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EFFECT OF COMPASSION MEDITATION AND AMOUNT OF EXERCISE ON BODY IMAGE IN COLLEGE FRESHMEN

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2005

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Behavioral Sciences and Health Education
2011

Abstract

EFFECT OF COMPASSION MEDITATION AND AMOUNT OF EXERCISE ON BODY IMAGE IN COLLEGE FRESHMEN

By Erica Lipizzi

To assess the effect of meditation and amount of exercise on body image, 61 freshmen college students were randomized to six weeks of training in compassion meditation or to a health discussion group. At the beginning and end of the intervention, 33 women and 28 men completed the Stanford Usual Activity Questionnaire and the Cash Multidimensional Body- Self Relations Questionnaire. High practice time and low practice time meditators (defined by median split) were compared to each other and to controls. The sample was divided into two exercise groups: (1) amount of exercise decreased over the course of the semester; (2) exercise increased or remained the same. There was a significant positive relationship between the students' amount of exercise at pretest and the minutes they spent meditating during the first three weeks of the intervention ($r = .37$, $p = .036$), and a positive trend in meditation practice time during the course of the intervention and self-reported exercise at posttest. Repeated measures analyses of covariance revealed that students who meditated more frequently were more health conscious at posttest compared to control participants and those who meditated less frequently ($p = .013$), and students whose exercise increased or stayed the same over the course of the intervention became more involved in activities to enhance or maintain their fitness ($p = .029$), more alert to personal symptoms of physical illness ($p = .002$), and more satisfied with their appearance ($p = .004$) compared to students whose exercise decreased. In addition, there were statistically significant higher-level interactions. High practice meditators who increased or had no change in amount of exercise felt more positive about their appearance ($p = .001$) and there was a trend toward increased satisfaction with areas of their body compared to high-practice meditators who decreased their amount of exercise. These findings suggest that compassion meditation and amount of exercise may interact to affect body image in college students.

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Introduction

Body image is often used to describe the perceptions, thoughts, and feelings one has about their body. It is a multifaceted construct that includes body size estimation, evaluation of body attractiveness and emotions associated with body shape (Grogan, 2006). One's body image is often formed based on several factors, such as weight or body shape, as well as other sociocultural factors. Social factors may include peer influence, the media, and participation in sports from an early age. Perceptual factors further influence one's level of satisfaction with their body, and it has been demonstrated that body image can be changed through social influence (Groesz, Levine, & Murnen, 2002; Mussap & Salton, 2006).

Throughout history, the media has played a large role in shaping the public's view of an idealized body figure that is not attainable, or even healthy, for the average person (Derenne & Beresin, 2006). Images in magazines, movies, and even in cartoons are increasingly thinner and portray the message that thinner is better. The women's "ideal" body, as depicted by Playboy magazine centerfolds and Miss America contestants, is 13-19% below expected weight (Saraceni & Russell-Mayhew, 2007). This is an unhealthy range, considering body weights below 15% of expected are defined by the DSM-IV-TR (American Psychiatric Association, 2000) as one of the criteria for anorexia nervosa. In recent decades, there also has been a significant increase in the proportion of underweight cartoon characters to overweight characters (Klein & Shiffman, 2005). Along with this trend, the underweight versus overweight characters tend to portray different traits and behaviors, with the overriding tendency for cartoons to provide positive messages about being thin and negative messages about being overweight.

Body image is a core aspect of one's physical and mental health, as it is implicated in many unhealthy behaviors. Figure dissatisfaction has consistently been the greatest predictor of eating pathology in females (Cooley & Toray, 2001). A poor body image is associated with increases in bulimic and eating disorder symptoms, as well as the maintenance of bulimic pathology (Stice, 2002). It also has been linked to other unhealthy behaviors, such as frequent dieting, high-risk sexual behaviors, cigarette smoking, and suicidal ideation.

While body image concerns tend to arise during early adolescence (Neumark-Sztainer & Hannan, 2000), it is likely that the college environment may exacerbate these issues. Dieting, body dissatisfaction, and disordered eating and exercise behaviors are prevalent on college campuses. Approximately 67% of female college students and 35% of male college students report being dissatisfied with their body image (Forrest & Stuhldreher, 2007), and 28% of college students suffer from inaccurate body weight perception (Harring, Montgomery, & Hardin, 2010). According to data from the National College Health Assessment (NCHA) of the American College Health Association, 33.2% of college students perceive themselves to be overweight or obese, whereas 28.3% actually are overweight (Wharton, Adams, & Hampl, 2008).

One study that followed participants over the freshman year found that the frequency of participants who described themselves as overweight increased significantly, although participants were not more likely to be categorized as overweight or obese toward the end of the year (Delinsky & Wilson, 2008). By April, 37% of the sample described themselves as overweight, whereas only 18% of the sample met criteria for overweight or obesity. Other studies have shown that women entering college with

higher levels of figure dissatisfaction have demonstrated worsening patterns of eating pathology across the college years (Cooley & Toray, 2001). It is possible that poor body image may also lead to involvement in other unhealthy behaviors during a relatively impressionable period, when lifelong habits may be established.

Interventions to enhance body image among adolescents and young adults are of great importance considering the high prevalence of body dissatisfaction is this age group, as well as the association between body image and various unhealthy behaviors. Several interventions aimed at reducing body dissatisfaction among adolescents have been conducted and there is some evidence that interventions focusing on body acceptance are more effective than programs without this focus (Stice, Shaw, & Marti, 2007). One study that incorporated loving-kindness meditation practices into a mindfulness-based stress reduction (MBSR) program was successful in increasing positive affect and self-compassion, while simultaneously reducing stress, negative affect, rumination, and state and trait anxiety (Shapiro, Warren Brown, & Biegel, 2007). However, few studies have used compassion meditation as an intervention, and none have looked at the interaction between this form of meditation and other more common intervention techniques, such as exercise, on body image. Therefore, the purpose of this study was to investigate the effect of compassion meditation and amount of exercise on body image in freshmen college students.

Research Questions

1. Is there a relationship between amount of meditation practice and amount of exercise?

2. Is the level of practice (high vs. low) of compassion meditation practice associated with a change in body image?
3. Is a change in exercise behavior associated with a change in body image?
4. Do the level of practice of compassion meditation and change in exercise behavior have an interactive effect upon change in body image?

Review of the Literature

Poor body image, or body dissatisfaction, is associated with many unhealthy behaviors. One such behavior is frequent dieting (Ackard, Croll, & Kearney-Cooke, 2002). This pattern, in turn, puts individuals at risk for eating disorders, such as anorexia nervosa, bulimia nervosa, or binge eating disorder (Stice & Shaw, 2002). Several studies have reported on the impact of body image on frequent dieting and disordered eating habits in college students. Data from the 2006 National College Health Assessment showed that 61.2% of female college students and 34.1% of male college students were trying to lose weight at the time of the survey (Harring et al., 2010). While there was no difference for men, females with inflated body weight perception were 1.76 times more likely to vomit to lose weight and 2.23 times more likely to use diet pills than were females with accurate body weight perception (Harring et al., 2010). Another longitudinal study that followed women entering college found that figure dissatisfaction was the most consistent predictor of eating pathology over the subsequent three years (Cooley & Toray, 2001). Women who entered college with higher levels of figure dissatisfaction were likely to show worsening patterns of eating pathology than those who entered college with lower levels of figure dissatisfaction.

