Innovative Interventions for Disordered Eating: A Pilot Comparison Between Dissonance-Based and Yoga Interventions

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Innovative Interventions for Disordered Eating: A Pilot Comparison Between Dissonance-Based and Yoga Interventions

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University

by

Karen S. Mitchell
Bachelor of Science, Virginia Commonwealth University, 2002

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Abstract

INNOVATIVE INTERVENTIONS FOR DISORDERED EATING: A PILOT COMPARISON OF DISSONANCE-BASED AND YOGA INTERVENTIONS

Karen S. Mitchell, B.S.

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University

Virginia Commonwealth University, 2005

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Disordered eating, including bingeing, dieting, purging, and clinical and subclinical forms of anorexia nervosa, bulimia nervosa, and binge eating disorder, is prevalent among college-aged women. To date, few interventions have successfully reduced risk factors related to disordered eating. One promising intervention utilizes principles of cognitive dissonance to reduce thin-ideal internalization among women at risk for eating disorders. Additionally, the benefits of yoga, including increased awareness of bodily processes, offer hope that this practice might reduce disordered eating symptomatology. The current study compared cognitive dissonance and yoga interventions for disordered eating attitudes and behaviors. Hierarchical regression analyses revealed that there were no significant differences between the yoga and control groups. However, participants in the dissonance group had significantly lower scores
than both other groups on measures of disordered eating symptoms as well as thin-ideal internalization, body dissatisfaction, alexithymia, and anxiety. These findings have important implications for potential interventions on college campuses.
Introduction

Innovative Interventions for Disordered Eating: A Pilot Comparison Between Dissonance-Based and Yoga Interventions

Disordered eating is prevalent among college students. For example, Mitchell and Mazzeo (2004) found that 13.3% of a sample of African American and Caucasian undergraduate women at Virginia Commonwealth University reported moderate or severe binge eating. Research studies examining a broader range of disordered eating behaviors (e.g., extreme dieting, purging) have found even higher rates of disturbance. Hawkins and Clement (1980) found that as many as 79% of undergraduate women report eating disorder symptomatology, and Mintz and Betz (1988) reported that 61% of their sample evidenced some form of eating disturbance, including subclinical bulimia nervosa (BN), chronic dieting, or bingeing or purging alone. These findings underscore the tremendous need for effective interventions for disordered eating among college women. Unfortunately, very few interventions have successfully reduced eating disorder symptoms and related attitudes (e.g., Carter, Stewart, Dunn, & Fairburn, 1997; Mann et al., 1997).

The following sections outline risk factors for disordered eating, including body dissatisfaction, thin-ideal internalization, dieting, depression, and anxiety. Additionally, an overview of the extant literature regarding prevention efforts in this area is presented.
Risk Factors for Disordered Eating

Risk factor terminology recently has been the focus of several empirically-based articles (e.g., Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004; Kazdin, Kraemer, Kessler, Kupfer, & Offer, 1997; Kraemer et al., 1997). Specifically, Kraemer et al. (1997) argue that the term “risk factor” has been misused, often implying causation when there is no empirical proof that the construct precedes the incidence of an illness or disorder. These authors suggest a typology for risk factors based on empirical findings that these constructs precede the outcome of interest. Further, once a variable has been demonstrated to occur before an outcome in a population, it is then subsequently categorized as to its potency, i.e., its potential to divide a population into high- and low-risk groups for that outcome.

Jacobi et al. (2004) applied this typology for the classification of risk factors for eating disorders to the extant literature and demonstrated that the term risk factor has often been used too liberally in this area of research. For this study, I focused on five established risk factors: body image dissatisfaction, thin-ideal internalization, dieting, depression, and anxiety. Jacobi et al. (2004) classified dieting, body image dissatisfaction and weight concerns, including thin-ideal internalization, as potent variable risk factors, meaning that they are robust predictors of disordered eating and can change spontaneously within an individual or through an intervention. According to this typology, negative affect and anxiety disorders are nonspecific risk factors because longitudinal studies have demonstrated that these conditions precede both eating disorders and other psychiatric illnesses. Nonetheless, depression and anxiety are
included in this study because of the large number of studies which have found evidence of their comorbidity with eating disorders (e.g., Antony, Johnson, Carr-Nangle, & Abel, 1994; Brewerton et al., 1995; Braun, Sunday, and Halmi, 1994; Bulik, Sullivan, & Kendler, 2002; Fornari et al., 1992; Mitchell & Mazzeo, 2004; Mussell et al., 1995; Raymond, Mussell, Mitchell, de Zwaan, & Crosby, 1995; Smith, Marcus, Lewis, Fornari et al., 1992; Mitchell & Mazzeo, 2004; Mussell et al., 1995; Raymond, Mussell, Mitchell, de Zwaan, & Crosby, 1995; Smith, Marcus, Lewis, Mussell, Mitchell, de Zwaan, & Crosby, 1995; Smith, Marcus, Lewis, Fornari et al., 1992; Mitchell & Mazzeo, 2004; Mussell et al., 1995; Raymond, Mussell, Mitchell, de Zwaan, & Crosby, 1995; Smith, Marcus, Lewis, Fitzgibbon, & Schreiner, 1998; Tanofsky, Wilfley, Spurrell, Welch, & Brownell, 1997; Telch & Agras, 1994; Telch & Stice, 1998).

Additionally, poor interoceptive awareness, which describes difficulty in interpreting internal states (Leon, Fulkerson, Perry, & Cudeck, 1993), has been identified as a variable risk factor of unclear potency and specificity, due to the somewhat conflictual findings in the literature (Jacobi et al., 2004). A related construct, alexithymia (a condition in which an individual has difficulty identifying and describing his or her emotions; Sifneos, 1973), has been found to be associated with disordered eating (e.g., de Zwaan et al., 1995; Leon, Fulkerson, Perry, & Early-Zald, 1995; Mazzeo & Espelage, 2002; Schmidt, Jiwany, & Treasure, 1993; Sexton, Sunday, Hurt, & Halmi, 1998). Thus, it will be included in the current study.

**Body Image Dissatisfaction.** Body image dissatisfaction has emerged as one of the most significant predictors of disordered eating (Attie & Brooks-Gunn, 1989; Field, Camargo, Taylor, Berkey, & Colditz 1999; Graber, Brooks-Gunn, Paikoff, & Warren, 1994; Jacobi et al., 2004; Killen et al., 1994, 1996; Leon et al., 1993; Stice & Agras, 1998). Attie & Brooks-Gunn (1989) conducted one of the first studies on body dissatisfaction as a precursor to the onset of eating problems in normal adolescent girls.
The researchers assessed disordered eating, body fat, negative body image, psychopathology, and family relationships in 193 Caucasian females in the 7th grade (Time 1) and again two years later (Time 2). Negative body image was the only variable that predicted long-term change in disordered eating, such that adolescents with negative body image at Time 1 had higher rates of disordered eating at Time 2. Additionally, Leon et al. (1993) supported these findings in an investigation of personality and behavioral characteristics associated with increased risk for eating disturbances among 7th-10th grade adolescent girls. Body dissatisfaction, along with negative emotionality and poor interoceptive awareness were the strongest predictors of increased risk status.

More recent studies have corroborated these earlier findings. For example, in a nine month study involving 218 female adolescents, perceived pressure to be thin, thin-ideal internalization, body dissatisfaction, and dieting predicted the onset of binge eating and compensatory behaviors, (e.g., vomiting, use of laxatives, and fasting; Stice & Agras, 1998). Field et al. (1999) conducted a longitudinal investigation of peer and media influences on the onset of purging among preadolescent and adolescent girls. Results indicated that concern with weight and shape; dieting; importance of thinness to peers; and trying to look like females on television, in movies, or in magazines predicted the beginning of purging behaviors.

Of note, in a recent study, Presnell, Bearman, and Stice (2004) investigated factors which lead to the development of body dissatisfaction. Results of their investigation indicated that higher body mass index (BMI) and negative affect, as well as perceived pressure for thinness, and social support deficits predicted body image
disturbances among adolescent girls as well as boys. Interestingly, they also found that thin-ideal internalization did not contribute to the variance in body dissatisfaction.

**Thin-Ideal Internalization.** Internalizing a thin ideal has been shown to contribute to dieting, body image dissatisfaction, and negative affect (the McKnight Investigators, 2003; Stice, 2001; Stice & Agras, 1998; Stice, Mazotti, Weibel, & Agras, 2000). In the aforementioned study by Stice and Agras (1998), thin-ideal internalization predicted the onset of bulimic symptomatology. Furthermore, Stice (2001) tested the dual-pathway model of bulimia (proposed by Stice & Agras, 1998) in a community sample of 231 adolescent girls. Results indicated that thin-ideal internalization and pressure to be thin predicted body image dissatisfaction, which then led to dieting and negative affect. These factors further predicted bulimic symptoms. Additionally, lower scores on measures of thin-ideal internalization among binge eaters at Time 1 predicted the cessation of binge eating at Time 2 (Stice & Agras, 1998). Similar results were found by the McKnight Investigators (2003) who conducted a longitudinal study of risk factors for the development of eating disorders. Thin-body preoccupation, along with social pressure to be thin, were the most important predictors of disordered eating symptomatology among middle and high school girls.

**Dieting.** Dieting has been identified as a significant risk factor for disordered eating (Agras & Telch, 1998; Field et al., 1999; Jacobi et al., 2004; Polivy & Herman, 1985; Stice, 2001; Stice & Agras, 1998). According to the dual-pathway model, dieting, along with negative affect, predicts the onset of bulimic symptoms. Furthermore, the
aforementioned study by Field et al. (1999) found that frequency of dieting predicted the onset of purging at least once a month.

Results of an experimental study which involved the manipulation of caloric deprivation corroborated these findings. Agras and Telch (1998) investigated the effects of food deprivation among a sample of women meeting criteria for BED. The researchers found that individuals who did not eat for 14 hours subsequently binge ate at significantly higher rates compared to individuals who were not deprived. Additional studies which have supported the relationship between dieting and subsequent disordered eating include Mussel1 et al.'s (1997) study involving 221 women who participated in treatment for BN. Findings indicated that a majority of the participants (69.9%) had dieted before the onset of binge eating, compared to a small number of women who reported bingeing first (8.8%). This study was cross-sectional and relied on retrospective self-reports, which are limited by the participants' ability to accurately remember the age at which they first dieted and binged. However, results from longitudinal studies also support the causal relationship between dieting and eating problems (see Polivy & Herman, 1985, for a review).

**Depression.** Studies have shown significant correlations between disordered eating, including anorexic, bulimic, and binge eating symptomatology, and depression (e.g., Brewerton et al., 1995; Braun et al., 1994; Bulik et al., 2002; Mussell et al., 1995; Raymond et al., 1995; Smith et al., 1998; Telch & Agras, 1994; Telch & Stice, 1998). For example, Brewerton et al. (1995) found that, in a sample of 59 women with BN, 75% had a comorbid diagnosis of any affective disorder, 63% had a depressive disorder, and
36% had an anxiety disorder. Additionally, Yanovski, Nelson, Dubbert, and Spitzer (1993) found that participants with BED were more likely to have a lifetime diagnosis of any Axis I disorder, particularly Major Depression, than obese, non-eating disordered (NED) controls. Similar results have subsequently been found in community samples (e.g., Telch & Stice, 1998). A recent study by Mitchell and Mazzeo (2004) found that depression was significantly associated with disordered eating symptomatology among Caucasian, but not African American, undergraduate women.

