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Preventing Eating Disorder Pathology: Common and Unique Features of Successful Eating Disorders Prevention Programs

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Abstract

Over the past two decades, the field of eating disorders has made remarkable strides in identifying, evaluating, and disseminating successful prevention programs. The current review identifies and discusses nine distinct eating disorders prevention programs that reduce existing eating disorder pathology or prevent the onset of future pathology. Each program was evaluated in one or more controlled trial with a follow-up period of at least six months. We review the evidence base for these nine successful programs and discuss their common and unique features. Based on authors' descriptions of their programs in published trials, we found that all programs were theory-driven, targeted one or more eating disorder risk factor (e.g., body dissatisfaction), were delivered across multiple group sessions, and included at least some interactive content. Most programs included content related to healthy eating/nutrition, media literacy/sociocultural pressures, and body acceptance/body satisfaction. Notably, there was wide variation in some participant features (e.g., participant age, sex, risk status) and intervention features (e.g., setting and format, length and dose, providers), suggesting that a variety of programs are beneficial in impacting eating disorder pathology. Implications and directions for future research are discussed, including an increased focus on universal and indicated prevention programs, expanding programs to a wider age range and a broader spectrum of weight-related problems, and rigorous evaluation of programs through efficacy, effectiveness, and implementation research.

Keywords

Eating disorders; eating disorder pathology; prevention; review

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Compliance with Ethics Guidelines

Conflict of Interest

Katie Loth declares that he has no conflict of interest.

Human and Animal Rights and Informed Consent

This article does not contain any studies with human or animal subjects performed by any of the authors.

Introduction

Research estimates that up to 13 percent of young women and four percent of young men are affected by eating disorders such as anorexia nervosa, bulimia nervosa, binge eating disorder, and other and unspecified feeding and eating disorders [1,2]. Eating disorders are marked by chronicity, psychological comorbidity, medical consequences, and increased mortality [3,4]. Despite these consequences, treatment seeking in eating disorder populations is low [2*]. Even when individuals complete empirically-supported treatments, many do not achieve full remission, and relapse is common [5]. In addition, subthreshold disordered eating behaviors, such as dieting and unhealthy weight control practices, affect one third to one half of adolescent girls and boys, and a significant minority report engaging in serious disordered eating such as extreme weight control practices (e.g., vomiting, laxative abuse) and binge eating [6*]. Moreover, longitudinal research suggests that individuals will continue to engage in these unhealthy behaviors through young adulthood, and some will experience an increase in symptoms [6*]. As such, it is essential to identify successful interventions that prevent eating disturbances from developing or becoming chronic.

Current Status of Eating Disorders Prevention

The field of eating disorders prevention has grown rapidly in the past two decades. A comprehensive review of eating disorders prevention programs in 2000 cited just 20 published trials [7]; at most recent count [8], over 60 distinct eating disorders prevention programs have been developed and evaluated in one or more published trial. Early perspectives on the prevention field were somewhat discouraging, with reviews [7,9] pointing to modest program success and widely varied research methodology across trials, preventing broad conclusions about the merit of prevention efforts. Since that time, the field of eating disorders prevention has made remarkable strides. For example, there is greater attention to prevention within the broader field of eating disorders, many more programs are being implemented and evaluated, and different types of approaches are emerging.

Successful eating disorders prevention programs typically focus on modifying specific factors known to confer greater risk for developing eating disorders. Prospective studies have identified several modifiable risk factors for developing global eating pathology, including: belief in the cultural thin-ideal (called thin-ideal internalization), perceived pressure to be thin, body dissatisfaction, self-reported dieting, and negative affect (e.g., depressive symptoms) [10]. A comprehensive meta-analysis from 2007 reported that half of eating disorders prevention programs led to reductions in one or more eating disorder risk factor (e.g., body dissatisfaction, thin-ideal internalization) [11]. Theoretically, if risk factors are reduced, eating disorder pathology will be reduced or prevented and eating disorders will not develop. The gold standard in eating disorders prevention is to show that interventions can prevent the onset of eating disorder cases. Theoretically, this outcome can be monitored in controlled designs where individuals are followed over a sufficient length of time post intervention to observe developing eating disorder cases compared to a control population. In reality, limited resources have been devoted to the implementation and evaluation of eating disorders prevention programs. Thus, the bulk of evaluations of prevention interventions to date have not been able to follow participants for the length of time

necessary to demonstrate prevention of eating disorder onset. Therefore, a more realistic standard for prevention research is to reduce current eating disorder symptoms or prevent new symptom development relative to a control group. However, a recent qualitative review [8] noted that only six programs have reported reductions in eating disorder symptoms through a 6-month follow-up in controlled trials.

