

Prevention programs for body image and eating disorders on University campuses: a review of large, controlled interventions

ZALI YAGER and JENNIFER A. O'DEA*

Health Education and Human Movement, Faculty of Education and Social Work, University of Sydney, Building A35, Sydney 2006, NSW, Australia

*Corresponding author. E-mail: j.o'dea@edfac.usyd.edu.au

SUMMARY

Body dissatisfaction, dieting, eating disorders and exercise disorders are prevalent among male and female university students worldwide. Male students are also increasingly adopting health-damaging, body-image-related behaviors such as excessive weight lifting, body building and steroid abuse. Given the severity and difficulty of treating eating disorders, prevention of these problems is a recognized public health goal. Health promotion and health education programs have been conducted in the university setting since the mid 1980s, but few have achieved significant improvements in target health attitudes and behaviors. In this paper, 27 large, randomized and controlled health promotion and health education programs to improve body dissatisfaction, dieting and disordered eating and exercise behaviors of male and female college students are reviewed. In general, health education programs to improve body image and prevent eating disorders in the university setting have been limited by small sample sizes and the exclusion of male students. The

majority of studies were conducted among either female undergraduate psychology students or women that were recruited using on-campus advertising. The latter reduces the ability to generalize results to the whole university population, or the general community. In addition, there has been a paucity of longitudinal studies that are methodologically sound, as only 82% (22/27) of interventions included in the review used random assignment of groups, and only 52% ($n = 14$) included follow-up testing.

Information-based, cognitive behavioral and psycho-educational approaches have been the least effective at improving body image and eating problems among university students. Successful elements for future initiatives are identified as taking a media literacy- and dissonance-based educational approach, incorporating health education activities that build self-esteem, and using computers and the internet as a delivery medium. A newly designed program for Australian university students is described.

Key words: eating disorders; prevention; health promotion; university

INTRODUCTION

Dieting, body dissatisfaction and disordered eating and exercise behaviors are well documented among male (Drummond, 2002; O'Dea and Abraham, 2002) and female (Crawford and Worsley, 1988; Drenowski *et al.*, 1994; Kenardy *et al.*, 2001; Hill, 2002) university students worldwide.

Between 70 and 94% of female university students express a desire to lose weight and become slimmer (Abraham *et al.*, 1983; Paxton *et al.*, 1991; Vohs *et al.*, 2001), and 80–91% report dieting (Abraham *et al.*, 1983; Striegel-Moore *et al.*, 1990).

Dieting to gain weight has not received equivalent empirical attention, but there is evidence to indicate that this is occurring among

young men, with 17% of undergraduate psychology males in the USA (McCreary *et al.*, 2005); and 16 (Yager and O'Dea, 2006) to 28.9% (O'Dea and Abraham, 2001) of male university students in Australia indicating that they diet to gain weight. Male students are also increasingly adopting health-damaging body-image-related behaviors such as excessive weight lifting, body building, steroid abuse (Williamson, 1993; Drummond, 2002; O'Dea and Abraham, 2002).

Among the adult female population in the USA, 0.9% report a lifetime prevalence of anorexia nervosa and 1.5% report bulimia nervosa (Hudson *et al.*, 2007). The prevalence of bulimia nervosa in female American university students is reported to be up to 19% (Halmi *et al.*, 1981; Katzman *et al.*, 1984; Pope *et al.*, 1984; Pyle *et al.*, 1986; Fairburn and Beglin, 1990; Coric and Murstein, 1993). On university campuses, the prevalence of Anorexia Nervosa is between 1 and 4.2% among females (Fairburn and Beglin, 1990; Kurtzman *et al.*, 1989; Pope *et al.*, 1984).

The prevalence of subclinical eating disorders among female university students is far higher, with 61% of female American university students having some sort of subclinical eating problem, including chronic dieting, binge/purging and subclinical bulimia nervosa (Mintz and Betz, 1988). Between 11 and 20% of female American university students score high enough to indicate an eating disorder on the Eating Attitudes Test (Nelson *et al.*, 1999; Prouty *et al.*, 2002; Thome and Espelage, 2004).

Studies of the clinical prevalence of eating disorders report that 5–10% of all individuals who experience eating disorders are male (Carlat and Carmargo, 1991; Lucas *et al.*, 1991). In an Australian study 21% of male university students displayed eating attitudes and behaviors characteristic of eating disorders and disordered eating (O'Dea and Abraham, 2002). Nine percent of male students report that they suffer from disordered eating and 2% meet the criteria to be diagnosed with clinical Bulimia Nervosa (O'Dea and Abraham, 2002).

Given the high prevalence of body dissatisfaction, dieting and eating disorders among university students, many universities have encouraged the implementation of health education and health promotion programs to prevent these body image and eating problems. The aims of the present review are to

analyze the prevention programs implemented on university campuses to improve body image and prevent eating disorders and to make recommendations for future preventive initiatives.