**Anxiety.** While depression has been the main focus of research on disordered eating and comorbid Axis I disorders, there is evidence to suggest that anxiety is also prevalent among individuals with eating disturbances (e.g., Fornari et al., 1992; Mitchell & Mazzeo, 2004). Several studies have found an association between BED and anxiety symptomatology in clinical samples (e.g., Antony et al., 1994; Yanovski et al., 1993). In the aforementioned study by Mitchell and Mazzeo (2004), anxiety was the only unique predictor of disordered eating among African American women. Furthermore, the relationship between eating disturbances and anxiety has been found in both men and women with BED (Tanofsky et al., 1997). However, a recent review of the comorbidity between anxiety and eating disorders (Godart, Flament, Perdereau, & Jeammet, 2002) found tremendous variability in estimates of comorbidity rates, from 25-75% among individuals with BN and 23-54% among individuals with AN. Moreover, few studies to date have included control groups, which raises questions about the validity of these findings. Godart et al. (2002) further criticized previous studies for focusing mainly on clinical samples and for including comorbid anxiety only as a secondary assessment in
treatment and follow up studies. According to this review, studies of comorbid obsessive-compulsive disorder (OCD) among individuals with AN and BN have been the most consistently supported among clinical samples (e.g., Fornari et al., 1992). However, the investigations demonstrating the highest rates of OCD among individuals with AN used DSM-III criteria to diagnose OCD. The inclusion of food-related obsessions and compulsions in these criteria likely may have skewed their results (Fornari et al., 1992).

Regarding other specific anxiety disorders, generalized anxiety disorder (GAD) has been estimated to be 6.1 times more prevalent among women with AN (Walters & Kendler, 1995) and 2.6 times more prevalent among women with BN (Garfinkel et al., 1995) than among non-eating disordered women. The great variety of findings regarding comorbid anxiety and disordered eating underscores the necessity of further investigation of anxiety as a specific outcome.

Alexithymia. Heatherton and Baumeister (1991) theorized that binge eating may represent a means of escape from negative affect or a reduction in awareness of negative emotions. Additional studies have focused on the relationship between alexithymia and all eating disorders (de Zwaan et al., 1995; Mazzeo & Espelage, 2002; Schmidt, Jiwany, & Treasure, 1993; Sexton, Sunday, Hurt, & Halmi, 1998). The aforementioned study by Leon et al. (1993) discovered that poor interoceptive awareness, along with body dissatisfaction and negative emotionality, predicted increased risk for disordered eating. Further, in a three-year study of the development of eating disorders, Leon et al. (1995) found that poor interoceptive awareness at Year 2 significantly predicted elevated risk status for disordered eating at Year 3. A more recent study by Mazzeo and Espelage
(2002) found that alexithymia mediated the relationship between childhood abuse and disordered eating. Given the potential associations between alexithymia and disordered eating as well as negative affect, this variable was included in the current study.

**Eating Disorder Interventions**

*Iatrogenic Effects.* Despite demonstrated need for eating disorder interventions, the extant literature in this area depicts a fairly pessimistic picture (Levine & Smolak, 2001; Striegel-Moore & Steiner-Adair, 1998). Many prevention efforts to date have had only modest success, and improvements are usually limited to increases in knowledge regarding disordered eating and do not impact actual attitudes or behaviors (McVey & Davis, 2002; Smolak, Levine, & Schermer, 1998; Stice & Shaw, 2004). Alarmingly, several studies have found that prevention efforts produced iatrogenic effects (Carter et al., 1997; Mann et al., 1997; O'Dea & Abraham, 2000). For example, Mann et al. (1997) implemented an eating disorder prevention program with 788 college freshman women. Participants attended 90-minute discussion groups with a panel of two college women who had personal histories of eating disorders. The investigators found that intervention participants exhibited more disordered eating behaviors than control participants four weeks after the program. While the researchers did not control for baseline scores, they did note that there were no differences in scores on baseline measures between the intervention and control groups. The researchers concluded that the intervention may have normalized eating disorders by reducing the stigma that these diagnoses can carry. Further, they suggested that the attractiveness of the panelists with eating disorder histories might have undermined the seriousness of their past experiences.
Carter et al. (1997) evaluated a pilot program that aimed to reduce dietary restraint among 46 females aged 13-14 and found that, although disordered eating, dietary restraint, and shape concern decreased immediately following the intervention, scores on these measures significantly increased six months later. Knowledge increased at the post-intervention assessment and decreased slightly at six months but was still higher than at baseline. It is unfortunate that this study did not include a control group, as results could be due to developmental processes or other influences. However, this particular study is often cited in the eating disorder prevention literature as a caution regarding potential iatrogenic effects of these programs.

Researchers have suggested that iatrogenic effects occur more often when programs are presented to groups of individuals who are not at risk for developing eating disorders (e.g., Mann et al., 1997; Levine & Smolak, 2001). An example of this type of study is O’Dea and Abraham’s (2000) investigation of an interactive, educational program titled “Everybody’s Different.” This intervention was given to a sample of 470 female students between the ages of 11 and 14. This was a school-based program, and participants were not selected on the basis of any criteria. When the sample was analyzed as a whole, the researchers found that the intervention generally had positive effects on body dissatisfaction, physical appearance ratings, and social acceptance, at least in the short-term (i.e., immediately following the intervention). Both the intervention and control groups’ weight loss behaviors had increased following the intervention, but this change was significant only for the control group. However, 12 months after the intervention, the intervention group had increased significantly, while the control group
had a nonsignificant increase in efforts to lose weight. When data from participants
classified as high risk (i.e., those with low self-esteem and high trait anxiety) were
analyzed separately, results showed that body satisfaction improved significantly
following the intervention and was still significant at 12 months. Additionally, drive for
thinness improved following the intervention but was not significant at 12 months. The
importance of physical appearance increased in the high risk participants in the control
group but decreased significantly for those participants classified as high risk in the
intervention group. Thus, the high risk participants appeared to have more lasting
benefits than participants who were not at risk. In contrast, it is possible that lower-risk
participants were actually harmed by the intervention.

**Successful Psychoeducational Interventions.** A recent meta-analysis of eating
disorder prevention programs (Stice & Shaw, 2004) found that the interventions with the
largest effect sizes were interactive, selected (i.e., delivered to at-risk individuals), and
delivered to exclusively female samples. However, most of the studies classified as
selected by the authors did not involve the actual selection of participants; typically, the
researchers would post fliers advertising an intervention for people with body image
concerns (Stice, Chase, Stormer, & Appel, 2001; Stice, Mazotti, et al., 2000; Stice, Trost
& Chase, 2003, Winzelberg et al., 1998). Respondents to the advertisements were
enrolled in the studies without further screening.

An example of such a program is Winzelberg et al.’s (1998) study of a computer-
based eating disorder intervention with 57 undergraduate women. Participants were
recruited for an intervention designed to decrease negative body image (the content of the
fliers was not stated by the researchers). Fifty-four percent of the sample participants were Caucasian, 20% were Asian American, 10% were African American, and 16% were of other ethnic backgrounds. Participants were randomly assigned to either the intervention or control group. The software used was *Student Bodies*. This interactive program includes a psychoeducational component with information about body image dissatisfaction, weight concerns, and dieting patterns. An additional component of the program is an e-mail support group that serves as a forum for discussion of the program among participants. Results of the study indicated that intervention participants significantly improved on a measure of body image compared to controls. However, intervention participants did not improve on measures of drive for thinness, bulimia, or weight concern relative to the control group. The researchers hypothesized that the lack of significant improvement among these variables could have been a consequence of high attrition rates due to difficulties with the software. Specifically, 21% of participants dropped out of the program or did not complete the follow up assessment, and, on average, the remaining participants completed only 50% of the software. Those who completed more of the software showed greater improvement on several of the outcome variables, including eating behavior and attitudes.

A classroom-setting psychoeducational intervention conducted and evaluated by Stice and Ragan (2002) produced more promising results. The researchers’ aim was to create an eating disorder intervention intense enough to reduce eating pathology, which has rarely been accomplished (Stice, Chase, et al., 2001; Stice, Mazotti, et al., 2000). A sample of undergraduate women enrolled either in a class titled “Eating Disorders” or
other seminars offered at the University of Texas. Stice and Shaw (2004) refer to this intervention as “selected;” however, the researchers did not state whether those women who enrolled in the class were considered at-risk. Only 17 females were in the Eating Disorders class, and a matched control group ($n = 49$) was recruited from other upper-class seminars. The total sample was comprised of 68% Caucasians, 13% Asian Americans, 2% African Americans, 15% Hispanics, and 2% of other ethnicities. The researchers assessed thin-ideal internalization, body dissatisfaction, dieting, depressive symptoms, and eating pathology (including clinical and subclinical AN, BN, and BED) before and after the intervention.

The Eating Disorder class was conducted over a period of 15 weeks (i.e., a college semester). Results showed that intervention participants’ scores significantly decreased on measures of thin-ideal internalization, body dissatisfaction, dieting, and eating disorder symptoms compared to the control group. However, there were no significant post-treatment changes in depression between the two groups. The researchers note that discussion in the class of the thin-ideal for women may have reduced thin-ideal internalization by creating cognitive dissonance (see the next section for a review of dissonance-based interventions). An additional component of the class was the correction of misperceptions of weight and shape norms, which may have served to increase participants’ body satisfaction. The authors of this study point out that it had several limitations. The sample size was small, limiting statistical power. Additionally, they were unable to randomly assign participants to the two conditions (Stice & Ragan,
Moreover, the sample was largely Caucasian (i.e., 68%), thus findings could not be generalized to more ethnically heterogeneous populations.

_Dissonance-Based Eating Disorder Interventions._ Another example of a selective intervention is that which has been implemented by Stice and colleagues (Stice, Chase, et al., 2001; Stice, Mazotti, et al., 2000; Stice, Trost, et al., 2003). These researchers designed interventions based on cognitive-dissonance theory, which postulates that people will adjust their cognitions to make them more congruent. Research has supported this concept in other areas such as social attitudes toward race (e.g., Leippe & Einstadt, 1994).

Stice, Mazotti, et al. (2000) assigned (of note, assignment was not random) 30 female undergraduates to either the dissonance or delayed-intervention control conditions. The dissonance-based intervention group consisted of three sessions which involved a variety of exercises aimed at critiquing the thin-ideal. Their results indicated that intervention participants had significant decreases on measures of thin-ideal internalization, body dissatisfaction, and bulimic symptoms relative to the control group. These differences remained for thin-ideal internalization and body dissatisfaction at the one-month follow-up assessment. A marginally significant (p = .10) group x time interaction was detected for negative affect, with intervention participants experiencing decreases on post-intervention scores but not at the one-month follow up. Of note, the group x time interaction was nonsignificant for dieting.

Stice, Chase, et al. (2001) compared the cognitive dissonance intervention to a healthy behaviors placebo condition, in which participants met for three sessions to
discuss a healthy lifestyle consisting of a lower-fat diet and exercise. Their participants included 87 female undergraduates who were randomly assigned to one of the two groups. These researchers found significant differences in thin-ideal internalization between the two groups at the post-intervention and one-month follow up assessments; specifically, the intervention group showed a greater decrease than did the placebo group participants. A marginally significant group x time interaction was found for body dissatisfaction. Dissonance participants had decreases following the intervention and at the one-month follow-up; however, participants in the placebo condition also had decreases in body dissatisfaction at the one-month follow-up relative to their baseline scores. Group x time interactions were nonsignificant for dieting, negative affect, and bulimic symptoms.

Stice, Trost, et al. (2003) conducted a study involving both a healthy weight control and a dissonance-based eating disorder programs based on the aforementioned findings (Stice, Chase, et al., 2001; Stice, Mazotti, et al., 2000). The researchers recruited female adolescents with fliers advertising interventions designed to improve body satisfaction. Participants were randomly assigned to either one of the intervention groups or the wait-list control group. Based on the outlines given by the authors of both studies (Stice, Chase, et al., 2001; Stice, Trost et al., 2003), the healthy weight control group included more specific information about eating disorders and their consequences in the later study. As in earlier studies, both intervention groups met for three sessions. Results indicated that the group x time interaction was marginally significant for thin-ideal internalization. Participants in the dissonance group experienced significant
decreases from baseline at the post-intervention as well as one, three, and six month follow-ups. The healthy behaviors group had decreases at the post-intervention and one month follow-up but not at the three or six month follow-ups. Of note, participants in the control group experienced a significant decrease at the three month follow-up relative to their baseline scores. Significant group x time interactions were also observed for negative affect and bulimic symptomatology. The healthy weight control group experienced decreases on these measures at the post-intervention, one, three, and six month follow-up assessments. The dissonance participants demonstrated decreases in bulimic symptomatology at post-intervention as well as the three month follow up. Additionally, they had significant decreases in negative affect at the three month follow up relative to their baseline scores. The control group participants did not experience significant decreases on either of these measures. No significant group x time interactions were found for either body dissatisfaction or dieting. The researchers hypothesized that the healthy weight control group effectively reduced thin-ideal internalization because of it emphasized that a healthy lifestyle is more important than appearance.