Given the importance of understanding eating disorders prevention's impact on relevant symptomatology, the purpose of the current review was to revisit the literature and identify programs that successfully reduce existing eating disorder pathology or prevent the onset of future pathology. A systematic review of the literature was conducted to identify programs with one or more trials meeting the following criteria: (1) published in English, (2) utilized a randomized or quasi-randomized, controlled design, (3) reported a reduction in existing eating disorder pathology or prevented the onset of future pathology through at least a 6-month follow-up. Eating disorder pathology was defined as: (a) distinct behaviors relevant to eating disorders such as binge eating, purging (e.g., laxatives, vomiting), unhealthy dieting practices (e.g., skipping meals, extreme dietary restriction), and other unhealthy weight control behaviors (e.g., diet pill use, unhealthy/excessive exercise); and/or (b) attitudinal features of eating disorders measured with valid instruments like the Eating Disorders Examination-Questionnaire (EDE-Q) Global scale [12] or the Eating Attitudes Test (EAT) [13,14]. Searches of electronic databases (PubMed, PsychInfo, Google Scholar) were conducted using specific keywords (eating disorders prevention, eating disorders prevention intervention/program, disordered eating prevention). Reference lists from other recent and comprehensive reviews were also consulted [8,11,15,16*]. This systematic search identified nine programs with trials meeting these criteria. In chronological order of primary publication date, these programs were: (1) *The Weigh to Eat* by Neumark-Sztainer *et al*., 1995 [17]; (2) an untitled program by Stewart *et al*., 2001 [18]; (3) *Planet Health* by Austin *et al*., 2005; [19]; (4) *Student Bodies*™ by Taylor *et al*., 2006 [20]; (5) the *Body Project* by Stice *et al*., 2006 [21] and related *Dissonance Programs* [22]; (6) *Healthy Weight* by Stice *et al*., 2006 [21]; (7) *New Moves* by Neumark-Sztainer *et al*., 2010 [23]; (8) an untitled program by Yager & O'Dea, 2010 [24]; and (9) *Eating, Aesthetic Feminine Models and the Media* by González *et al*., 2011 [25]. Five programs were evaluated in single trials meeting our criteria [17,18,23–25] and four programs were evaluated in multiple trials meeting our criteria [original trials: 19–21]. Table 1 includes all trials meeting our inclusion criteria. Of note, some high-quality programs were excluded because they did not meet the relatively stringent inclusion criteria developed for this review. For example, the *Media Smart* program by Wilksch and Wade [26]) and the *Happy Being Me* program by Richardson and Paxton [27] have demonstrated sustained reductions in several eating disorder risk factors including dieting and body dissatisfaction, but were not included here due to predetermined inclusion criteria requiring change in an eating disorder pathology outcome (e.g., relevant eating disorder behaviors or attitudinal eating disorder features measured with validated inventories). Other notable programs that positively impacted eating disorder pathology were excluded due to insufficient follow-up (e.g., *Torera* by Berger and colleagues [28]) or a lack of experimental design (e.g., *Eating Smart, Eating For Me* by Smolak and Levine [29], and Piran's seminal work within an elite ballet school [30]). Thus, this review should not be seen as exhaustive or representative of all eating disorders prevention programs with

merit. Rather, the goal of the current review was to identify successful programs that specifically impact eating disorder pathology over the long-term. We first review the evidence base for successful programs, highlighting their impact on eating disorder pathology. We then briefly report on each program's significant findings related to eating disorder risk factors. We discuss common and unique features of successful programs and conclude with recommendations for future research. It is our hope that a review of this nature will be of use to researchers, clinicians, and non-professionals in understanding the nature of successful programs that directly impact eating disorder pathology.

Evidence Base for Successful Prevention Programs

The Weigh to Eat

In the mid-90's, a school-based program called *The Weigh to Eat* was created for Israeli high school girls [17]. The 10-week classroom intervention utilized principles of social cognitive theory. A nutritionist/health educator (i.e., the study principal investigator) delivered lessons within the classroom setting. Intervention components included: (1) psychoeducation on nutrition, healthy eating, healthy physical activity, and eating disorders; (2) behavior modification for healthy weight maintenance; (3) media literacy on the media's impact on body image and self-esteem; and (4) assertiveness training on social pressure and modifying the social environment in the context of food, eating, and weight. A study utilizing a quasi-experimental design compared *The Weigh to Eat* intervention to an assessment-only control condition among 269 high school girls (mean age = 15.3 years, *SD* = 0.4). Subgroup analyses revealed that the intervention was particularly beneficial for overweight girls and those without baseline unhealthy dieting and binge eating, with lower rates of eating disorder pathology such as unhealthy dieting and binge eating compared to controls at 2-year follow-up.

Stewart's Untitled Program

This school-based program was developed in the United Kingdom for students in all-female middle and high schools [18]. The 6-week interactive classroom intervention utilized cognitive-behavioral strategies focused on factors contributing to eating disorders. Research staff led the intervention, which covered topics such as sociocultural pressures for thinness, weight and shape comments, body dissatisfaction, self-esteem, dieting and nutrition, and coping with stress. The intervention also provided specific skills for detecting an eating disorder and seeking help. A group randomized-controlled trial compared the intervention to an assessment-only waitlist control group among 474 middle and high school girls (mean age = 13.4 years, *SD* = 0.5). Compared to girls in the control group, girls in the intervention reported improvements in dietary restraint, eating and shape concerns, and eating disorder pathology (assessed with the children's EAT [14]) post-intervention, as well as reductions in dietary restraint and eating disorder pathology through a 6-month follow-up.

Planet Health

Another school-based program called *Planet Health* has been evaluated in three separate research trials over the past decade [19,31,32**]. *Planet Health* was originally designed to prevent obesity among middle school girls and boys in the Northeast United States. The 2-

year classroom intervention utilized principles of social cognitive theory to promote behavioral changes in television viewing, physical activity, and nutritional choices. Teachers within the classroom delivered the 32 program lessons over a 2-year period. The intervention also included brief "microunits" that focused directly on activity and nutrition and fitness checks conducted in physical education classes. The original randomized-controlled trial of *Planet Health* [33] examined the intervention compared to an assessment-only control group among 1,295 middle schoolers. The intervention showed positive effects for Body Mass Index (BMI) and other weight-related outcomes for girls in the study. A secondary analysis of the trial with a subset of 480 girls (mean age = 11.5 years, *SD* = 0.7) demonstrated its positive effects on eating disorder pathology in the form of unhealthy weight control behaviors [19]. Specifically, girls who received the *Planet Health* program were less likely to report purging and diet pill use compared to girls the control group. Subgroup analyses indicated that this effect was particularly pronounced for individuals who did not report dieting at baseline.