Several studies have pointed to an association between cigarette smoking and poor body image. Clark et al. (2005) found that smoking status was associated with several dimensions of body image in male and female college students. Compared to never smokers, smokers were more preoccupied with being overweight, reported poorer health, were more invested in their appearance, and were and less invested in their health and physical fitness. Smokers also had worsening body image the more days they

reported smoking in the past month. Another study that presented images of thin models to female college students found that those images produced more urges to smoke than did control images. They also found that weight concerns moderated this effect, with the desire to smoke strongest among women with greater weight concerns (Lopez, Drobes, Thompson, & Brandon, 2008).

There is some evidence that individuals with a negative body image may be more likely to engage in high-risk sexual behaviors than others. One study found that college students' satisfaction with their body image was inversely related to having a casual partner and a marginal inverse relationship to using no or unreliable contraception during last intercourse (Eisenberg, Neumark-Sztainer, & Lust, 2005). Among females who claimed to never be satisfied with their body image, 28% reported having a casual partner and 24.5% reported not using contraceptives. Among females who claimed to always be satisfied with their body image, 10.5% reported having a casual partner and 11.5% reported not using contraceptives. In addition, those reporting unhealthy weight control behaviors were more likely to have a casual partner, use no or unreliable contraception, and reported being intoxicated at last intercourse. No relationships between weight-related issues and sexual behaviors were found among sexually active men. Similar results were found in a sample of African-American female adolescents. Adolescents who were more dissatisfied with their body image were 2.1 times more likely to perceive that they had fewer options for sexual partners, 2.0 times more likely to perceive themselves as having limited control in their sexual relationships, and 1.8 times more likely to fear the results of negotiating condom use (Wingood, DiClemente, Harrington, & Davies, 2002). Moreover, adolescents who were more dissatisfied with their body

image were 1.6 times more likely to report never using condoms during sexual intercourse in the past 30 days and were 1.6 times more likely to report having unprotected vaginal intercourse.

Several studies have demonstrated an association between body image and suicidal ideation. This is particularly alarming, since suicide is the third leading cause of death for 15- to 24-year-olds in the United States (Centers for Disease Control and Prevention National Center for Injury Prevention and Control, 2007). One study found that for both male and female adolescents, body attitudes/feelings were the strongest predictor of current suicidal ideation, and they contributed to the measurement of suicide ideation above and beyond other predictors, such as depression, hopelessness, and past suicidal behavior (Brausch & Muehlenkamp, 2007). Another study used a path analysis to construct a causal model of suicide proneness, and found that body image dissatisfaction may lead to suicide proneness mainly through its impact on depression and alcohol use (Lamis, Malone, Langhinrichsen-Rohling, & Ellis, 2010). In this study, suicide proneness was positively predicted by alcohol use, alcohol use was positively predicted by depression, and depression was negatively predicted by body image.

Although the literature focuses primarily on body image in females, the prevalence of men's dissatisfaction with their bodies has increased over the last few decades (Keel, Baxter, Heatherton, & Joiner, 2007). It is suggested that body mass index may play a key role in men's body image. In one study, overweight men reported higher levels of body dissatisfaction, negative body image, and weight and shape concerns, while underweight men reported higher levels of body dissatisfaction only, and obese men reported higher levels of both body dissatisfaction and negative body image, but not

weight and shape concerns (Watkins, Christie, & Chally, 2008). Additionally, exposure to images of ideal bodies has been associated with body dissatisfaction in males, although this may only be apparent for men not categorized as normal weight (Blond, 2008).

Some interventions on body image have focused on physical activity. The health benefits of exercise are well known and corroborated through numerous research studies and interventions. Compared to less active individuals, more active men and women have lower rates of mortality, coronary heart disease, high blood pressure, stroke, type 2 diabetes, metabolic syndrome, colon cancer, and breast cancer (U.S. Department of Health and Human Services, 2008). In addition to the benefits of exercise on physical health, research also demonstrates the salutary effects of physical activity on mental health and wellbeing. There is strong evidence that physical activity can decrease one's risk of developing clinical depression, and that it can treat depression at the same magnitude as therapeutic interventions (Fox, 1999). Moderate effects of exercise also have been reported in reducing anxiety and reactivity to stress, and on improving mood, self-perceptions, self-esteem, and cognitive function.

The literature on the impact of physical activity on body image, however, is mixed. One study found that physical activity interventions may have some negative consequences of increasing concerns about thinness in women (Zabinski, Calfas, Gehrman, Wilfley, & Sallis, 2001). Conversely, another study that assessed state body image after a single exercise session found that participants reported less discontent with their body, slightly slimmer "felt" body dimensions (i.e., how they felt about their body), and enhanced mood post-exercise. In this case, the higher one's drive for thinness, body dissatisfaction, and weight and shape concerns were pre-exercise, the greater the

influence that the physical activity had on their body image (Vocks, Hechler, Rohrig, & Legenbauer, 2009). An overall reduction in state body dissatisfaction and increase in positive affect following exercise was also found among undergraduate females who exercised frequently; however, women who reported being more dissatisfied with their body experienced greater state body dissatisfaction and less positive affect than women who reported being less dissatisfied with their body (Lepage & Crowther, 2010).

A meta-analysis by Campbell and Hausenblas (2009) looked at 57 studies and found an overall improvement in body image for subjects undergoing an exercise intervention when compared to controls. There was a significantly larger effect for exercise-based interventions compared to lecture-based or combined lecture- and exercise-based interventions. The impact of exercise was moderated by age, with a larger effect of exercise on adults and older adults. A greater effect size also was found for females and individuals categorized as overweight or obese, although these differences were not significant, and ethnicity was not found to moderate the relationship between exercise and body image.

One limitation of these studies, however, is the overrepresentation of females in research investigating the effects of exercise on body image. There is evidence that dissatisfaction with body image differs between males and females, even from an early age (McCabe, Ricciardelli, & Salmon, 2006). While males tend to demonstrate a greater focus on and dissatisfaction with their muscles and body shape, females tend to demonstrate a greater focus on and dissatisfaction with their weight. Therefore, research that measures multiple dimensions of body image on both males and females would be

beneficial in providing a comprehensive picture of the association between physical activity and body image.

