to prevent eating disorders has been relatively unexplored but is an important avenue of future research. By implementing eating disorder prevention programs within social organizations, researchers and practitioners alike can create systemic changes in the organization's environment in addition to changes within individuals across time. For example, prevention programs can target the organization's views of the thin-ideal and change practices that enhance or maintain the thin-ideal, thereby reducing the peer pressure and environmental pressure women report. In addition, prevention programs that successfully reduce eating disorder risk factors in current members of the organization may also reduce risk factors for new incoming members of the organization. Social organizations can also assist in wide-spread dissemination of prevention programs.

College fraternities are an example of a social organization that can be conducive to the dissemination of eating disorder prevention programs. Previous research examining the implementation of dissonance based eating disorder prevention programs within college sororities has indicated that dissonance based programs can be effective in reducing eating disorder symptoms and associated risk factors within this particular form of social organization (Becker et al., 2005, 2006; Becker, Bull et al., 2008; Perez et al., 2010). In addition, research has found that naturalistic dissemination of a dissonance based eating disorder prevention program within a sorority can be effective at reducing eating disorder symptoms and associated risk factors (Perez et al., 2010). However, this research has yet to examine if the intervention was successful in creating systematic changes throughout the organization by creating an overall reduction in eating disorder symptoms in the members. Therefore, a dissonance based eating disorder prevention program implemented in a sorority at a large public university was examined to assess if the intervention was successful in creating systematic reductions in eating disorder symptoms throughout the organization.

To examine group-level change in eating disorder symptoms instead of individual change, a sorority at a large public university participated in a dissonance based eating disorder prevention program. During the first year, all current members of the sorority participated in the prevention program. During the second and third year, all incoming new sorority members participated in the eating disorder prevention program during their first semester as members of the sorority. All participants completed self-report questionnaires prior to the intervention (baseline), immediately after the intervention (post-intervention), 5 months later, and at 1 year follow-up. Because members participated in the program at different times based on the year they entered the sorority, longitudinal data was compared to examine the similarities between classes at certain time points. Specifically, the 5-month follow-up assessment for the Year 1 members was conducted at the same time as the baseline assessment for Year 2 new members, and the 1-year follow-up assessment for Year 1 members overlapped with 5 month follow up for Year 2 and the baseline assessment for Year 3 new members.

The total sample included 212 participants: 125 members already enrolled in the sorority at the time the program was initiated, 49 new members recruited during the second year the program was ran, and 38 new recruits from the third year. Ages ranged from 18 to 22 (19.16 ± 1.16), with body mass indexes ranging from 16.18 to 26.66 (21.15 ± 1.98). Most participants identified as Caucasian (94.8%), followed by Hispanic (2.4%), Asian (.5%), Native American (.5%), and of mixed ethnicities (1.9%). Participants completed baseline, post-intervention, 5-month, and 1-year follow-up assessments throughout the course of the program. Eating disorder symptoms were assessed using the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994). The EDE-Q is designed to measure individual's eating attitudes and behaviors over one-month and can be used to make tentative diagnoses of clinical eating disorders. Higher global scores indicate higher levels of overall eating disorder symptoms. Research on the EDE-Q has demonstrated good internal consistency for global scores, $\alpha = .78$ to $.93$, and test-retest reliability, $r = .81$ to $.94$ (Luce & Crowther, 1999; Mond et al., 2004). Alphas for the current study were $.94$, $.95$, $.93$, and $.95$ for baseline, post-intervention, 5-month follow-up, and 1-year follow-up respectively.

