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**A controlled intervention to promote a healthy body image, reduce eating disorder risk and prevent excessive exercise among trainee health education and physical education teachers.**

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**A controlled intervention to promote a healthy body image, reduce eating disorder risk and prevent excessive exercise among trainee health education and physical education teachers.**

**Abstract**

This study examined the impact of two interventions on body image, eating disorder risk and excessive exercise among 170 (65% female) trainee health education and physical education teachers (HE&PE) of mean (SD) age 21.6 (2.3) who were considered an “at risk” population for poor body image and eating disorders. In the first year of the study, the Control group cohort (n=49 female, 20 male) received the regular didactic health education curriculum; the Intervention 1 cohort (n=31 female, 21 male) received a self esteem and media literacy health education program the following year and the Intervention 2 cohort (n=30 female, 19 male) received a combined self esteem, media literacy and dissonance program using online and computer-based activities in the third year. Intervention 2 produced the best results, with males improving significantly in self esteem, body image, and Drive for Muscularity. Intervention 2 females improved significantly on EDI Drive for Thinness, EDE and excessive exercise. The improvements were consistent at 6-month follow-up, but retention of males was poor, and hence, long term analyses were not reported for males. It is feasible to promote body image, reduce body dissatisfaction and reduce excessive exercise among trainee HE&PE teachers via a health education curriculum.

**Key Words:** Body image, eating disorders, dieting, intervention

Article length = words

## **A controlled intervention to promote a healthy body image and reduce eating disorders risk and excessive exercise among young adults.**

### **Introduction**

Body dissatisfaction, dieting, eating disorders, exercise disorders and other health damaging body image related behaviors such as excessive weight lifting, body building and steroid abuse are prevalent among male and female college students worldwide [1,2]. Given the increasing public health risks associated with body image concerns and the long term cost, severity and difficulty of treating eating disorders, prevention of these problems is a well-recognised public health education goal.

The current study focused on implementing a college-based health education intervention among trainee health education and physical education (HE&PE) teachers because they have been shown to possess excess risk for body image concerns and eating problems [3, 4, 5]. For example, in a recent comparative study of trainee teachers and other undergraduates, HE&PE females reported more dieting to lose weight (55% versus 42%), particularly those who were classified as normal weight. Also, female HE&PE participants used more dieting methods and disordered eating behaviors (vomiting, laxative abuse, fasting, smoking for weight control, excessive exercise and slimming pills) than their Non HE&PE counterparts [5], and this is of concern because dieting is known to precede and predict eating disorders [6] as well as weight gain [7]. HE&PE undergraduates are more likely than their non HE&PE peers to have exercise disorders [5, 8] eating problems and body image problems [9, 10], as do health educators [11] and nutritionists [12, 13]. Weight concerns and dieting are attitudes and behaviors that teachers ought not intentionally or inadvertently role model to the impressionable young students in their care.

These risks among college students lead to mental health issues [14], have serious consequences for physical health [15] and impact upon the knowledge, beliefs and attitudes of

future school students and health education clients. The potential for role modeling of positive health behaviors by physical education teachers is well reported [16], but teachers may inadvertently model and transfer negative attitudes such as body dissatisfaction, dieting, disordered eating and excessive exercise attitudes and behaviors [10,11]. HE&PE teachers play a particularly influential role in the development of appropriate body image and eating attitudes and behaviors among young people [17, 18] and educational efforts to ensure that they are properly prepared and capable of this task are essential.

In addition, despite professional training, HE&PE teachers [9], health professionals [19], personal trainers [20] and those who specialise in research and treatment of obesity [21], are known to possess weight bias and prejudice towards overweight or obese people. The bias against overweight, combined with a personal obsession with body weight and shape may result in the transference of abnormal expectations of thinness and ‘body perfection codes’ from the HE&PE teachers [22]. Hence, the current study investigates the efficacy of a body image intervention among the very teachers who are expected to perform such duties in schools.

The aim of the current study was to design, implement and evaluate two controlled interventions to promote a healthy body image and reduce body dissatisfaction, disordered eating and excessive exercise among successive annual cohorts of trainee male and female HE&PE teachers. The interventions utilised the regular didactic health education program as the control situation among the first annual cohort of students; a self esteem and media literacy program as the first intervention in the next years cohort of students and a combined self esteem, dissonance and media literacy program utilising computer-based delivery as the second intervention among the cohort in the third year.

## **Methods**

### **Participants**

Participants (N= 170, 65% female) were three successive annual cohorts of trainee HE&PE students who were enrolled in the third year of their undergraduate HE&PE teacher training program. The numbers of participants who completed Time 1(T1) and Time 2 (T2) of the study were: Control group (N=49 female, 20 male), Intervention 1 group (N=31 female, 21 male) and Intervention 2 group (N= 30 female, 19 male). Participation at Time 3 (T3) was Control group (N=22 female, 7 male), Intervention 1 group (N=12 female, 8 male) and Intervention 2 group (N= 26 female, 16 male). Data are therefore presented for T3, but were not included in the analyses of males. The age range of participants was 18.7 to 33.5 years. The mean (SD) age for the whole group was 21.6 (2.3). A comparison of the mean (SD) age for females in the Control, Intervention 1 and Intervention 2 groups was 22.2(2.7); 20.8(1.2) and 21.6(2.0) ( $F=3.91$ ,  $df = 2$ ,  $P<0.05$ ). A comparison of the mean (SD) age for males in the Control, Intervention 1 and Intervention 2 groups was 22.7(2.7); 20.8 (1.4) and 20.7 (0.71) ( $F=4.48$ ,  $df = 2$ ,  $P<0.05$ ). Therefore all statistical analyses controlled for age as a covariate.