EATING DISORDER PREVENTION IN THE UNIVERSITY SETTING

Eating disorders are considered to be serious conditions, with limited success of treatment and high morbidity and co-morbidity with other mental health conditions (Sullivan, 1995). The prevention of these disorders is well recognized as a necessary public health goal (Paxton, 2000). The university setting also provides an ideal opportunity for the prevention of these problems due to the access to students for screening and diagnosis of problems and the implementation of prevention programs into coursework, in small group programs or at residential colleges and on campus accommodation. Prevention initiatives and interventions have been implemented in the university setting since the mid-1980s, yet they have produced limited success.

METHODS

A thorough literature search was conducted to obtain studies of eating disorder prevention interventions in the university campus setting. Databases including Medline, PreMedline, ProQuest and Wiley Interscience were searched using the terms 'body image', 'body dissatisfaction', 'eating disorders', 'prevention', 'health promotion', 'health education', 'intervention', 'college students' and 'university students'. In addition, the reference lists of relevant articles were also scanned for intervention studies, and the issues published in the past 12 months from the following journals were also scanned: *Journal of American College Health*, *Body Image*, *Eating Disorders*, *Health Education Research*, *International Journal of Eating Disorders*, *Preventive Medicine*, *Health Promotion International*.

Studies were included in the review if they met the following criteria: were from a scientific or academic journal (not unpublished dissertations); implemented a health education or health promotion program aimed at improving

body image, reducing body dissatisfaction and/or disordered eating; and included participants who were enrolled at a college or university. Studies were excluded if they did not include a control group.

RESULTS

A summary of all controlled, university campus body image and disordered eating interventions from 1987 to 2007 is presented in Table 1. In general, health education programs to improve body image and prevent eating disorders in the university setting have been limited by small sample sizes (Butters and Cash, 1987; Rosen *et al.*, 1989; Franko, 1998; Springer *et al.*, 1999; Stice *et al.*, 2000; Stice and Ragan, 2002; Watson and Vaughn, 2006; O'Brien and LeBow, 2007) and the exclusion of male students. The majority of studies were conducted among either female undergraduate psychology students or women that were recruited using on-campus advertising. The latter reduces the ability to generalize results to the whole university population, or the general community. In addition, there has been a paucity of longitudinal studies that are methodologically sound, as only 82% ($n = 22$) of the 27 interventions included in the review used random assignment of groups, and only 52% ($n = 14$) included any follow-up testing.

Almost half of the education programs were conducted among participants who responded to advertisements for female undergraduates with body image concerns to voluntarily participate in studies or discussion groups. This is likely to affect the outcome of the programs, as the women who elected to be involved would have a greater motivation to change (Vansteenkiste *et al.*, 2005) and some are likely to have been paid for their participation. Health education programs using 'normal' cohorts of participants, who were not self-referred or recruited via clinic wait lists, reported that the use of these participants may have been responsible for the disappointing effects of programs, as the participants were not at risk, and may not have found the program content relevant (Nicolino *et al.*, 2001). In addition, authors commented that the participants who do not exhibit disordered eating pathology at pre-test have little scope for improvements in their behaviors,

and therefore significant results were not found (O'Brien and LeBow, 2007).

Remarkably, only one eating disorder prevention program in the past 20 years included males. This program (Rabak-Wagener *et al.*, 1998) aimed to improve body image attitudes and behaviors through a psycho-educational, media literacy intervention, and did not report any significant effects among males. The lack of intervention effects among males in this study is likely to be due to the health education program being designed primarily for women, and although it included males, it was not adapted to their specific body image concerns.

The review found that some approaches were not particularly successful, such as didactic, or knowledge-based interventions, psycho-educational and cognitive behavioral interventions. Education programs in the 1980s and 1990s used one-shot, single teaching sessions to provide information about eating disorders, including symptoms and medical complications, in an attempt to prevent the initiation of behaviors and to motivate students with eating disorders to seek treatment (Koszewski *et al.*, 1990). Although some of these studies reported positive results, limitations in methodological design, such as small numbers, lack of follow-up and non-randomized group allocation limit the reliability and generalizability of these results. Those health education programs that reported success included female participants who either responded to advertising inviting women with body image concerns to participate in the study or selected women with elevated body image problems from undergraduate psychology student pools. These factors also limit the widespread application of these health education initiatives to university students.

To develop effective health education and health promotion programs to improve the body dissatisfaction, dieting and disordered eating and exercise behaviors of university students, several effective options for the approach and delivery of interventions have emerged throughout the literature. These include media literacy and dissonance-based approaches with a self-esteem focus and interventions implemented using computers.