All participants completed baseline assessment before beginning a dissonance based eating disorder prevention program that focuses on creating cognitive dissonance about both thin-ideal internalization and self-objectification. The program was led by peer facilitators that had been extensively trained by a doctoral level psychologist on the protocol for the prevention program. The intervention consisted of 2-hour group sessions in group format, with groups containing approximately 20 members. The first session began by defining the thin-ideal body image for women proposed by society, including discussions of the costs and origins of the thin-ideal, sources of pressures placed on women to obtain the thin-ideal, and the impact this has on women. The session concluded with a discussion of personal situations where members felt pressured to conform to the thin-ideal and ways to respond to these pressures appropriately. Participants were given a homework exercise of completing the mirror exposure task outlined in section 3.2. The homework assignment was then discussed at the beginning of the second session, by having participants share two non-physical qualities they like about themselves that they had identified during the mirror exposure exercise. This then became a discussion on the importance of focusing on non-physical qualities rather than physical appearance. Role plays where members attempted to prevent friends from pursuing the thin-ideal were conducted and discussions about ways women perpetuate the thin-ideal and ways women can resist pressures to conform to these standards were also included in the second session. The same assessments that participants completed at baseline were completed immediately following the intervention, as well as at 5-month and 1-year follow-up assessments.

The dissonance-based eating disorder prevention program was effective at reducing eating disorder symptoms and associated risk factors for new members from each year through 1-year follow-up. The details of these results are reported elsewhere (Perez et al., 2010). The figure below depicts the mean global EDE-Q scores for each year at each assessment time point. At Time 3, 5 and 7, where the members of each year overlap in assessment, there were no significant differences between the years. It is interesting to note that Year 1 recruited incoming new members (i.e., Year 2) that were similar to them in global eating disorder symptoms. At Time 5, Year 1 and Year 2 had virtually identical global EDE-Q scores, and recruited new members (i.e., Year 3) that were similar to them. At Time 7, Year 2 and Year 3 had very similar global EDE-Q scores. Thus, a pattern emerged where the eating disorder symptoms

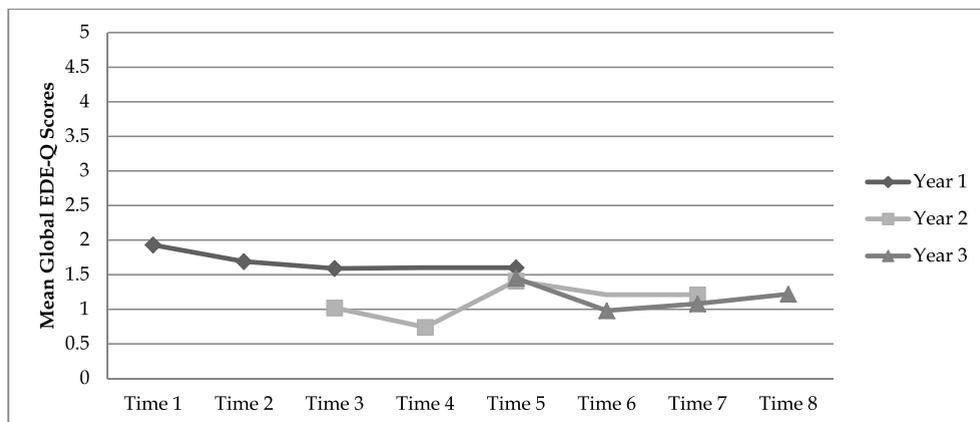


Fig. 1. Global EDE-Q scores for each year across time. *Note:* Time 1 - Baseline assessment for Year 1; Time 2 - Post intervention assessment for Year 1; Time 3 - 5 month follow up Year 1 and Baseline assessment for Year 2; Time 4 - Post intervention assessment for Year 2; Time 5 - 12 month follow up for Year 1, 5 month follow up for Year 2, and Baseline assessment Year 3; Time 6 - Post intervention assessment for Year 3; Time 7 - 12 month follow up for Year 2 and 5 month follow up for Year 3; Time 8 - 12 month follow up for Year 3.

of the incoming new members were similar to the eating disorder symptoms of the social organization as a whole. In addition, there seems to be a migratory convergence of eating disorder symptoms over time.

This preliminary evidence suggests that implementing eating disorder prevention programs within large social organizations such as sororities can be beneficial in creating long-term systematic changes throughout the organization. Eating disorder prevention programs that can be adapted to school settings, athletic organizations, dance teams, and other social structures may have an advantage of creating systemic change in addition to individual change. While this information is promising, this evidence is preliminary and requires replication. Further research is needed to increase the effectiveness of creating systematic reduction in eating disorder symptoms in large social organizations and sustaining these changes for longer time periods.