### **Details of Theoretical Frameworks and the Design of Intervention Programs**

The health promotion Interventions 1 and 2 were based on the Ottawa Charter [23] principles of enabling individuals to increase control over, and to improve their health. Individual health promotion and behavior change theory including the Theory of Planned Behavior [24], Social Learning Theory [25] and Social Cognitive Theory [26] were also used to underpin the design of the two intervention programs.

The theoretical approach of the two experimental interventions in the current study were also based on evidence from recent reviews that suggest that thin-ideal dissonance programs and those including dissonance towards the media can achieve positive results in terms of attitudinal and behavioral change [7, 27]. Dissonance-based education is a term that describes an educational process where participants are encouraged to act in a way (e.g., write a letter) different than their original attitude, it causes cognitive dissonance and may lead to a shift in

attitude toward the new perspective, especially if that new stance is accompanied by social disclosure and support of the action.

High school and college education programs based on the improvement of personal skills and individual attributes such as self esteem have also reduced body dissatisfaction, dietary restraint and disordered eating [28, 29]. The success of self esteem, dissonance and media literacy approaches, and their complementary nature indicate that these approaches would be even more effective when combined in a comprehensive intervention program. A combination of these approaches was therefore used for the two Intervention groups with variations for Intervention 1 and Intervention 2 to determine which approach was more successful.

### **Brief Description of Program Content**

An outline of the topics and content of programs delivered to Control, Intervention 1 and Intervention 2 groups is given in Table I. Control participants consisted of the first annual cohort that participated in the usual didactic, information-based HE&PE program delivered by both authors over a 12 week semester. Program topics were aimed at building the professional knowledge of the trainee teachers and included adolescent growth and development, nutrition, weight issues, self esteem and suicide prevention. The intervention programs covered the same basic content as the Control program, but incorporated experiential, student-centred, problem-based and peer-based learning activities that aimed to increase the personal health of the trainee teachers as well as their professional awareness of the content. This was also achieved by including media literacy and dissonance activities that aimed to reduce body dissatisfaction through a reduction in the internalisation of the thin and muscular ideals similar to the program outlined by Stice (Stice, Shaw, Becker, & Rhode, 2008). Intervention 1 used this approach in a 12 week self-esteem and media literacy program that aimed to promote positive body image, self esteem development and media literacy and incorporated some activities from the 'Everybody's Different' [30, 29]. The 'Everybody's different' program had been previously

designed as a body image improvement program for adolescents [30, 29] and, in the current study, it was modified to implement deeper discussion and to develop a greater meta-cognitive understanding among the older audience of college students. The Intervention 2 program covered similar content to Intervention 1 (Table I), was delivered in the same interactive teaching style and included similar activities to improve self esteem and media literacy. Intervention 2 differed from Intervention 1 in that the focus on cognitive dissonance was much stronger. Specifically, the program focused on the counter attitudinal advocacy component of the dissonance approach [31], so that participants were not only in a state of cognitive dissonance but they were required to express their change in attitudes via class discussions, online discussion boards and in written assignments. Complete program activity details [29, 30] and the course outlines for the Control, Intervention 1 and Intervention 2 intervention programs are available upon request from the first author.

### **Instruments and Procedure**

The standardized questionnaires were administered to Control, Intervention 1 and Intervention 2 participants at baseline [T1], after the 12 week intervention [T2] and at six month follow up [T3]. Height and weight were measured and Body Mass Index [BMI] was calculated [32].

Self Esteem was assessed using the Global Self Worth subscale of the Harter Adult Self Perception Profile [33]. Internal reliability for this scale is reported at  $\alpha = 0.91$  in previous studies of adults [33] and  $\alpha = 0.83$  in the current study. Shape and weight concern was assessed using the Eating Disorder Examination Shape and Weight Concerns Scale (EDE-Q; [34], and the Dutch Eating Behaviors Questionnaire [DEBQ] Restricted Eating scale [35]. Internal reliability for the EDE-Q scale is reported at  $\alpha = 0.89-0.93$  in previous studies of young adults [34] and  $\alpha = 0.96$  in the current study. Internal reliability for the DEBQ scale is reported at  $\alpha = 0.95$  in previous studies of adults [35] and  $\alpha = 0.94$  in the current study. The Drive For Muscularity Scale (DFM) was also used to indicate an increased drive for muscularity [36] Internal reliability for this scale



is reported at  $\alpha = 0.84-0.91$  in previous studies of adults [36] and  $\alpha = 0.88$  in the current study. The Drive for Thinness subscale of the EDI [37] was used to assess desire for weight loss. Internal reliability for the EDI is reported at  $\alpha = 0.83-0.93$  in previous studies of adults [37] and  $\alpha = 0.88$  in the current study. The level of obligation to exercise and the presence of exercise disorders were assessed using the Obligatory Exercise Questionnaire [OEQ][8]. Internal reliability for the OEQ scale is reported at  $\alpha = 0.96$  in previous studies of adults [8] and  $\alpha = 0.88$  in the current study.