Matusek, Wendt, and Wiseman (2004) have also utilized cognitive dissonance principles in designing interventions for disordered eating attitudes and behaviors. This group of researchers elected to implement the intervention as a single two-hour session in order to reduce sampling bias that may arise in studies which require participants to return on several different occasions. Additionally, following Stice et al’s (2003) study, Matusek et al. (2004) included a second experimental group, which received information
about healthy eating and exercise. Their 84 female undergraduate participants were randomly assigned to this condition \((n = 24)\) as well as the dissonance \((n = 26)\) and waitlist \((n = 34)\) groups. They found that participants in both the dissonance and healthy behaviors groups improved significantly on measures of drive for thinness, thin-ideal internalization, and disordered eating. Matusek et al. (2004) note that while surprising, the finding that thin-ideal internalization decreased among the healthy behaviors group participants may indicate that the session could have indirectly challenged their internalization of the thin-ideal.

Wiseman, Sunday, Bortolotti and Halmi (unpublished manuscript) investigated a dissonance-based intervention among high school females in the U.S. \((n = 50)\) and Italy \((n = 138)\). This intervention was implemented during health classes in which participants were already enrolled. Classes were randomly assigned to the dissonance and control conditions. The intervention included a total of six sessions, comprised of five lectures and a summary session. Baseline differences were found between U.S. and Italian participants; specifically, students in the U.S. had higher scores on a measure of perfectionism and lower scores on drive for thinness. Post-intervention results revealed that Italian intervention participants had significant decreases in drive for thinness relative to the Italian control group. No differences were observed between the U.S. intervention and control groups. The researchers hypothesized that the heterogeneity of the U.S. subsample, which was comprised of 23-24% African American, 35-36% Hispanic, and 40% Caucasian and other participants, may have influenced findings among this group. Specifically, ethnically diverse groups have demonstrated higher
acceptance of larger body sizes (e.g., Cachelin, Veisel, Barzengarnazari, & Striegel-Moore, 2000); thus, the dissonance intervention may not have impacted drive for thinness in this subsample. In contrast, the Italian subsample was 100% Caucasian Italian, which may have increased the likelihood that changes in attitudes due to the intervention would be more uniform among participants.

The current study involved the implementation of a dissonance-based intervention that is an adaptation of the intervention used in the three aforementioned studies by Stice et al. (Stice, Chase, et al., 2001; Stice, Mazotti, et al., 2000; Stice, Trost, et al., 2003). The intervention included six 45-minute sessions instead of three 60-minute sessions. It was hoped that the longer duration of the class would create more lasting attitudinal and behavioral change. The basic outline of the intervention is the same; participants discussed the origin and perpetuation of the thin-ideal as well as the negative consequences of such attitudes. In addition to Stice et al.’s outline, media images were presented and the concepts of fattism and self-objectification (Kano, 1989) were introduced. Further, feminist perspectives of the history of thinness and oppression of women were discussed during sessions (Rothblum, 1994; Seid, 1994).

**Mindfulness Meditation and Yoga as Eating Disorder Interventions**

The popularity of meditation and yoga has increased enormously in Western countries over recent decades. In addition to the benefits of yoga as an exercise, preliminary research on meditation and yoga has been conducted in the area of medical and mental health (Sell, 2003). To my knowledge, only one study has been published regarding the effects of yoga on disordered eating attitudes and behaviors (Daubenmier,
This study was based on the theory that women's self-objectification leads to diminished awareness of internal bodily states, which then contributes to disordered eating. The researcher hypothesized that individuals who participate in yoga would have greater body awareness and, consequently, evidence fewer attitudes and beliefs related to eating disorders. The sample consisted of female yoga practitioners (n = 43), women taking aerobics classes (n = 45), and a control group of women who had taken neither yoga nor aerobics in the past two years (n = 51). Of note, yoga and aerobics participants were recruited from their respective exercise classes. Several of the control participants were friends or family members of the yoga and aerobics participants; others were recruited at grocery stores and shopping centers. Results indicated that yoga participants had significantly higher body awareness, responsiveness and satisfaction as well as less self-objectification than either the aerobics or control participants.

Two other studies have focused not on yoga specifically, but rather on mindfulness meditation techniques, which are related to principles of yoga. A study of mindfulness-based stress reduction and health-related quality of life was recently conducted by Reibel, Greeson, Brainard, and Rosenzweig (2001) with a sample of 136 patients with various medical diagnoses, the most prevalent of which were anxiety/panic disorder, hypertension, and chronic pain. The intervention was conducted over a period of eight weeks and included exercises in breathing awareness, mindful hatha yoga, and guided imagery meditations. The purpose of the intervention was to enhance body and mind awareness, teach patients to substitute consciously chosen responses for automatic reactions, and bring awareness and skill to their interpersonal relationships. Comparison
of pre- and post-treatment measures indicated that participants improved significantly on measures of physical functioning, role limitations because of physical problems, bodily pain, general health perception, vitality, social functioning, role limitations because of emotional problems, and mental health. This study was limited by its lack of a control group; however, these findings point to an important direction for future research.

A meditation-based intervention for BED was conducted by Kristeller and Hallet (1999). Their rationale for the use of meditation in treating BED was that it would increase awareness of physiological signals, thereby enhancing response to satiety cues. Additionally, the intervention aimed to increase self-acceptance, which would likely decrease the likelihood of binge eating as an escape from negative self-awareness (e.g., Heatherton & Baumeister, 1991). It was hypothesized that the mindfulness aspect of the meditation intervention would increase attention to physical, cognitive, and emotional triggers for binge eating as well as bodily sensations. Moreover, a sense of control would be increased and anxiety and negative affect would be decreased (Kristeller & Hallet, 1999).

This study used a single-group design with 21 women, all but one of whom were Caucasian. Seven sessions were conducted during a six week period. Comparison of pre- and post-treatment scores on measures of binge eating, depression, and anxiety revealed that frequency of bingeing and scores on the Binge Eating Scale both decreased significantly following the intervention. Depression and anxiety were also significantly reduced (Kristeller & Hallet, 1999). The single group design and small sample impose limitations to the validity of this study. Furthermore, due to the sample's ethnic
homogeneity (i.e., only one participant was not Caucasian), these results cannot be
generalized to other ethnic groups.

Nonetheless, these two meditation-based studies further underscore the potential
for the use of yoga and meditation for disordered eating and correlated psychological
distress such as depression and anxiety. However, additional research using larger and
more ethnically diverse samples as well as more stringent methodology is necessary to
study the efficacy of this type of intervention.

Summary

Disordered eating, including both clinical and subclinical forms of AN, BN, and
BED, is prevalent among college students and presents serious health risks. Furthermore,
these disorders are associated with significant psychological distress, such as depression
and anxiety. Many college women manifest risk factors for eating disorders, such as body
dissatisfaction, dieting, and thin-ideal internalization. Some eating disorder interventions
have been moderately successful at improving these risks (e.g., Kristeller & Hallet, 1999;
Stice & Ragan, 2002;; Winzelberg et al., 1998). However, these studies are limited by
small and relatively homogeneous samples with respect to ethnicity (e.g., Kristeller &
Hallet, 1999; Stice & Ragan, 2002; Winzelberg et al., 1998). Furthermore, some have
not used the most rigorous methodology (Kristeller & Hallet, 1999; Reibel et al., 2001).
More promising efforts have resulted from programs which have targeted at-risk
individuals and used an interactive format (e.g., Stice, Chase et al., 2001; Stice, Mazotti,
et al., 2000; Stice, Trost et al., 2003; Winzelberg et al., 1998). Delivering selected
programs is especially important given the evidence suggesting that universal programs
may produce iatrogenic effects in individuals who are not at risk for disordered eating (e.g., Carter et al., 1997; Mann et al., 1997). According to Stice and Hoffman (2004), good eating disorder interventions are ones that are based on etiologic theory of eating disorders, (i.e., those that aim to reduce risk factors for disordered eating rather than simply providing psychoeducation). Additionally, the most effective interventions to date have been selective and interactive. Furthermore, a control group should be included in the study design, and participants should be randomly assigned to conditions. Baseline scores should be statistically controlled for, and effect sizes should be reported.

The present study aimed to evaluate and compare two interventions: 1) an interactive dissonance-based intervention and 2) a yoga and meditation intervention with a randomly assigned control group. Because of the exploratory nature of the use of yoga and meditation as an intervention for disordered eating, no a priori hypotheses were made regarding differences in outcome between this group and the dissonance group. It was hypothesized that participants in both the dissonance and yoga groups will display significantly less eating pathology, body dissatisfaction, thin-ideal internalization, dieting, and related depression and anxiety compared to the control group following the intervention.
Methods

Participants

The total sample consisted of 252 undergraduate women. Participants were undergraduate Psychology students who were recruited from the 101 Subject Pool and other students recruited with fliers advertising a study for women who are dissatisfied with their bodies (see Appendix A for a copy of the flier). Psychology 101 students were given course credit for their participation. Additionally, participants were exclusively women due to the very low base rates of disordered eating among men (APA, 2000). After completing baseline surveys, they were randomly assigned to one of the two intervention groups or to the control group. A total of 113 participants responded to the e-mails about the groups and subsequently attended at least one session; however, 20 of these individuals (17 from the yoga group and three from the discussion group) dropped out before completing the post-intervention surveys. Of note, the credit requirements for the 101 Subject Pool changed after the initiation of the study; therefore, participants may have dropped out upon realizing that they did not need the total number of credits offered for completing the intervention and post-intervention surveys. The final sample (i.e., women who completed both baseline and post-intervention assessments, \( N = 93 \)) included 30 control group participants, 33 yoga participants, and 30 discussion group participants. Of note, only one of these women was not recruited from the Psychology Subject Pool; she participated in the discussion group.
Ethnic breakdown of the final sample is as follows: 55.4% were Caucasian, 25.0% were African American, 4.3% were Hispanic, 9.7% were Asian, and 5.4% were of other ethnicities. Participants' mean age at baseline was 19.56 ($SD = 4.12$); 67.7% were freshmen, 14.0% were sophomores, 16.1% were juniors, and 2.2% were seniors. Participants' mean BMI was 25.28 ($SD = 5.22$).

Measures

Demographic Questionnaire. (Appendix B). This questionnaire was created by the researchers and asks participants to provide their age, year in school, ethnicity, and gender. Participants were also asked to provide their current height and weight (so that BMI can be calculated) as well as their highest and lowest weights at their current height (so that percentage of weight loss/gain can be calculated).

Eating Disorder Diagnostic Scale (EDDS). (Appendix C). The EDDS is a 22-item self-report measure of AN, BN, and BED symptomatology (Stice, Telch, & Rizvi, 2000). Specific patterns of responses on this measure can be used to diagnose eating disorders; additionally, a composite disordered eating symptomatology score can be attained by summing all of the items except height, weight, and whether participants are taking hormonal birth control. The initial validation of the EDDS (Stice, Telch et al., 2000) indicated that it yielded stable and internally consistent scores (test-retest reliability for the EDDS symptom composite was .87, Cronbach’s alpha was .89). The validity of the EDDS was supported by its high correlations with diagnoses obtained via structured interviews using the Eating Disorder Examination (EDE, Fairburn & Cooper, 1993) and the Structured Clinical Interview for DSM-IV Axis I Diagnoses (Spitzer, Williams,
Evidence of convergent validity also includes high correlations between the EDDS symptom composite and scores on other measures of eating disturbances (Stice, Telch et al., 2000).