A subsequent effectiveness trial of *Planet Health* with 1,551 middle school girls and boys found that girls in the intervention were less likely to report unhealthy weight control behaviors after the 2-year intervention compared to an environmental-intervention control condition. There was no effect on unhealthy weight control behaviors for boys [31]. Since that time, the *Planet Health* program has been disseminated across the United States and internationally. In a large controlled dissemination study across the state of Massachusetts, cross-sectional data indicated that students in schools with greater exposure to the *Planet Health* program had lower odds of disordered weight control behaviors including vomiting, laxative use, and diet pill use after three years [32**].

Student Bodies™

Researchers at Stanford University created *Student Bodies*™ for college women with high weight and shape concerns [34]. The 8-week online intervention utilized cognitive-behavioral strategies to improve body satisfaction and reduce weight and shape concerns. Intervention topics included improving body dissatisfaction and body image, healthy weight management and nutrition, and increasing knowledge of eating disorder risk factors. Intervention techniques include self-monitoring and goal setting through weekly assignments like journaling or posting to a discussion group moderated by research staff. Early studies established the feasibility of the intervention in small trials with short-term follow-up [34–36]. In a large randomized-controlled trial, 480 college women (mean age = 20.8 years, *SD* = 2.6) with high weight and shape concerns were provided with the 8-week intervention plus optional booster session for nine months after the intervention [20]. Compared to a waitlist control group, students who received *Student Bodies*™ experienced significant reductions in body dissatisfaction, drive for thinness, and eating disorder pathology (assessed with the EDE-Q [12]) post-intervention and at 1-year follow-up. In a subset of individuals (those with BMI > 25 and those with baseline purging behaviors at one treatment site), the intervention reduced eating disorder onset through 2-year follow-up compared to the control group. The original *Student Bodies*™ program has also been adapted for a German population with similar effects on eating disorder pathology through a 3-month follow-up [37]. Of note, two modified *Student Bodies*™programs for sub-threshold

eating disorders have also been developed for overweight high school girls and boys (mean age = 15.1 years, *SD* = 1.0) with subthreshold binge eating [38] and for college women (mean age = 22.3 years, *SD* = 2.9) with subclinical eating disorders [39**]. Both programs resulted in a reduction in eating disorder symptoms compared to a waitlist control through 5-to-6-month follow-up.

Body Project/Dissonance Programs

Researchers at the University of Texas originally developed the *Body Project* for high-risk adolescent girls with body dissatisfaction [21]. The brief, 3-session intervention was based in cognitive dissonance theory and utilized active verbal, written, and behavioral exercises to directly challenge the belief in the current cultural beauty ideal. Activities were designed to elicit psychological dissonance/discomfort to promote change in attitudes and behavior surrounding weight loss and beauty. Early randomized trials established the efficacy of the 3-session *Body Project* among adolescent girls (mean age = 17.0 years, *SD* = 1.4) with body dissatisfaction. The intervention, which was delivered by research staff, significantly reduced thin-ideal internalization, body dissatisfaction, dieting, negative affect, and eating disorder pathology (assessed with a structured diagnostic symptom interview) compared to an assessment-only control and an alternate intervention through 6-month and 1-year follow-up [21]. At 2- and 3-year follow-up, the dissonance program led to a reduction of risk in eating disorder pathology onset compared to controls [40].

Randomized-controlled trials from independent research groups further established the short-term efficacy of the *Body Project* and adapted *Dissonance Programs* in reducing eating disorder pathology in high-risk college-aged women [41,42] and college-aged women of all risk levels [43,44]; of note, none of these trials included a long-term (i.e., greater than 6 months) follow-up. Given the success of initial efficacy trials, subsequent research has focused on dissemination of the program using community-based providers. One early trial [45] found that college health educators could implement a dissonance program, but follow-up was limited to one month; subsequent studies with long-term follow-up have found that dissonance programs can be implemented using a variety of endogenous providers such as high school staff members [46,47], and college-aged peer leaders [22,48–50]. Trials were conducted with high-risk girls and women [46,47,50] or college women of all risk levels [22,48,49]. These controlled effectiveness studies report significant reductions in eating disorder pathology and other eating disorder risk factors, although effect sizes are generally smaller when compared to trials where research staff deliver the intervention. To address this issue, an enhanced-dissonance version of the *Body Project* was recently created. College clinicians received increased training and supervision in the enhanced program in a study with high-risk college women. The enhanced program demonstrated larger intervention effects at 1-year follow-up compared to previous effectiveness trials [51**]. The *Body Project* manual is widely available and this and other versions of the dissonance program have been widely disseminated. Several different versions of the *Body Project* intervention materials are available online (www.bodyprojectsupport.org). The program appears to be highly disseminable; for example, the peer-led *Reflections* dissonance program can be delivered in two 2-hour sessions [22,48,49] and was recently adopted for use within sororities on college campuses across the U.S. [52].