During the last 40 years, the therapeutic use of meditation practices in healthcare also has become increasingly popular in Western countries. Mind-body interventions in the scientific literature tend to focus on the benefits of meditation practices that emphasize calming the mind (e.g., transcendental meditation), improving focused attention, developing mindfulness (e.g., mindfulness-based stress reduction), and generating compassion for other people. Compassion practices include loving-kindness (metta) from the Theravada Buddhist tradition (Salzberg, 2002) and mind-training (lojong) from Tibetan Buddhism (The Dalai Lama, 2001). Several controlled studies have shown significant physical and mental health improvements following meditation interventions, such as reductions in blood pressure, anxiety, depression, and improved coping ability in students and adults (Eppley, Abrams, & Shear, 1989). Interestingly, only one meditation intervention has assessed body image. In this study, chronic pain patients were trained in mindfulness meditation for 10 weeks (Kabat-Zinn, Lipworth, & Burney, 1985). Following the intervention, patients showed significant improvements in negative body image, which was maintained for 12 to 15 weeks post-intervention, while no change was reported in the control group.

Meditation interventions with college-aged students are mixed but, overall, show favorable results on mental health and wellbeing. One study of nursing students in Korea examined the effectiveness of a stress-coping program on stress, anxiety, and depression (Kang, Choi, & Ryu, 2009). The students were randomly assigned to either a control group or the experimental group, in which they attended 90-minute training sessions for

eight weeks. The stress-coping program was based on mindfulness meditation, but included lessons on self-reflection and physical stretching. At the end of the eight weeks, the experimental group showed a significant decline in stress, anxiety, and depression scores compared to baseline levels. Results for the two groups further showed a significant difference in stress and anxiety scores, but no significant difference in depression scores.

Another study of nursing students in the United States explored the effects of an 8-week mindfulness-based stress reduction (MBSR) course on stress and empathy (Beddoe & Murphy, 2004). The course was intended to provide students with tools to cope with personal and professional stress and to foster empathy through intrapersonal knowledge. Participation in the intervention significantly reduced students' anxiety and was associated with improved attitude and a favorable trend in Time Pressure Scale scores. Sixty-three percent of participants reported changes in their reactions to thoughts and feelings, 75% reported greater self-confidence, 88% indicated they were more hopeful, and 69% reported they were more assertive and able to express their needs and feelings directly as a result of the training. Two dimensions of empathy – personal distress and fantasy – also demonstrated favorable downward trends. The greatest benefits were found in participants who reported meditating more frequently.

The effects of a mindfulness intervention on obsessive compulsive disorder (OCD) symptoms were investigated among students from Tilburg University, The Netherlands (Hanstede, Gidron, & Nyklicek, 2008). Participants with OCD symptoms either received mindfulness training or formed a waiting-list control group. Meditation included eight group sessions in which meditative breathing, body-scan, and mindful

daily living were taught to participants. The intervention had a significant and large effect on mindfulness, OCD symptoms, letting go of bothering thoughts and feelings, and thought-action fusion. Furthermore, when the researchers controlled for changes in "letting go," the group effects on change in OCD symptoms disappeared, pointing at the skill of letting go of bothering thoughts and feelings as a mediating factor.

Another randomized, controlled study in students found that four weeks of mindfulness mediation training or somatic relaxation training significantly reduced negative psychological states and enhanced positive states of mind for students experiencing distress (Jain et al., 2007). Significant pre-post decreases in both distractive and ruminative thoughts/behaviors were found to be unique to the meditation group, with mediation models suggesting that students' reduction in distress was partially mediated by their reduction in rumination. Compared to normative data, participants in the study reported significant amounts of psychological distress pre-intervention. Following mindfulness training, however, psychological distress fell below normative levels, further demonstrating a clinical significance for this intervention.

Loving-kindness, or compassion, meditation has received less attention in the literature, but there are few studies that have looked at the effects of this form of meditation on mental and physical health. One study of working adults found that loving-kindness meditation led to shifts in people's daily experiences of a wide range of positive emotions, including love, joy, gratitude, contentment, hope, pride, interest, amusement, and awe (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). These positive emotions were apparent during meditation practice and persisted after the session had ended. Over the course of nine weeks, repeated loving-kindness practice produced a cumulative increase

in positive emotions that appeared on subsequent days, even if the individual did not meditate that day. These positive emotions produced increases in mindfulness, purpose in life, and social support, which, in turn, increased life satisfaction and decreased depressive symptoms in participants.

However, the effect of loving-kindness mediation on decentering was not as promising (Feldman, Greeson, & Senville, 2010). Immediately following 15-minute sessions of either mindful breathing, loving-kindness, or progressive muscle relaxation, novice meditators completed measures that assessed decentering, frequency of repetitive thoughts during the exercise, and the degree of negative reaction to thoughts. Participants partaking in mindful breathing reported greater decentering compared to those who practiced progressive muscle relaxation and loving-kindness. In addition, participants in the mindful breathing condition reported a greater frequency of repetitive thoughts, but no difference in negative reaction to thoughts, relative to the other conditions. For participants in the progressive muscle relaxation and loving-kindness mediation groups, there was a stronger association between frequency of repetitive thoughts and negative emotional reactions to them when compared to the mindful breathing group.

In the only study of college students, the effect of compassion meditation on innate immune, neuroendocrine, and behavioral responses to psychosocial stress was investigated (Pace et al., 2009). Participants were randomly assigned to a 6-week training in compassion meditation or a health discussion control group. After completion of the program, participants were exposed to a laboratory psychosocial stressor proven to reliably activate innate immune and neuroendocrine pathways. Within the meditation group, participants who spent more time practicing meditation demonstrated lower levels

of distress and decreased IL-6 production, a measure of systemic inflammatory response that has been associated with major depression (Raison, Capuron, & Miller, 2006).

Since the literature on compassion meditation is limited, further research can provide a better understanding of this form of meditation and its possible mental and physical health effects. Only three of studies have been reported specifically on compassion meditation as an intervention, and none of these have focused on its impact on body image. It is possible that fostering compassion for others as well as oneself may be beneficial for individuals experiencing bodily dissatisfaction and image concerns. Given the high prevalence of eating disorders on college campuses, in addition to the stress and change in environment that is be associated with one's first year away from home, it would be advantageous to study the effects of this intervention on college freshman.

Methods

Participants

The participants were 61 freshmen college students (32 women, and 29 men) enrolled in an introductory health education course at a private University in the southeastern United States. Ages ranged between 17 and 19 years (M = 18.5; SD = 0.70). The sample was 55% Caucasian, 35% Asian, 6.7% African American, 1.7% Hispanic, and 1.7% mixed race. Subjects were medically healthy and had no history of significant psychiatric illness (i.e., schizophrenia, bipolar disorder or depression severe enough to warrant hospitalization) as determined by a psychiatrist certified by the American Board of Psychiatry and Neurology. Potential participants were excluded at the beginning of the study for active psychiatric treatment (including psychotherapy/counseling) or for a score $\geq$ 30 on the Inventory of Depressive Symptoms-Self Report (IDS-SR), consistent with moderate-to-severe depression (Rush et al., 2000). All participants provided written informed consent, and all study procedures were approved by the University's Institutional Review Board.