A more recent series of studies further assessed this measure's criterion and convergent validity as well as its potential to detect the effects of eating disorder prevention programs (Stice, Fisher, & Martinez, 2004). Agreement between the EDDS and EDE was assessed among adolescent girls and women (mean age = 17.90, SD = 3.4). The researchers discovered that the EDDS had a positive predictive value of .74 and a negative predictive value of .98. Additionally, the overall symptom composite score on the EDDS demonstrated acceptable convergent validity with measures of thin-ideal internalization, body dissatisfaction, dieting, temperamental emotionality, and depressive symptoms as well as social maladjustment. The researchers reported that Cronbach's alpha in this study was .89 (Stice, Fisher et al., 2004). Furthermore, the researchers demonstrated that the symptom composite scores were sensitive enough to detect response to an intervention (Stice, Fisher et al., 2004). Cronbach's alpha for EDDS composite score for the total sample in the current study was .76.

*Binge Eating Scale (BES)*. (Appendix D). The BES is a 16 item self-report measure of binge eating. The BES is typically used to assess binge eating symptomatology continuously or to screen individuals who may have BED. Additionally, this measure has been found to discriminate effectively among individuals with no, moderate, and severe binge eating problems based on cutoff scores (Gormally,
Black, Daston, & Rardin, 1982). The developers of this measure report that it yields internally consistent scores (Cronbach’s alpha = .85, Gormally et al., 1982).

Results of a more recent study indicated that the BES was effective in assessing objective binge eating, defined as consumption of a large amount of food accompanied by a loss of control (Celio, Wilfley, Crow, Mitchell, & Walsh, 2004). Cronbach’s alpha for the BES for the total sample in the current study was .87.

*State-Trait Anxiety Inventory (STAI).* (Appendix E). The STAI is a 40 item self-report measure designed to assess state and trait anxiety. This measure has been found to yield internally consistent scores (Cronbach’s alpha = .93, Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). Additionally, concurrent, convergent, divergent, and construct validity of the STAI were demonstrated by its developers (Spielberger et al., 1983). Cronbach’s alphas for the state and trait subscales for the total sample in the current study were .92 and .96, respectively.

*Center for Epidemiological Studies Depression Scale (CES-D).* (Appendix F). The CES-D (Radloff, 1977) is a self-report measure consisting of 20 items rated on a 4 point scale. This measure assesses depressive symptomatology in the general population. Higher scores indicate greater depressive symptomatology.

Radloff (1977) found that the CES-D yields scores that are internally consistent (Cronbach’s alpha = .85) and stable (test-retest coefficient = .57). It also discriminates effectively between depressed and non-depressed individuals (e.g., Radloff, 1977) and exhibits convergent validity with other measures of depression. Cronbach’s alpha for the CES-D for the total sample in the current study was .92.
**Eating Disorder Inventory (EDI).** (Appendix G). The EDI is a self-report measure consisting of 8 subscales, totaling 64 items, which are rated on a 6-point, Likert-type scale ranging from “never” to “always” (Garner, Olmstead, & Polivy, 1983). The body dissatisfaction subscale (EDI-BD), which consists of nine items, and the drive for thinness subscale (EDI-DFT), which consists of 7 items, were used in this study. Internally consistent scores have been demonstrated for both the body dissatisfaction (Cronbach’s alpha = .91) and drive for thinness (Cronbach’s alpha = .90) subscales. Additionally, criterion-related, convergent, and discriminant validity have been established for these scales (Garner et al., 1983). Cronbach’s alpha for the drive for thinness and body dissatisfaction subscales for the total sample in the current study were .86 and .84, respectively.

**Ideal Body Stereotype Scale-Revised (IBSS-R).** (Appendix H). The IBSS was designed to measure subscription to the female ideal body stereotype (Stice, Schupak-Neuberg, Shaw, & Stein, 1994). This survey consists of six Likert-type items (responses range from “strongly disagree” to “strongly agree”). Scores on this measure were internally consistent (Cronbach’s alpha = .86), and the researchers demonstrated convergent validity (Stice et al., 1994). However, initial reliability analyses in the current study revealed that item five on the IBSS detracted from the measure’s overall alpha. Results of a follow-up confirmatory factor analysis demonstrated that item five had a non-significant factor loading on the latent construct (coefficient = .01). In a personal communication with the measure’s developer (E. Stice, personal communication, July 2, 2005), I was given permission to drop item five from the total score on the IBSS.
Cronbach’s alpha in the current study for the total sample was .82 when item five was excluded.

*Three-Factor Eating Questionnaire (TFEQ).* (Appendix I). The TFEQ is a 51-item (mixed true-false and Likert-type), self-report questionnaire with three subscales: cognitive restraint, disinhibition, and hunger (Stunkard & Messick, 1988). Only the restraint subscale, which consists of 21 items, was used in this study. Content, construct, and criterion-related validity of the TFEQ have been established, and the restraint subscale yielded internally consistent scores (Cronbach’s alpha = .93, Stunkard & Messick, 1988). Internal consistency for the total sample in the current study was .86.

*Toronto Alexithymia Scale (TAS-20).* (Appendix J). The TAS-20 is a self-report measure consisting of 20 items. Both exploratory and confirmatory factor analyses supported the measure’s construct validity (Bagby, Parker, & Taylor, 1994), and its three-week test-retest reliability was adequate ($r = .77$). These psychometric properties were further supported in two validation samples (Bagby, Taylor, & Parker, 1994). In the current study, the internal consistency (Cronbach’s alpha) of the TAS-20 was .84.

*Body Shape Questionnaire-Revised-10 (BSQ-R-10).* (Appendix K). The BSQ-R-10 is a modified version of the original 34-item Body Shape Questionnaire (BSQ). Mazzeo (1999) developed the BSQ-R-10 as an abbreviated version using eight of the original items plus two new items. The BSQ-R-10 was validated and cross-validated in two separate samples of undergraduate women. All items significantly loaded on the single factor, body image preoccupation. Additionally, the measure demonstrated
acceptable criterion validity and internal consistency (Cronbach’s alpha = .96). In the current study, internal consistency of the BSQ-R-10 was .94.

Procedure

Participants were recruited from Psychology 101 classes and with fliers (see Appendix A). The study advertised an intervention that addresses body dissatisfaction and eating disturbances. Participants first completed the baseline measures. One credit was given for participation in this phase of the study. At this time, participants signed a consent form and provided contact information if they wished to participate in the intervention. A total of 231 participants (91.7%) consented to be contacted for participation in the intervention.

Participants were randomly assigned to the dissonance-based intervention group, the yoga/meditation group, or the control group. The dissonance and yoga/meditation group participants received three credits for their participation in all sessions of the program, including the post-intervention questionnaires. The control group completed the baseline and post-intervention measures at the same time as the intervention groups and received a total of two credits for their participation. However, they did not receive any treatment in the interim. In order to provide additional incentive for participants to stay in the program until the post-intervention assessment, raffles were held for gift certificates to an area mall during the last session of each group (i.e., after the post-intervention measures have been completed) and for the control group as well.

The yoga and dissonance groups each met once a week for 45 minutes over a six-week period. Participants signed a second consent form at the beginning of the first
session of each group. The yoga/meditation group was taught by a Clinical Psychology graduate student who is a certified Integral Yoga instructor. See Appendix L for an outline of the sessions and a sample six-week course. The dissonance-based intervention group was taught by a Counseling Psychology graduate student. See Appendix M for an outline.

Post-intervention measures were completed during the last session of each group. At that time, participants were given a debriefing form explaining the hypotheses of the study.

Table 1. Intervention Schedule for the Dissonance, Yoga, and Control Groups

<table>
<thead>
<tr>
<th></th>
<th>Dissonance Group</th>
<th>Yoga Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Measures</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Intervention</td>
<td>X</td>
<td>X</td>
<td>___</td>
</tr>
<tr>
<td>Post-intervention Measures</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Results

Baseline Differences

Baseline scores for participants who completed the post-intervention assessment and those who chose not to participate in the intervention were compared via independent samples t-tests. Mean scores for both groups are presented in Table 2. Of note, individuals who attended some intervention sessions but dropped out before completing post-intervention measures were excluded from these comparisons. No significant differences were observed for scores on the EDDS (t = - .39, df = 223, p > .05), EDI-DFT (t = - .13, df = 227, p > .05), EDI-BD (t = - .33, df = 227, p > .05), CES-D (t = - .01, df = 227, p > .05), BSQ-R-10 (t = - .32, df = 229, p > .05), BES (t = .14, df = 191, p > .05), TFEQ (t = -1.08, df = 218, p > .05), IBSS (t = -1.26, df = 228, p > .05), TAS-20 (t = -.59, df = 228, p > .05), state subscale of the STAI (t = - .62, df = 228, p > .05), or trait subscale of the STAI (t = -.73, df = 228, p > .05). Chi-square tests were conducted to examine whether these two groups differed on year in school or ethnicity. Results were non-significant for both variables $\chi^2 (5) = 4.18, p = .52; \chi^2 (4) = 1.99, p = .74,$ respectively. In sum, there were no baseline differences between individuals who completed both pre- and post-intervention assessments and those who chose not to participate in the intervention.
Table 2. Mean Scores on Pre-Intervention Measures for Those Who Chose to and Not to Participate

<table>
<thead>
<tr>
<th>Measure</th>
<th>Participated in Intervention</th>
<th>Did Not Participate</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDDS</td>
<td>26.30</td>
<td>25.58</td>
</tr>
<tr>
<td>EDI Drive for Thinness</td>
<td>25.02</td>
<td>24.88</td>
</tr>
<tr>
<td>EDI Body Dissatisfaction</td>
<td>35.78</td>
<td>35.37</td>
</tr>
<tr>
<td>CES-D</td>
<td>21.77</td>
<td>21.76</td>
</tr>
<tr>
<td>BSQ-R-10</td>
<td>36.49</td>
<td>35.99</td>
</tr>
<tr>
<td>BES</td>
<td>13.04</td>
<td>13.20</td>
</tr>
<tr>
<td>TFEQ</td>
<td>9.61</td>
<td>8.86</td>
</tr>
<tr>
<td>IBSS</td>
<td>18.28</td>
<td>17.69</td>
</tr>
<tr>
<td>TAS-20</td>
<td>50.10</td>
<td>49.14</td>
</tr>
<tr>
<td>State STAI</td>
<td>41.63</td>
<td>40.70</td>
</tr>
<tr>
<td>Trait STAI</td>
<td>46.47</td>
<td>47.55</td>
</tr>
</tbody>
</table>

EDDS = Eating Disorder Diagnostic Scale; EDI = Eating Disorder Inventory (Drive for Thinness and Body Dissatisfaction subscales); CES-D = Center for Epidemiological Studies-Depression Scale; BSQ-R-10 = Body Satisfaction Questionnaire; BES = Binge Eating Scale; TFEQ = Three-Factor Eating Questionnaire (Restraint subscale); IBSS = Ideal Body Satisfaction Survey; TAS-20 = Toronto Alexithymia Scale; STAI = State-Trait Anxiety Inventory (State and Trait subscales)