The Body Appearance Rating (BAR) [38] was used to produce a score on a scale of zero to 10, with 10 being perfect, in terms of how they think they look (*Self*), how they think their friends think they look (*Friends*), they think other people think they look (*Other people*) and how they think people of the opposite sex think they look (*Opposite sex*). The BAR has been validated against the Eating Disorders Inventory [39] and reported internal reliability was  $\alpha = 0.87$  in previous studies [39] and  $\alpha = 0.93$  in the current study.

Participants were asked to report dieting in the previous 12 months and their current dieting - “Do you diet to lose weight?” (*Yes/No*) “Do you diet to gain weight?”(*Yes/No*) and they indicated which of the 20 weight loss methods they had used. Disordered eating behaviors included fasting/starvation, laxatives, smoking, vomiting, excessive exercise and slimming pills.

## **Procedure**

Participation in three successive annual cohorts occurred naturalistically in 3<sup>rd</sup> year HE&PE students as follows – Control group cohort (N=69; N= 49 females and 20 males); Intervention 1 cohort (N=52; N= 31 females and 21 males); Intervention 2 cohort (N=49; N= 30 females and 19 males). All third year undergraduate HE&PE trainee teachers in each annual cohort were invited to participate in the study and all but one male control group student agreed. Participants were partially blinded to the different educational interventions, in order to avoid the Hawthorne effect [40]. Students were allocated a unique ID number to ensure anonymity and confidentiality. The

study design, instruments and protocol were approved by the University of Sydney Human Ethics Committee in each of the three consecutive study years.

### **Data Analysis**

Data were entered into SPSS (Version 13.0; 2004). The Kolmogorov- Smirnov [K.S] Test was used on variables where the normality of the distribution of the data was uncertain. ANOVA was used on continuous interval data to identify any differences between the groups at baseline and Pearson's chi square analysis was used to determine any differences in categorical data.

Repeated Measures ANCOVA controlling for age and including a Bonferroni adjustment were used to compare the change in gender specific group by time interactions from T1 to T2 and T2 to T3 for each of the three groups. Therefore, only participants who had completed T1, T2 and T3 data collection were able to be included in the analyses. Bonferroni adjustments were included in all ANOVA and repeated measures ANCOVA analyses.

### **Results**

Participation at T1, T2 and T3 was as follows: Male Control (N= 23, 20, 7); Male Intervention 1(N= 23, 21, 8); Male Intervention 2 (N= 19, 19, 16) and Female Control (N= 51, 49, 22); Female Intervention 1 (N= 35, 31, 12) and Female Intervention 2 (N= 37, 30, 26). Those who chose not to participate at time T2 and T3 cited time constraints as their main reason. Post hoc power analyses revealed that there was adequate statistical power for repeated measures ANCOVA among females from T1 to T2 and T2 to T3 but inadequate numbers at T3 for males. T3 data for males were therefore considered to be under-powered and are presented in the following tables of results for observation only.

### **Changes in Self Esteem, Disordered Eating and Excessive Exercise Behaviors**

#### **Results in Males (Tables II and III)**

The change in males' self esteem, desire for muscularity, disordered eating and exercise behaviors at baseline [T1], after the intervention [T2] and at 6 month follow-up [T3] are given

below in Table II. Intervention 2 males showed consistent decreases in eating disorder behaviors and attitudes ( $P < .01$ ); significant improvement in Global Self Worth ( $P < .05$ ) and significant improvements in the DEBQ ( $P < .01$ ). Both Intervention 1 and Intervention 2 males reported significant reductions in the Drive for Muscularity [DFM] ( $P < .001$  and  $P < .01$  respectively) from T1 to T2, and the direction of results held at the 6 month follow up. Drive for Muscularity scores did not improve among Control group males, remaining stable throughout all three time periods.

Table III presents the change in males Body Appearance Ratings at baseline [T1], after the intervention [T2] and at 6 month follow-up [T3]. The Body Appearance Ratings of Intervention 2 males improved after the intervention and these increases were statistically significant for the Self score T1 to T2 ( $P < .05$ ).

### **Results in Females (Tables IV and V)**

Intervention 1 and 2 female's scores on the Drive for Thinness scale of the EDI decreased consistently across the three time points. This was statistically significant from T1 to T2 among Intervention 2 females ( $P < .05$ ), the decrease in Intervention 1 female's scores approached statistical significance ( $P = .07$ ). Similar trends were observed on the EDE and the DEBQ with Control female's scores tending to increase over time. Intervention 1 females' scores decreased significantly on the EDE from T1 to T2 ( $P < 0.05$ ). Intervention 2 females significantly and consistently reduced their levels of excessive exercise according to the OEQ after the intervention ( $P < .001$ ) and this was held at 6 month follow up.

