AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF ACCEPTANCE AND RUMINATION ABOUT BODY IMAGE

By

VICKI L. CLARK

A Dissertation submitted to the Graduate School-New Brunswick

Rutgers, the State University of New Jersey

in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

Graduate Program in Psychology

written under the direction of

G. Terence Wilson, Ph.D.

and approved by

_____

_____

_____

_____

New Brunswick, New Jersey

October, 2008

ABSTRACT OF THE DISSERTATION

An Experimental Investigation of the

Effects of Acceptance and Rumination about Body Image

By VICKI L. CLARK

Dissertation Director:

G. Terence Wilson, Ph.D.

Objective: The aim of the present study was to compare the effects of different ways of responding to thoughts about body image after exposure to images of the sociocultural ideal body type.

Method: One hundred nineteen women with high and low body dissatisfaction were randomly assigned to rumination, acceptance, and control conditions which gave them instructions on how to handle thoughts they had in response to viewing images of the sociocultural ideal body type. Participants completed questionnaires assessing body image, mood, and self-esteem before and after the experimental manipulation. They also participated in word recall and word recognition tasks in order to assess memory bias to shape and appearance words as well as a taste test to evaluate differences in food intake.

Results: Rumination increased negative mood in participants with high body dissatisfaction. Training in acceptance had beneficial effects on body image, mood, and self-esteem in comparison to the rumination and control conditions among participants with high body dissatisfaction. As expected, the experimental

condition did not affect individuals with low body dissatisfaction. Rumination and acceptance did not affect memory biases toward shape and appearance words or the amount of food consumed during the taste test.

Conclusion: These findings suggested that training in acceptance helps protect body image, mood, and self-esteem in women with high body dissatisfaction in response to a body image stressor they experience frequently in their daily lives. These results suggest that acceptance-based treatments for body image might facilitate improvements in body image, mood, and self-esteem in this population.

Table of Contents

List of Tables

List of Illustrations

Introduction

The Diagnostic and Statistical Manual for Mental Disorders (DSM-IV; American Psychiatric Association, 1994) describes three diagnostic categories of eating disorders which include anorexia nervosa (AN) and bulimia nervosa (BN), and eating disorder not otherwise specified (EDNOS) which is a residual classification for individuals with clinically significant eating pathology who fail to meet criteria for AN or BN. The EDNOS category currently includes patients who meet the proposed criteria for binge eating disorder (BED). The lifetime prevalence rates of eating disorders among females are 0.9% to 2.2% for AN and 1.5% to 2.0% for BN (Keski-Rahkonen, Raevuori, & Hoek, 2008), although EDNOS is the most common eating disorder (Fairburn & Bohn, 2005). Eating disorders are chronic, associated with high rates of relapse (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000; Lewinsohn, Striegel-Moore, & Seeley, 2000), and marked by psychosocial impairment, psychiatric comorbidity (Bulik, 2002), medical complications (Pomeroy & Mitchell, 2002), and mortality (Keski-Rahkonen et al., 2008).

Cognitive behavioral therapy (CBT) is currently the treatment of choice for BN and BED (Wilson, Grilo, & Vitousek, 2007). CBT for BN, for example, has been shown to eliminate binge eating and purging in approximately 40-50% of patients as well as reduce binge eating and purging symptoms by 80% (Wilson, 2005). A significant number of patients, however, show an incomplete or have no response to treatment. The development of more effective treatments are needed. Furthermore, in light of the frequent comorbidity between eating

disorders and other forms of psychopathology (Bulik, 2002), treatments focused on common maintenance mechanisms might simultaneously facilitate improvements across diagnostic categories.

Rumination has been linked to depression in a substantial amount of research and recent studies suggest that rumination is also associated with disordered eating (Clark & Wilson, in preparation; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007; Troop & Treasure, 1997). Methods of promoting acceptance have been a popular topic of investigation across both fields in recent years (Singer & Dobson, 2007; Wilson, 2004). An increased understanding of the effects of rumination and acceptance might help improve the effectiveness of treatments for these often comorbid conditions.

Rumination in Body Dissatisfaction and Eating Disorders

Rumination is defined as an emotion-focused method of coping with depressed mood that involves passive and repetitive focus on the symptoms associated with their distress as well as their causes and resultant problems (Nolen-Hoeksema, 1991). According to Nolen-Hoeksema's (1991) response styles theory, those who ruminate in response to depression will experience longer-lasting and more severe symptoms than individuals who distract themselves from their mood. Rumination has been shown to predict depressive symptoms as well as the onset of major depressive episodes (Just & Alloy, 1997; Kuehner & Weber, 1999; Nolan, Roberts, & Gotlib, 1998; Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Roberts, Gilboa, & Gotlib, 1998). It has also been

shown to mediate the gender difference in depressive symptoms (Nolen-Hoeksema et al., 1999).

Several recent studies have evaluated the relationship between rumination and eating disorder symptoms. Mezulis, Abramson, and Hyde (2002) found that females were more likely than males to ruminate in response to events related to their appearance. The effect sizes were largest for the interpersonal and body image/attractiveness domains, indicating that women are particularly more likely than men to ruminate in response to events in these areas (Mezulis et al., 2002). Therefore, women not only experience a significant amount of body dissatisfaction, but they are also likely to ruminate about negative body image/appearance events. Given the frequency in which the “thin ideal” body shape permeates the media, negative body image events might be extremely frequent. If women are inclined to ruminate about negative feelings resultant from this exposure, it might induce greater body dissatisfaction as well as eating pathology and depressive symptoms.

In support of this hypothesis, one study evaluated levels of rumination in clinically depressed individuals with and without co-morbid eating pathology. Controlling for depressive symptoms, depressed individuals with elevated eating disorder symptoms engaged in higher levels of rumination in comparison to those without co-morbid eating pathology (Calmes et al., 2003). Furthermore, rumination has been shown to mediate the relationship between body dissatisfaction and depression in post-pubertal adolescent girls (Smith, Floyd, Neeren, Hughes, & Alloy, 2004).

Research on the coping skills of women with eating disorders provides additional support for further evaluation of women's response styles to negative body image. First, eating pathology has been associated with perceived levels of psychological stress (Striegel-Moore, Silberstein, Frensch, & Rodin, 1989; Wolf & Crowther, 1983). Second, women with eating disorders reportedly have poorer coping skills than those without eating disorders (Troop, Holbrey, & Treasure, 1998; Troop & Treasure, 1997). This suggests that women with ineffective response styles might be at risk for the development of an eating disorder when faced with a stressful situation for which they are not equipped to cope. Research indicates that rumination, in particular, in response to a stressful event is associated with the development of bulimic symptoms (Troop & Treasure, 1997). The data in this study, however, were collected retrospectively from women who had experienced eating disorders within the past four years. A recent prospective study found that rumination about body image/attractiveness events predicted an increase across a variety of cognitive and behavioral eating disorder symptoms including shape concerns, dietary restraint, body checking and avoidance, lack of acceptance of shape and weight, objective bulimic episodes, subjective bulimic episodes, and purging behavior in a non-clinical sample (Clark & Wilson, in preparation).

Acceptance in Body Dissatisfaction and Eating Disorders

A central feature of the diagnostic criteria of both anorexia nervosa (AN) and bulimia nervosa (BN) is an "undue influence" of body shape or weight on self-evaluation (American Psychiatric Association, 1994, p. 589). Individuals with

eating disorders judge their self-worth largely, or even exclusively, by their body shape and weight and their ability to control these factors. Other factors such as interpersonal relationships, achievement, and other forms of competency are overshadowed by shape, weight, and eating concerns in determining their self-worth. Clients with eating disorders often harbor unrealistic beliefs regarding the controllability of their weight and shape. These beliefs are fueled by a billion dollar cosmetic industry encouraging consumers to strive to change their appearance through a variety of means, such as weight loss products and cosmetic surgery. Once reasonable efforts have been made at making realistic and healthy lifestyle changes, however, clients need to accept their resultant shape and weight (Wilson, 1996).