Additionally, no significant differences were found on any of the measures between individuals who completed both pre- and post-intervention measures and those who attended several intervention sessions but dropped out: EDDS ($t = 1.02$, $df = 106$, $p > .05$), EDI-DFT ($t = 1.45$, $df = 110$, $p > .05$), EDI-BD ($t = -.18$, $df = 111$, $p > .05$), CES-D ($t = .71$, $df = 110$, $p > .05$), BSQ-R-10 ($t = .75$, $df = 111$, $p > .05$), BES ($t = .49$, $df = 106$, $p > .05$), TFEQ ($t = 1.72$, $df = 105$, $p > .05$), IBSS ($t = 1.30$, $df = 111$, $p > .05$),
One-way analyses of variance (ANOVAs) were performed to compare baseline scores for the three intervention groups. See Table 3 for mean scores. No significant differences were found between groups on the EDDS \(F_{2,87} = 1.91, p > .05\), EDI-DFT \(F_{2,89} = 1.51, p > .05\), EDI-BD \(F_{2,90} = 1.30, p > .05\), CES-D \(F_{2,90} = 1.92, p > .05\), BSQ-R-10 \(F_{2,90} = 1.77, p > .05\), TFEQ \(F_{2,84} = 2.50, p > .05\), IBSS \(F_{2,90} = 23, p > .05\), TAS-20 \(F_{2,89} = 2.19, p > .05\), state subscale of the STAI \(F_{2,90} = .17, p > .05\), or trait subscale of the STAI \(F_{2,90} = 2.95, p > .05\). However, differences were found on the BES \(F_{2,88} = 4.09, p < .05\); specifically, the discussion group had significantly higher scores \(M = 16.30, SD = 8.22\) than either the yoga \(M = 11.58, SD = 7.74\) or control groups \(M = 11.30, SD = 6.83\).
Table 3. Mean Scores for Three Intervention Groups on Pre- and Post-Intervention Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Control Group</th>
<th>Yoga Group</th>
<th>Discussion Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDDS</td>
<td>22.55</td>
<td>26.34</td>
<td>30.00</td>
</tr>
<tr>
<td>(Post) EDDS</td>
<td>22.77</td>
<td>22.47</td>
<td>22.10</td>
</tr>
<tr>
<td>EDI Drive for Thinness</td>
<td>23.45</td>
<td>24.85</td>
<td>26.73</td>
</tr>
<tr>
<td>(Post) EDI Body DFT</td>
<td>24.00</td>
<td>24.09</td>
<td>23.21</td>
</tr>
<tr>
<td>EDI Body Dissatisfaction</td>
<td>35.77</td>
<td>36.09</td>
<td>37.47</td>
</tr>
<tr>
<td>(Post) EDI BD</td>
<td>33.57</td>
<td>34.59</td>
<td>32.33</td>
</tr>
<tr>
<td>CES-D</td>
<td>18.37</td>
<td>24.06</td>
<td>22.67</td>
</tr>
<tr>
<td>(Post) CES-D</td>
<td>16.97</td>
<td>20.77</td>
<td>16.47</td>
</tr>
<tr>
<td>BSQ-R-10</td>
<td>34.67</td>
<td>35.42</td>
<td>40.03</td>
</tr>
<tr>
<td>(Post) BSQ-R-10</td>
<td>33.70</td>
<td>33.94</td>
<td>33.40</td>
</tr>
<tr>
<td>BES</td>
<td>11.30*</td>
<td>11.58*</td>
<td>16.30*</td>
</tr>
<tr>
<td>(Post) BES</td>
<td>10.53</td>
<td>11.00</td>
<td>11.96</td>
</tr>
<tr>
<td>TFEQ Restraint</td>
<td>7.77</td>
<td>10.71</td>
<td>10.07</td>
</tr>
<tr>
<td>(Post) TFEQ Restraint</td>
<td>8.00</td>
<td>10.30</td>
<td>10.34</td>
</tr>
<tr>
<td>IBSS</td>
<td>18.00</td>
<td>18.33</td>
<td>18.57</td>
</tr>
<tr>
<td>(Post) IBSS</td>
<td>17.90</td>
<td>17.72</td>
<td>17.93</td>
</tr>
<tr>
<td>TAS-20</td>
<td>49.52</td>
<td>52.67</td>
<td>50.73</td>
</tr>
<tr>
<td>(Post) TAS-20</td>
<td>47.70</td>
<td>49.84</td>
<td>43.47</td>
</tr>
<tr>
<td>State STAI</td>
<td>40.70</td>
<td>42.12</td>
<td>42.03</td>
</tr>
<tr>
<td>(Post) State STAI</td>
<td>38.20</td>
<td>37.31</td>
<td>36.33</td>
</tr>
<tr>
<td>Trait STAI</td>
<td>42.97</td>
<td>49.52</td>
<td>46.63</td>
</tr>
<tr>
<td>(Post) Trait STAI</td>
<td>41.93</td>
<td>45.03</td>
<td>39.83</td>
</tr>
</tbody>
</table>

EDDS = Eating Disorder Diagnostic Scale; EDI = Eating Disorder Inventory (Drive for Thinness and Body Dissatisfaction subscales); CES-D = Center for Epidemiological
Studies-Depression Scale; BSQ-R-10 = Body Satisfaction Questionnaire; BES = Binge Eating Scale; TFEQ = Three-Factor Eating Questionnaire (Restraint subscale); IBSS = Ideal Body Satisfaction Survey; TAS-20 = Toronto Alexithymia Scale; STAI = State-Trait Anxiety Inventory (State and Trait subscales)

*Results of one-way ANOVAs revealed that the discussion group was significantly higher than both the control ($p < .05$) and yoga ($p < .05$) groups on baseline BES scores.

Post-Intervention Comparisons

Hierarchical linear regressions were conducted to determine whether the interventions were associated with changes in scores from pre- to post-intervention assessments. The proposed plan of analysis was to conduct two MANCOVAs, controlling for baseline scores. However, results of a power analysis indicated that I would not have adequate power to detect significant differences that were present (Hair, Anderson, Tatham, & Black, 1984). ANCOVAs were considered; however, preliminary analyses indicated that these data violated the assumption of homogeneity of regression slopes, such that there was a significant group x covariate interaction for pre-intervention scores on the EDDS, EDI-BD, and BSQ. Tabachnick and Fidell (1996) state that another analysis must be conducted when this assumption is violated.

The use of regression in experimental designs has been advocated by Wampold & Freund (1987), who suggest that regressions may be applied to a variety of research designs, especially when ANOVA becomes cumbersome. Cohen, Cohen, Aiken, & West (2003) also support this approach; further, the group x covariate interactions may be entered into the regression equation in order to control for their effects. Plots were created in SPSS to assess the assumptions of homoscedasticity (i.e., whether the variance of residuals within each group is equal) and whether the residuals from each regression
equation followed a normal distribution. The plots for each outcome indicated that these assumptions were adequately met.

Regression analyses were conducted separately for dependent variable (i.e., scores on post-intervention measures): EDDS, EDI-DFT, EDI-BD, CES-D, BSQ-R-10, BES, TFEQ, IBSS, TAS-20, state subscale of the STAI, and trait subscale of the STAI. For each regression, corresponding scores on pre-intervention measures were entered into the first step. BMI and ethnicity were also entered into the first step to control for their influence on the outcomes of interest. BMI is related to body dissatisfaction (e.g., Presnell et al., 2004), and ethnic differences have been found among these variables as well (e.g., Cachelin et al., 2000). Unfortunately, the sample size was too small to permit analysis of ethnic differences in this case; thus this variable's influence was controlled for in each regression. Dummy variables for the yoga and discussion groups, with the control as the referent group, were entered into the second step of the regression.

For those variables which had evidenced significant group x covariate interactions (the EDDS, EDI-BD, and BSQ-R-10), pre-intervention scores were centered, and product terms were created by multiplying these variables by each of the dummy variables. For these outcomes, the centered pre-intervention scores were entered into the first step, and the product terms were entered into the third step so that the group x covariate interactions would be accounted for in the regression equation.

Of note, no alpha corrections were made. Due to the small sample size, I was concerned that a more stringent p-value would overly limit power to detect significant
findings. Significance in the current study was based on $p < .05$. Marginally significant findings were those in which $p < .10$.

**Results for Disordered Eating Variables.** A summary of results is presented in Table 4. The overall regression for the EDDS was significant ($F_{5,84} = 15.53, p < .05, R^2 = .40$). The third step of the analysis with all variables included was also significant ($F_{2,84} = 4.68, p < .05, R^2\text{-change} = .06$). There was a marginally significant main effect for the discussion group ($\beta = -.17, t = -1.72, p = .09$), such that the discussion group had lower scores on the EDDS than did the control group. No significant influences were found for the yoga group ($\beta = -.14, t = -1.37, p = .18$).

The overall regression for the BES was significant ($F_{5,82} = 19.71, p < .05, R^2 = .53$). The second step of the analysis with all variables included was not significant ($F_{2,82} = 1.77, p > .05, R^2\text{-change} = .02$). Therefore, regression coefficients for the discussion and yoga groups were not interpreted.

**Results for Specific Risk Factors for Disordered Eating.** The overall regression for the EDI-BD was significant ($F_{7,84} = 18.43, p < .05, R^2 = .54$). The third step of the analysis with all variables included was also significant ($F_{2,84} = 3.45, p < .05, R^2\text{-change} = .03$). Additionally, there was a significant main effect for the discussion group ($\beta = -.21, t = -2.55, p = .01$). Participants in the discussion group had lower scores than the control group on the EDI-BD. No significant influences were found for the yoga group ($\beta = -.08, t = -.92, p = .36$).

The overall regression for the EDI-DFT was significant ($F_{5,84} = 20.45, p < .05, R^2 = .52$). The second step of the analysis with all variables included was marginally
significant (F-change $2.84 = 2.59$, $p = .08$, $R^2$-change = .03). There was a significant main effect for the discussion group ($\beta = -.20$, $t = -2.26$, $p = .03$); these participants had lower scores than the control group on this measure. No significant influences were found for the yoga group ($\beta = -.09$, $t = -.97$, $p = .33$).

The overall regression for the BSQ-R-10 was significant (F $7.83 = 14.00$, $p < .05$, $R^2 = .45$). The third step of the analysis with all variables included was also significant (F-change $2.83 = 5.71$, $p < .05$, $R^2$-change = .06). However, there were no significant differences for either the discussion ($\beta = -.13$, $t = -1.50$, $p = .14$) or yoga groups ($\beta = -.01$, $t = -.13$, $p = .90$).

The overall regression for the TFEQ was significant (F $5.77 = 26.28$, $p < .05$, $R^2 = .63$). The second step of the analysis with all variables included was not significant (F-change $2.77 = .39$, $p > .05$, $R^2$-change = .004). Therefore, regression coefficients for the discussion and yoga groups were not interpreted.

The overall regression for the IBSS was significant (F $5.85 = 22.16$, $p < .05$, $R^2 = .56$). The second step of the analysis with all variables included was not significant (F-change $2.85 = .71$, $p > .05$, $R^2$-change = .01). Therefore, regression coefficients for the discussion and yoga groups were not interpreted.

Results for Nonspecific Risk Factors for Disordered Eating. The overall regression for the CES-D was significant (F $5.85 = 6.83$, $p < .05$, $R^2 = .26$). The second step of the analysis with all variables included was not significant (F-change $2.85 = 1.32$, $p > .05$, $R^2$-change = .02). Therefore, regression coefficients for the discussion and yoga groups were not interpreted.
The overall regression for the state subscale of the STAI was significant ($F_{5,86} = 3.44, p < .05, R^2 = .16$). The second step of the analysis with all variables included was not significant ($F$-change $2,86 = .62, p > .05, R^2$-change $= .01$). Therefore, regression coefficients for the discussion and yoga groups were not interpreted.

The overall regression for the trait subscale of the STAI was significant ($F_{5,86} = 12.19, p < .05, R^2 = .38$). The second step of the analysis with all variables included was marginally significant ($F$-change $2,86 = 2.38, p = .099, R^2$-change $= .02$). There was a significant main effect for the discussion group ($\beta = -.20, t = -2.02, p = .047$), such that this group had lower scores on this measure than did the control group. No significant influences were found for the yoga group ($\beta = -.03, t = -.34, p = .74$).