The change in female's Body Appearance Ratings at baseline [T1], after the intervention [T2] and at 6 month follow-up [T3] is given in Table V. Intervention 1 and 2 females' scores tended to improve on each scale but none reached statistical significance. Intervention 2 females' "Self" score increased significantly from T1 to T3 ( $P < .01$ ).

In addition to the results presented in Tables IV and V, additional data suggested a reduction in dieting among females who participated in the interventions and a worsening of dieting in the Control group. Results of “current dieting to lose weight” among females were as follows - Control group – 54.9% at T1 to 60.4% at T2 to 72.0% at T3; Intervention 1 – 60.1% at T1 to 51.6% at T2 to 50.0% at T3; Intervention 2 - 48.6% at T1 to 41.4% to 38.5% at T3. The trends were consistent, but none reached statistical significance. Results of 3X3 Group by Dieting Chi square analysis were T1,  $X^2 = 0.94$ ,  $df=2$ ,  $P = 0.63$ ; T2,  $X^2 = 3.14$ ,  $df=2$ ,  $P = 0.07$ ; T3,  $X^2 = 5.25$ ,  $df=2$ ,  $P = 0.07$ .

The Mean [SD] number of disordered eating methods did not change significantly in Control females – T1 0.57 [1.10], T2 0.33 [0.75], T3 0.32 [0.69] and Intervention 2 females - T1 0.37 [0.70], T2 0.30 [0.63], T3 0.20 [0.62] but it decreased significantly among Intervention 1 females - T1 0.78 [1.30], T2 0.59 [1.07], T3 0.25 [0.45] (Repeated measures ANCOVA,  $F(1, 59) = 5.69$ ,  $P < .05$ ).

Control females lost approximately 2.0 kilograms of weight from T1 to T2, with a mean (SD) weight of 65.6 (1.4) Kg to 63.9 (1.4) Kg from T1 to T2; [ $F(1,92) = 3.99$ ,  $P < .05$ ] to 63.6(1.4) at T3 [ $F(1,59) = 0.52$ ,  $P > .05$ ]. Weight remained stable and no significant weight loss occurred from T1 to T2 among Intervention 1 females [62.4(1.6) Kg; 63.3(1.7) Kg from T1 to T2 [ $F(1,59) = 0.48$ ,  $P > .05$ ]; or from T2 to T3 63.2 (1.5) Kg ( $F=0.46(1, 92)$   $P > 0.05$ ) or among women in Intervention 2 [(64.5(1.6); 64.0(1.7); 64.0 (2.1) from T1 to T2 ( $F(1,59) = 0.33$ ,  $P > 0.05$ )].

## Discussion

Results of this study are promising and they suggest that body image education among trainee HE&PE teachers is effective and feasible, and that such programs may be utilised on college campuses as natural, universal-selective interventions to improve the body dissatisfaction of

young people. In the current study, this objective was achieved in both Intervention groups, with a stronger trend for improvement in Intervention 2, suggesting that the combined self esteem, dissonance and media literacy program with an online delivery component had the greatest impact overall. Males also benefitted from the intervention, and their improvement appeared to be long lasting, but the male participant numbers did not allow for sufficient statistical power to determine the extent of the results at the 6-month follow up.

Overall, Intervention 2 with its strong focus on media literacy and dissonance activities utilising counter-attitudinal advocacy was more effective than Intervention 1 in achieving long term behavioral change among male and female participants. In particular, the reduction in drive for thinness in females and drive for muscularity in males is promising, as these are indicators of the internalisation of the thin and muscular ideals which may act as intentions for behavior change according to the socio-cultural model of eating disorder development and the Theory of Reasoned Action [24, 41].

Since the content of the two health education interventions were similar, it is assumed that the stronger effect of Intervention 2 was due to the inclusion of a stronger dissonance approach. Similar to those of previous dissonance studies, [31,42] the current findings further suggest that counter-attitudinal advocacy was most effective in producing a more positive body image. Even though the strength of the dissonance program was not as concentrated as in previous psychology based programs by Stice and his colleagues [31], the current program uniquely incorporated new tasks that required students to write online arguments against the thin and muscular media ideals and actively argue to convince their peers to reject such views. Also unique to the current study, was that the students' written works were available for their peers to read on the online discussion boards and this fostered further ongoing widespread online discussion. As such, this online activity appears to have increased the "dose" of the intervention through ongoing, public displays of counter-attitudinal advocacy as well as inadvertently creating a climate of peer support. In this

regard, the online dissonance discussions in the current study were largely peer led and, as Becker and her colleagues recently suggest, [43, 44] this type of online peer led activity may partially account for our promising results.