Notably, several promising adaptations of the *Body Project* have emerged in recent years. Two recent Internet feasibility studies found that dissonance prevention delivered in an online format was as effective as the in-person version in the short-term for college-age women [53,54]. Further, a recently adapted dissonance program for use with college-age couples [55*] shows initial promise as a unique method of intervention delivery. However, these studies did not include long-term follow-up, and more research is needed to understand their effects over time.

Healthy Weight

The *Healthy Weight* program was originally developed as a comparison intervention in the *Body Project* research trials [21]. The *Healthy Weight* program is based in behavioral theory and nutritional science and promotes behavioral weight control techniques. Motivational principles are used to set small goals for lifestyle change in eating and physical activity to maintain a healthy weight. Original research trials of the *Healthy Weight* intervention found that the 3-session program delivered by research staff had positive effects on eating disorder pathology (assessed with a structured diagnostic symptom interview) and eating disorder risk factors relative to an assessment-only control group [21] for adolescent girls with body dissatisfaction. Further, the *Healthy Weight* program resulted in a reduction of risk in eating disorder pathology onset through 3-year follow-up [40]. Since then, researchers have continued developing and evaluating the *Healthy Weight* program as a distinct efficacious intervention. An enhanced 4-session version of the intervention incorporated additional principles of healthy eating and physical activity [56]. The *Healthy Weight-2* intervention was delivered by research staff and evaluated among college women (mean age = 18.4 years, *SD* = 0.6) with body image concerns in a randomized comparison to an assessment-only control group. Results indicated that compared to controls, the intervention resulted in greater reductions in body dissatisfaction and eating disorder pathology (assessed with a structured diagnostic symptom interview) post-intervention, as well as greater reductions in self-reported dieting at 6-month follow-up. At 2-year follow-up, the *Healthy Weight-2* intervention produced greater reductions in body dissatisfaction and eating disorder pathology compared to controls as well as a reduction of risk in eating disorder pathology onset [57**]. Independent research has also shown that a modified 2-session, peer-led version of the *Healthy Weight* intervention can be delivered to college women of all risk levels with a similar impact on eating disorder pathology and eating disorder risk factors over 14-month follow-up [49]. A subsequent peer-led trial found that female college athletes preferred the *Healthy Weight* intervention over a dissonance program [58**].

New Moves

New Moves is a school-based program geared toward high school girls who are overweight or at risk of becoming overweight [23]. The 16-week comprehensive program includes elements of both eating disorder and obesity prevention, utilizing principles of social cognitive theory to promote behavior change. Program components include: a teacher-led physical education class with moderate and non-competitive physical activities; discussions led by research staff on social support, self-empowerment, and a non-dieting approach to nutrition; individual counseling with research staff for goal setting and motivational work; lunch meetings with research staff to practice healthy eating and promote social support; and

psychoeducational materials for girls and their parents. All materials for program implementation are freely available to download (www.newmovesonline.com). *New Moves* was evaluated in a group randomized-controlled trial with 356 U.S. high school girls (mean age = 15.8 years, *SD* = 1.2). The active program was compared to a control condition of an all-girls physical education class without any of the *New Moves* specific curriculum. Compared to girls in control schools, girls in the intervention schools exhibited significant improvements in body satisfaction and a reduction in eating disorder pathology in the form of unhealthy weight control behaviors (e.g., skipping meals, fasting) at 9-month follow-up. *New Moves* has been recognized as an evidence-based program by both the Substance Abuse and Mental Health Service Administration [59] and the National Cancer Institute at the National Institutes of Health [60].

Yager's Untitled Program

This program was created in Australia for male and female college students majoring in health education and physical education, a previously identified high-risk group [24]. A quasi-experimental trial compared two active eating disorders prevention interventions to a psychoeducational control group. All three 12-week programs were led by research staff and included psychoeducation on adolescent growth and development, healthy weight management, self-esteem, nutrition, and suicide prevention. The two active interventions included activities on improving self-esteem and increasing media literacy and one intervention also included computer-based and online activities grounded in cognitive dissonance theory. Results among 170 college students (mean age = 21.6 years, *SD* = 2.3) indicated that for female students, the most comprehensive intervention that included several dissonance components produced reductions in drive for thinness post-intervention and a reduction in eating disorder pathology in the form of excessive exercise through 6-month follow-up compared to the control group. Males in the same treatment condition also improved body image and drive for muscularity.

Eating, Aesthetic Feminine Models and the Media

Outcomes of the school-based Spanish program, *Eating, Aesthetic Feminine Models and the Media*, have been described across several reports [25,61–63]. The program, based on social cognitive theory, was developed for middle school girls and boys. Following an initial trial that showed modest long-term results [61], a revised version of the program added greater interactive content. Using a quasi-experimental design, 443 adolescent girls and boys (mean age = 13.5 years, *SD* = 0.4) received one of two enhanced versions of the program compared to an assessment-only control group: (1) a media literacy-only version with four weekly interactive sessions (two 90-minute sessions and two 60-minute sessions) on critically examining perceptions of beauty portrayed in the media, or (2) a media literacy plus nutrition version which added one 90-minute session on nutrition beliefs and knowledge. Research staff delivered all interventions. Results indicated that girls and boys in both versions of the program had lower eating disorder pathology (assessed with the EAT [13]) and lower aesthetic body ideal scores (a measure of sociocultural influence on body satisfaction) compared to the control group at both 7-and 30-month follow-up; no differences were found between the intervention versions [25]. Similar program effects on body image have also been reported [62], and a separate report on the 263 girls in the

program also noted positive change relative to controls at 6-month follow-up. Specifically, improvements in dieting were found within the media literacy program and improvements in aesthetic body ideal scores were found within the comprehensive program [63].