The overall regression for the TAS-20 was significant ($F_{5,84} = 13.09, p < .05, R^2 = .40$). The second step of the analysis with all variables included was significant ($F$-change $2,84 = 3.09, p = .05, R^2$-change $= .04$). There was a significant main effect for the discussion group ($\beta = -.23, t = -2.37, p = .02$); these participants had lower scores than the control group on this measure. No significant influences were found for the yoga group ($\beta = -.06, t = -.59, p = .55$).
Table 4. Summary of Results for Post-Intervention Comparisons

<table>
<thead>
<tr>
<th>Measure</th>
<th>$R^2$ / $R'^2$ Change</th>
<th>Differences between Groups</th>
<th>Partial Eta-squared Effect Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDDS</td>
<td>.41 / .06</td>
<td>N/A</td>
<td>.03</td>
</tr>
<tr>
<td>EDI-DFT*</td>
<td>.52 / .03</td>
<td>Discussion &lt; Control</td>
<td>.06</td>
</tr>
<tr>
<td>EDI-BD*</td>
<td>.54 / .03</td>
<td>Discussion &lt; Control</td>
<td>.08</td>
</tr>
<tr>
<td>CES-D</td>
<td>.26/ 02</td>
<td>N/A</td>
<td>.04</td>
</tr>
<tr>
<td>BSQ-R-10</td>
<td>.45 / .06</td>
<td>N/A</td>
<td>.04</td>
</tr>
<tr>
<td>BES</td>
<td>.53 / .02</td>
<td>N/A</td>
<td>.04</td>
</tr>
<tr>
<td>TFEQ</td>
<td>.63 / .004</td>
<td>N/A</td>
<td>.01</td>
</tr>
<tr>
<td>IBSS</td>
<td>.56 / .01</td>
<td>N/A</td>
<td>.01</td>
</tr>
<tr>
<td>TAS-20*</td>
<td>.40 / .04</td>
<td>Discussion &lt; Control</td>
<td>.09</td>
</tr>
<tr>
<td>STAI-State</td>
<td>.16 / .01</td>
<td>N/A</td>
<td>.01</td>
</tr>
<tr>
<td>STAI-Trait*</td>
<td>.38 / .02</td>
<td>Discussion &lt; Control</td>
<td>.05</td>
</tr>
</tbody>
</table>

* Denotes significant between-group differences.

Effect sizes (also presented in Table 4) were obtained through repeated-measures ANOVAs for each outcome variable. According to Cohen (1988), a small effect size is an eta-squared value of .01, a moderate effect size is .06, and a large effect size is .14.

Thus, there was a small to moderate magnitude of the differences between groups in the current study.
Discussion

As disordered eating attitudes and behaviors are prevalent among college-aged women (e.g., Hawkins & Clement, 1980; Mintz & Betz, 1988; Mitchell & Mazzeo, 2004), there is a particularly salient need for interventions which aim to reduce risk factors for eating disorders such as body dissatisfaction, thin-ideal internalization, and dieting. Many interventions to date have been successful in increasing knowledge about disordered eating but not actual attitudes and behaviors (McVey & Davis, 2002; Smolak et al., 1998; Stice & Shaw, 2004). The interventions that have produced the most promising results are those that are theoretically based, selective, interactive, include a control group, and use an experimental design (Stice & Hoffman, 2004).

Results of the current study indicated that participants in the cognitive dissonance group manifested significant decreases on measures of disordered eating symptomatology, drive for thinness, body dissatisfaction, and alexithymia. These findings support earlier studies by Stice et al. (Stice, Chase et al., 2001; Stice, Mazotti et al., 2000; Stice, Trost et al., 2002) as well as Matusek et al. (2004) and Wiseman et al. (unpublished manuscript). Thus, this intervention was successful in reducing both attitudes and behaviors related to disordered eating, despite that beliefs such as these are likely very difficult to change. While cognitive dissonance itself was not measured, it is very possible that the group discussions and activities created tension for participants
who internalized the thin ideal. Thus, they altered their attitudes and beliefs to make them more congruent. Additionally, participants in this group also evidenced decreases in alexithymia, possibly due to increased awareness of their own thoughts and feelings that arose from processing their beliefs during the sessions. Moreover, the finding that behavioral change occurred as well was particularly promising, as it underscores the potential for lasting effects of this intervention.

Surprisingly, scores on the IBSS, which was developed to assess thin-ideal internalization, were non-significant. There is some evidence that thin-ideal internalization is a particularly difficult construct to assess (e.g., Stice & Hoffman, 2004). Furthermore, a recent confirmatory factor analytic study of the Sociocultural Attitudes Towards Appearance Questionnaire-3 (SATAQ-3; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004), the EDI-DFT, and a version of the IBSS revealed that the SATAQ-3 and EDI-DFT were the better measures of thin-ideal internalization. Specifically, the version of the IBSS used in this study did not load onto the latent variable thin-ideal internalization; however, all items in the SATAQ-3 designed to measure this construct did load onto the factor as predicted. Additionally, the SATAQ-3 demonstrated convergent validity with the EDI-DFT. Therefore, the nonsignificant results between groups on the IBSS may have been a consequence of measurement issues.

An unexpected finding was the significant decrease in trait anxiety scores among the dissonance group participants. It is possible that at baseline, participants were
Experiencing anxiety about their own appearance, and this affect was reduced during the intervention.

Disappointingly, no significant effects were observed for the yoga group. However, the only published study to date (Daubenmier, 2005) investigating the impact of yoga on disordered eating attitudes and behaviors compared women who had been practicing yoga for several years ($M = \text{six years and two months}, SD = 87.58 \text{ months}$). Furthermore, Daubenmier investigated these variables using a cross-sectional design; thus, causation cannot be inferred. It is likely that women who choose to participate in yoga classes and remain committed to these classes for several years may have a predisposition to be more self-aware. Additionally, the women in Daumenmier's (2005) study practiced for several hours per week ($M = 4.96, SD = 3.19$). Perhaps the current study, in which classes occurred for only six weeks, 45 minutes per week, was not long enough to significantly impact participants' attitudes and behaviors. In addition, the vast majority of participants in this study had not practiced yoga previously. Compared to the cognitive dissonance group, the yoga intervention used a much more indirect method to address participants' internalization of the thin-ideal and body dissatisfaction. Thus, the potential benefits for yoga to reduce disordered eating attitudes and behaviors remain elusive. Future research should include investigations of longer and more intense yoga classes.

There are several limitations to this study. Due to characteristics of the sample, results may not generalize well to other populations. For example, because men evidence much less eating pathology than women, little is known about successful intervention
efforts for men. This study is limited to undergraduate women participants, so these
types of intervention efforts may not be successful among non-college populations.
However, college women are at high risk for eating disturbances, and the need for
effective interventions is particularly salient for this population.

Furthermore, due to the small sample, it was not possible to investigate
differences among various ethnic groups in this study. Therefore, results of this study
may not apply to ethnically diverse groups of women. The sample size in this study,
while not unusual for interventions, also may have limited my capacity to assess
significant differences, given that effect sizes for these variables are likely small to
moderate. Specifically, the variables for which no group differences were found (i.e., the
CES-D, BSQ-R-10, BES, TFEQ, IBSS, and state subscale of the STAI) had the smallest
eta-squared values. As power is related to both effect and sample size, a much larger
sample size may have been necessary in order to detect differences between groups on
these measures. Future research should include larger samples with greater numbers of
ethnically diverse individuals. Additionally, due to limited time and resources, long-term
follow-up assessment was not possible.

However, there are several strengths to this study, including the use of random
assignment and comparison of both conditions to a control group. Interventions were
guided by theory establishing thin-ideal internalization, body dissatisfaction, and dieting
as specific risk factors for disordered eating. Furthermore, as the study was advertised
for women who are dissatisfied with their bodies, this was a somewhat selected
intervention. Additionally, analyses did not reveal any iatrogenic effects for either intervention group.

This study demonstrated the effectiveness of a cognitive dissonance-based intervention in reducing both attitudes and behaviors related to eating disorders. These findings have implications for the use of inexpensive interventions at the college level. For example, many universities host seminars and workshops during Eating Disorder Week. Interactive interventions, which need not be time-consuming (e.g., Matusek et al., 2004) could be a valuable addition to these types of programs.
List of References


Cachelin, F. M., Veisel, C., Barzengarnazari, E., & Striegel-Moore, R. H. (2000). Disordered eating, acculturation, and treatment-seeking in a community sample of


Appendix A

Do you worry about your appearance?

Researchers in the Psychology Department at Virginia Commonwealth University are conducting groups for women who are dissatisfied with their bodies.

The groups meet for 6 weeks, 45 minutes each week.

Gift certificates to Short Pump Town Center will be raffled during the last session.

Please contact Karen Mitchell at ksmitche@vcu.edu
Appendix B

Demographic Questionnaire

(Reminder, your scores will be aggregated with all other scores and this information cannot be used to identify you in any way).

1. Age: _______
2. Year in school (please circle):

   Freshman (first-year)   Sophomore   Junior   Senior   Grad

3. Race/ethnicity: _______________
4. Sex (please circle): M   F
5. Height: ______
6. Weight: ______
7. What was your **highest** weight at your current height? _______________
8. What was your **lowest** weight at your current height? _______________
9. Are you a member of a sorority/fraternity (circle one):  yes  no
10. Do you feel dissatisfied with your body?  yes  no
11. Do you wish you were thinner?  yes  no
Appendix C

**Eating Disorder Diagnostic Scale (EDDS)**

Please carefully complete all questions.

<table>
<thead>
<tr>
<th>Over the past 3 months…</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Have you felt fat?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Have you had a definite fear that you might gain weight or become fat?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Has your weight influenced how you think about (judge) yourself as a person?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Has your shape influenced how you think about (judge) yourself as a person?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. During the past 6 months, have there been times when you felt you have eating what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) give the circumstances?</td>
<td>YES NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. During the times when you ate an unusually large amount of food, did you experience a loss of control (feel you couldn’t stop eating or control what or how much you were eating)?</td>
<td>YES NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. How many DAYS per week on average over the past 6 MONTHS have you eaten an unusually large amount of food and experienced a loss of control?</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. How many TIMES per week on average over the past 3 MONTHS have you eaten an unusually large amount of food and experienced a loss of control?</td>
<td>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
During these episodes of overeating and loss of control, did you...

9. Eat much more rapidly than normal? YES NO

10. Eat until you felt uncomfortably full? YES NO

11. Eat large amounts of food when you didn’t feel physically hungry? YES NO

12. Eat alone because you were embarrassed by how much you were eating? YES NO

13. Feel disgusted with yourself, depressed, or very guilty after overeating? YES NO

14. Feel very upset about your uncontrollable overeating or resulting weight gain? YES NO

15. How many times per week on average over the past 3 months have you made yourself vomit to prevent weight gain or counteract the effects of eating?
   0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

16. How many times per week on average over the past 3 months have you used laxatives or diuretics to prevent weight gain or counteract the effects of eating?
   0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

17. How many times per week on average over the past 3 months have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of dieting?
   0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

18. How many times per week on average over the past 3 months have you engaged in excessive exercise specifically to counteract the effects of overeating episodes?
   0 1 2 3 4 5 6 7 8 9 10 11 12 13 14


20. How tall are you? _______ ft _______ in.

21. Over the past 3 months, how many menstrual periods have you missed?
   1 2 3 4 na

22. Have you been taking birth control pills during the past 3 months? YES NO
Appendix D

Binge Eating Scale (BES)

Instructions: Below are groups of lettered statements. Read all of the statements in each group and CIRCLE the letter of the statement that best describes the way you feel about your eating habits.

1. A. I don’t feel self-conscious about my weight or body when I’m with others.
   B. I feel concerned about how I look to others, but it normally does not make me feel disappointed with myself.
   C. I do get self-conscious about my appearance and weight which makes me feel disappointed in myself.
   D. I feel very self-conscious about my weight and frequently, I feel intense shame and disgust for myself. I try to avoid social contacts because of my self-consciousness.

2. A. I don’t have any difficulty eating slowly in the proper manner.
   B. Although I seem to “gobble down” foods, I don’t end up feeling stuffed because of eating too much.
   C. At times, I tend to eat quickly and then, I feel uncomfortably full afterwards.
   D. I have the habit of bolting down my food, without really chewing it. When this happens I usually feel uncomfortably stuffed because I’ve eaten too much.

3. A. I feel capable to control my eating urges when I want to.
   B. I feel like I have failed to control my eating more than the average person.
   C. I feel utterly helpless when it comes to feeling in control of my eating habits.
   D. Because I feel so helpless about controlling my eating I have become very despondent about trying to get in control.