Although HE & PE students are likely to be at risk of increased dieting, body dissatisfaction and disordered eating and exercise behaviours, [3,4,5,9,10,11] there were participants in the current study who did not have elevated baseline scores and this may have reduced the statistical impact observed in our results. Many reviews report that targeted eating disorder interventions are more effective as studies that use participants who have elevated baseline scores are known to produce larger effect sizes [7, 31]. Other studies that have used an educational approach to reduce eating problems, [46] or have used 'normal' women in studies [47] have also commented on the lack of room for improvement among women who are not 'high risk' or do not have high body dissatisfaction at the beginning of the intervention program [47]. It is suggested that men and women at low risk for body image problems may also find the information presented in health education and health promotion interventions to be less personally relevant as women who are considered to be high risk [47]. This puts the findings of the current study into a positive light, as the greatest improvements were found among Intervention 2 females even though they had the lowest baseline scores, thus illustrating its universal effectiveness.

Only one other previous study has included a health education approach to reduce body image concerns among males in a college setting [48]. However, the program of Rabak-Wagener and colleagues [48], did not alter the health education program content to address the specific needs of males and consequently reported a limited effect among the male participants. Hence, our current findings suggest that a health education, media literacy and dissonance approach that aims at challenging the muscular body ideal for men, is most likely to be both relevant and successful. Online delivery, using discussion boards, also appears to be an effective way of engaging young men in body image education and the body image debate. Future research should specifically

concentrate on the development and testing of effective resources and empirically supported education and promotion interventions to be used among males.

Strengths of the current study included high participation at pre and post test; inclusion of a control group; use of standardized and validated instruments with high internal reliability; consistency of the program delivery to control and intervention groups by the same instructors and complete data collection. Limitations of the study include voluntary attrition of male participants at the 6-month follow-up and use of successive annual cohorts creating a reliance on existing student enrolments and the inability to implement randomized sampling and randomized intervention groups. The curriculum appeared feasible and acceptable to students and the results were generally in the right direction, suggesting that the current study findings contribute the appropriate background for a larger, randomized study.

The encouraging results of our study suggest that universities could use a similar approach to improving the body image-related health of their undergraduates, and particularly those students in teacher training for health and physical education. Wider university community approaches could also extend the program by offering the program to students from different courses; utilizing online learning to assess risk; screening for body image problems; utilizing university health referral services and closer liaison with student counselling staff. Prevention of eating disorders on college campuses could also implement more of a participatory and community development approach, as recently suggested by other prevention researchers [49].

Our findings have wide relevance and implications for undergraduate university and teacher training programs in physical education, food, nutrition, exercise, body image and eating disorders. The ultimate health promotion research question is whether such body image promotion programs among HE&PE teachers translates into improvement of the body image, eating behaviors and health literacy among their future school students.

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**Table I.** Outline of the course content in the Control, Intervention 1 and Intervention 2 Programs

<b>Control Group Program</b>		
<b>Week</b>	<b>Lecture</b>	<b>Tutorial</b>
1	Course Introduction, Aims.	Course outline, Explanation of assessment , course due dates, links to HE&PE syllabus
2	Fetal growth, development and birth	Video of fetal growth, development and birth
3	Determinants of health and growth	Discussion of Genetic Determinants & Disorders- Down’s Syndrome case study
4	Growth and Development in Adolescence	Activities: Adolescent Growth Spurt Fact File (From Body Basics, O’Dea, 2002)
5	Anthropometric measures of height and weight	Students calculate their weight status using BMI, height/weight charts, wrist diameter
6	Child & Adolescent Self Esteem and Self Concept	<i>Body Basics</i> Video part 1 (O’Dea, 2002).
7	Self Esteem and Resilience	Discussion of self concept and gender stereotypes in Western societies
8	Nutrition – Micro and macro nutrients	Discussion- 5 Food groups, Pyramid, Macro and Micro Nutrients, Fad diets discussion & Exploring weight loss fads
9	Benefits of Self Esteem for children & adolescents	Discussion - How self esteem develops and how to build self esteem in students
10	Suicide and Prevention Programs in Schools	Outline of Programs for Suicide Prevention in Schools
11&12	Exam & Presentation of Group Assignments	Presentation of Group Assignments
<b>Intervention 1 Group Program</b>		
<b>Week</b>	<b>Lecture</b>	<b>Tutorial</b>
1	Course Introduction, Aims	Discussion of subject outline; dates; assessments
2	Growth & Development in Puberty How physical, mental and socio-cultural health are linked. The “Whole Child” approach to teaching	Puberty experiences & discussion of psychological and social effects experienced during their own pubertal development. Discussion of how best to teach puberty and what to avoid in order to “First, do no harm”
3	Teaching about Growth & Development. “Whole Child” approaches. <i>Body Basics</i> video part 2.	How was growth and development taught at your school? Dissonance discussion- Appropriate and inappropriate methods of teaching students about height/weight
4	Weight Issues in children and adolescents. BMI and its many limitations. Size acceptance	Weight issues- Calculate BMI & Dissonance discussion- Limitations of the BMI, discussion of more ‘body image friendly’ way to teach and measure growth and health
5	Self Concept, Self Esteem, Media Literacy & Promotion of A Positive Body Image in Schools	Body Image. Brainstorm- What influences your body image in a positive or negative way? Score out of 10 for your own body image. Dissonance against thin/ muscular media ideals. Presentation of case studies of adolescents with self concept issues. Media literacy activities focusing on deconstructing gender body stereotypes
6	Resilience and Self Esteem	Teaching Practice and Self Esteem- Discussion and case study activities: What makes a good PE teacher? How does role modeling and practice affect student self esteem?
7	Nutrition – Micro and macro nutrients and Teaching nutrition positively	Activities: Why did I eat that? Fun food tasting activities. Blindfold taste tests
8	Self Esteem and Building Self Esteem Activities	What makes up a person? Strength cards, Hand outline, Self advertisement activity. Activities from Everybody’s Different Book
9		