Dissonance-based approaches

Cognitive Dissonance Theory (Festinger, 1957) operates on the notion that when there is an

Table 1: Review of controlled body image and eating disorder intervention and prevention programs for university students

Authors	Sample	Description of program	Results	Comments/limitations
i. Didactic information-only programs				
Springer <i>et al.</i> , (1999)	24 undergraduate females Mean age = 19.5 (SD = 0.83)	Participants who were enrolled in 'Body Traps' course ($n = 24$) met for information and discussion groups for 2 h each week for 10 weeks An additional 17 participants were used as a comparison group	Significant improvements on body image (BI) and disordered eating scales Effects may be due to length and depth of the program	Non-randomized groups No follow-up
Mutterperl and Sanderson, (2002)	107 first-year university females Mean age = 18.1 (SD = 0.57)	Participants were randomly assigned to read: 'Norm Misperception' brochure, which aimed to reduce misconceptions about the high perceived norms of college females' dieting and disordered eating and exercise behavior; or 'General Healthy Behavior' control brochure	No significant effects of brochure condition at post-test or at 3-month follow-up The Control brochure was reported to be significantly more personally relevant	Participants were paid \$10 for their participation in the study
ii. Psycho-educational programs				
Mann <i>et al.</i> , (1997)	113 freshman college females Mean age = 17.9 years	Participants were randomly assigned to either the wait list control group; or to attend a universal intervention aimed at both the primary and secondary prevention of eating disorders in a single (90 min), didactic, psycho-educational presentation in groups of 10–20 students Presentation contained information about eating disorders, personal stories and experiences of two women, who were recovering from eating disorders	No effects for body dissatisfaction (BD) or disordered eating behaviors at post-test or 1- or 3-month follow-up Intervention participants reported more symptoms of eating disorders at post-test	The program was deemed unsuccessful as primary or secondary prevention and the authors conclude that these should not be combined
Franko, (1998)	19 female college students Mean age not reported	Females (who all identified themselves to be at risk for AN) were randomly assigned to eight, 90-min sessions of a psycho-educational prevention program ($n = 10$), which included didactic presentations and group discussion about the thin ideal, healthy and dysfunctional eating attitudes and behaviors Others formed an assessment only control ($n = 9$)	Significant improvement in body image but no effects for disordered eating in the intervention group	Self-referred participants Participants received a \$10 payment Very small sample size Non-randomized assignment of groups No follow-up

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Table 1: Continued

Authors	Sample	Description of program	Results	Comments/limitations
Martz and Bazzini, (1999)	Study 1: $n = 114$ females Mean age = 19 Study 2: $n = 77$ females Mean age = 19	Participants (females in general psychology courses) were randomly assigned to a 'one-shot' intervention ($n = 73$) or a control ($n = 41$) group Study 1: 1-h, didactic psycho-educational information session addressing body image, eating disorders and healthful eating and exercise Study 2: intervention identical to study one, but with the addition of an imagery exercise	Study 1: intervention had small effects on dieting and body esteem compared to controls Study 2: found the same small effects as study 1 Authors describe the effects as statistically, but not clinically significant	Participants were self-selected Authors conclude that 'one-shot' sessions may be insufficient Authors suggest caution when using imagery exercises No follow-up
Stice and Ragan, (2002)	66 female college students Mean age not reported	Women who enrolled in a class called 'eating disorders' became the intervention group ($n = 17$). Didactic presentations and group discussion about eating disorder pathology, etiology and epidemiology were given twice weekly for 1.5 h over 15 weeks Matched control group ($n = 49$): three control participants (undergraduate psychology) were matched to each intervention participant	Intervention group had higher dieting and eating disorder symptoms at pre-test Intervention group had significant decreases in thin-ideal, eating disorder symptoms, BD and dieting	Intervention females may have enrolled in the course seeking treatment Small sample size in intervention group No follow-up
Stice <i>et al.</i> , (2006)	95 undergraduate psychology females Mean age = 21.3	Women who enrolled in an eating disorders course ($n = 25$) became the intervention group Intervention group met for 1.5 h, two times a week, for 15 weeks for didactic presentations, and extended group discussions as a replication of the study by Stice and Ragan (Stice and Ragan 2002) Matched comparison students ($n = 70$) formed the control group	Significant reductions in thin ideal internalization, body dissatisfaction, dieting behaviors and eating disorder symptoms were reported Results were similar to those found by Stice and Ragan (Stice and Ragan, 2002)	Small sample sizes Self-selected participants No random assignment No follow-up