6. Conclusion

The field of eating disorder prevention has produced a number of encouraging advancements. Specifically, research on eating disorder prevention has produced several prevention programs that have successfully reduced current eating disorder symptoms and risk factors as well as the risk for future onset of eating disorder symptoms. These effects have also been replicated in multiple trials conducted by the same lab for some programs, and some program results have been replicated by independent labs. Certain programs have also been shown to be effective when delivered by endogenous providers in a variety of conditions. Additionally, several programs have been found to significantly outperform alternative interventions. For example, dissonance based programs that decrease attitudinal risk factors and healthy weight control programs were more effective than others. Also, preliminary evidence suggests that

prevention programs may also help create systematic changes throughout large social organizations, further increasing the benefits of prevention programs.

While many current programs are producing promising effects, effect sizes for these results could be larger and more persistent (Shaw et al., 2009; Stice, Shaw et al. 2007). Further research needs to be conducted to determine what components of programs need to be adapted to increase the effectiveness of programs, as well as to sustain improvements made during the program for longer periods of time. Also, many examinations of the effects of prevention programs have not included a control group, which prevents researchers from determining if the effects are a direct result of the intervention or if they are actually due to regression to the mean or the passage of time. Researchers continuing to evaluate current prevention programs should address these limitations in order to refine these programs and increase the program effectiveness.

Overall, empirical evidence supports the effectiveness of several eating disorder prevention programs, with most programs decreasing current and future eating disorder symptoms and associated risk factors. More importantly, some of these effects have been sustained for extended periods of time. Some of these programs have also been successfully disseminated and are effective when facilitated by endogenous providers. As more research is conducted on eating disorder prevention programs, limitations of current programs can be reduced and program effectiveness can be further increased. Continued research on the prevention of eating disorders and efforts directed towards increasing effectiveness of prevention programs will assist in reducing the overall prevalence of eating disorders.

It is also important to examine prevention programs within diverse populations. Future research should examine the generalizability of these programs to individuals of other ethnicities, genders, and sexual orientations in order to determine if programs are effective within these populations. Although females are more likely than males to experience eating disorder symptoms and associated risk factors like thin-ideal internalization and self-objectification, men are still affected by body dissatisfaction and eating disorder symptoms and should therefore be included within studies evaluating the effectiveness of prevention programs (Hudson et al., 2007). Only one eating disorder prevention program in the last 20 years has included males (Yager & O'Dea, 2008), and this program was purely psychoeducational, and did not produce any significant reductions in eating disorder symptoms or risk factors (Rabak-Wagener et al., 1998). Therefore, more efforts need to be directed at examining the effectiveness of prevention programs in males, as well as other more diverse populations.

Finally, although extensive progress in prevention research on individual change has been made in the past decade, further research is needed on eating disorder prevention programs that can create systemic changes in social organizations. The ability to intervene at a systemic level allows for dissemination of prevention programs to greater numbers of individuals, and creates a healthier environment.

7. References

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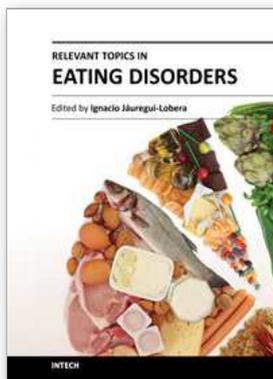
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Eating disorders are common, frequently severe, and often devastating pathologies. Biological, psychological, and social factors are usually involved in these disorders in both the aetiopathogeny and the course of disease. The interaction among these factors might better explain the problem of the development of each particular eating disorder, its specific expression, and the course and outcome. This book includes different studies about the core concepts of eating disorders, from general topics to some different modalities of treatment. Epidemiology, the key variables in the development of eating disorders, the role of some psychosocial factors, as well as the role of some biological influences, some clinical and therapeutic issues from both psychosocial and biological points of view, and the nutritional evaluation and nutritional treatment, are clearly presented by the authors of the corresponding chapters. Professionals such as psychologists, nurses, doctors, and nutritionists, among others, may be interested in this book.

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