Mindful mirror exposure has recently been utilized to facilitate non-judgmental acceptance about shape and weight. Similar to the mindfulness treatment for low self-esteem described by Fennell (2004), the goal is to help patients “move from ‘This is who I am’ to ‘This is what I do’” (p. 1062). Fennell’s (2004) approach aims to help participants recognize their negative thinking when it occurs (e.g., “Here I go again”) and distance themselves from their exceptionally negative, critical thoughts. Preliminary studies of mindful mirror exposure have yielded promising results (Delinsky & Wilson, 2006; Hilbert, Tushen-Caffier, & Vogele, 2002; Keys et al., 2002).

One mechanism through which acceptance might achieve its benefits is by impeding engagement in maladaptive rumination. Mindfulness-based cognitive therapy (MBCT) for depression was designed, in part, to reduce

depressive rumination (Segal, Williams, & Teasdale, 2002). MBCT teaches recovered, recurrently depressed individuals to change the way they relate to their thoughts. Teasdale et al. (2002) reported that metacognitive awareness, the ability to view negative thoughts and feelings as "passing events in the mind rather than as inherent aspects of self or as necessarily valid reflections of reality" (p. 285), was greater among participants who received MBCT as opposed to treatment as usual. This method of processing reflects what Teasdale (1999) called "mindful experiencing/being" (non-evaluative awareness of present experiences), whereas rumination can be described as "mindless emoting" (analytical thinking about the self). According to Teasdale (1999), these processes represent two of three distinct and incompatible "modes of mind".

In a series of studies, Watkins and colleagues have found that an experiential focus in response to negative mood, in comparison to an analytical focus, has led to better social problem solving (Watkins & Moulds, 2005) and less overgeneral autobiographical memory (Watkins & Teasdale, 2001, 2004) in depressed individuals. A recent study randomized formerly depressed individuals to rumination, distraction, acceptance, or no training control conditions prior to undergoing a negative mood induction. Participants instructed to acceptance and distraction conditions experienced a decrease in induced negative mood, whereas rumination maintained negative mood at a level non-significantly different than the control group (Singer & Dobson, 2007).

The current study was designed to examine the effects of rumination about, and acceptance of, thoughts about shape and weight in comparison to a

no-treatment control in response to viewing images of the sociocultural ideal on affective, cognitive, and behavioral measures. Cognitive models of eating disorders purport that excessive shape and weight concerns play a central role in the maintenance of these disorders (Fairburn, 2002; Vitousek & Hollon, 1990). These theories maintain that the activation of schemas related to food, shape, weight, and the self will affect information processing among individuals with eating disorders (Vitousek & Hollon, 1990). Williamson and colleagues (1999) argue that cognitive biases are a function of preoccupation with body shape and should therefore be present among individuals with high body dissatisfaction. Viewing images of the sociocultural ideal would be expected to activate body and appearance schemas in participants with high body dissatisfaction.

Rumination will maintain focus on shape and weight concerns and should therefore improve memory for schema-consistent information in these women. Acceptance training is believed to help participants acknowledge the presence of cognitions and emotions about body image and let them pass, which should help protect against memory bias. Therefore, it is hypothesized that the rumination group will recall more fat (as opposed to thin) and unattractive (as opposed to attractive) words among women in the high body dissatisfaction group. Individuals in the acceptance and control groups were not expected to show evidence of a memory bias. Memory bias is not expected in the low body dissatisfaction group because they do not possess the schemas about the importance of body shape and weight that would lead to cognitive biases regarding shape and appearance words.

Eating in response to negative affect is thought to be a risk factor for binge eating (Stice, 2001; Stice, Presnell, & Spangler, 2002). Several studies indicate negative affect frequently precedes binge eating (Le Grange, Gorin, Catley, & Stone, 2001; Lattimore, 2001; Telch, Pratt, & Niego, 1998). The mechanism behind the relationship between negative affect and overeating is unknown. Rumination may contribute to overeating by maintaining one's focus on negative emotions. Acceptance, on the other hand, would be expected to reduce the likelihood of overeating by helping participants distance themselves from their distressing thoughts and emotions.

Therefore, it was predicted that rumination would maintain or worsen state body image, negative mood, and self-esteem, whereas acceptance would positively affect these variables. It was also hypothesized that the rumination group would exhibit a memory bias toward unattractive (as opposed to attractive) and fat (as opposed to thin) words. Individuals in the acceptance and control groups were not expected to show evidence of a memory bias. Consistent with prior research, women with high body dissatisfaction were anticipated to recognize and recall more fat words than thin words and more attractive words than unattractive words (Baker, Williamson, & Sylve, 1995). Women with low body dissatisfaction are not hypothesized to show this recall bias. Finally, participants who ruminated were hypothesized to consume more food during the eating task than those in the control and acceptance conditions. In accordance with prior research demonstrating that rumination had negative effects in dysphoric, but not non-dysphoric individuals (e.g., Lyubomirsky & Nolen-

Hoeksema, 1995), these effects are expected to be found in the high body dissatisfaction, but not low body dissatisfaction group.

Method

Participants

One hundred nineteen female undergraduate students participated in this study.

Two individuals were excluded due to technical problems (n = 1) and falling asleep during the experimental manipulation (n = 1). The remaining 117 participants are included in the analyses. The mean age of the participants was 20.70 $\pm$ 3.82 years and the mean body mass index (BMI) of the sample was 22.38 $\pm$ 3.88 kg/m^2, which falls within the normal range of BMI (18.5 – 24.9) (NHLBI, 1998). Fifty three participants (45.3%) were Caucasian, 30 (25.6%) were Asian, 11 (9.4%) were Black, 11 (9.4%) were Hispanic, 4 (3.4%) identified themselves as more than one race, and 8 (6.8%) responded as “other.”

Materials

Self-report Measures

Demographic variables. Participants reported their height, weight, age, and ethnicity. Height and weight were used to calculate each individual’s body mass index (BMI).

Body Shape Questionnaire (BSQ). The BSQ (Cooper et al., 1987) is a 34-item measure that assesses concerns about body shape and weight in normal and clinical populations. Each item is a question about how participants have felt about their appearance over the past four weeks (e.g., Have you ever been afraid that you might become fatter?; Has eating even a small amount of food made you feel fat?; Has thinking about your shape interfered with your ability to

concentrate?). Responses are given on a 6-point scale ranging from (1) never to (6) always. The sums of all ratings are calculated to produce each subject's score. The internal reliability coefficient (Cronbach's α) for this sample was 0.97.

Beck Depression Inventory (BDI). The BDI (Beck et al., 1961) is a 21-item measure that is widely-used in order to assess depressive symptoms (e.g., pessimism, indecisiveness, sleep disturbance). Participants indicate their agreement to each statement on a 4-point scale ranging from 0 to 3. Item #9 assessing suicidal thoughts was excluded from the questionnaire. The internal reliability coefficient (Cronbach's α) for this sample was 0.84.

Eating Disorder Examination – Questionnaire (EDE-Q). The EDE-Q (Fairburn & Beglin, 1994) was derived from the interview-based Eating Disorder Examination (EDE; Fairburn & Cooper, 1993) which is the gold-standard for the assessment of disordered eating. The reliability and validity of the EDE-Q has been well-documented (Black & Wilson, 1996; Fairburn & Beglin, 1994).

Body Image States Scale (BISS). The BISS (Cash, 2004; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002) is a six-item measure of state body image. Participants rate how they feel "right now at this moment" on a 9-point Likert scale. The BISS has acceptable internal consistency and has shown to be sensitive to experimental manipulation (Cash et al., 2002). The internal reliability coefficient (Cronbach's α) for this sample was 0.83.