10	Suicide prevention Guest Speaker	Understanding mental illness and school-based opportunities for suicide prevention
11&12	Exam & Presentation of Case Studies. Exam essay asks students to write how media literacy and HE&PE classes can improve student self esteem and body image. How can schools improve?	Presentation of Case Studies of an adolescent with a self image or mental health issue Discuss multi-dimensional nature of “health” and how adolescent health can be holistically promoted in schools
<b>Intervention 2 Group Program</b>		
<b>Week</b>	<b>Lecture</b>	<b>Tutorial</b>
1	Course introduction, aims and course outline	Introduction to WebCT online learning. Assignment; Online Discussion and Quiz
2	Pubertal Growth & Development How physical, mental and socio-cultural health are linked. The “Whole Child” approach to teaching	Pubertal change- Personal experiences of puberty & Social and emotional effects. Dissonance discussion online about how best to teach puberty.
3	Teaching about Growth & Development. “Whole Child” approaches. <i>Body Basics</i> video part 2.Determinants of height and weight	How was height and weight taught at your school? Dissonance against the importance of weight in society. Write about how weight should be taught or not taught. Online discussion board of how best to teach about height, weight and growth in schools (dissonance against controllability of weight and shape)
4	Weight Issues in children and adolescents. BMI and its many limitations. Size acceptance. How to measure health, how to teach about weight. What to avoid and why.	BMI and its limitations; Dissonance against BMI & Other ways to measure health. Online discussion board about how best to measure and promote “health” not weight in schools. Discussion focuses on avoiding worrying children about their weight.
5	The Media and Body Image: How the media promotes the thin and muscular ideals in society	Media Literacy- Magazine covers activity with dissonance thin / muscular ideal - Web Assessment Task- Dissonance Discussion board against media body ideals
6	Self Concept and Self Esteem Self Concept, Self Esteem, Media Literacy & Promotion of A Positive Body Image in Schools	Self Concept and Body Image- Influences on Body Image; Score out of 10 & influences - Web Assessment task- Dissonance responses about thin/ muscular ideals
7	Resilience and how to promote it among students	Teaching Practice and Self Esteem- Self esteem building in schools & Case Studies
8	Nutrition - Teaching nutrition positively	Why did I eat that? Fun food tasting. Blindfold taste tests.
9	Online Readings about how to promote Self Esteem and how to “Do No Harm”	Activities for Building Self Esteem. What makes up a person? Strength cards. Hand outline activity. Self advertisements. Activities from Everybody’s Different Book
10	Mental Health Promotion in Schools and Suicide Prevention	Mental Health Promotion. Health Promoting Schools. Successful Case studies. Investigate resources in schools. Building confidence to deal with crisis situations
11&12	Exam & Presentation of Group Case Studies.	Exam essay asks students to write about how media literacy and HE&PE classes can improve student self esteem and body image

**Note:** Each lecture and each tutorial were of 60 minutes duration. Each program included 24 hours delivered over 12 weeks.

**Table II:** Male participants' self esteem, desire for muscularity, disordered eating and exercise behaviours at baseline [T1], after the intervention [T2] and at 6 month follow-up [T3]