4. A. I don’t have the habit of eating when I’m bored.
   B. I sometimes eat when I’m bored, but often I’m able to “get busy” and get my mind off food.
   C. I have a regular habit of eating when I’m bored, but occasionally, I can use some other activity to get my mind off eating.
   D. I have a strong habit of eating when I’m bored. Nothing seems to help me break the habit.
5. A. I'm usually physically hungry when I eat something.
   B. Occasionally, I eat something on impulse even though I really am not hungry.
   C. I have the regular habit of eating foods, that I might not really enjoy, to satisfy a hungry feeling even though physically, I don't need the food.
   D. Even though I'm not physically hungry, I get a hungry feeling in my mouth that only seems to be satisfied when I eat a food, like a sandwich, that fills my mouth. Sometimes, when I eat the food to satisfy my mouth hunger, I then spit the food out so I won't gain weight.

6. A. I don’t feel any guilt or self-hate after I overeat.
   B. After I overeat, I feel guilt or self-hate.
   C. Almost all the time I experience strong guilt or self-hate after I overeat.

7. A. I don’t lose total control of my eating when dieting even after periods when I overeat.
   B. Sometimes when I eat a “forbidden food” on a diet, I feel like I “blew it” and eat even more.
   C. Frequently, I have the habit of saying to myself, “I’ve blown it now, why not go all the way” when I overeat on a diet. When that happens, I eat even more.
   D. I have a regular habit of starting strict diets for myself, but I break the diets by going on an eating binge. My life seems to be either a “feast” or “famine.”

8. A. I rarely eat so much food that I feel uncomfortably stuffed afterwards.
   B. Usually about once a month, I eat such a quantity of food, I end up feeling very stuffed.
   C. I have regular periods during the month when I eat large amounts of food, either as mealtime or at snacks.
   D. I eat so much food that I regularly feel quite uncomfortable after eating and sometimes a bit nauseous.

9. A. My level of calorie intake does not go up very high or go down very low on a regular basis.
   B. Sometimes after I overeat, I will try to reduce my calorie intake to almost nothing to compensate for the excess calories I’ve eaten.
   C. I have a regular habit of overeating during the night. It seems that my routine is not to be hungry in the morning but overeat in the evening.
   D. In my adult years, I have had week-long periods where I practically starve myself. This follows periods when I overeat. It seems I live a life of either “feast or famine.”

10. A. I usually am able to stop eating when I want to. I know when “enough is enough.”
    B. Every so often, I experience a compulsion to eat which I can’t seem to control.
C. Frequently, I experience strong urges to eat which I seem unable to control, but at other times I can control my eating urges.
D. I feel incapable of controlling urges to eat. I have a fear of not being able to stop eating voluntarily.

11. A. I don’t have any problems stopping eating when I feel full.
B. I usually can stop eating when I feel full but occasionally overeat, leaving me feeling uncomfortably stuffed.
C. I have a problem stopping eating once I start and usually I feel uncomfortably stuffed after I eat a meal.
D. Because I have a problem not being able to stop eating when I want, I sometimes have to induce vomiting to relieve my stuffed feeling.

12. A. I seem to eat just as much when I’m with others (family, social gatherings), as when I’m by myself.
B. Sometimes, when I’m with other persons, I don’t eat as much as I want to eat because I’m self-conscious about my eating.
C. Frequently, I eat only a small amount of food when others are present, because I’m very embarrassed about my eating.
D. I feel so ashamed about overeating that I pick times to overeat when I know no one will see me. I feel like a “closet eater.”

13. A. I eat three meals a day with only an occasional between meals snack.
B. I eat three meals a day, but I also normally snack between meals.
C. When I am snacking heavily, I get in the habit of skipping regular meals.
D. There are regular periods when I seem to be continuously eating, with no planned meals.

14. A. I don’t think much about trying to control unwanted urges.
B. At least some of the time, I feel my thoughts are pre-occupied with trying to control my urges.
C. I feel that frequently I spend much time thinking about how much I ate or about trying not to eat anymore.
D. It seems to me that most of my waking hours are pre-occupied by thoughts about eating or not eating. I feel like I’m constantly struggling not to eat.

15. A. I don’t think about food a great deal.
B. I have strong cravings for food but they last only for brief periods of time.
C. I have days when I can’t seem to think about anything else but food.
D. Most of my days seem to be pre-occupied with thoughts about food. I feel like I live to eat.

16. A. I usually know whether or not I’m physically hungry. I take the right portion of food to satisfy me.
B. Occasionally, I feel uncertain about knowing whether or not I’m physically hungry. At these times it’s hard to know how much food I should take to satisfy me.

C. Even though I might know how many calories I should eat, I don’t have any idea what is a “normal” amount of food for me.
Appendix E

State-Trait Anxiety Inventory

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and then enter your response to the left of the number of each statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.


1. I feel calm.
2. I feel secure.
3. I am tense.
4. I feel strained.
5. I feel at ease.
6. I feel upset.
7. I am presently worrying over possible misfortunes.
8. I feel satisfied.
9. I feel frightened.
10. I feel comfortable.
11. I feel self-confident.
12. I feel nervous.
13. I am jittery.
15. I am relaxed.
16. I feel content.
17. I am worried.
18. I feel confused.
19. I feel steady.
20. I feel pleasant.
**Directions:** A number of statements which people have used to describe themselves are given below. Read each statement and then enter your response to the left of the number of each statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

<table>
<thead>
<tr>
<th></th>
<th>1 Almost Never</th>
<th>2 Sometimes</th>
<th>3 Often</th>
<th>4 Almost</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>I feel pleasant.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>I feel nervous and restless.</td>
<td></td>
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<td></td>
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<tr>
<td>23</td>
<td>I feel satisfied with myself.</td>
<td></td>
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<tr>
<td>24</td>
<td>I wish I could be as happy as others seem to be.</td>
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<tr>
<td>25</td>
<td>I feel like a failure.</td>
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<tr>
<td>26</td>
<td>I feel rested.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>I am “calm, cool, and collected.”</td>
<td></td>
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<td></td>
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<tr>
<td>28</td>
<td>I feel that difficulties are piling up so that I cannot overcome them.</td>
<td></td>
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<tr>
<td>29</td>
<td>I worry too much over something that really doesn’t matter.</td>
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<tr>
<td>30</td>
<td>I am happy.</td>
<td></td>
<td></td>
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<tr>
<td>31</td>
<td>I have disturbing thoughts.</td>
<td></td>
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<tr>
<td>32</td>
<td>I lack self-confidence.</td>
<td></td>
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<tr>
<td>33</td>
<td>I feel secure.</td>
<td></td>
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<tr>
<td>34</td>
<td>I make decisions easily.</td>
<td></td>
<td></td>
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<tr>
<td>35</td>
<td>I feel inadequate.</td>
<td></td>
<td></td>
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<tr>
<td>36</td>
<td>I am content.</td>
<td></td>
<td></td>
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<tr>
<td>37</td>
<td>Some unimportant thought runs through my mind and bothers me.</td>
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<tr>
<td>38</td>
<td>I take disappointments so keenly that I can’t put them out of my mind.</td>
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<tr>
<td>39</td>
<td>I am a steady person.</td>
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<td></td>
<td></td>
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<tr>
<td>40</td>
<td>I get in a state of tension or turmoil as I think over my recent concerns and interests.</td>
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</table>
Appendix F

Center for Epidemiological Studies Depression Scale

Directions: Below is a list of the ways you might have felt or behaved. Please indicate how often you have felt this way during the past week.

0 = Rarely or none of the time (Less than 1 day)
1 = Some or a little of the time (1-2 days)
2 = Occasionally or a moderate amount of time (3-4 days)
3 = Most or all of the time (5-7 days)

During the past week:

____ 1. I was bothered by things that usually don’t bother me.
____ 2. I did not feel like eating; my appetite was poor.
____ 3. I felt that I could not shake off the blues even with help from my family or friends.
____ 4. I felt that I was just as good as other people.
____ 5. I had trouble keeping my mind on what I was doing.
____ 6. I felt depressed.
____ 7. I felt that everything I did was an effort.
____ 8. I felt hopeful about the future.
____ 9. I thought that my life had been a failure.
____ 10. I felt fearful.
____ 11. My sleep was restless.
____ 12. I was happy.
13. I talked less than usual.
15. People were unfriendly.
16. I enjoyed life.
17. I had crying spells.
18. I felt sad.
19. I felt that people disliked me.
20. I could not get “going.”
Appendix G

Eating Disorder Inventory (EDI)

Directions: Please circle the number that corresponds to the way you feel about your body.

1. I eat sweets and carbohydrates without feeling nervous.
   
   1  2  3  4  5  6
   Always  Usually  Often  Sometimes  Rarely  Never

2. I think that my stomach is too big.
   
   1  2  3  4  5  6
   Always  Usually  Often  Sometimes  Rarely  Never

3. I think about dieting.
   
   1  2  3  4  5  6
   Always  Usually  Often  Sometimes  Rarely  Never

4. I think that my thighs are too large.
   
   1  2  3  4  5  6
   Always  Usually  Often  Sometimes  Rarely  Never

5. I feel extremely guilty after overeating.
   
   1  2  3  4  5  6
   Always  Usually  Often  Sometimes  Rarely  Never

6. I think that my stomach is just the right size.
   
   1  2  3  4  5  6
   Always  Usually  Often  Sometimes  Rarely  Never

7. I am terrified of gaining weight.
8. I feel satisfied with the shape of my body.

9. I exaggerate or magnify the importance of weight.

10. I like the shape of my buttocks.

11. I am preoccupied with the desire to be thinner.

12. I think that my hips are too big.

13. If I gain a pound, I worry that I will keep gaining.

14. I think that my thighs are just the right size.

15. I think that my buttocks are too large.

16. I think that my hips are just the right size.
<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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Appendix H

Ideal Body Stereotype Scale-Revised (IBSS-R)

We want to know what **you** think attractive women look like. How much you agree with these statements:

<table>
<thead>
<tr>
<th></th>
<th>strongly agree</th>
<th>strongly disagree</th>
<th>disagree</th>
<th>neutral</th>
<th>agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Slender women are more attractive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Women who are in shape are more attractive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Tall women are more attractive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Women with toned (lean) bodies are more attractive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Shapely women are more attractive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Women with long legs are more attractive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Appendix I

Three-Factor Eating Questionnaire (TFEQ)

**Directions:** Please answer the following questions by circling T for true and F for false.

1. When I have eaten my quota of calories, I am usually good about not eating more. T  F
2. I deliberately take small helpings as a means of controlling my weight. T  F
3. Life is too short to worry about dieting. T  F
4. I have a pretty good idea of the number of calories in common food. T  F
5. While on a diet, if I eat food that is not allowed, I consciously eat less for a period of time to make up for it. T  F
6. I enjoy eating too much to spoil it by counting calories or watching my weight. T  F
7. I often stop eating when I am not really full as a conscious means of limiting the amount that I eat. T  F
8. I consciously hold back at meals in order not to gain weight. T  F
9. I eat anything I want, any time I want. T  F
10. I count calories as a conscious means of controlling my weight. T  F
11. I do not eat some foods because they make me fat. T  F
12. I pay a great deal of attention to changes in my figure. T  F

**Directions:** Please answer the following questions by circling the number above the response that is appropriate to you.

13. How often are you dieting in a conscious effort to control your weight?

   1  2  3  4

   Rarely  Sometimes  Usually  Always

14. Would a weight fluctuation of 5 pounds affect the way you live your life?

   1  2  3  4

   Not at all  Slightly  Moderately  Very much

15. Do your feelings of guilt about overeating help you to control your food intake?

   1  2  3  4

   Never  Rarely  Often  Always
16. How conscious are you of what you are eating?

1  2  3  4
Not at all  Slightly  Moderately  Extremely

17. How frequently do you avoid “stocking up” on tempting foods?

1  2  3  4
Almost never  Seldom  Usually  Almost always

18. How likely are you to shop for low calorie foods?

1  2  3  4
Unlikely  Slightly unlikely  Moderately likely  Very likely

19. How likely are you to consciously eat slowly in order to cut down on how much you eat?

1  2  3  4
Unlikely  Slightly unlikely  Moderately likely  Very likely

20. How likely are you to consciously eat less than you want?

1  2  3  4
Unlikely  Slightly unlikely  Moderately likely  Very likely

21. On a scale of 0 to 5, where 0 means no restraint in eating (eating whatever you want, whenever you want it), and 5 means total restraint (constantly limiting food intake and never “giving in”), what number would you give yourself?