Features of Successful Prevention Programs

As outlined above, there are numerous eating disorders prevention programs reporting a positive impact on eating disorder pathology. This is extremely encouraging, and the features of these nine programs were compared to try and draw conclusions about their common elements. Based on authors' descriptions of their programs in published trials, we found that all of the programs included in this review had multiple intervention sessions, were delivered in a group format, contained at least some interactive content, were grounded in a cognitive or behavioral theory, and focused on the reduction of one or more eating disorder risk factor (e.g., body dissatisfaction). Most programs included content related to healthy eating and nutrition, media literacy and sociocultural factors relating to beauty ideals, and body acceptance or body satisfaction. Notably, there was wide variation in some participant features (e.g., participant age, sex, risk status) and intervention features (e.g., setting and format, length and dose, providers). This suggests that successful eating disorders prevention programs can take many forms. Details on the specific participant and intervention features of trials meeting criteria for this review are summarized by program in Table 1. We also highlight the consistent themes of successful eating disorders prevention programs in Table 2. Previous research notes that certain features (e.g., high-risk, older participants and interactive content) produce larger effects in risk factor and eating pathology outcomes [11]. With that in mind, we compare and contrast the features of these successful programs below.

Program Content

Theory and Approach—All programs targeted one or more empirically-identified risk factor (e.g., body dissatisfaction); this was either explicitly stated in published reports or could be implied based on the focus of intervention content. The most commonly targeted risk factors were dietary restraint, body dissatisfaction, and thin-ideal internalization. All programs included at least some interactive content; once again, this was either explicitly stated or could be derived based on the program description. All programs made reference to a cognitive or behavioral theory to promote behavior and attitude change. Theories that were mentioned include social cognitive theory (*The Weigh to Eat*; *Planet Health*; *New Moves; Eating, Aesthetic Feminine Models and the Media*) cognitive-behavioral or behavioral theory (Stewart's program; *Student Bodies™; Healthy Weight*), and cognitive dissonance theory (*Body Project/Dissonance Programs;* Yager's program). These results suggest the importance of including interactive intervention content and addressing risk factors that are specific to eating disorder pathology (e.g., dieting) rather than global mental health. The findings also suggest that there is not one recommended theoretical approach, but that it is important to use theory to guide prevention interventions.

Topics covered—The topics most frequently mentioned in published reports were healthy eating/nutrition (mentioned in all programs except *Body Project/Dissonance Programs*),

media literacy/sociocultural pressures (mentioned in all programs except *Planet Health*), and body acceptance/body satisfaction (mentioned in all programs except *Planet Health*). Healthy eating/nutrition was typically addressed with a non-dieting approach. Media literacy/sociocultural pressures were typically addressed by exploring unrealistic beauty ideals perpetuated in the media and discussing the sociocultural and individual consequences of these beauty ideals. Body acceptance/body satisfaction content was often addressed in the context of other intervention topics (e.g., body dissatisfaction in response to media exposure). Four programs promoted moderate and healthy physical activity (*The Weigh to Eat; Planet Health; Healthy Weight; New Moves*) and four programs provided education on healthy weight management (*The Weigh to Eat; Student Bodies™; Healthy Weight;* Yager's program). Self-esteem was also covered in three of the nine programs (*The Weigh to Eat;* Stewart's program; Yager's program), and several programs individually covered other topics such as assertiveness (*The Weigh to Eat*), stress (Stewart's program), reducing television viewing (*Planet* Health), self-empowerment and social support (*New Moves*), and suicide prevention (Yager's program). In reviewing the topics covered, it is important to note not only what was addressed, but also the topics that were not addressed. We are commonly asked whether eating disorders prevention programs should specifically address eating disorders, and whether it is recommended to have a speaker who has recovered from an eating disorder share his/her experience. It is of interest that the majority of the programs identified as effective in this review did not include psychoeducation on eating disorders specifically (only three programs mentioned this topic); in no cases was such type of education the primary focus; and to the best of our knowledge, none of these programs included the sharing personal experiences with eating disorders.

Participant Features

Age and sex—Programs spanned the age range from middle school to young adulthood. The youngest groups targeted were middle school girls and boys (*Planet Health; Eating, Aesthetic Feminine Models and the Media)*. Programs targeting a high school age range tended to have female-only intervention groups (Stewart's program; *Body Project/ Dissonance Programs; Healthy Weight; New Moves*) although *The Weigh to Eat* program was implemented in a co-ed format but only evaluated among girls. Further, an adapted, indicated version of *Student Bodies™* was evaluated among high school girls and boys [39]. Of the four programs targeting a college age range, three utilized female-only intervention groups (*Student Bodies™; Body Project; Healthy Weight)* and one included college-aged men and women together (Yager's program). Notably, three programs have adapted versions that have been evaluated across multiple age ranges: *Student Bodies™*, *Body Project/ Dissonance Programs*, and *Healthy Weight*.