Procedure

Participants were stratified by sex and then randomly assigned to six weeks of compassion meditation training (n = 33) or a health discussion group (n = 28), which served as the control condition. Measurement instruments were completed during the first week of classes and again during the 14th week of classes.

The compassion meditation program was designed and taught a senior lecturer in the University's Department of Religion. The instructor holds a Geshe Lharampa degree, which is the highest Tibetan Buddhist doctorate awarded to monks. Participants

randomized to meditation training attended a 50-minute class twice a week for six weeks. Class sessions combined teaching and discussion with an average of 20 minutes of meditation practice. Participants were provided with a meditation CD designed to guide "at-home" practice sessions. Although secular in presentation, the compassion meditation program was derived from Tibetan Buddhist mind-training practices. These practices derive largely from writings ascribed to the Indian Buddhist masters Shantideva (8th Century) and Atisha (11th Century) (The Dalai Lama, 2001) and differ in important ways from the mindfulness-based practices that have received scientific attention in recent years. Whereas mindfulness-based practices emphasize the development and maintenance of a non-judgmental stance toward thought processes and emotional reactions (Kabat-Zinn, 1991), lojong practices utilize a cognitive, analytic approach to challenge one's unexamined thoughts and emotions toward other people, with the long-term goal of developing altruistic emotions and behavior towards all people (The Dalai Lama, 2001).

Lojong-based compassion meditation has two primary elements: an initial phase in which various arguments are examined that challenge one's common sense notion of other people as falling into the categories of "friend, enemy and stranger," and a second phase in which one practices developing spontaneous feelings of empathy and love for an ever-expanding circle of people, beginning with the self and extending eventually to those with whom one has conflicts and/or dislikes. Within the Tibetan Buddhist tradition, concentrative (i.e., shamatha) and mindfulness (i.e., vipassana) practices are typically employed as valuable preliminary techniques for establishing the focus and awareness necessary to engage in specific compassion practices (The Dalai Lama, 2001). In keeping

with this tradition, study participants were given two weeks of training in attentional and mindfulness-based techniques to help improve attention and awareness prior to commencing specific lojong compassion practices in training weeks 3–6. The training protocol was highly iterative, such that by the end of 6 weeks, each student's daily meditation practice (guided by CD) began with a brief period of shamatha and vipassana to calm and focus the mind, followed by analytical practices designed to challenge unexamined assumptions regarding feelings and actions toward others with a focus on generating spontaneous empathy and compassion for themselves and other. Table 1 provides a week-by-week description of the elements of the compassion meditation protocol utilized in the current study.

Participants randomized to the control condition attended health discussion groups that, like the meditation intervention, were 50-minute classes that met twice a week for six weeks. Classes were taught by graduate students under the supervision of one of the study investigators in the University's Department of Health, Physical Education & Dance. Topics relevant to the mental and physical health of college students that were discussed included stress management, the physician's exam, environmental health, substance abuse, depression and anxiety, body image and eating disorders, sexual assault, contraception, sexually transmitted infections, and HIV/AIDS. Table 2 provides a week-by-week description of the elements of the health discussion protocol utilized in the current study. In addition to didactic content delivered by the instructor, a variety of techniques were employed to enhance subject participation, including community-building exercises, group discussion, mock debates and role playing. To provide some ''at-home'' activity to match the expectation that participants in the compassion

meditation group would practice meditation on a daily basis, participants in the control group completed a weekly 2-3 page self-improvement paper focused on the health topic discussed that week in class.

Measures

Participation. For both meditation and control groups, participation in the study was assessed as the number of classes attended. Attendance was taken by the instructor at the beginning of each class.

Practice Time. For the meditation group, time spent practicing meditation outside of class also was recorded within 48 hours of its occurrence using a secure, internet-based diary. Practice time was assessed as the total number of minutes spent meditating during the semester, including class time, as recorded in the participants' internet diary.

Body Image. The 69-item Multidimensional Body-Self-Relations Questionnaire (MBSRQ) is a standardized, attitudinal assessment (Thompson, Penner, & Altabe, 1990) of body image and weight-related variables with acceptable reliability and validity in a number of settings (Brown, Cash, & Mikulka, 1990; T. F. Cash, 1990; T.F. Cash & Brown, 1989; T.F. Cash, Winstead, & Janda, 1986). The MBSRQ is composed of seven cross-validated factor subscales, and three separate multi-item scales based on factor analysis. The seven cross-validated factor subscales are: (1) Appearance Evaluation, (2) Appearance Orientation, (3) Fitness Evaluation, (4) Fitness Orientation, (5) Health Evaluation, (6) Health Orientation, and (7) Illness Orientation. The three separate multi-item subscales are: (1) Body-areas Satisfaction, (2) Self-classified Weight, and (3) Overweight Preoccupation. The MBSRQ uses a 5-point response scale, with a 1

indicating “definitely disagree”, 3 indicating “neither agree nor disagree”, and 5 indicating “definitely agree”.

Appearance Evaluation includes one’s feelings of physical attractiveness or unattractiveness (i.e., satisfaction or dissatisfaction with one's looks). High scorers tend to feel positive and satisfied with their appearance, while low scorers tend to have a general unhappiness with their physical appearance. *Appearance Orientation* refers to the extent of one’s investment in their appearance. High scorers place more importance on how they look, pay more attention to their appearance, and engage in extensive “grooming behaviors” to manage their appearance. Low scorers, on the other hand, are more apathetic about their physical appearance; their looks are not especially important and they do not expend much time or energy to “look good.” *Fitness Evaluation* involves one’s perception of being physically fit or unfit. High scorers regard themselves as physically fit, “in shape,” or athletically active and competent. Low scorers feel physically unfit, “out of shape,” or athletically unskilled. *Fitness Orientation* refers to the extent of one’s investment in being physically fit or athletically competent. High scorers value fitness more and are actively involved in activities to enhance or maintain their fitness, while low scorers do not value physical fitness as much and do not regularly incorporate exercise activities into their lifestyle. *Health Evaluation* involves one’s perception of physical health and/or the freedom from physical illness. High scorers tend to feel that their bodies are in good health, while low scorers tend to feel unhealthy or experience bodily symptoms of illness or vulnerability to illness. *Health Orientation* refers to the extent of one’s investment in a physically healthy lifestyle. High scorers are more “health conscious” and try to lead a healthy lifestyle, while low scorers are more

apathetic about their health. *Illness Orientation* refers to the extent of one's reactivity to being or becoming ill. High scorers are alert to personal symptoms of physical illness and are apt to seek medical attention. Conversely, low scorers are not especially alert or reactive to physical symptoms of illness. The *Body-Areas Satisfaction* scale is similar to the Appearance Evaluation subscale, but it emphasizes satisfaction or dissatisfaction with discrete aspects of one's appearance. High scorers are generally content with most areas of their body, while low scorers tend to be unhappy with the size or appearance of several areas of their body. The *Self-Classified Weight* scale reflects how one perceives and labels one's weight, and it ranges from very underweight to very overweight. Finally, the *Overweight Preoccupation* scale assesses a construct reflecting fat anxiety, weight vigilance, dieting, and eating restraint. Cronbach alpha coefficients for the MBSRQ were reported by Adame, Johnson, and Cole (2000) as follows for college women and men respectively: Appearance Evaluation, .85, .86; Appearance Orientation, .87, .83; Fitness Evaluation, .72, .75; Fitness Orientation, .91, .89; Health Evaluation, .73, .75; Health Orientation, .74, .68; Illness Orientation, .74, .77: Body-Areas Satisfaction, .69, .86; Overweight Preoccupation, .85, .66; and, Self-Classified Weight, .71, .76.