0  1  2  3
eat whatever you want, whenever you want it
usually eat whatever you want, whenever you want it
often eat whatever you want, whenever you want it
often limit food intake, but often “give in”  
4
usually limit food intake, rarely “give in”  
5
constantly limiting food intake, never “giving in”
Appendix J

**Toronto Alexithymia Scale**

**Directions:** Using the following scale as a guide, indicate how much you agree or disagree with each of the following statements by entering your response to the left of the number of each statement. Give only one answer for each statement.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Moderately Disagree</th>
<th>Neither Disagree nor Agree</th>
<th>Moderately Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<td>5</td>
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</tbody>
</table>

1. I am often confused about what emotion I am feeling.
2. It is difficult for me to find the right words for my feelings.
3. I have physical sensations that even doctors don’t understand.
4. I am able to describe my feelings easily.
5. I prefer to analyze problems rather than just describe them.
6. When I am upset, I don’t know if I am sad, frightened, or angry.
7. I am often puzzled by sensations in my body.
8. I prefer to just let things happen rather than to understand why they turned out that way.
9. I have feelings that I can’t quite identify.
10. Being in touch with emotions is essential.
11. I find it hard to describe how I feel about people.
12. People tell me to describe my feelings more.
13. I don’t know what’s going on inside me.
14. I often don’t know why I am angry.
15. I prefer talking to people about their daily activities rather than their feelings.
16. I prefer to watch “light” entertainment shows rather than psychological dramas.
17. It is difficult for me to reveal my innermost feelings, even to close friends.
18. I can feel close to someone, even in moments of silence.
19. I find examination of my feelings useful in solving personal problems.
20. Looking for hidden meanings in movies or plays distracts from their enjoyment.
Appendix K

Body Shape Questionnaire

1. Have you been so worried about your shape that you have been feeling that you ought to diet?

   1 never  2 rarely  3 sometimes  4 often  5 very often  6 always

2. Have you noticed the shape of other women and felt that your own shape compared unfavorably?

   1 never  2 rarely  3 sometimes  4 often  5 very often  6 always

3. Has being naked, such as when taking a bath, made you feel fat?

   1 never  2 rarely  3 sometimes  4 often  5 very often  6 always

4. Has eating sweets, cakes, or other high calorie food made you feel fat?

   1 never  2 rarely  3 sometimes  4 often  5 very often  6 always

5. Have you felt excessively large and rounded?

   1 never  2 rarely  3 sometimes  4 often  5 very often  6 always

6. Have you felt ashamed of your body?

   1 never  2 rarely  3 sometimes  4 often  5 very often  6 always

7. Has seeing your reflection (e.g., in a mirror or a shop window) made you feel bad about your shape?
8. Have you been particularly self-conscious about your shape when in the company of other people?

1 2 3 4 5 6
never rarely sometimes often very often always

9. Have you found yourself brooding about your shape?

1 2 3 4 5 6
never rarely sometimes often very often always

10. Has seeing thin women made you feel badly about your own shape?

1 2 3 4 5 6
never rarely sometimes often very often always
Appendix L

Dissonance-Based Intervention

Week 1

1. Informed consent for participation in the dissonance-based intervention will be obtained.

2. Decide on a group definition of the thin-ideal.
   
a. What comes to mind when you hear the term “thin ideal”?

3. Discuss where the thin-ideal came from and how it is perpetuated.
   
a. How is the thin-ideal perpetuated by media images, family, friends, dating?

Week 2

1. Presentation of media images: positive and negative.

2. Fattism
   
a. Making Peace with Food (p.146): definition of fattism, objectification
      
i. Fattism is a prejudice based on physical characteristics; it is reinforced daily. Fattism can be both direct and indirect. People who deny being fattist may still make fattist comments under the guise of health and fitness. Fattism can accompany a
preoccupation with health and fitness, e.g., when not exercising makes one “bad.”

ii. Objectification: being judged by one’s physical appearance.

Combined with the idealization of thinness, objectification creates tremendous pressure to be “perfect.”

b. *Making Peace with Food* (p.10-17): 6 faulty assumptions about being fat

i. Presented as “True or false: fat people eat more than thin people?”

ii. “A slow metabolism is just an excuse.”

iii. “Each person needs a certain number of calories to maintain her weight.”

iv. “Being fat is unhealthy.”

v. “Fatness is caused by lifestyle, not heredity.”

vi. “Anyone can become and remain thin through a ‘sensible’ diet.”

3. HW (start in class if you have time): Questions about fattism from *Making Peace with Food*

1. How do you judge other people on the basis of their appearance? For instance, do you respect fat people less than thin people? If so, so you consider it fair or just?

2. How do you apply fattism to yourself? Do you believe that you are (or would be) “better” or more capable if thinner? Why or why not?

3. To what extent do you judge yourself solely on the basis of your appearance? Are you harder on yourself than on others? If so, why?

4. Do you behave differently depending on what you weigh? If so, in what ways? When can you begin to act as you like, regardless of what you weigh?
5. How does a bony body versus a fatter body feel to your touch? What is pleasant and what is unpleasant about each one? Now answer from an infant’s point of view. Which would an infant find more pleasant?

**Week 3**

1. Discussion of fattism questions (if didn’t finish during week 2)

2. In-class writing assignment about the negative consequences of the thin-ideal.

3. Discussion of the writing, including who suffers from perpetuation of the thin-ideal and who benefits from it.

   **Ideas for Discussion**

4. History of thinness (*Feminist Perspectives* p. 4-11)
   
   a. Why are women more affected by the thin ideal than men?
   
   b. Ideal weight is actually the thinnest 5-10% of women.
   
   c. Health industry—creation of fatophobia (fat of any kind is dangerous)

**Week 4**

1. Role plays: in pairs or groups, one or more individuals argue with one person about pursuing the thin ideal. The individual being persuaded will play roles such as a dieter, a person with anorexia, an athlete.

2. **HW (start in class if you have time):**

   1. Imagine that you are completely at peace with your body and yourself—that you really love and appreciate the person you are to the fullest. Describe what you think and feel about yourself and your body in the present tense, as if it were true.

   2. Write down at least 4 things you like about your body. Let yourself feel really good about those things—knowing that your body is worthy of unqualified appreciation.
3. Write down at least 4 things you like about yourself. Let yourself feel really good about those things—knowing you are worthy of respect, love, and unqualified appreciation. Ask them to go home and look at self in a full-length mirror and record ONLY positive characteristics (physical, behavioral, emotional).

_Week 5_

1. Discussion of homework assignments.
   a. How did it feel to write positive things about yourself while looking in the mirror?
   b. Ask them to share some things that they wrote.

2. What is difficult about resisting the thin-ideal?

3. What can be done to encourage other women to accept their bodies?

_Ideas for Discussion:_

4. Contemporary food rules = Victorian sex rules (*Feminist Perspectives* p. 8)
   a. As in Victorian times, when sexual behavior was the yardstick of goodness, so have eating and weight become the yardsticks of virtue. Food rules are as inhibitory as were sex rules in the 19th century.

5. Oppression of women (*Feminist Perspectives* p. 9)
   a. The body that women strive to achieve is more like that of a man, thus suppressing secondary female sex characteristics. Beauty largely determines women's social and economic success—but men's successes are based on their actions and accomplishments.
Week 6

1. Post-intervention questionnaires will be administered.
2. Drawing for a gift certificate to Short Pump Town Center.
Appendix M

Yoga Intervention

Week 1

1. Introductions and overview of class: be careful and listen to your body. Pay attention to the breath. Watch for pain.

2. Sitting: work on posture.

3. Beginning poses: instructor makes corrections, demonstrates mistakes, solicits questions.
   a. Sukhaasana (Comfortable Pose)
   b. Surya Namaskaaram (Sun Salutation)
   c. Savaasana (Corpse Pose)
   d. Bhujangaasana (Cobra)
   e. Paschimotanaasana
   f. Yoga Mudra
   g. Yoga Nidra (Deep Relaxation)
   h. Deergha Swaasam (Deep Breathing)
   i. Closing Chants
Week 2

1. Instructor asks if students have any questions

2. Poses (some are new, some old)
   a. Introduce chanting
   b. Netra Vyaayaamam (Eye Movements)
   c. Surya Namaskaaram (Sun Salutation)
   d. Bhujangaasana (Cobra)
   e. Dhanuraasana (Full Forward Bend)
   f. Arddha Padmaasana (Half Lotus)
   g. Vajraasana (Pelvic Diamond Pose)
   h. Badraasana (Gentle Pose)
   i. Leg Stretches
   j. Yoga Nidra (Deep Relaxation)
   k. Pranayama (Breathing Practices)
   l. Deergha Swaasam (Deep Breathing)
   m. Closing Chants: ask how students feel after a yoga session, compared to what they noticed when they started.

Week 3

1. Chant. Any questions?

2. Poses (new and old):
   a. Netra Vyaayaamam
   b. Surya Namaskaaram (Sun Salutations)
Week 4

1. Chant. Any questions?

2. Poses (new and old):
   a. Arddha Salabaasana (Half Locust) and Salabaasana (Locust)
   b. Nauaasana (Boat Pose)
   c. Dhanuraasana (Bow Pose)
   d. Janursirshaasana (Head to Knee Pose) and Paschimotanaasana
   e. Arddha Matsyendraasana (Half Spinal Twist)
   f. Yoga Mudra (Deep Relaxation)
   g. Yoga Nidra (Deep Relaxation)
   h. Pranayama—Introduce Naadi Suddhi

3. Meditation

4. Closing Chants
Week 5

1. Chants. Any questions?

2. Poses (some new, some old).
   a. Surya Namaskaaram (Sun Salutations)
   b. Sarvangaasana (Shoulder Stand)
   c. Matsyaana (Fish Pose)
   d. Pavanamuktaasana (Wind Relieving Pose)
   e. Arddha Matsyendraasana
   f. Yoga Mudra (Deep Relaxation)
   g. Yoga Nidra (Deep Relaxation)
   h. Deergha Swaasam (Deep Breathing)
   i. Kapaalabhaati (New Breath)
   j. Naadi Suddhi

3. Meditation


Week 6

1. Post-intervention questionnaires will be administered.

2. Drawing for a gift certificate to Short Pump Town Center.
Karen Suzanne Mitchell was born on February 11, 1980 in Richmond, Virginia and is an American citizen. She graduated from Hermitage High School, Richmond, Virginia, in 1998. She enrolled at Virginia Commonwealth University in the fall of 1998 as an art major, but changed her major to Psychology after taking and greatly enjoying an abnormal psychology class. Karen received her Bachelor of Science in Psychology from Virginia Commonwealth University, Virginia in 2002. During her undergraduate years, she worked as a research assistant for Dr. Clarissa Holmes and for her current graduate advisor, Dr. Suzanne Mazzeo. Additionally, Karen was a research assistant for Dr. Dawn Wilson in the Division of Nephrology at the Medical College of Virginia. Under Dr. Mazzeo’s direction, she completed an undergraduate thesis titled “Binge Eating and Psychological Distress in Ethnically Diverse Undergraduate Men and Women.” After graduating, she worked for a year as a research assistant for Dr. Elizabeth Fries in the Psychology Department at Virginia Commonwealth University on the Youth Tobacco Evaluation Project, which aimed to evaluate tobacco prevention programs in the state of Virginia. Karen also continued in the Division of Nephrology as project coordinator for a dietary intervention for African American adolescents to increase their fruit and vegetable consumption and reduce their risk of hypertension. She enrolled in Virginia Commonwealth University’s Doctoral program in the fall of 2003. Karen continued working with Dr. Fries through the summer of 2004. She also continues her research with her advisor, Dr. Mazzeo, in their work with eating disorders and obesity. Karen has been a yoga practitioner for three years.