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Table 1: *Continued*

Authors	Sample	Description of program	Results	Comments/limitations
O'Brien and Le Bow, (2007)	24 first- and second-year females Mean age = 22.2	Participants were randomly assigned to: Intervention ($n = 13$): eight weekly sessions, 80–90 min in duration, that included psycho-education to reduce disordered eating behaviors Self-monitoring control ($n = 11$): completed daily exercise and meal records Included 3- and 6-month follow-up	Intervention participants significantly improved their BI and disordered eating behavior Improvements in control group suggests possibility of self-monitored interventions	Participants were given entry to a lottery with a \$100 prize for completing the study Very small sample size
iii. Cognitive behavioral therapy (CBT) programs				
Butters and Cash, (1987)	31 female undergraduates Mean age = 21.3 (SD = 5.0)	Participants were randomly assigned to a CBT program ($n = 15$), or a wait list control group ($n = 16$) CBT intervention consisted of six, 1-h individual counseling sessions that applied relaxation and CBT techniques to improve BD	CBT intervention significantly improved body dissatisfaction and negative affect at post-test Results still significant at 7-week follow-up	Very small numbers limits generalizability Program was delivered as individual therapy which limits the possibility for larger scale programs
Dworkin and Kerr, (1987)	79 college women experiencing body image problems Mean age not reported	Participants (mostly education majors) were randomly assigned to groups for 3 × 30 min individual counseling sessions or to the wait list control (WL) Cognitive therapy (CT): changing automatic negative thoughts to positive CBT: CT plus behavioral exercises e.g. Fantasy Reflective therapy (RT): explored feelings and beliefs about body image at various life stages	All three therapies were more effective than the control CT, CBT and RT were able to improve BI and SE CT was most effective in improving body image	Self-referred participants Authors suggested that the unexpected results of CT being more effective than CBT may be due to an inappropriate fantasy exercise No follow-up
Rosen <i>et al.</i> , (1989)	23 normal weight female undergraduates Mean age = 19 (SD = 1.15)	Participants (with BI concerns, but not eating disorders) were randomly assigned to a weekly, 1 h body image program using CBT ($n = 13$) as described for Butters and Cash, (Butters and Cash, 1987) for 6 weeks 'Minimal treatment' control program ($n = 10$) was the same as the intervention program, but did not include CBT	CBT intervention achieved clinically and statistically significant reduction in body size overestimation and BD Results among the CBT participants were held at 2-month follow-up	Self-referred participants may have had high willingness for change Very small numbers No true control group

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Table 1: Continued

Authors	Sample	Description of program	Results	Comments/limitations
Nicolino <i>et al.</i> , (2001)	85 female undergraduate students Mean age = 18.9 (SD = 2.5)	Participants (undergraduate psychology students) were randomly assigned to either the control ($n = 40$) or the CBT intervention group ($n = 45$) CBT intervention consisted of a one off, 1-h, CBT body image therapy session in small groups of 7–10 participants	No significant effects Authors suggest that 'normal' student population may have had little scope for improvement or did not find the program relevant	One-off program may have also been responsible for lack of findings No follow-up
iv. Computer-based programs				
Winzelberg <i>et al.</i> , (1998)	57 undergraduate females, with a desire to improve BI Mean age = 19.7	Participants were randomly assigned to the 'Student Bodies' program ($n = 27$); an online psycho-educational eating disorder prevention program including audio and video presentations about eating disorders, healthy weight regulation, nutrition and peer email support groups moderated by a clinical psychologist The other participants formed the wait-list control group ($n = 30$) Three-month follow-up was included	Significant improvement in BI by intervention group Effects decreased at follow-up No other significant effects on EDI or EDE-Q Knowledge was high in intervention and control groups	Self-referred participants Participants were paid \$10 Only $n = 14$ (53%) participants completed the whole program Low use of email support
Celio <i>et al.</i> , (2000)	67 college women with body image concerns Mean age = 19.6 (SD = 2.2)	Participants were randomly assigned to a Wait-list control group ($n = 24$), or to: A modified version of 'Student Bodies' (SB) ($n = 26$), plus three 1–2 h face-to-face sessions 'Body Traps' (BT) (Springer <i>et al.</i> , 1999) ($n = 20$) a face-to-face psycho-educational approach with lectures and group discussions Six-month follow-up was included	SB achieved significant reduction in BD and ED attitudes and behaviors SB results remained and increased at follow-up SB had a significantly higher effect on high risk participants BT: no significant results	Self-referred participants 71% of participants did the whole program Revised SB program required more personal involvement which may have contributed to positive outcomes

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Table 1: *Continued*

Authors	Sample	Description of program	Results	Comments/limitations
Winzelberg <i>et al.</i> , (2000)	52 female undergraduates with a desire to improve BI Mean age = 20 (SD = 1.4)	Participants were randomly assigned to the intervention group ($n = 27$) where they participated in the 'Student Bodies' program (Winzelberg <i>et al.</i> , 1998; Celio <i>et al.</i> , 2000) Or to the delayed intervention control condition ($n = 25$) Three-month follow-up	No significant results at post-intervention Significant differences were found at follow-up between intervention and control groups for BD and Drive for thinness	Self-referred participants and were paid \$25 for their involvement Participants completed an average of 64% of online assignments
Zabinski <i>et al.</i> , (2001)	62 introductory psychology females Mean age = 19.3 (SD = 1.4)	Participants (females with high scores on disordered eating questionnaires) were randomly assigned to a wait-list control group ($n = 31$), or 'Student Bodies' program ($n = 31$) (Winzelberg <i>et al.</i> , 1998). In addition, participants were contacted by phone on a weekly basis to remind them of assignments to be completed 10-week follow-up was included	Control and intervention groups decreased BD and improved disordered eating behaviors at post-test, and remained at follow-up No significant differences between intervention and control	Compliance ranged from 91% in the first week to below 50% in the last week
Franko <i>et al.</i> , (2005)	240 high and low risk first-year undergraduate college women Mean age = 18.2 (SD = 0.4)	High- and low-risk participants (chosen from screening participants according to scores on screening measures) were randomly assigned to: Intervention: 'Food, Mood and Attitude' (FMA) program – interactive CD-ROM containing didactic and psycho-educational information and exercises. Participants used the program independently for 1 h in each of the 2 sessions Control women viewed videos on topics that were not related to BI or eating disorders	Increased knowledge among FMA participants At risk FMA participants had significantly lower internalization of the thin ideal at post-intervention and at 3-month follow-up Program received very positive evaluation from participants	Participants were paid \$125 in total for completing the study Authors concluded that the FMA program was safe and effective for both low and high risk participants