Amount of Exercise. Students estimated the amount of time they spent exercising on the 9-point Amount of Self-Reported Exercise Inventory (ASREI), which was developed for this program of research (Adame, Johnson, Cole, Matthiasson, & Abbas, 1990). For this assessment, students were asked to estimate their exercise in hours per week during the last month. The scale ranges from no regular exercise to ten or more hours per week. Exercises include brisk walking, jogging, and aerobics, and sports activities like soccer, tennis, and swimming.

Reliability and validity estimates for the amount of exercise scale have been reported by Adame et al. (Adame, Johnson, Nowicki, Cole, & Matthiasson, 2001). They studied 261 college freshmen in 1987 and 243 college freshmen in 1997, who estimated their amount of exercise and completed the Physical Fitness Test Profile. Measures of physical fitness commonly are used as validation criteria of self-reported measures of physical activity (J. F. Sallis & Saelens, 2000). For the 1987 sample, the Pearson correlation coefficients for the relations between amount of exercise and physical fitness were statistically significant for women, $r(118) = .29$, $p < .01$, and for men, $r(121) = .34$, $p < .001$. For the 1997 sample, the correlations were statistically significant for women, $r(121) = .30$, $p < .01$, and for men, $r(136) = .41$, $p < .001$. Correlations also were computed between amount of exercise and the aerobic power component of the Physical Fitness Test Profile. For the 1987 sample, the correlation coefficients between amount of exercise and aerobic power were statistically significant for women, $r(118) = .19$, $p < .05$, and for men, $r(121) = .18$, $p < .05$. For the 1997 sample, the correlations were statistically significant for women, $r(121) = .48$, $p < .001$, and for men, $r(136) = .50$, $p < .001$.

Reliability of the amount of exercise instrument that was used with the 1987 and 1997 studies was assessed with a recent sample of 128 freshmen and sophomores from the same university as the 1987 and 1997 groups of students. Students were asked to estimate the amount of exercise for the previous month. Two weeks later, the students were asked to estimate their amount of exercise for that same month. For the 85 women, the intraclass correlation for the two estimates of amount of exercise was .89, $p < .001$, and the Pearson correlation coefficient was .80, $p < .001$. For the 43 men, the intraclass correlation was .82, $p < .001$ and the Pearson correlation coefficient was .70, $p < .001$.

Stanford Usual Activity Questionnaire (SUAQ). For this assessment, students were instructed to report their usual activity, with no specified time component. The instrument is comprised of two scales: six items are used to estimate the level of participation in moderate activities, and a separate series of five items is used to assess participation in vigorous activities. The number of moderate activities reported are summed to produce the moderate activity scale (range 0-6) and the number of vigorous activities are summed to produce the vigorous activity scale (range 0-5). The authors (J.F. Sallis et al., 1985) reported test-retest reliability coefficients of .75 and .83 for the moderate and vigorous scales, respectively. Jacobs et al. (Jacobs, Ainsworth, Hartman, & Leon, 1993) reported test-retest reliability coefficients of .77 and .67 for the moderate and vigorous scales, respectively. The authors also investigated the validity of the SUAQ by testing the relationship between the activity scales and maximum oxygen consumption and found statistically significant correlations for the moderate ($r = .27$) and vigorous ($r = .38$) scales.

Analysis

Pearson product moment correlation coefficients were used to assess the relations between amount of exercise (ASREI; SUAQ) and amount of meditation practice. One-way ANCOVAs were used to assess possible pretest differences for the study measures by treatment group. Since class attendance was significantly different between groups, it was used as a covariate in each analysis.

Participants randomized to compassion meditation training were divided into high-practice ($n = 16$) and low-practice groups ($n = 17$) based on median practice time. Study participants were categorized into two exercise groups based on change in total

SUAQ scores from pretest to posttest: (1) Decrease in amount of exercise (n = 29); (2) Increase or no change in amount of exercise (n = 32). Three (low practice meditation; high-practice meditation; control) by two (decrease in exercise; increase or no change in exercise) by two (pretest; posttest) repeated measures analyses of covariance (ANCOVA) were conducted for each body image scale controlled for class attendance. Scales were ordered a priori for a step-down ANCOVA in the following order: Appearance Orientation, Overweight Preoccupation, Health Orientation, Fitness Orientation, Illness Orientation, Appearance Evaluation, Body-Areas Satisfaction, Fitness Evaluation, Health Evaluation, and Self-Classified Weight. Simple main effects analyses were conducted to isolate the source(s) of statistically significant interactions. Tests of significance were two-sided with an alpha level set at $p < .05$.

Results

The study flowchart is provided in Figure 1. Ninety-three individuals signed consent and were screened for study participation. Eighty-nine of these individuals (39 males/50 females) met entry criteria and were randomized to either compassion meditation (n = 45) or the health discussion control group (n = 44). Twenty-eight participants (31.5%) withdrew from the study after randomization but prior to completing the study (12 [26.7%] from the meditation group and 16 [36.4%] from the control group). Sixty-one participants (68.5%) completed the study (meditation n = 33 [73.3%]; control n = 28 [63.6%]). Primary reasons for withdrawal included scheduling conflicts, desire to discontinue meditation training or being disqualified from (i.e., due to illness) or unwilling/unable to participate in the study.

As shown in Table 3, no differences were found between participants completing the meditation or control groups in terms of age, sex, BMI, or IDS-SR scores. Class attendance was approximately 90% in both groups; however, participants randomized to the control group attended significantly more classes (11.46 [S.D. = 0.88]; range 8-12 classes) than did participants randomized to compassion meditation (10.67 [S.D. = 0.99]; range 8-12 classes) ($t = 3.30$, d.f. = 59, $p < 0.05$). Within the meditation group, the average number of ‘‘at-home’’ practice sessions per week was 2.81 (S.D. = 1.65; range 0.55-7.01 sessions) and the mean number of total practice sessions per week during the study (class + at-home) was 3.64 (S.D. = 1.65; range 1.34-7.87 sessions) (Table 3). The average time spent meditating per session outside of class was 20.08 min (S.D. = 4.54; range 11-29 min). No significant correlations were found between any demographic or

clinical variables (i.e., age, sex, BMI, IDS-SR score) and total number of practice sessions in the meditation group (data not shown).

Research Question 1: Is there a relationship between amount of meditation practice and amount of exercise?