	T1	T2	T1/T2	T3
	M [SD]	M [SD]	( <i>df</i> ) F <sup>(a)</sup>	M [SD]
Global Self Worth [GSW] (Scale Range 6-26)				
Control	20.70 [8.11]	20.15 [4.48]	(1, 57) 0.66	20.50 [3.51]
Intervention 1	20.00 [3.58]	19.05 [2.64]	(1, 57) 2.52	20.75 [3.06]
Intervention 2	21.68 [2.89]	23.11 [2.08]	(1, 57) 4.20*	21.81 [2.86]
Drive for Muscularity [DFM] (Scale Range 15-90)				
Control	35.35 [8.81]	35.30 [11.43]	(1, 57) 0.00	35.50 [7.48]
Intervention 1	44.95 [16.99]	39.05 [18.31]	(1,57) 21.58 ***	40.50 [20.23]
Intervention 2	36.37 [11.45]	32.26 [11.99]	(1,57) 7.30 **	34.62 [13.24]
Drive for Thinness- Eating Disorders Inventory [DFT-EDI] (Scale Range 0-21)				
Control	0.85 [1.84]	0.80 [1.37]	(1, 41) 0.94	1.67 [2.42]
Intervention 1	1.67 [2.81]	1.50 [2.74]	(1, 41) 0.04	4.25 [7.46]
Intervention 2	0.63 [1.30]	0.00 [0.00]	(1, 41) 3.81	0.20 [0.56]
Eating Disorders Examination [EDE] (Shape and Weight Concern Scale Range 0-66)				
Control	13.80 [9.21]	14.21 [9.64]	(1, 47) 0.34	20.00 [13.98]
Intervention 1	12.52 [11.37]	11.31 [7.13]	(1, 47) 0.55	12.67 [7.68]
Intervention 2	11.21 [8.88]	8.22 [7.38]	(1, 47) 3.71	9.60 [7.26]
Dutch Eating Behavior Questionnaire [DEBQ] (Scale Range 10-50)				
Control	15.95 [5.12]	15.42 [4.02]	(1, 49) 0.33	19.20 [8.76]
Intervention 1	13.55 [4.10]	14.21 [4.85]	(1,49) 1.79	14.83 [4.02]
Intervention 2	15.16 [4.09]	12.47 [2.44]	(1,49) 8.58**	15.00 [4.30]
Obligatory Exercise Questionnaire [OEQ] (Scale Range 20-80)				
Control	43.95 [4.61]	40.90 [5.87]	(1, 57) 7.33**	40.67 [5.50]
Intervention 1	48.24 [8.45]	48.00 [7.91]	(1,57) 0.91	49.75 [9.27]
Intervention 2	47.90 [7.93]	46.89 [8.69]	(1,57) 0.75	47.37 [9.59]

\*  $P < .05$ ; \*\*  $P < .01$ ; \*\*\*  $P < .001$  <sup>(a)</sup> Repeated measures, ANCOVA

Note – N at Time 1 and Time 2 = Control (20); Intervention 1(21) and Intervention 2 (19). All data are included in analyses.

N at Time 3 = Control (7); Intervention 1(8) and Intervention 2 (16). Data for Time 3 are not included in analyses.

**Table III:** Male participants' Body Appearance Ratings at baseline [T1], after the intervention [T2] and at 6 month follow-up [T3]

	T1	T2	T1/T2	T3
	M [SD]	M [SD]	( <i>df</i> ) F <sup>(a)</sup>	M [SD]
<b>Self Body Appearance Rating</b>				
Control	7.00 [1.03]	6.85 [1.04]	(1, 58) 0.26	7.17 [0.41]
Intervention 1	7.00 [1.30]	6.80 [1.13]	(1,58) 0.66	6.87 [1.73]
Intervention 2	7.05 [1.02]	7.68 [0.86]	(1, 58) 4.28	7.69 [1.14]
<b>Friends Body Appearance Rating</b>				
Control	7.15 [1.23]	7.05 [0.89]	(1, 58) 0.13	7.17 [0.98]
Intervention 1	7.00 [1.22]	6.92 [1.13]	(1,58) 0.01	7.00 [0.93]
Intervention 2	7.21 [0.98]	7.32 [0.88]	(1, 58) 0.13	7.88 [0.96]
<b>Other People Body Appearance Rating</b>				
Control	7.05 [1.22]	6.90 [0.97]	(1, 58) 0.32	6.17 [2.14]
Intervention 1	6.90 [1.30]	6.76 [1.10]	(1, 58) 0.12	7.00 [0.93]
Intervention 2	7.00 [0.88]	7.21 [0.85]	(1, 58) 0.57	7.63 [1.31]
<b>Opposite Sex Body Appearance Rating</b>				
Control	6.80 [1.57]	6.80 [1.64]	(1, 58) 0.00	7.67 [0.82]
Intervention 1	6.90 [1.54]	6.60 [1.30]	(1, 58) 0.72	6.88 [1.64]
Intervention 2	7.00 [1.10]	7.42 [1.12]	(1, 58) 1.77	7.63 [1.75]

\*  $P < 0.05$  <sup>(a)</sup> Repeated measures ANCOVA

Note. The Body Appearance Rating is given as a range of 0-10 (10 being "perfect")

Note – N at Time 1 and Time 2 = Control (20); Intervention 1(21) and Intervention 2 (19). All data are included in analyses.

N at Time 3 = Control (7); Intervention 1(8) and Intervention 2 (16). Data for Time 3 are not included in analyses.