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Table 1: Continued

Authors	Sample	Description of program	Results	Comments/limitations
Taylor <i>et al.</i> , (2006)	<i>N</i> = 480 undergraduate females Mean age = 20.8 (SD = 2.6)	Participants (with high shape and weight concerns) were randomly allocated to either control (<i>n</i> = 215) or Intervention (<i>n</i> = 206) groups Intervention group completed the 'Student Bodies' program (Winzelberg <i>et al.</i> , 1998) with additional booster sessions after the initial 8-week intervention period Follow-up ranged up to 2 years in duration	Significant reductions in weight concerns Adherence to the program was higher among those with elevated baseline scores, and they had the greatest effects at post-test	Very large numbers Adherence was higher than other studies, and an average of 71% of pages were read 40% of participants used the booster sessions
v. Media literacy interventions				
Rabak-Wagener <i>et al.</i> , (1998)	105 male and female undergraduate students Mean age not reported	Students enrolled in a 'Healthful Living' class became the intervention group (<i>n</i> = 60). They received a psycho-educational/media literacy program consisting of four 1.5-h weekly classes, which included the video 'Slim hopes', and discussion of stereotypes of thin ideal promoted by the media Another class was used for comparison (<i>n</i> = 45)	Intervention group women had a significant improvement in their overall perceptions of body image No significant changes in behaviors In men there was no change in attitudes or behaviors	Authors concluded that this intervention was more effective with women Intervention was not designed for males No true control group
Irving and Berel, (2001)	110 female college students Mean age = 18.9 (SD = 2.07)	Participants randomly assigned to a 45-min session of: ExML—Externally oriented (<i>n</i> = 27): 'Slim Hopes' video, discussion and media activism InML—Internally oriented (<i>n</i> = 31): 'Slim Hopes' video, psychoeducation and CBT VO—Video only intervention (<i>n</i> = 28): 'Slim Hopes' video presentation No-intervention control (<i>n</i> = 24) received 'About Face' Postcards	ExML, InML and VO all improved students' critical appraisal skills of media Control group significantly improved BD InML did not achieve a reduction in BD or thin ideal	No follow-up Authors comment that the length of intervention was quite brief compared to the cumulative impact of many years of media exposure No follow-up

Continued

Table 1: *Continued*

Authors	Sample	Description of program	Results	Comments/limitations
Posovac <i>et al.</i> , (2001)	125 female college students Mean age not reported	Participants (introductory psychology students with high BD) were randomly assigned to watch a 7-min video with the theme of: Artificial Beauty of models ($n = 25$) Genetic reality of looking like a model ($n = 25$) Combination of first 2 ($n = 25$) Parenting skills ($n = 25$) control condition	Intervention participants reported significantly less weight concern when viewing media images at post-test No difference in the impact of the different interventions	Authors suggest that these intervention messages could quickly, easily and cost-effectively be used to prevent media-induced BD No follow-up
Watson and Vaughn, (2006)	54 female college students Mean age = 19.21 (SD = 1.67)	Participants were randomly assigned to either a no intervention control group ($n = 14$), or to Video only ($n = 12$) 'Killing us softly' video Short-term ($n = 12$) viewed the video and participated in 1.5 h discussion Long-term ($n = 16$) video, discussion and media literacy exercises in 4, weekly, 1.5 h sessions	Significant decreases in internalization of the thin ideal in long- and short-term interventions Significant decrease in body dissatisfaction in the long-term interventions	Very low numbers Authors concluded that long-term interventions are more effective than short-term ones No follow-up
vi. Dissonance-based programs				
Stice <i>et al.</i> , (2000)	30 female undergraduate students Mean age not reported	The first ten participants (with elevated body image concerns) to respond were allocated to the Dissonance program, the next 20 to the control The intervention consisted of three, 1 h, weekly small group sessions including group discussion and role play exercises One-month follow-up was included	Significant decreases in thin- ideal internalization, BD, dieting and bulimic symptoms Still significant at 1-month follow-up	Participants responded to advertising Subjects paid \$10 Non-randomized group allocation
Matusek <i>et al.</i> , (2004)	84 undergraduate college women Mean age = 19.86 (SD = 1.55)	Participants (with elevated body image concerns) were randomly assigned to: Dissonance based (DTI; $n = 26$) Psycho-educational, Healthy Behavior (HB; $n = 24$) workshop; or Wait-list control group (WL, $n = 34$) as a replication of Stice <i>et al.</i> (Stice <i>et al.</i> 2001) One-month follow-up was included	Significant improvement in thin-ideal internalization for DTI and HB groups at post-intervention and follow-up Significant improvement in disordered eating for DTI	Participants responded to advertisements Participants in the DTI condition did not experience greater improvement than the HB group