For the 33 study participants randomized to the compassion meditation group, there was a statistically significant positive relationship between amount of meditation practice during weeks 1 to 3 and amount of exercise as measured by total SUAQ scores at pretest, $r(31) = .37$, $p = .036$, and a non-significant positive trend toward a relationship between total amount of meditation practice during the semester and amount of exercise as measured by SUAQ scores at posttest, $r(31) = .30$, $p = .089$. There was a non-significant trend toward a relationship between amount of meditation practice during weeks 1 to 3 and amount of exercise as measured by ASREI scores at pretest, $r(31) = .30$, $p = .090$. Since, of the two exercise measures, there was a stronger association between meditation practice and SUAQ scores, SUAQ scores were used to categorize students into change of exercise groups to test research questions 2 through 4.

Research Question 2: Is the level of practice (high vs. low) of compassion meditation practice associated with a change in body image?

Means and standard deviations for body image scales by low and high meditation practice and control groups are presented in Table 4 and by exercise group in Table 5. Statistically significant results are presented below by body image scale. There were no significant pretest treatment group differences for the body image measures.

Appearance Orientation. There was a no statistically significant treatment group x time interaction.

Overweight Preoccupation. There was a no statistically significant treatment group x time interaction.

Health Orientation. There was a significant treatment group x time interaction, p = .013, partial eta squared = .16. High-practice meditators increased their extent of investment in a physically healthy lifestyle from pretest (M = 3.32, SE = 0.15) to posttest (M = 3.61, SE = 0.17). In contrast, both low-practice meditators and control participants became more apathetic about their health. Scores for low-practice meditators decreased from pretest (M = 3.45, SE = 0.15) to posttest (M = 3.36, SE = 0.16) and scores for controls decreased from pretest (M = 3.39, SE = 0.11) to posttest (M = 3.25, SE = 0.12).

Fitness Orientation. There was a no statistically significant treatment group x time interaction.

Illness Orientation. There was a no statistically significant treatment group x time interaction.

Appearance Evaluation. There was a no statistically significant treatment group x time interaction.

Body-Areas Satisfaction. There was a no statistically significant treatment group x time interaction.

Fitness Evaluation. There was a no statistically significant treatment group x time interaction.

Health Evaluation. There was a no statistically significant treatment group x time interaction.

Self-Classified Weight. There was a no statistically significant treatment group x time interaction.

Research Question 3: Is a change in exercise behavior associated with a change in body image?

Means and standard deviations for body image scales by change in exercise are presented in Table 5. Statistically significant results are presented below by body image scale. There were no significant pretest treatment group differences for the body image measures.

Appearance Orientation. There was a no statistically significant exercise group x time interaction.

Overweight Preoccupation. There was a no statistically significant exercise group x time interaction.

Health Orientation. There was a no statistically significant exercise group x time interaction.

Fitness Orientation. There was a significant main effect for amount of exercise, p = .029, partial eta squared = .09. Extent of investment in being physically fit was higher (M = 3.62, SE = 0.78) for students whose exercise increased or stayed the same and lower (M = 3.14, SE = 0.72) for students whose amount of exercise decreased.

Illness Orientation. There was a significant main effect for amount of exercise, p = .002, partial eta squared = .18. Extent of one's reactivity to being or becoming ill was higher (M = 3.28, SE = 0.13) for students whose exercise increased or stayed the same and lower (M = 2.92, SE = 0.14) for students whose amount of exercise decreased.

Appearance Evaluation. There was a statistically significant exercise group x time interaction, p = .004, partial eta squared = .16. Students whose exercise increased or stayed the same had increased satisfaction with appearance from pretest (M = 3.35, SE =

0.12) to posttest (M = 3.50, SE = 0.12), while students who reported a decrease in exercise had decreased satisfaction with their appearance from pretest (M = 3.52, SE = 0.13) to posttest (M = 3.37, SE = 0.13).

Body-Areas Satisfaction. There was a no statistically significant exercise group x time interaction.

Fitness Evaluation. There was a no statistically significant exercise group x time interaction.

Health Evaluation. There was a no statistically significant exercise group x time interaction.

Self-Classified Weight. There was a no statistically significant exercise group x time interaction.

Research Question 4: Do the level of practice of compassion meditation and change in exercise behavior have an interactive effect upon change in body image?

Appearance Orientation. There was a no statistically significant treatment group x exercise group x time interaction.

Overweight Preoccupation. There was a no statistically significant treatment group x exercise group x time interaction.

Health Orientation. There was a no statistically significant treatment group x exercise group x time interaction.

Fitness Orientation. There was a no statistically significant treatment group x exercise group x time interaction.

Illness Orientation. There was a no statistically significant treatment group x exercise group x time interaction.

Appearance Evaluation. There was a significant treatment group x exercise group x time interaction, $p < .001$, partial eta squared = .29. The source of the interaction was for high-practice meditators ($p = .001$). For those who whose exercise increased or stayed the same, satisfaction with appearance increased from pretest ($M = 2.86$, $SE = 0.24$) to posttest ($M = 3.34$, $SE = 0.23$); for those high-practice meditators who decreased in exercise, satisfaction with their appearance decreased from pretest ($M = 3.59$, $SE = 0.24$) to posttest ($M = 3.20$, $SE = 0.23$). There was no difference in appearance evaluation among low-practice meditators who either increased or maintained or decreased their exercise.

Body-Areas Satisfaction. There was a treatment group x exercise group x time interaction that approached significance, $p = .08$, partial eta squared = .10. The significant source of the interaction was for high-practice meditators ($p = .009$); for those whose exercise increased or stayed the same, there was an increase in general contentment with most areas of their body from pretest ($M = 3.20$, $SE = 0.21$) to posttest ($M = 3.61$, $SE = 0.22$), while for those high-practice meditators who reported a decrease in exercise, their contentment with body areas decreased from pretest ($M = 3.33$, $SE = 0.21$) to posttest ($M = 3.03$, $SE = 0.22$). There was no difference in body areas satisfaction among low-practice meditators who either increased or maintained or decreased their exercise.

Fitness Evaluation. There was a no statistically significant treatment group x exercise group x time interaction.

Health Evaluation. There was a no statistically significant treatment group x exercise group x time interaction.

Self-Classified Weight. There was a no statistically significant treatment group x exercise group x time interaction.

Discussion

In terms of exercise habits, there was a significant positive relationship between the students' amount of exercise at the start of the intervention and the minutes they spent meditating during the first three weeks of the intervention. Participants who reported higher amounts of exercise spent more time meditating, while participants who reported lower amounts of exercise spent less time meditating. Although a significant relationship was not found for the meditation practice time during the course of the intervention and self-reported exercise at posttest, there was a positive trend suggesting that those students who spent more time meditating were still investing more time in exercise by the end of the intervention.