Risk status—Programs could be divided into one of three categories according to risk status of participants: universal, selected, and indicated. Six programs had versions available for a universal audience, targeting all individuals within a specified group, regardless of risk status. (*The Weigh to Eat;* Stewart's program; *Planet Health;* a *Dissonance Program; Healthy Weight; Eating, Aesthetic Feminine Models and the Media*). Five programs had versions available for a selected audience, targeting specific individuals who exhibit elevated risk status. This includes *Yager's* program for high-risk male and female college

students in physical education and health programs, the *Body Project* for high school and college women with high body dissatisfaction, *Student Bodies*™ for college women with high weight concerns, and *New Moves* for high school girls who were overweight or at risk of becoming overweight. Finally, two adapted versions of *Student Bodies*™ are available as indicated programs, targeting individuals with subthreshold eating disorders. Notably, three programs have adapted versions for multiple risk levels: *Body Project/Dissonance Programs* and *Healthy Weight* are available for both universal and selected audiences, and *Student Bodies*™ is available for both selected and indicated audiences.

Intervention Features

Setting and Format—All nine programs were delivered in a group format and the majority utilized face-to-face delivery. *Student Bodies*™ is the exception as it was delivered in an online format. An online version of the *Body Project* [53,54] was also recently developed but requires additional research to determine its long-term effects. The *New Moves* program was also unique in that it included some individual components along with its group activities. Six programs were delivered in a school setting within the classroom curriculum (*The Weigh to Eat;* Stewart's program; *Planet Health; New Moves;* Yager's program; *Eating, Aesthetic Feminine Models and the Media*). The other three programs (*Student Bodies*™; *Body Project/Dissonance Programs; Healthy Weight*) were delivered to independent (i.e., recruited) groups, although versions of a *Dissonance Program* and *Healthy Weight* were delivered to specific population groups (all sorority members, athletic teams). It is noteworthy that all programs meeting our criteria for this review were delivered within a structured setting (e.g., school, group); the impact of more unstructured interventions that target larger environmental factors (e.g., changes in policy and legislation) are largely unknown at this point, but well worthy of exploration.

Length and dose—Length and dose of programs spanned a range from three hours across three sessions (*Body Project; Healthy Weight*) to 32 sessions over two years (*Planet Health*). School-based programs tended to be longer and include a greater number of sessions than programs delivered outside of the classroom setting. These findings raise questions regarding the length of time needed; it is encouraging, yet somewhat surprising, that some interventions have been able to have consistent effects with just a few sessions.

Providers—Intervention providers varied between professional leaders (e.g., research staff and mental health professionals with expertise in eating disorders) and non-professional leaders (e.g., school staff, peer leaders). School-based programs delivered within the classroom setting were split between whether the program was delivered by school staff (*The Weigh to Eat; Planet Health*) or research staff (Stewart's program; Yager's program; *Eating, Aesthetic Feminine Models and the Media*). The *New Moves* program was unique in that it was partially delivered by school staff and partially by research staff. Two programs (*Body Project/Dissonance Programs* and *Healthy Weight*) have distinct research trials that specifically evaluate the effects of different types of intervention providers, finding that these interventions can be effectively delivered both by professional and non-professionals, which is very important if interventions are to be widely disseminated.

Conclusions and Future Directions

Within this review article, we identify and discuss nine eating disorders prevention programs that have been effective at reducing existing eating disorder pathology or preventing the onset of future pathology in controlled trials through a 6-month follow-up or longer. The bulk of the nine programs included in this review were also able to demonstrate a reduction in eating disorder risk factors such as dieting, body dissatisfaction, and thin-ideal internalization. Finally, two programs (*Body Project* and *Healthy Weight*) were found to reduce the risk of eating disorder pathology onset over multi-year follow-up and one program (*Student Bodies™)* reduced the risk of eating disorder onset in a subset of individuals studied. The sheer number of eating disorders prevention trials conducted in recent years is encouraging and suggests that efficacious and effective eating disorders prevention is a research priority. Moreover, it is heartening that successful programs share a great deal of common content but utilize a range of approaches to reduce and prevent eating disorder pathology across a variety of populations. However, despite this recent increased focus on eating disorders prevention programs within the scientific literature, there are still existing gaps within the literature leaving unanswered questions and areas for further exploration. With this in mind, the following are recommended areas for future research.

More work is needed in the area of universal prevention to address the needs of both genders

The majority of research covered in this review consists of trials of selected prevention programs originally developed for high-risk girls and women (*Body Project; Healthy Weight; Student Bodies*™). In fact, past the middle school age range, very few trials include more than one gender in intervention groups. Just two programs evaluate prevention with a traditional universal audience (i.e., girls and boys of all risk levels together): the middle-school based programs *Planet Health* and *Eating, Aesthetic Feminine Models and the Media*. The need for continued research on successful universal prevention has been highlighted in previous reviews [64]; yet research in this area does not appear to be progressing at the same rate as research on selected programs [65]. While universal programs tend to be targeted toward a younger age group, we urge researchers to continue pursuing universal prevention for both genders across the age range, and funders to make this type of work a priority.

Emerging research on males and eating disorders suggests that a number of boys and young men suffer from body dissatisfaction and disordered eating [66]; thus, young men would likely directly benefit from eating disorders prevention and body image work. Moreover, universal approaches could help to address the broader environmental influences on disordered eating, including peer, school, and parental factors [64]. Further, intervention groups with mixed genders of dating age may help to address between-gender misconceptions about attractiveness, particularly regarding thinness for women and muscularity for men, which can be central to body dissatisfaction. We encourage this work, utilizing program components found to be successful in this review.