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Table 1: Continued

Authors	Sample	Description of program	Results	Comments/limitations
Green <i>et al.</i> , (2005)	155 female undergraduate psychology students Mean age = 18.95 (SD = 1.01)	Participants attended either a low- or high-level dissonance intervention for 2 h over two consecutive weeks, and completed similar activities revolving around the thin ideal or were assigned to the no treatment control group Four-week follow-up was included	No baseline measurements were taken High-level dissonance intervention group had reduced EDE-Q scores further than those in the low-level dissonance intervention at post-test and follow-up	The absence of baseline measurements limits accuracy of data analysis and findings Authors comment that a 4 h intervention is not a sufficient to change attitudes and behaviors
Becker <i>et al.</i> , (2005)	161 high and low risk female sorority members Mean age = 19.95 (SD = 0.90)	Participants were randomly allocated to either a wait list control group (WL), or to: Cognitive dissonance intervention 2: 2-h sessions including discussion and a mirror exercise to counter the thin ideal Media literacy intervention 2: 2-h sessions involving discussions and videos about the media influence on young women One-month follow-up was included	Both intervention groups significantly decreased restraint, eating disorder pathology and BD Dissonance group decreased thin ideal internalization No significant difference between intervention groups	Sorority groups may differ to programs given in an academic setting due to the nature of the organizations facilitating social support
Mitchell <i>et al.</i> , (2007)	93 female psychology students Mean age = 19.56 (SD = 5.22)	Participants (who responded to emails inviting them to participate) were randomly assigned to either the control group ($n = 30$); or to attend 6, weekly sessions, 45 min in length of: Yoga intervention ($n = 33$): including yoga and meditation Dissonance intervention ($n = 30$): an adapted version of that developed by Stice and Colleagues (Stice <i>et al.</i> , 2000; Stice <i>et al.</i> , 2001; Stice <i>et al.</i> , 2003)	Dissonance participants improved their BD, drive for thinness and emotional problems No change among those in the Yoga intervention	Authors suggested that the amount of time spent practicing yoga may not have been sufficient No follow-up

inconsistency or dissonance between an individual's health beliefs and behaviors, the resulting psychological discomfort will motivate them to change their attitude or behaviors to reduce this inconsistency (Festinger, 1957; Stice *et al.*, 2000). This approach has been used

successfully in influencing health behaviors such as smoking cessation (Killen, 1985) and condom use (Stone *et al.*, 1994). Dissonance-based health education programs have also targeted the internalization of the thin female ideal among young women to reduce body

dissatisfaction and disordered eating behaviors (Stice *et al.*, 2000; Stice *et al.*, 2001; Stice *et al.*, 2003; Green *et al.*, 2005).

Dissonance-based approaches have achieved consistent success in reducing thin-ideal internalization, body dissatisfaction, dieting and disordered eating behaviors among female university students as summarized in Table 1vi. Stice and his colleagues (Stice *et al.*, 2000; Stice *et al.*, 2003) in the USA were the first to adapt the use of cognitive dissonance theory to prevent eating disorders, by targeting the reduction of the internalization of the thin ideal. In their dissonance-based health education program, Stice and colleagues (Stice *et al.*, 2000) asked female university students to design an education program that would reduce internalization of the thin ideal in high school girls. This approach was used so that participants would voluntarily assume a counter-attitudinal stance against the thin-ideal themselves (Stice *et al.*, 2000). Green and colleagues (Green *et al.*, 2005) then investigated the impact of the level of dissonance on the success of the education programs, and found that a high level of dissonance (perceived voluntary participation, high level of effort and public expression of their attitudes) achieved greater reductions in eating disorder pathology. Most recently, Roehrig and colleagues identified the counter attitudinal advocacy component (where participants in the education program publicly express their change in beliefs) of the dissonance approach to be successful even in isolation from the other components of a traditional dissonance-based program (Roehrig *et al.*, 2006).

The use of cognitive dissonance is known to be successful in reducing the drive for thinness and internalization of the thin ideal, which is said to improve body dissatisfaction and disordered eating behaviors (Stice *et al.*, 2000; Stice *et al.*, 2003; Green *et al.*, 2005; Roehrig *et al.*, 2006). Importantly, the findings suggest that the dissonance health education approach would be similarly useful for reducing the adherence to the muscular body ideal in males.