When the effects of meditation on body image were assessed, a difference was found for the students' health orientation. Students who meditated more frequently throughout the course of the training became more health conscious and were investing more in a physically healthy lifestyle, while control participants and those who meditated less frequently became more apathetic about their health. These results are consistent with the findings of Fredrickson et al. (2008) that compassion meditation led to an increase in positive emotions. The results of the current study extend these findings, showing that compassion meditation can have a positive effect on behavior, specifically college students' investment in a healthy lifestyle.

Physical exercise affected some aspects of body image, as well. Students whose exercise increased or stayed the same over the course of the intervention became more involved in activities to enhance or maintain their fitness, more alert to personal symptoms of physical illness and likely to seek medical attention, and more satisfied with

their appearance when compared to students whose exercise decreased. While the literature on exercise and body image is mixed, these results are consistent with findings that have demonstrated a positive impact of physical activity on increasing body satisfaction (Campbell & Hausenblas, 2009).

In addition to the aspects of body image that were associated with the main effect of meditation group and the main effect of exercise group, there were two body image components that were associated with the interactive effect of compassion meditation and amount of exercise. With respect to feelings of physical attractiveness or unattractiveness, high-practice meditators who increased or maintained their amount of exercise over the course of the intervention became more satisfied with their appearance, while high-practice meditators who decreased their amount of exercise became less satisfied with their appearance. A similar pattern emerged for student's satisfaction with discrete areas of their body. A trend appeared in which high-practice meditators who increased or maintained their amount of exercise became more content with most areas of their bodies, while high-practice meditators who decreased their amount of exercise became less satisfied with their bodies. With both aspects of body image in which there was an interactive effect, no difference in body image was found among low-practice meditators who either increased or maintained or decreased their exercise over the course of the intervention. These findings may help to explain the mixed results in previous studies of the impact of physical activity upon body image as they suggest that a degree of self-compassion may need to be present before one's activity level impacts how one feels about one's body.

The current study, therefore, provides new findings on the potentially beneficial effects of meditation and exercise on health. The results suggest that compassion meditation and exercise may independently and interactively contribute to improved body image in college students. Interestingly, although exercise was shown to have a positive impact on one's satisfaction with one's appearance, the effect size is larger when individuals both increased their exercise and meditated more frequently. In addition, neither exercise nor meditation had an impact on students' satisfaction with discrete aspects of their appearance in isolation, but there was a trend toward improved satisfaction with these discrete areas among high-practice meditators who increased their exercise over the course of the intervention.

These results should be viewed in light of several limitations. The sample size was small and, therefore, the results may not be generalizable to the entire student population. The University from which this sample was taken also is not representative among all universities in that the Dalai Lama holds a position as a Presidential Distinguished Professor. For this reason, students' exposure to meditation may vary from that of other college students. Furthermore, the study was implemented in a freshman health education class, so it does not provide information on the impact the intervention would have on upperclassmen. Freshman year may be considered particularly distinguishable from others due to the influence of recent change, unfamiliarity, and making of new friends. In addition, meditation was not tracked in the control group, so there is no way of knowing whether the students were meditating on their own. The self-report method may also present issues due to social desirability bias or issues with recall.

Despite these problems, randomization and an active control group are major strengths of the current study. The health discussion group helped control for several nonspecific aspects of meditation training, such as group support and a focus on wellbeing, which might influence body image and perception. Further research and replication of the current study with a larger sample size would be beneficial in further investigating the effects of compassion meditation and exercise on body image. In the current study, certain aspects of body image improved in individuals involved in the meditation training over those in the health discussion group. For this reason, colleges may want to consider implementing meditation practice into already existing health education curriculum. Future research on the advantages and disadvantages of this approach are needed.

College freshman tend to carry the burden of a high level of stress, since it is a period of transition and uncertainty about the future. For this reason, they are an important population for the focus of public health interventions. Body image is believed to be a core aspect of one's physical and mental health, and it has been shown that most mental disorders first emerge during adolescence (Kessler et al., 2005). Interventions aimed at improving body image in these individuals may not only improve students' self-esteem, but it may also help prevent other harmful behaviors that may be picked up during the college years, such as frequent dieting, high-risk sexual behaviors, cigarette smoking, and suicidal ideation. More attention should be devoted toward the development and testing of such interventions.

Figure 1. Flowchart for participant progress through the stages of the randomized trial