Positive and Negative Affect Scale (PANAS). The PANAS (Watson, Clark, & Tellegan, 1988) is a 20-item measure of affect consisting of two 10-item subscales assessing positive and negative affect. The PANAS has excellent

internal consistency as well as excellent convergent and discriminant validity (Watson et al., 1988). The negative affect scale only (PANAS-N) was used in this experiment. The internal reliability coefficient (Cronbach's α) for this sample was 0.88.

State Self-esteem State Scale (SSES). The SSES (Heatherton & Polivy, 1991) is a 20-item measure of state self-esteem. The SSES consists of 3 subscales and has been shown to be sensitive to experimental manipulation. Participants rate their feelings "right now" on a 5-point Likert-scale. Only the total scale was used in this study. The internal reliability coefficient (Cronbach's α) for this sample was 0.91.

Visual Analog Scales-Body Image (VAS-BI). Visual analog scales were created in order to assess short-term changes in body image throughout the study session. Participants responded by making a vertical mark on a 100 mm line in which a higher score indicates greater body image concerns. Items assessing concerns about shape and weight were combined into one scale. This factor structure was supported by a factor analysis with varimax rotation in which only one factor was extracted. The internal reliability coefficient (Cronbach's α) for this sample was 0.77.

Visual Analog Scale-Depression (VAS-DEP). A visual analog scale was created in order to assess short-term changes in mood throughout the experiment. Participants responded by making a vertical mark on a 100 mm line in which a higher score indicates a more negative mood.

Verbal Stimuli

Fat, thin, attractive, and unattractive words were obtained from stimulus sets published by Cassin and Von Ranson (2005). Fat words were matched to thin words, and unattractive words to attractive words, for syllables, word frequency, word length, and word familiarity (Cassin & Von Ranson, 2005). Each word list was divided into two separate lists and rematched for syllables, word frequency, word length, and word familiarity. Half of these words were utilized as stimuli in the encoding task. All of the Cassin & Von Ranson (2005) words were presented during the word recognition task in order to force participants to discriminate between stimulus and distracter words.

Food Intake

The amount of food consumed during a taste test was measured in grams on a digital scale.

Manipulation Check

In order to evaluate the effectiveness of the experimental manipulations, participants rated the degree to which they tried and were able to analyze and understand their thoughts (i.e., rumination) as well as notice and "accept" (i.e., acceptance) their thoughts and feelings during the experiment on 7-point Likert scales from 1 (not at all) to 7 (completely). Mean scores for rumination (i.e, MC-RUM) and acceptance (i.e., MC-ACC) were calculated from the two questions for each condition.

Procedure

Potential participants completed the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987), Eating Disorder Examination-

Questionnaire (EDE-Q; Fairburn & Beglin, 1994), Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), and a demographic questionnaire as part of a larger packet of questionnaires administered over email as a “Mood and Attitudes Study.” Individuals who scored $\geq$ 110 or $\leq$ 53 on the BSQ (reflective of one standard deviation above and below the mean) were recruited for the high (H-BID) and low (L-BID) body dissatisfaction groups, respectively. Due to ethical concerns, students who reported engaging in self-induced vomiting, laxative or diuretic use > 2 times over the past month or objective bulimic episodes > 2 times per week over the past month on the EDE-Q or greater than 29 on the BDI were excluded. Students received course credit or monetary compensation for their participation.

Eligible students were informed that they would be participating in a study on “Imagination and Thoughts” as well as a pilot study evaluating taste preferences and the perceived pleasantness of a series of words in order to aid in the development of future studies. All students participated individually and the experimenter was blind to the participant’s manipulation condition and body image group. Participants’ responses on a debriefing questionnaire and their comments after debriefing indicated that the cover story was successful. None of the participants successfully guessed the true intention of the study.

After completing the consent form, participants completed an encoding task described to them as part of the "pilot study". Stimulus words were presented on a computer screen for 6 seconds each (with 2 seconds between each word trial) following the procedure of Israeli and Stewart (2001). The

encoding task involved rating the stimulus words on a 5-point Likert scale with ratings from -2 (very unpleasant) to +2 (very pleasant). They were not told that they would be asked to recall the words later.

Participants then completed the BISS, PANAS, SSES, and visual analogue scales (Time 1) before listening to the instructions of their randomly assigned "imagination tasks" including: 1) rumination; 2) acceptance; 3) no training control group in which participants were not given any instructions. The instructions (provided in Appendix 1) were given via audiotape. Participants were informed that they would view a slideshow after listening to the audiotape and they should follow the instructions provided on the tape during, and for 5 minutes following, the slideshow. They were given a summary card with a brief description of the instructions in order to remind them of their experimental technique during their participation in the experiment.

Participants then viewed pictures illustrating the sociocultural ideal body type using their instructed technique to respond to their thoughts (the control group viewed the pictures without receiving instructions on how to cope with their thoughts). Pictures were displayed on a computer screen for 15 seconds each with a 15 second exposure to a blank slide in between following the methodology used by Yamamiya, Cash, Melnyk, Posavac, & Posavac (2005). Following this task, subjects again completed the questionnaires administered at the beginning of the experiment (Time 2) as well as manipulation check questions.

In order to bolster the cover story, participants were reminded that the remaining tasks were parts of the pilot studies described previously. They were

then provided with pre-measured portions of milk chocolate, potato chips, and popcorn and given 5 minutes to complete questionnaires about taste perceptions and taste preferences. Participants were told that they may consume as much as they like in order to answer the questions.

Finally, participants completed the memory tasks. A free-recall test was used to test recall of the encoded words. Participants were given 5 minutes to write down all of the words they could remember from the encoding task. The dependent variable was defined as the number of stimulus words correctly recalled in each word group. Word recognition was assessed by giving participants a list of words and asking them to check “yes” or “no” to indicate whether each word was presented during the encoding task. Dependent variables were defined as the number of words correctly identified from each word group as well as words that were inaccurately classified as target words (i.e., false positives).

At the end of the session, participants were probed for their hypotheses regarding the nature of the study. Participants were debriefed and informed of the true purpose of the study. They were also given an opportunity to withdraw their participation.

Results

Sample Characteristics

The mean BSQ score was 133.05 ± 20.65 in the high body dissatisfaction group and 43.32 ± 6.37 in the low body dissatisfaction group. Mean BDI scores were 9.65 ± 6.05 in the high body dissatisfaction group and 4.25 ± 3.96 in the low body dissatisfaction group. Analyses of variance (ANOVAs) and chi-square tests were calculated to examine whether there were any differences across body image group and experimental condition on demographic variables as well as the BSQ and BDI. As expected, the high body dissatisfaction group had significantly higher BSQ scores, $F(1, 111) = 1011.79$, $p < .001$ and BDI scores, $F(1, 111) = 32.17$, $p < .001$, than the low body dissatisfaction group. There also were main effects of body image group, $F(1, 109) = 56.87$, $p < .001$, and condition, $F(2, 109) = 7.65$, $p < .01$ on BMI. The BMI of participants in the high body dissatisfaction group ($M = 24.58$) was higher than those in the low body dissatisfaction group ($M = 20.23$). Tukey post hoc comparisons examining the main effect of condition revealed that the acceptance group had a higher average BMI than the rumination or control groups ($M_{acceptance} = 23.96$, $M_{rumination} = 21.34$, $M_{control} = 21.91$), $p = .004$. There were no other significant effects (main effect or interaction) for any descriptive variables. Table 1 presents the characteristics of the sample by condition and body image group.

Preliminary analyses

A series of 3 (condition: rumination, acceptance, control) X 2 (body image group: high body dissatisfaction, low body dissatisfaction) ANOVAs were

conducted to determine if there were baseline differences among groups on the outcome variables. As expected, the high body dissatisfaction group scored significantly higher on the PANAS-N, $F(1, 111) = 13.72$, $p < .001$, VAS-BI, $F(1, 111) = 400.14$, $p < .001$, and VAS-DEP, $F(1, 111) = 147.54$, $p < .001$, than the low body dissatisfaction group. The high body dissatisfaction group scored lower on the BISS, $F(1, 111) = 195.18$, $p < .001$, and SSES, $F(1, 111) = 103.79$, $p < .001$. There were no significant main effects of condition or interaction effects for any baseline measures.