**Table IV:** Female participants' self esteem, desire for muscularity, desire for thinness, disordered eating and exercise behaviours at baseline [T1], after the intervention [T2] and at 6 month follow-up [T3]

	T1	T2	T1/T2	T3
	M [SD]	M [SD]	(df) F <sup>(a)</sup>	M [SD]
Global Self Worth [GSW] (Scale Range 6-26)				
Control	19.60 [3.45]	19.44 [3.65]	(1, 99) 0.48	19.37 [3.61]
Intervention 1	19.03 [3.82]	19.03 [4.06]	(1, 99) 0.00	21.33 [3.47]
Intervention 2	19.97 [3.70]	19.79 [3.89]	(1, 99) 3.64	20.92 [3.39]
Drive For Muscularity [DFM] (Scale Range 15-90)				
Control	24.31 [7.45]	24.32 [6.86]	(1, 102) 0.00	25.32 [7.65]
Intervention 1	24.50 [6.63]	24.83 [13.86]	(1, 102) 0.00	29.33 [12.21]
Intervention 2	25.50 [8.55]	22.69 [6.05]	(1, 102) 3.64	22.12 [5.85]
Drive for Thinness Scale- Eating Disorders Inventory (Scale Range 0-21)				
Control	5.45 [5.37]	4.78 [5.21]	(1,100) 2.70	6.32 [6.91]
Intervention 1	5.97 [6.32]	3.89 [5.42]	(1,100) 3.45	3.08 [3.92]
Intervention 2	4.77 [5.45]	3.21 [4.75]	(1,100) 4.41 *	2.36 [4.11]
Eating Disorder Examination [EDE] (Shape and Weight Concern Scale Range 0-66)				
Control	31.14 [15.73]	32.09 [14.22]	(1, 106) 0.02	33.16 [15.99]
Intervention 1	34.35 [15.75]	28.94 [15.96]	(1, 106) 6.53*	22.92 [12.77]
Intervention 2	26.23 [15.33]	25.62 [15.80]	(1, 106) 0.17	23.44 [15.38]
Dutch Eating Behavior Questionnaire [DEBQ] (Scale Range 10-50)				
Control	26.02 [7.38]	25.78 [7.81]	(1, 104) 0.02	28.24 [8.22]
Intervention 1	25.32 [7.62]	24.52 [8.88]	(1, 104) 0.57	22.75 [5.24]
Intervention 2	24.10 [9.73]	22.41 [8.17]	(1, 104) 1.54	21.76 [8.81]
Obligatory Exercise Questionnaire [OEQ] (Scale Range 20-80)				
Control	47.70 [9.55]	46.85 [9.16]	(1, 106) 0.81	48.28 [11.52]
Intervention 1	43.13 [7.67]	42.23 [8.59]	(1, 106) 0.63	41.33 [7.16]
Intervention 2	47.80 [9.70]	43.40 [9.39]	(1, 106) 13.60 ***	44.73 [10.40]

\*  $P < .05$ ; \*\*  $P < .01$ ; \*\*\*  $P < .001$  <sup>(a)</sup> Repeated measures ANCOVA

Note – N at Time 1 and Time 2 = Control (49); Intervention 1(31) and Intervention 2 (30). All data are included in analyses.

N at Time 3 = Control (22); Intervention 1(12) and Intervention 2 (26). All data are included in analyses.

**Table V:** Female participants' Body Appearance Ratings at baseline [T1], after the intervention [T2] and at 6 month follow-up [T3]

	T1	T2	T1/T2	T3
	M [SD]	M [SD]	Direction, ( <i>df</i> ) $F^{(a)}$	M [SD]
<b>Self Body Appearance Rating</b>				
Control	6.42 [1.00]	6.54 [0.92]	(1, 105) 0.96	6.17 [0.76]
Intervention 1	6.20 [1.19]	6.26 [1.35]	(1, 105) 0.14	7.04 [0.96]
Intervention 2	6.70 [1.34]	6.93 [1.36]	(1, 105) 1.85	7.27 [1.12]
<b>Friends Body Appearance Rating</b>				
Control	6.89 [0.92]	6.93 [1.02]	(1, 103) 0.09	6.54 [0.88]
Intervention 1	6.20 [1.12]	6.39 [1.31]	(1, 103) 0.54	7.42 [1.08]
Intervention 2	7.10 [0.96]	7.34 [1.32]	(1, 103) 1.10	7.27 [1.08]
<b>Other People Body Appearance Rating</b>				
Control	6.51 [1.05]	6.40 [1.21]	(1, 103) 0.24	6.37 [1.10]
Intervention 1	5.80 [1.45]	6.21 [1.42]	(1, 103) 3.09	7.25 [0.96]
Intervention 2	6.97 [1.25]	6.72 [1.33]	(1, 103) 0.87	6.96 [1.22]
<b>Opposite Sex Body Appearance Rating</b>				
Control	6.47 [1.11]	6.34 [1.11]	(1, 102) 3.57	6.04 [1.16]
Intervention 1	5.87 [1.61]	6.06 [1.50]	(1, 102) 3.46	7.36 [1.12]
Intervention 2	6.57 [1.45]	6.83 [1.28]	(1, 102) 0.40	7.04 [1.31]

<sup>(a)</sup>Repeated measures ANCOVA

Note. The Body Appearance Rating is given in a range of 0-10 (10 being "perfect")

Note – N at Time 1 and Time 2 = Control (49); Intervention 1(31) and Intervention 2 (30). All data are included in analyses.

N at Time 3 = Control (22); Intervention 1(12) and Intervention 2 (26). All data are included in analyses.