Media literacy interventions

There is evidence to suggest that print, broadcast and electronic media both present and reinforce the value of the thin ideal for women and the muscular ideal for men through ideal images and

articles about eating disorders (Shulze and Gray, 1990; Heinberg and Thompson, 1995; Agliata and Tantleff-Dunn, 2004). Health education programs based on developing media literacy are based on the assumption that promoting a critical evaluation of the media will reduce its credibility and persuasive influence (Irving and Berel, 2001). This is proposed to reduce cultural body image norms and reduce the internalization of the thin ideal, thereby improving body dissatisfaction, dieting and disordered eating behaviors (Shaw and Waller, 1995).

Media literacy health education programs have been found to improve intended alcohol consumption and acceptance of television violence in young children (Voojis and van der Voort, 1993; Austin and Johnson, 1997). Media literacy interventions that aim to improve body image and eating problems have traditionally been conducted among children (McVey and Davis, 2002; Wade *et al.*, 2003) and adolescents (Levine and Smolak, 2002) and have found positive results.

Media literacy education among university students (as summarized in Table 1v) has typically involved a psycho-educational approach and the viewing of video presentations. These interventions have been very brief, ranging from as little as a one off intervention of 10–45 min (Irving and Berel, 2001; Posovac *et al.*, 2001) to 6 h over a 4-week period (Rabak-Wagener *et al.*, 1998; Watson and Vaughn, 2006). It is reasonable to infer that these brief education programs may be unlikely to effect change compared with a lifetime of exposure to the media. These media literacy education programs have reported some successes in improving body image and thin ideal internalization, but no improvements in target behaviors (Rabak-Wagener *et al.*, 1998; Posovac *et al.*, 2001; Watson and Vaughn, 2006).

It is therefore suggested that a dissonance, rather than a psycho-educational approach to media literacy be used to reduce thin ideal internalization. Interventions that develop dissonance against the thin ideals presented in the media have been successful in achieving behavioral change among female university students (Becker *et al.*, 2005; Stice *et al.*, 2000). This approach to developing media literacy in the university campus population appears to be more successful than the use of psycho-educational or cognitive behavioral approaches, and health promotion programs could be

developed to target the development of dissonance against the muscular ideal of men presented in the media to target males.

Additional considerations for future body image education and programs

Incorporation of health promotion activities to build self-esteem: A self-esteem approach toward the prevention of body image and eating problems has been widely used among young children and adolescents. It is based on the self-efficacy component of Bandura's Social Learning Theory and Social Cognitive Theory (Bandura, 1986), which theorize that to change health behavior, individuals must have the required personal skills, perceptions and degree of self-efficacy to do so as well as health-promoting physical environments that provide opportunities for positive health behaviors and social support.

Low self-esteem is known to be a risk factor for body dissatisfaction, dieting, and eating disorders among men and women of all ages (Button *et al.*, 1997; Croll *et al.*, 2002; Stice, 2002) and to the broad spectrum of mental health (Mann *et al.*, 2004). Health education and health promotion programs that have been based on the improvement of self-esteem in adolescents have achieved success in the reduction of body dissatisfaction, dietary restraint and disordered eating (see Table 1) (O'Dea, 1995; O'Dea and Abraham, 2000; McVey *et al.*, 2004). The results of self-esteem health promotion programs and the importance of self-efficacy and self-esteem in behavior change theory suggest that this would be an important addition to an intervention for university students.

Using computer-based delivery methods

Although not a theoretical approach in itself, presenting health promotion information and health education programs through a computer-based medium offers a unique health promotion opportunity. Computer-based interventions have been successfully utilized for behavior change and the treatment of a variety of mental health disorders including depression (Selmi *et al.*, 1990), agoraphobia (Ghosh and Marks, 1987) as well as more general nutrition promotion programs (Oenema *et al.*, 2001) and obesity prevention (Taylor *et al.*, 1991). Online

support groups have also become increasingly popular in the treatment and recovery process, and have been used for a variety of health promotion and behavior change initiatives (White and Dorman, 2001).

Internet-based interventions have been described as appealing to university students, and it is known that students are skilled and confident in using these technologies (Robinson *et al.*, 1998). Using the internet for health promotion has the benefit of anonymity, which may enable users to gain access to or discuss sensitive information that they may not be comfortable with in a face-to-face situation (Robinson *et al.*, 1998; Moore *et al.*, 2005). Online health education information is also highly accessible, as resources may be used at any time, and from a variety of locations, and computer access is readily available on the university campus (Robinson *et al.*, 1998; Moore *et al.*, 2005; St Leger, 2006).