Pearson correlation coefficients were calculated to examine the relationship among self-report measures. As shown in Table 2, there were significant relationships among almost all of the study variables. The strongest relationship was between VAS-BI and BISS, $r = -0.88$, $p < .001$, VAS-BI and SSES, $r = -0.74$, $p < .001$, and BISS and SSES, $r = 0.76$, $p < .001$. The remainder of the associations are within the 0.3 - 0.5 range.

Manipulation Checks

In order to assess the effectiveness of the experimental manipulations, a 2 X 3 X 2 mixed model ANOVA with body image group (high body dissatisfaction, low body dissatisfaction) and condition (rumination, acceptance, control) as between-subject factors and manipulation check questions (MC-RUM, MC-ACC) as a within-subjects factor was conducted. Tukey's Honestly Significant Difference (HSD) was used to examine interaction effects.

The predicted manipulation check question by condition interaction was significant, $F(2, 111) = 3.12$, $p = .048$. As shown in Figure 1, participants in the

rumination condition scored higher (*M* = 4.80) than the acceptance (*M* = 3.88) and control groups (*M* = 3.58) on MC-RUM, *p*s < .01. The rumination group (*M* = 4.55) also scored higher than the control group (*M* = 3.57) on MC-ACC, *p* < .01. The acceptance group (*M* = 4.28) did not differ from the rumination or control groups on MC-ACC (see Figure 1). There was also a significant manipulation check question by body image group interaction, *F*(1, 111) = 12.71, *p* = .001, indicating that participants with high body dissatisfaction (*M* = 4.44) scored higher on MC-RUM than individuals with low body dissatisfaction (*M* = 3.74), *p* < .01, and the low body dissatisfaction group scored higher on MC-ACC (*M* = 4.17) than MC-RUM (*M* = 3.74), *p* < .05 (see Figure 2).

These results indicate that the rumination manipulation successfully induced participants to attempt to analyze and understand their thoughts and feelings during the experiment. The fact that the MC-ACC scores of the acceptance group did not differ from the two other groups suggested that participants in the acceptance condition had greater difficulty engaging in their assigned manipulation. Therefore, the manipulation check analyses were rerun including only participants (n = 71) who reported successfully engaging in their assigned experimental manipulation by scoring at least 5 (out of 7) on the appropriate manipulation check (i.e., MC-RUM for participants in the rumination condition and MC-ACC for the acceptance group). The predicted manipulation check question by condition interaction was significant, *F*(2, 65) = 6.20, *p* = .003. As shown in Figure 3, participants in the rumination group scored significantly higher (*M* = 5.74) than those in the acceptance (*M* = 4.81), *p* < .05, and control

groups (M = 3.58) on MC-RUM, $p < .01$. The acceptance group also scored higher than the control group, $p < .01$. The acceptance and rumination groups scored higher on MC-ACC ($M_{acceptance}$ = 5.89, $M_{rumination}$ = 5.22) than the control group (M = 3.57), ps < .01, but not significantly different from each other. The acceptance group also scored significantly higher on MC-ACC than MC-RUM, $p < .01$.

In order to test the current study's hypotheses with participants who report successfully engaging on the experimental manipulation, analyses were conducted with the full sample (N = 117) and repeated with those passing the manipulation check (n = 71).

Effects of condition on body image, mood, and self-esteem

Means and standard errors of body image, mood, and self-esteem measures at time 1 and time 2 are presented in Tables 3 (all participants) and 4 (participants who passed the manipulation check). Each dependent variable was analyzed using a 2 X 3 X 2 mixed model ANOVA with body image group (high body dissatisfaction, low body dissatisfaction) and condition (rumination, acceptance, control) as between-subject factors and time (time 1, time 2) as a within-subjects factor.[1] Tukey's HSD was used to examine interaction effects. Effect sizes are reported as partial η^2. A conservative alpha level of .01 was used to adjust for the number of analyses conducted.

Effects of rumination and acceptance on body image. There was a significant main effect of body image group on VAS-BI, $F(1, 111) = 406.96$, $p < .001$, partial $\eta^2 = 0.786$. Participants with high body dissatisfaction scored higher

(*M* = 64.21) than those in the low body dissatisfaction group (*M* = 23.69). There was also a significant time by condition interaction on VAS-BI, $F(2, 111) = 4.92$, $p = .009$, partial $\eta^2 = 0.081$. As shown in Figure 4, VAS-BI scores at time 2 for the rumination group (*M* = 46.69) was significantly higher than the acceptance group (*M* = 41.57). The control group (*M* = 45.32) did not differ from the rumination or acceptance groups. The predicted 3-way interaction between time, condition, and body image group approached significance, $F(2, 111) = 4.13$, $p = .019$, partial $\eta^2 = 0.069$. Due to the limited power present in this study to detect significant interaction effects, exploratory pairwise comparisons using Tukey's HSD were conducted. As shown in Figure 5a, VAS-BI scores at time 2 for rumination and control groups were significantly higher than the acceptance condition among individuals with high body dissatisfaction, *p*s < .01. There were no differences between the rumination and control groups. As expected, there were also no differences between groups among participants with low body dissatisfaction (see Figure 5b).

There was a significant main effect of body image group on the BISS, $F(1, 111) = 216.16$, $p < .001$, partial $\eta^2 = 0.661$. Participants with high body dissatisfaction scored lower (*M* = 3.95) than those in the low body dissatisfaction group ($M_{VAS\text{-}BI} = 23.69$, $M_{BISS} = 6.52$). There predicted 3-way interaction between time, body image, group, and condition was also a significant, $F(2, 111) = 5.29$, $p = .009$, partial $\eta^2 = 0.087$. As shown in Figures 6a and 6b, there was a significant reduction in BISS score in the rumination and control groups among participants with high body dissatisfaction, $p < 0.05$. Therefore, BISS scores at time 2 for the

acceptance group was significantly higher than the rumination and control groups, $p < 0.01$. There were no differences between the rumination and control groups. There were also no differences between groups among participants with low body dissatisfaction.

In the subsequent analyses including only participants who passed the manipulation check, the main effect of body image group, $F(1, 65) = 186.96$, $p < .001$, partial $\eta^2 = 0.724$, as well as the interactions of time and condition on VAS-BI score remained significant, $F(2, 65) = 9.28$, $p < .001$, partial $\eta^2 = 0.222$. The predicted 3-way interaction between time, condition, and body image group, $F(2, 65) = 6.87$, $p = .002$, partial $\eta^2 = 0.174$, also was significant. There was an increase in VAS-BI score from time 1 to time 2 in the rumination condition ($M_{T1} = 61.28$, $M_{T2} = 68.80$), $p < .05$, and a decrease in the acceptance condition ($M_{T1} = 67.29$, $M_{T2} = 49.98$), $p < .01$, among participants in the high body dissatisfaction group. At Time 2, individuals with high body dissatisfaction in the rumination and control groups ($M_{rumination} = 68.80$, $M_{control} = 67.21$) scored higher than the acceptance group ($M = 49.98$), $p < .01$. Participants with low body dissatisfaction in the rumination group ($M = 27.41$) also scored higher than those in the acceptance condition ($M = 19.61$), $p < .05$ (see Figures 7a and 7b).

The main effect of body image group, $F(1, 65) = 93.98$, $p < .001$, partial $\eta^2 = 0.591$, and the 3-way interaction between time, body image group, and condition on BISS score remained significant, $F(2, 65) = 10.56$, $p < .001$, partial $\eta^2 = 0.245$. There was a significant increase in BISS score in the acceptance condition from time 1 ($M = 3.80$) to time 2 ($M = 4.97$), $p < .01$ among participants

with high body dissatisfaction, which resulted in a significantly greater BISS score at time 2 in comparison to the rumination (M = 3.35) and control (M = 3.37) groups, $p < .01$ (see Figures 8a and 8b).