Indicated prevention research is also needed and should be combined with early detection efforts

Given the chronicity of eating disorders and the lack of treatment engagement in eating disorders populations, interventions that target the early stages of illness are needed. These interventions may delay symptom progression and prevent full-blown eating disorder cases. Currently, very little is known about early identification and early intervention for eating disorders, but the trials on indicated prevention from this review suggest that this may be a promising avenue for early intervention. The indicated versions of *Student Bodies*™ for adolescents with emerging binge eating [38] and young adult women with subthreshold eating disorders [39**] were able to engage individuals sufficiently enough to reduce eating disorder symptoms. These group-based programs may be more appealing to individuals compared to individual psychotherapy treatment and could potentially improve treatment engagement. Research should continue exploring best ways to use current evidence-based treatment approaches (e.g., family-based treatment for adolescent anorexia nervosa, cognitive-behavioral therapy for bulimia nervosa and binge eating disorder) to inform indicated prevention programs. Further, the screening utilized for such indicated prevention efforts may help to identify individuals in particular need of services. We also recommend that researchers continue investigating the development of early eating disorder symptoms and barriers to help-seeking behaviors among individuals with eating disorder symptoms in order to better tailor and utilize prevention programs with these populations.

Programs may benefit from addressing a broad spectrum of weight-related problems

Research has indicated that it may be practical to combine eating disorders prevention programs with obesity prevention efforts, given that obesity is of public health concern and that disordered eating behaviors and obesity have shared risk factors [67]. As is evidenced by prevention programs highlighted in this review article, such as *Planet Health*, *New Moves*, and *Healthy Weight*, programs that focus on healthy weight management with the goal of preventing obesity can also have a direct benefit on preventing the use of extreme weight control behaviors that may lead to the development of disordered eating. Moreover, many successful programs included in this review that did not have an explicit obesity focus did contain information on dieting, nutrition, healthy weight management, and healthy exercise. Thus, it appears promising to continue pursuing prevention from both the eating disorder and obesity perspective in order to communicate messages about healthy and flexible eating and exercise. These types of programs could also allow for an exploration of the broader impact of sociocultural pressures about weight, such as the pervasive and negative effects of obesity stigma.

Eating disorders prevention programs should be extended to a wider age range

Recent developments in prevention suggest that school-based prevention for younger ages continues to be somewhat of a prevention priority [25], yet results from this review suggest there are no programs that impact eating disorder pathology for individuals younger than middle school age. Moreover, no programs for individuals beyond early adulthood met our criteria for this review. Given that a peak period for risk of onset of eating disorders is mid-to-late adolescence [68], it is logical to focus the majority prevention efforts on this age

rage; and yet, disordered eating also exists outside of this age group. Thus, it may also be important for researchers to make efforts to tailor existing, successful programs for use within younger and older age groups. In one recent example, a brief 8-week cognitive-behavioral program was found to improve body image and reduce eating concerns among mid-life women (ages 30–60) through 6-month follow-up [69*]. A second example with a very young age group was recently developed by Bulik and colleagues. This program, *NUTURE*, is focused on preventing the development of eating disorders in young people starting at birth. Outcome data from this intervention has not yet been published, but if results of this trial prove to be efficacious, it will be of interest for researchers to take immediate steps to replicate and disseminate this novel prevention approach within a very unique age group not previously targeted.

Researchers should find ways to evaluate the impact of broader environmental prevention efforts

All trials meeting criteria for this review evaluated prevention programs in traditional settings (e.g., schools, recruited groups). However, with the recent emergence of new prevention efforts focused on changes to public policy, it is important that the field explores new ways to evaluate prevention efforts that make use of novel prevention approaches outside of traditional settings (e.g. local, state, federal and international organizations). For example, within the U.S., there is currently a large focus on anti-bullying policies within schools; it is crucial that we build upon these policies to ensure that weight-related bullying is addressed and then evaluate these efforts and their potential impact on disordered eating. In Israel, there is new legislation that requires models to have BMI values of at least 18.5 and to indicate when photos of models have been digitally altered; again it is crucial to find ways to evaluate the impact of these environmental approaches. Given the challenges associated with evaluation of these types of programs, it is worth exploring some innovative methodological strategies to understand the impact of these policy changes, perhaps by borrowing from evaluation work in relevant health-related fields such as the evaluation of public smoking bans [70].

Programs should strive to demonstrate efficacy, effectiveness, and sustained implementation success

As a first step, it is optimal for all eating disorders prevention programs to undergo rigorous evaluation through large, well-controlled, randomized trials to establish efficacy. Once the efficacy of a prevention program is established, it is essential that researchers transition to exploring the effectiveness of the program to demonstrate that programs can be disseminated under real-world conditions while retaining their intervention effects [71*]. Finally, researchers must continue evaluating programs past the effectiveness stage to learn about their uptake in the community and their success and sustainability when implemented in the real world without professional guidance. We offer the following recommendations to achieve sustainability through these stages of dissemination.

First, results from this review would suggest that the evaluation of prevention programs could be more standardized. Evaluation would ideally include an assessment of eating disorder pathology along with the assessment of risk factors known to contribute to eating

disorder pathology. Assessment of eating disorder pathology could be achieved by collecting information on relevant behaviors or utilizing a reliable and valid measure of eating disorder psychopathology. It would also be ideal for researchers to adopt a standardized set of instruments to assess constructs relevant to prevention (e.g., the EDE-Q to assess global eating pathology and eating disorder behaviors [12], the Ideal Body Stereotype Scale for thin-ideal internalization [72]) in order to make comparisons across programs and trials. Further, researchers should conduct follow-up assessments for as long as possible (we recommend six month follow up as a minimum standard). Ideally, all programs would be evaluated in long-term follow-up studies where information on eating disorder symptoms is collected over many years. This would provide a rigorous test of the hypothesis that prevention programs do in fact prevent the onset of eating disorders in the long term.