The review of recent computer-based health education to promote positive body image and prevent eating disorders is presented in Table 1iv. The majority of studies have revolved around the evaluation of a health promotion body image program called 'Student Bodies' (Winzelberg *et al.*, 1998), which was modeled after the 'Road to Recovery' program for women with bulimia nervosa (Davis *et al.*, 1989) and cognitive behavioral interventions by Cash (Cash 1991). Student Bodies was originally developed as interactive software that allowed participants to progress through the health education course at their own pace (Winzelberg *et al.*, 1998). It was later altered to be offered as an 8-week education program delivered over the internet (Winzelberg *et al.*, 2000; Celio *et al.*, 2000; Zabinski *et al.*, 2001). Another computer-based body image education program aimed at the university population 'Food, Mood and Attitude' [FMA] (Franko *et al.*, 2005) used an interactive CD-ROM based on case studies of university women. This enabled a didactic and psycho-educational intervention that was able to be targeted to both low and high risk participants with equal success (Franko *et al.*, 2005).

Eating disorder prevention programs using a dissonance- and media-literacy-based approach may therefore become more successful if delivered via the internet to the university population. Using the internet would make it possible to screen students for eating disorders using an online questionnaire, and would then allow the

appropriate program to be tailored to the individual, or according to gender, thus including males. Such health screening could be linked to campus health referrals hence adding a secondary prevention aspect to the health promotion program. The counter-attitudinal advocacy component of the cognitive dissonance approach may also be particularly effective when implemented using computers, as participants could share their change in attitudes on online discussion boards. In addition to the health promotion benefits of tailored intervention programs, this method could easily be implemented over a larger audience, and is very cost-effective, allowing for a greater range of students to benefit from health promotion initiatives.

Using cognitive dissonance and media literacy education approaches, health promotion targeting the development of self-esteem and presenting some information through computers and the internet have been identified as successful elements of past eating disorder prevention interventions. Given the complementary nature of these preventive elements, we assumed that they may be combined successfully into one intervention aimed at reducing thin ideal internalization, body dissatisfaction and disordered eating behaviors in college women and that the education program could be modified to improve the adherence to the muscular ideal in males. We briefly describe the new health education program below.

A current health education program to improve body image and eating disorders in male and female university students

We designed a longitudinal, controlled, intervention study that uses a combined dissonance- and media-literacy-based education approach and incorporates the promotion of self-esteem using computer-based technologies to improve the body image, body dissatisfaction, dieting and disordered eating behaviors of male and female university students. Participants are male and female students who are training to become physical and health education teachers at three different universities in Australia.

The control group receives the usual health education course content in a didactic, information-based manner, with a purely academic teaching style. In our current program, one group receives similar health education course content as the control group, using a dissonance

and self-esteem promotion approach. Low-level dissonance-based education activities (such as voluntary discussion about media gender stereotypes or limitations with the body mass index) aim to reduce students' body dissatisfaction via a reduction in the internalization of the stereotypical thin and muscular ideals. In addition to the theoretical basis for the study, the educational methods employ an interactive, student-centered approach as this type of inclusive and interactive education has been found to increase self-esteem and body image in adolescents (Franko and Orosan-Weine, 1998; O'Dea and Abraham, 2000; O'Dea, 2004).

Our second education program contains higher level dissonance activities and a media literacy education component. Students are involved in small group and online dissonance education discussions about the thin and muscular images presented by the media. An additional focus on the counter-attitudinal advocacy component of the dissonance approach (Roehrig *et al.*, 2006) requires participants to not only reject the thin and muscular ideals, but to voice this in class discussions, online discussion boards and class assignments that involve the discussion of the student's own body image. An online educational component of the program is also used for some class and homework activities, and for the online discussion boards.

We intend to measure the change in male and female students body image after the two different health education programs, and then conduct a 6-month follow-up to determine the effects of prevention over time. No published study to date has tested the efficacy of a combined dissonance education and self-esteem approach, or a self-esteem, dissonance and media literacy education program, nor has this been implemented among both males and females, so we look forward to reporting the results of our study when they become available.

CONCLUSION

Male and female university students are a population at risk of sub-clinical and clinical body dissatisfaction, disordered eating, excessive body building, steroid abuse and eating disorders. The current prevalence of these conditions in university students justifies an urgent health promotion response. Due to the communal setting and academic atmosphere of the

university environment, it is possible that health promotion initiatives aimed at protecting students' body image and promoting healthy body image attitudes and behaviors could be effectively implemented as a part of coursework or online activities. However, it is vital that attention is paid to the approach and delivery of the prevention initiatives to ensure that they are suitable and effective for the campus audience. A recent study by Meier *et al.* (Meier *et al.*, 2007) explored the contribution of health discussion groups with students to campus health promotion and this approach to community involvement in the planning of campus health promotion programs is recommended. In the current review of all controlled body image and eating disorder education programs over the past 20 years, we have found that information-based, cognitive behavioral therapy and psychoeducational interventions have had limited success and would not be recommended for large-scale university prevention initiatives. Given their previous success among undergraduate populations, we recommend dissonance-, media-literacy- and self-esteem-based educational approaches using some computer-based delivery to improve the body image and related health behaviors of male and female university students.

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