Effects of rumination and acceptance on mood. VAS-DEP and PANAS-N data were positively skewed. A square-root transformation successfully normalized VAS-DEP data. A floor effect was present in PANAS-N data and heterogeneity of variances was unable to be corrected with square-root or log transformations. Therefore, separate mixed model ANOVAs were used to examine the effects of experimental condition on PANAS-N in high body dissatisfaction and low body dissatisfaction groups and the assumption of homogeneity of variance was met in both analyses.

The main effects of time, $F(1, 111) = 14.62$, $p < .001$, partial $\eta^2 = 0.116$, and body image group, $F(1, 111) = 46.72$, $p < .001$, partial $\eta^2 = 0.296$, on VAS-DEP were statistically significant. These main effects were qualified, however, by a significant time by body image group interaction, $F(1, 111) = 12.98$, $p < .001$, partial $\eta^2 = 0.105$, which indicated that there was a greater increase in VAS-DEP score in the high body dissatisfaction group than the low body dissatisfaction group. The predicted 3-way interaction of time, condition, and body image group was not significant $F(2, 111) = 1.84$, $p = .164$, partial $\eta^2 = 0.032$. Plots of the 3-way interaction reveal the hypothesized pattern of results (see Figures 9a and 9b). Therefore, due to the limited power present in this study to detect significant interaction effects, exploratory pairwise comparisons using Tukey's HSD were conducted. These analyses indicated that, among individuals with high body

dissatisfaction, the rumination group scored higher on VAS-DEP than the acceptance and control groups at time 2, *p*s < .01. There was no difference between acceptance and control groups. There were also no differences between conditions in the low body dissatisfaction group.

There were no significant main effects of condition or interaction effects of time by condition in either body image group on PANAS-N. Similar to the VAS-DEP, however, graphs of the predicted interaction of time by condition revealed the hypothesized pattern of results (see Figures 10a and 10b). Therefore, due to the limited power present in this study to detect significant interaction effects, exploratory pairwise comparisons using Tukey's HSD were made. Among the high body dissatisfaction group, participants in the rumination condition scored higher on PANAS-N than the acceptance group at time 2, $p < .01$. There were no other significant differences.

In the second set of analyses with participants who passed the manipulation check, the main effect of body image group on VAS-DEP, $F(1, 65) = 12.30$, $p = .001$, partial $\eta^2 = 0.159$, remained significant. The main effect of time, $F(1, 65) = 4.73$, $p = .03$, partial $\eta^2 = 0.068$, and the interaction of time and body image group on VAS-DEP, $F(1, 65) = 4.95$, $p = .03$, partial $\eta^2 = 0.071$, were no longer significant. Graphs of the predicted 3-way interaction between time, condition, and body image group continued to reflect the hypothesized pattern of results (see Figures 11a and 11b). Exploratory pairwise comparisons indicated that participants with high body dissatisfaction experienced an increase in VAS-DEP from time 1 ($M = 5.19$) to time 2 ($M = 6.75$) in the rumination condition, $p <$

.05. This increase led to significantly higher VAS-DEP scores at time 2 in the rumination group (M = 6.75) in comparison to the acceptance (M = 2.61), $p < .01$, and control groups (M = 5.12), $p < .05$, among those with high body dissatisfaction.[2] The control group also scored higher than the acceptance group at time 2, $p < .01$.

There was a main effect of time on PANAS-N, indicating a significant decrease in negative affect (M_{T1} = 13.54, M_{T2} = 12.41), among participants in the low body dissatisfaction group, $F(1, 33) = 9.15$, $p = .005$, partial $\eta^2 = 0.217$. The graph of the predicted interaction of time by condition in the high body dissatisfaction group, however, continued to display the hypothesized pattern of results (see Figure 12a). Exploratory pairwise comparisons showed that, among participants in the high body dissatisfaction group, those in the rumination and control conditions scored higher on PANAS-N than the acceptance group, $p < .01$. There was also a significant decrease on PANAS-N score among participants with low body dissatisfaction in the acceptance condition, $p < .05$, although there were no differences between conditions at time 2. Figure 12b suggests that this result is a regression to the mean effect.

Effects of rumination and acceptance on self-esteem. There was significant main effect of body image group on SSES score, $F(1, 111) = 119.54$, $p < .001$, partial $\eta^2 = 0.519$. Participants with low body dissatisfaction (M = 79.45) had higher SSES scores than those with high body dissatisfaction (M = 60.98). There were no other significant differences. A plot of the predicted 3-way interaction, however, revealed the hypothesized pattern of results (see Figures

13a and 13b). Therefore, due to the limited power present in this study to detect significant interaction effects, exploratory pairwise comparisons with Tukey's HSD were conducted. These analyses indicated that, among individuals with high body dissatisfaction, the acceptance group scored higher on SSES than the rumination and control groups, *p*s < .01. There was no difference between rumination and control groups. Among the low body dissatisfaction group, SSES score was higher in the rumination than control group, $p < .05$. In order to determine whether these effects were driven by the items assessing appearance-related self-esteem, these analyses were repeated excluding the items of the appearance subscale of the SSES. There were no changes to the pattern of results.

Among participants who passed the manipulation check, the main effect of body image group remained significant, $F(1, 65) = 46.58$, $p < .001$ partial $\eta^2 = 0.417$. The time by condition interaction approached significance, $F(2, 65) = 4.29$, $p = .018$, partial $\eta^2 = 0.117$. Exploratory Tukey's HSD showed that SSES score increase among participants in the acceptance group from time 1 ($M = 70.64$) to time 2 ($M = 75.39$), $p < .01$. At time 2, the acceptance group scored higher on the SSES than the rumination ($M = 70.04$) and control ($M = 67.95$) groups, *p*s < .01. There also was a trend of a 3-way interaction between time, condition, and body image group, $F(2, 65) = 3.27$, $p = .045$, partial $\eta^2 = 0.091$. Tukey's HSD revealed that there was an increase in SSES score from time 1 to time 2 among high body dissatisfaction participants, $p < .01$. At time 2, individuals in the acceptance condition scored higher on the SSES ($M = 68.20$) than those in the rumination (*M*

= 61.64), $p < .05$, and control (M = 58.95) groups, $p < .01$. There were no significant differences among participants with low body dissatisfaction (see Figures 14a and 14b).

Effects of rumination and acceptance on memory bias

Means and standard deviations of word recall, word recognition, and false word recognition frequencies are presented in Tables 5-10. Separate 2 X 3 X 2 mixed model ANOVAs were used with body image group (high body dissatisfaction, low body dissatisfaction) and condition (rumination, acceptance, control) as between-subject factors and word group (attractive vs. unattractive or thin vs. fat) as a within-subjects factor.[3] Tukey HSD tests were used to examine interaction effects. Effect sizes are reported as partial η^2. Alpha was set at 0.025 for these analyses.

Effects of rumination and acceptance on word recall. There was a main effect of body image group on the recall of thin and fat words in which the high body dissatisfaction group (M = 4.55) recalled more words than the low body dissatisfaction group (M = 3.94), $F(1, 111) = 6.60$, $p = .012$, partial $\eta^2 = 0.056$. There were no other significant effects on the recall of thin and fat or attractive and unattractive words, including the hypothesized word type x condition x body image group interactions. There were no significant effects in the analyses including only participants who passed the manipulation check.

Effects of rumination and acceptance on word recognition. There was a significant effect of word type on recognition of thin and fat words in which thin words (M = 8.01) were recognized more frequently than fat words (M = 7.66),

$F(1, 111) = 6.42$, $p = .013$, partial $\eta^2 = 0.055$. There were no other significant effects on recognition of thin and fat or attractive and unattractive words, including the hypothesized word type x condition x body image group interactions.