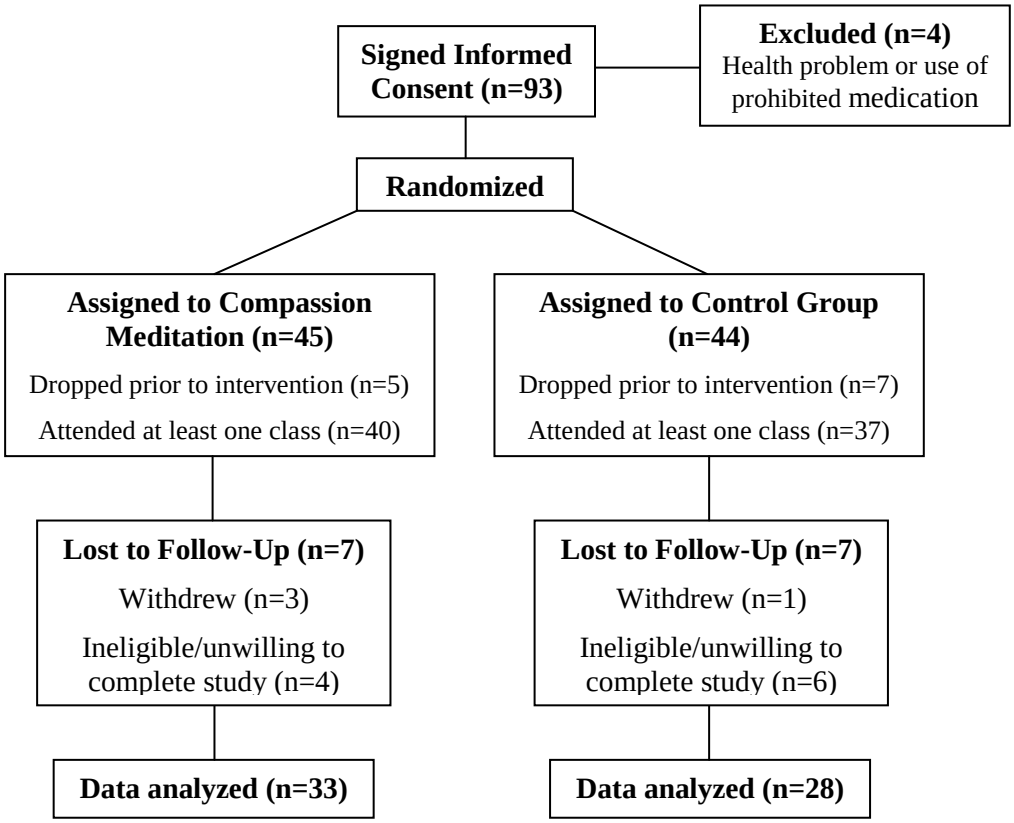

Table 1. Elements and schedule of compassion meditation training program

Week 1: Developing basic concentration and mental stability. Participants taught basic attentional meditation practice (i.e. shamatha) by using the breath as the object of focus.
Week 2: Introduction of mindfulness (i.e. vipassana) practice. Participants instructed in the techniques of non-judgmental observation of the processes of thought and bodily sensation.
Week 3: Use of concentrative and mindfulness techniques to explore universal human desires for happiness and wishes to avoid suffering as a prelude toward the practice of developing compassion for the self.
Week 4: Continuing meditation on the thought that the self shares with all people a desire for happiness and a wish to avoid suffering, as well as a struggle to attain these goals. Participants instructed to expand upon this awareness to examine the contingent and changeable nature of the distinctions between "friends" and "enemies", with the goal of generating a felt sense that instinctive emotional responses to others do not reflect reality.
Week 5: Meditative reflection on the disadvantages of selfishness and a self-centered attitude and the advantages of considering the welfare of others. Participants guided through meditative techniques aimed at generating compassionate emotions and cognitions for those emotionally close to them.
Week 6: Meditation aimed at attempting to generate compassionate emotions not only for friends, but also for strangers.

Table 2. Elements and schedule of health discussion program

Week 1: Introduce students, and encourage the formation of a small group community to foster discussion. Discuss the different types of stress that are a part of life and develop strategies to prevent and reduce stress responses.
Week 2: Demystify the common tests and procedures of the routine physician's examination. Understand the impact individuals can have on the environment and how the environment can impact the health of an individual.
Week 3: Understand the types of commonly abused drugs on college campuses, dependency and addiction, and resources available to prevent or treat drug addiction. Understand depression as a disease and how to recognize warning signs and intervene if you suspect a friend is in need of help.
Week 4: Discuss the cultural construction of the concept of "ideal body type" and understand types of eating disorders and resources for those affected. Discuss the problem of sexual assault on college campuses and discuss the role of culture and society on creating situations where sexual assault may be more prone to occur.
Week 5: Discuss contraception options and the pros, cons, and personal choices when it comes to heterosexual intercourse and preventing pregnancy. Learn about common sexual transmitted infections (STIs), modes of transmission, prevention and treatment methods.
Week 6: Learn about the biological basis of HIV and AIDS and how stigmatization of the disease has affected transmission and health education. Evaluate the knowledge gained by students and evaluate the curriculum for future improvements to the program.

Table 3. Characteristics of the 61 subjects randomized to compassion meditation or a health discussion control group.

Characteristic	Compassion meditation group	Health discussion control group
Number of subjects	33	28
Females/males	17/16	15/13
Mean age (S.D.)	18.48 (0.62)	18.54 (0.69)
Body mass index (S.D.)	22.60 (2.96)	22.02 (2.57)
Baseline IDS-SR score (S.D.)	13.27 (6.64)	12.32 (6.98)
Mean number (percentage) of classes attended	10.67 (89)	11.46 (96)*
Mean at-home meditation sessions/week (S.D.)	2.81 (1.65)	NA
Mean practice time per at-home session (S.D.)	20.08 (4.54)	NA

*$p < 0.05$ compassion meditation vs. health discussion control group; NA = not applicable.

Table 4. Means and Standard Deviations for Body Image Scales by Treatment Group.

	Meditation Groups				Control Group	
	Low Practice (n=16)		High-practice (n=17)		(n=28)	
Study Measures	**Pretest M (SD)**	**Posttest M (SD)**	**Pretest M (SD)**	**Posttest M (SD)**	**Pretest M (SD)**	**Posttest M (SD)**
Body Image (MBSRQ)						
Appearance						
Evaluation	3.66 (0.60)	3.62 (0.66)	3.22 (0.77)	3.27 (0.65)	3.43 (0.67)	3.43 (0.63)
Orientation	3.30 (0.65)	3.12 (0.67)	3.53 (0.87)	3.36 (0.89)	3.39 (0.72)	3.20 (0.77)
Fitness						
Evaluation	3.51 (0.91)	3.59 (1.08)	3.46 (0.59)	3.52 (0.71)	3.31 (0.83)	3.46 (0.72)
Orientation	3.72 (0.83)	3.46 (0.80)	3.45 (0.72)	3.50 (0.74)	3.38 (0.86)	3.29 (0.82)
Health						
Evaluation	4.00 (0.54)	3.86 (0.71)	3.59 (0.76)	3.72 (0.89)	3.64 (0.46)	3.61 (0.49)
Orientation	3.43 (0.63)	3.35 (0.71)	3.32 (0.55)	3.61 (0.58)	3.39 (0.59)	3.25 (0.68)
Illness						
Orientation	3.01 (0.90)	3.09 (0.95)	3.05 (0.86)	3.10 (0.87)	3.21 (0.62)	3.13 (0.73)
Body Areas Satisfaction	3.31 (0.47)	3.40 (0.53)	3.27 (0.79)	3.32 (0.69)	3.39 (0.49)	3.44 (0.62)
Overweight Preoccupation	2.25 (0.59)	2.09 (0.59)	2.53 (1.08)	2.50 (1.17)	2.27 (0.88)	2.37 (0.86)
Self-Classified Weight	3.06 (0.46)	3.03 (0.60)	3.16 (0.57)	3.09 (0.64)	3.00 (0.62)	3.09 (0.51)

Table 5. Means and Standard Deviations for Body Image Scales by Exercise Group.

Study Measures	Increase or No Change in Amount of Exercise (n=32) Pretest M (SD)	Increase or No Change in Amount of Exercise (n=32) Posttest M (SD)	Decrease in Amount of Exercise (n=29) Pretest M (SD)	Decrease in Amount of Exercise (n=29) Posttest M (SD)
Body Image (MBSRQ)				
Appearance				
Evaluation	3.41 (0.65)	3.50 (0.63)	3.48 (0.73)	3.38 (0.67)
Orientation	3.40 (0.80)	3.18 (0.79)	3.40 (0.67)	3.26 (0.77)
Fitness				
Evaluation	3.41 (0.72)	3.59 (0.79)	3.40 (0.88)	3.42 (0.86)
Orientation	3.69 (0.84)	3.62 (0.78)	3.28 (0.75)	3.14 (0.72)
Health				
Evaluation	3.74 (0.67)	3.76 (0.67)	3.71 (0.50)	3.66 (0.69)
Orientation	3.43 (0.53)	3.47 (0.72)	3.32 (0.64)	3.26 (0.60)
Illness				
Orientation	3.24 (0.76)	3.28 (0.70)	2.97 (0.76)	2.92 (0.91)
Body Areas Satisfaction	3.37 (0.60)	3.52 (0.63)	3.27 (0.53)	3.26 (0.56)
Overweight Preoccupation	2.30 (0.93)	2.28 (0.92)	2.37 (0.83)	2.37 (0.87)
Self-Classified Weight	3.00 (0.55)	3.00 (0.52)	3.12 (0.58)	3.16 (0.60)

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