Second, the manualization of efficacious and effective programs will assist with dissemination efforts. Manuals or online descriptions for several of the eating disorders prevention programs discussed in this review are readily available (e.g., *Body Project*, *New Moves*), and anecdotal evidence suggests that programs are being implemented independently within communities and schools. Yet there is little research on the success of prevention interventions when they are implemented independently without training and supervision from researchers and program developers. Research has shown that intervention effects are smaller when trained non-professionals administer eating disorders prevention programs, and adaptations to protocols and training practices may help to improve outcomes [51**]. It stands to reason that effects may also be smaller when untrained individuals deliver manualized programs, and researchers must work to improve manuals and dissemination practices to overcome this limitation.

Third, to assist with dissemination and sustained implementation within communities, prevention researchers should form partnerships with communities that will implement prevention programming (e.g., schools, youth organizations). Such partnerships can help to promote programs with evidence such as those identified in this review and can also help to inform new prevention efforts for underserved settings and populations. Furthermore, researchers can help to guide program evaluation to better understand outcomes when programs are adapted and implemented without professional oversight. We believe that sustainability should be the ultimate goal of every eating disorders prevention program, where programs are developed, evaluated, and disseminated with rigor, communities are engaged as collaborators, and interventions are generalizable such that researchers are no longer needed for programs to continue with success.

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* Of importance

** Of major importance

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Table 1

Overview of participant and intervention features of successful* eating disorders prevention programs

	Participant Features		Intervention Features		
Program	**Age & Sex**	**Risk Status**	**Setting & Format**	**Length & Dose**	**Providers**
The Weigh to Eat					
Neumark-Sztainer *et al*., 1995 [17]	High school girls	Universal	Classroom groups	10 weekly 1-hour sessions	High school staff
Stewart's Untitled Program					
Stewart *et al*., 2001 [18]	Middle and high school girls	Universal	Classroom groups	6 weekly 45-minute sessions	Research staff
Planet Health					
Austin *et al*., 2005 [19]; 2007 [31]; 2012 [32]	Middle school girls and boys	Universal	Classroom groups	32 sessions over 2-year period	High school staff
Student Bodies™					
Taylor *et al*., 2006 [20]	College women	Selected	Online groups	8 weekly sessions	Research staff
Jones *et al*., 2008 [38]	High school girls and boys	Indicated	Online groups	16 weekly sessions	Research staff
Jacobi *et al*., 2012 [39]	College women	Indicated	Online groups	8 weekly sessions	Research staff
Body Project/Dissonance Programs					
Stice *et al*., 2006 [1]; 2008 [40]	High s1chool girls	Selected	Recruited groups	3 weekly 1-hour sessions	Research staff
Stice *et al*., 2009 [46]; 2011 [47]	High school girls	Selected	Recruited groups	4 weekly 1-hour sessions	High school staff
Becker *et al*., 2006 [22]; 2008 [48]; 2010 [49]	College women	Universal	Sorority groups	2 weekly 2-hour sessions	College peer leaders
Stice, Rohde, *et al*., 2013 [50]	College women	Selected	Recruited groups	4 weekly 1-hour sessions	College peer leaders
Stice, Butryn, *et al*., 2013 [51]	College women	Selected	Recruited groups	4 weekly 1-hour sessions	College clinicians
Healthy Weight					
Stice *et al*., 2006 [21]; 2008 [40]	High school girls	Selected	Recruited groups	3 weekly 1-hour sessions	Research staff
Stice, *et al*., 2012 [56]; 2013 [57]	College women	Selected	Recruited groups	4 weekly 1-hour sessions	Research staff
Becker *et al*., 2010 [49]; 2012 [58]	College women	Universal	Sorority/athlete groups	2 weekly 2-hour sessions	College peer leaders
New Moves					
Neumark-Sztainer *et al*., 2010 [23]	High school girls	Selected	Classroom groups and	Daily curriculum for 16 weeks	High school staff and
Yager's Untitled Program			Individual meetings		research staff
Yager & O'Dea, 2010 [24]	College women and men	Selected	Classroom groups	24 biweekly 1-hour sessions	Research staff
Eating, Aesthetic Feminine Models and the Media					
González *et al*., 2011 [25]	Middle school girls and boys	Universal	Classroom groups	4 or 5 weekly 60–90-minute sessions	Research Staff

* Successful programs are defined as those with one or more trial that: (1) was published in English, (2) utilized a randomized or quasi-randomized, controlled design, (3) reported a reduction in existing eating disorder pathology or prevented the onset of future pathology through at least a 6-month follow-up.

Table 2

Common elements of successful eating disorders prevention programs

Program Content

- Successful programs target eating disorder risk factors, use a cognitive or behavioral theory/approach, and include content on healthy eating/nutrition, media literacy/sociocultural pressures, and body acceptance/body satisfaction

Participant Features

- Successful programs exist for a range of ages (middle school to young adult) with more options for high school and college ages
- Successful programs for younger ages tend to be universal and include girls and boys together
- Successful programs for older ages tend to be selected or indicated and target women alone

Intervention Features

- Successful programs are group-based, interactive, and include multiple sessions