Among participants who successfully passed the manipulation check, the main effect of word type on recognition of thin ($M = 8.07$) and fat words ($M = 7.73$) was no longer significant, $F(1, 65) = 3.67$, $p = .06$, partial $\eta^2 = 0.053$. There was a trend for an interaction of word type and body image group, $F(1, 65) = 4.12$, $p = .047$, partial $\eta^2 = 0.06$. Exploratory Tukey's HSD showed that the high body dissatisfaction group recognized more thin words ($M = 8.31$) than fat words ($M = 7.61$), $p < .05$. There was no difference in word recognition in the low body dissatisfaction group ($M_{thin} = 7.83$, $M_{fat} = 7.85$). There were also no significant effects on word recognition of attractive and unattractive words.

Effects of rumination and acceptance on false recognition. There was a significant main effect of word type on the false recognition of attractive and unattractive words, $F(1, 111) = 42.47$, $p < .001$, partial $\eta^2 = 0.277$, in which attractive words ($M = 1.74$) were more often falsely recognized than unattractive words ($M = 1.01$). There also was a trend of a word type by condition interaction, $F(2, 111) = 3.19$, $p = .045$, partial $\eta^2 = 0.054$. As shown in Figure 15, the acceptance and control groups endorsed more false recognition of attractive words ($M_{acceptance} = 1.74$, $M_{control} = 1.82$) than unattractive words ($M_{acceptance} = 0.85$, $M_{control} = 0.85$). There was no difference in false recognition in the rumination group ($M_{attractive} = 1.65$, $M_{unattractive} = 1.31$). There were no other

significant effects on false recognition of attractive and unattractive or thin and fat words, including the hypothesized word type x condition x body image group interactions.

Among participants who successfully passed the manipulation check, the main effect of word type on false recognition of attractive and unattractive words remained significant, $F(1, 65) = 18.78$, $p < .001$, partial $\eta^2 = 0.224$, in which attractive words ($M = 1.69$) were more frequently falsely recognized than unattractive words ($M = 1.01$). The word type by condition interaction was not significant, $F(2, 65) = 2.15$, $p = .124$, partial $\eta^2 = 0.062$. There was a significant condition by body image group interaction on false recognition of thin and fat words, $F(2, 65) = 4.08$, $p = .021$, partial $\eta^2 = 0.111$. Follow-up Tukey tests, however, did not find significant differences between groups (see Figure 16). There were no other significant effects including the predicted 3-way interactions between word type, condition, and body image group.

Effects of rumination and acceptance on food intake

Means and standard deviations of word recall and word recognition frequencies are presented in Tables 11 (all participants) and 12 (individuals who passed the manipulation check). A 2 (body image group: high body dissatisfaction, low body dissatisfaction) x 3 (condition: rumination, acceptance, control) between-subject ANOVA was conducted.[4] Effect sizes are reported as partial η^2. Alpha was set at 0.05. Tukey HSD tests were used to examine interaction effects. There was a significant main effect of body image group, $F(1, 111) = 4.50$, $p = .036$, partial $\eta^2 = 0.039$, in which the low body dissatisfaction

group consumed more food (*M* = 32.66 grams) than the high body dissatisfaction group (*M* = 25.03 grams). The predicted interaction of condition by body image group was not significant, $F(2, 111) = 0.639$, $p = .53$, partial $\eta^2 = 0.011$. Repeating this analysis with only the participants who passed the manipulation check yielded the same results. The main effect of body image group remained significant, $F(1, 65) = 6.76$, $p = .012$, partial $\eta^2 = 0.094$, but there were no other significant effects.

Discussion

The aim of the current study was to examine the effects of different methods of responding to a body image stressor (i.e., exposure to images of the sociocultural ideal) in women with high and low body dissatisfaction. Participants were included in the study if they scored 1 standard deviation above or below the mean on the BSQ. Individuals in the high body dissatisfaction group (*M* = 133.1) possess scores comparable to patients with BN (*M* = 136.9; Cooper et al., 1987), indicating that these participants have a clinically significant level of body image disturbance. The results showed that training in acceptance led to a more positive body image, mood, and self-esteem in comparison to the rumination and control groups among women with high body dissatisfaction. Rumination led to an increase in depression scores over time in the high body image group. As a result, women with high body dissatisfaction in the rumination group scored higher in depression than the control and acceptance groups, but not significantly different from the control group on body image, self-esteem, or negative affect. Contrary to hypotheses, experimental condition did not influence the recall or recognition of shape or appearance words. It also did not affect the quantity of food consumed during a taste test.

Findings regarding the effect of rumination and acceptance on mood and self-esteem in this study must be interpreted cautiously as the predicted 3-way interactions between time, body image group, and condition were not significant. Exploratory analyses found a significant advantage for acceptance condition in comparison to rumination and control groups that were consistent with the

hypotheses and the rest of the findings in this study. The fact that the pattern of findings is consistent across the study increases the credibility of these results. It also suggests that rumination about, and acceptance of, thoughts related to body image might have had an impact on self-evaluation more broadly than body image. The high correlations among the study measures indicate that there is overlap among the constructs that were assessed. In order to examine whether the measures assessed distinct constructs, a factor analysis with varimax rotation was performed on the five self-report measures at time 1. The analysis revealed a one-factor solution indicating that all of the self-report questionnaires loaded onto the same factor. As a result, composite measures were created by computing z-scores for each measure and calculating the overall means at time 1 and time 2.

A mixed model ANOVA was performed on these composite scores in order to test the study hypotheses. Among participants who passed the manipulation check, there was a significant time by condition interaction, $F(2, 65) = 4.82$, $p = .011$, partial $\eta^2 = 0.129$, which was qualified by a significant 3-way interaction between time, body image group, and condition, $F(2, 65) = 5.51$, $p = .006$, partial $\eta^2 = 0.145$. Follow-up comparisons with Tukey's HSD showed that the composite z-score decreased from time 1 to time 2 in the acceptance condition, $p < .01$. At time 2, z-scores in the acceptance group were lower than the rumination and control groups (see Figures 17a and 17b), $p < .01$.

These results mirror those of the rest of the study increasing confidence in the findings despite the limited power and number of analyses. Furthermore, the

results of the current study are strikingly consistent with the results of a recent study conducted by Singer and Dobson (2007). As previously explained, Singer and Dobson (2007) found that acceptance reduced a negatively induced mood while rumination maintained it at a level not significantly different from the no-training control group. The current study is novel, however, in its examination of responses to body image concerns specifically in response to a stressor encountered by women on a daily basis. This study examined the effect of rumination and acceptance of thoughts and emotions related to body shape and weight specifically, whereas prior studies investigated depressive rumination. Future studies with greater power are needed to evaluate whether the effects of rumination and acceptance are specific to women with high body dissatisfaction. One possibility suggested by this study is that rumination is detrimental only to those with high body dissatisfaction but women can benefit from training in acceptance regardless of their level of body image.

With one exception, this study failed to find support for the hypothesis that rumination would have a detrimental effect on body image, mood, and self-esteem in comparison to the no training control group. Although participants in the rumination condition scored higher than the control group on depression (in exploratory analyses), there were no other differences between the rumination and control groups. Despite the wealth of research on rumination about depression, the Singer and Dobson (2007) study is the only study I am aware of that included a no training control group. It can be argued that participants may spontaneously begin ruminating if they are not given alternate instructions. The

fact that participants in the rumination group in the current study scored higher on the rumination manipulation check indicates that they at least ruminated *more* than the control group but did not generally experience more negative effects than the control group.

The findings of the current study do not support the hypothesis that response to body image concerns influences memory bias for fat over thin, and unattractive over attractive words. The lack of evidence for memory bias in this study is consistent with the literature suggesting that the cognitive biases common to eating disorder patients are not found in non-clinical samples (Baker et al., 1995; Cassin, Von Ranson, & Whiteford, 2008; Dobson & Dozois, 2004; Lee & Shafran, 2004; Sebastian, Williamson, & Blouin, 1996). A recent study also failed to find evidence of memory bias after exposure to images of swimsuit models in college women who scored high on internalization of the thin ideal body type, another factor known to increase risk of eating disorders (Thompson & Stice, 2001). Baker et al. (1995) suggest that different aspects of body image might vary in their stability in response to negative affect. They found, for example, that women with high body dissatisfaction did not show memory bias for fatness words, but increase their estimation of their body size after a negative mood induction. Future studies should examine the effect of response style on other types of cognitive biases such as attention bias and body size estimation.

There was also no support for the hypothesis that response to body image concerns influences eating behavior in this non-clinical sample. Women with low body dissatisfaction consumed more food during the experiment than those with

high body dissatisfaction. This finding might be a reflection of the relationship between body dissatisfaction and dietary restraint (Johnson & Wardle, 2005). A recent study found that restrained eaters, without a propensity to overeat, who were exposed to commercials depicting thin models and diet advertisements decreased, whereas non-restrained eaters increased, their food intake (Anschutz, Van Strien, & Engels, 2008). Several prior studies have found increased disinhibition among restrained eaters with an overeating tendency (Mills, Polivy, Herman, & Tiggemann, 2002; Strauss, Doyle, & Kreipe, 1994). It would be interesting for a future study to evaluate whether response to body image thoughts would influence eating behavior in restrained or emotional eaters. It would also be beneficial to investigate the effect of response style on loss of control over eating, rather than only the amount of food consumed, particularly given findings that negative affect often precedes episodes of binge eating (Telch et al., 1998). Assessing food intake over a longer period of time would also be valuable as it is unknown whether response style may have impacted longer term eating behavior once participants returned to their daily routines.

Although the link between rumination and depression has been well-documented (Just & Alloy, 1997; Kuehner & Weber, 1999; Nolan, Roberts, & Gotlib, 1998; Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema & Morrow, 1991; Roberts, Gilboa, & Gotlib, 1998; Singer & Dobson, 2007) and research is beginning to emerge linking rumination to body dissatisfaction and disordered eating (Clark & Wilson, in preparation; Nolen-Hoeksema et al., 2007),

theories about the mechanism by which rumination exerts its harmful effects remain speculative. Several authors have proposed that rumination serves an avoidant function (Cribb, Moulds, & Carter, 2006; Martell, Addis, & Jacobson, 2001; Watkins et al., 2007). Martell and colleagues (2001) conceptualize rumination as a form of avoidance in which ruminative thinking prevents individuals from actively engaging in their environment. Accordingly, rumination has been associated with cognitive and behavioral avoidance (Cribb, Moulds, & Carter, 2006; Moulds, Kandris, Starr, & Wong, 2007) as well as experiential avoidance (Cribb et al., 2006) in non-clinical samples. Investigators have also suggested that rumination serves an avoidant function in other areas such as grief (Stroebe et al., 2007) and posttraumatic stress disorder (PTSD; Ehlers & Clark, 2000; Ehlers, Mayou, & Bryant, 1998).

Eating disorder behaviors have been hypothesized to help patients regulate their emotions (Heatherton & Baumeister, 1991; Wiser & Telch, 1999) and studies have shown that individuals with eating disorders are more likely to binge eat in response to negative mood (e.g., Telch & Agras, 1996). Schmidt and Treasure (2006) theorized that AN functions, in part, by helping patients avoid negative emotional experiences. Nolen-Hoeksema and colleagues (2007) suggest that bulimic behaviors may serve as a method for avoiding self-focused rumination.

Clinical interventions aimed at reducing maladaptive rumination might improve treatments for both depression and eating disorders. Watkins et al. (2007) recently obtained promising results using a modified version of CBT

designed to target depressive rumination in patients with medication-refractory residual depression. As stated previously, facilitating a reduction in maladaptive rumination may be a mechanism by which MBCT for depression works (Segal et al., 2002). Mindfulness and acceptance-based approaches are increasingly being incorporated into treatments for body image and eating disorders (e.g., Baer, Fischer, & Huss, 2005; Delinsky & Wilson, 2006; Heffner, Sperry, Eifert, & Detweiler, 2002). This study provides preliminary experimental evidence for the utility of acceptance training in promoting improvements in body image, mood, and self-esteem. Incorporating mindfulness and acceptance procedures into treatments for eating disorders might enhance its efficacy at treating body image, which is important because body image disturbance at the end of treatment for BN is a significant predictor of relapse (Fairburn, Peveler, Jones, Hope, & Doll, 1993).

A significant strength of this study is its use of an experimental design to manipulate response to body image concerns. It also utilized a stringent manipulation check and compared the effects of different response styles in only those who adhered to their experimental instructions. There are also a number of limitations that need to be considered. First, the use of a non-clinical student sample precludes generalization of these findings to clinical samples of patients with eating disorders. Second, while the use of a strict manipulation check increases the internal validity of this investigation, it may also compromise its external validity. It is unknown from this study what pre-existing differences participants may have had in their methods of responding to body image

stressors and how that might have affected their ability to adhere to their assigned instructions. Third, similar to studies with comparable designs (e.g., Lyubomirsky & Nolen-Hoeksema, 1995; Singer & Dobson, 2007; Watkins & Moulds, 2005), the experimental manipulation was short in duration. Increasing the intensity of the manipulation might be necessary to find more pervasive changes (such as cognitive and behavior changes) as a result. It might also be useful to provide more rigorous training in the experimental manipulations in order to facilitate better understanding of the procedure among participants. This is particularly important given that 27 of the 39 participants assigned to the acceptance condition and 19 of the 39 instructed to ruminate did not pass the manipulation checks. It would be useful to understand whether there was a failure to comprehend or adhere to the instructions.

The results of the current study provides preliminary evidence that acceptance might help women cope with body image concerns, consistent with the finding that mindful mirror exposure improved body image and mood in a sample of women with significant body image disturbance without clinical eating disorders (Delinsky & Wilson, 2006). If these findings are replicated in a clinical sample, it provides a promising avenue for improving the treatment of body image disturbance and eating disorders.

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders (4th ed.)*. Washington, DC: Author.

Anschutz, D. J., Van Strien, T., & Engels, R. C. M. E. (2008). Exposure to slim in mass media: Television commercials as reminders of restriction in restrained eaters. *Health Psychology, 27,* 401-408.

Baer, R. A., Fischer, S., & Huss, D. B. (2005). Mindfulness and acceptance in the treatment of disordered eating. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 23*, 281-300.

Baker, J. D., Williamson, D. A., & Sylve, C. (1995). Body image disturbance, memory bias, and body dysphoria: Effects of negative mood induction. *Behavior Therapy, 26*, 747-759.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561-571.

Black, C. M. D., & Wilson, G. T. (1996). Assessment of eating disorders: Interview versus questionnaire. *International Journal of Eating Disorders, 20*, 43-50.

Bulik, C. M. (2002). Anxiety, depression, and eating disorders. In. C. G. Fairburn & K. D. Brownell (Eds.), *Eating Disorders and Obesity: A Comprehensive Handbook, 2nd edition* (pp. 193-198). New York, NY: Guilford Press.

Calmes, C. A., Bottonari, K. A., & Roberts, J. E. (2003). Negative coping style among depressed individuals with elevated eating disordered attitudes, *Association for the Advancement of Behavior Therapy*. Boston, MA.

Cash, T. F. (2004). Body-image assessments and manuals. Available from the author's website at http://www.body-images.com.

Cash, T.F. & Fleming, E.C., Alindogan, J., Steadman, L., & Whitehead, A. (2002). Beyond body image as a trait: The development and validation of the Body Image States Scale. *Eating Disorders: The Journal of Treatment & Prevention, 10,* 103-113.

Cassin, S. E., & von Ranson, K. M. (2005). Word lists for testing cognitive biases in eating disorders. *European Eating Disorders Review, 13,* 216-220.

Cassin, S. E., von Ranson, K. M., & Whiteford, S. (2008). Cognitive processing of body and appearance words as a function of thin-ideal internalization and schematic activation. *Body Image, 5*, 271-278.

Clark, V. L., & Wilson, G. T. (in preparation). A prospective investigation of the effect of rumination about body image/attractiveness on eating disorder symptoms.

Cooper, P. J., Taylor, M. J., Cooper, Z., & Fairburn, C. G. (1987). The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders, 6*, 485-494.

Cribb, G., Moulds, M. L., & Carter, S. (2006). Rumination and experiential avoidance in depression. *Behaviour Change, 23*, 165-176.

Delinsky, S. S., & Wilson, G. T. (2006). Mirror exposure for the treatment of body image disturbance. *International Journal of Eating Disorders, 39,* 108-116.

Dobson, K. S., & Dozois, D. J. A. (2004). Attentional biases in eating disorders: A meta-analytic review of Stroop performance. *Clinical Psychology Review, 23*, 1001-1022.

Ehlers, A., & Clark, D. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research & Therapy, 38,* 319-345.

Ehlers, A., Mayou, R. A., & Bryant, B. (1998). Psychological predictors of chronic posttraumatic stress disorder for motor vehicle accidents. *Journal of Abnormal Psychology, 107,* 508-519.

Fairburn, C. G. (2002). Cognitive-behavioral therapy for bulimia nervosa. In: C.G. Fairburn & K.D. Brownell (Eds.) *Eating Disorders and Obesity: A Comprehensive Handbook, 2nd edition* (pp.302-307). New York: Guilford Press.

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: interview or self-report questionnaire? *International Journal of Eating Disorders, 16*, 363-370.

Fairburn, C. G., & Bohn, K. (2005). Eating disorder NOS (EDNOS): An example of the troublesome "not otherwise specified" (NOS) category in DSM-IV. *Behaviour Research and Therapy, 43*, 691-701.

Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorder Examination (12th edition). In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment, and treatment* (pp. 317-360). New York, NY: Guilford Press.

Fairburn, C. G., Cooper, Z., Doll, H. A., Norman, P., & O'Connor, M. (2000). The natural course of bulimia nervosa and binge eating disorder in young women. *Archives of General Psychiatry, 57*, 659-665.

Fairburn, C. G., Peveler, R. C., Jones, R., Hope, R. A., & Doll, H. A. (1993). Predictors of 12-month outcome in bulimia nervosa and the influence of attitudes to shape and weight. *Journal of Consulting & Clinical Psychology, 61*, 696-698.

Fennell, M. J. V. (2004). Depression, low self-esteem and mindfulness. *Behaviour Researc8h and Therapy, 42,* 1053-1067.

Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin, 110*, 86-108.

Heatherton, T. F., & Polivy, J. (1991). Development and validation of a scale for measuring state self-esteem. *Journal of Personality and Social Psychology, 60,* 895-910.

Heffner, M., Sperry, J., Eifert, G. H., & Detweiler, M. (2002). Acceptance and commitment therapy in the treatment of an adolescent female with anorexia nervosa: A case example. *Cognitive and Behavioral Practice, 9*, 232-236.

Hilbert, A., Tuschen-Caffier, B., & Vogele, C. (2002). Effects of prolonged and repeated body image exposure in binge-eating disorder. *Journal of Psychosomatic Research, 52*, 137-144.

Israeli, A. L., & Stewart, S. H. (2001). Memory bias for forbidden food cues in restrained eaters. *Cognitive Therapy and Research, 25,* 37-47.

Johnson, F., & Wardle, J. (2005). Dietary restraint, body dissatisfaction, and psychological distress: A prospective analysis. *Journal of Abnormal Psychology, 114*, 119-125.

Just, N., & Alloy, L. B. (1997). The response styles theory of depression: tests and an extension of the theory. *Journal of Abnormal Psychology, 106*, 221-229.

Keski-Rahkonen, A., Raevuori, A., & Hoek, H. W. (2008). Epidemiology of eating disorders: an update. In S. Wonderlich, J. E. Mitchell, M. de Zwaan, & H. Steiger (Eds.), *Annual Review of Eating Disorders—Part 2* (pp. 58-68). Oxford, England: Radcliffe Publishing.

Key, A., George, C. L., Beattie, D., Stammers, K., Lacey, H., & Waller, G. (2002). Body image treatment within an inpatient program for anorexia nervosa: The role of mirror exposure in the desensitization process. *International Journal of Eating Disorders*, *31,* 185-190.

Kuehner, C., & Weber, I. (1999). Responses to depression in unipolar depressed patients: an investigation of Nolen-Hoeksema's response styles theory. *Psychological Medicine, 29*, 1323-1333.

Lattimore, P. J., (2001). Stress-induced eating: An alternative method of inducing ego-threatening stress. *Appetite, 36,* 187-188.

Lee, M., & Shafran, R. (2004). Information processing biases in eating disorders. *Clinical Psychology Review, 24*, 215-238.

Le Grange, D., Gorin, A., Catley, D., & Stone, A. A. (2001). Does momentary assessment detect binge eating that is declined at interview? *European Eating Disorders Review, 9,* 309-324.

Lewinsohn, P. M., Striegel-Moore, R. H., & Seeley, J. H. (2000). Epidemiology and natural course of eating disorders in young women from adolescence to young adulthood. *Journal of the American Academy of Child & Adolescent Psychiatry, 39*, 1284-1292.

Lyubomirsky, S., & Nolen-Hoeksema, S. (1995). Effects of self-focused rumination on negative thinking and interpersonal problem solving. *Journal of Personality & Social Psychology, 69*, 176-190.

Martell, C. R., Addis, M. E., & Jacobson, N. S. (2001) *Depression in context: Strategies for guided action*. New York, NY: W.W. Norton & Co.

Mezulis, A. H., Abramson, L. Y., & Hyde, J. S. (2002). Domain specificity of gender differences in rumination. *Journal of Cognitive Psychotherapy, 16*, 421-434.

Mills, J. S., Polivy, J., Herman, C. P., & Tiggeman, M. (2002). Effects of exposure to thin media images: Evidence of self-enhancement among restrained eaters. *Personality and Social Psychology Bulletin, 28*, 1687-1699.

Moulds, M. L., Kandris, E., Starr, S., & Wong, A. C. M. (2007). The relationship between rumination, avoidance and depression in a non-clinical sample. *Behaviour Research and Therapy, 45*, 251-261.

National Heart, Lung, and Blood Institute (NHLBI). (1998). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: The evidence report. *Obesity Research, 6*, 51S-210S.

Nolan, S. A., Roberts, J. E., & Gotlib, I. H. (1998). Neuroticism and ruminative response style as predictors of change in depressive symptomatology. *Cognitive Therapy and Research, 22*, 445-455.

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100,* 569-582.

Nolen-Hoeksema, S., Larson, J., & Grayson, C. (1999). Explaining the gender difference in depressive symptoms. *Journal of Personality & Social Psychology, 77*, 1061-1072.

Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: the 1989 Loma Prieta Earthquake. *Journal of Personality & Social Psychology, 61*, 115-121.

Nolen-Hoeksema, S., Morrow, J., & Fredrickson, B. L. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology, 102*, 20-28.

Nolen-Hoeksema, S., Stice, E., Wade, E., & Bohon, C. (2007). Reciprocal relations between rumination and bulimic, substance abuse, and depressive symptoms in female adolescents. *Journal of Abnormal Psychology, 116*, 198-207.

Pomeroy, C. & Mitchell, J. E. (2002). Medical complications of complications of anorexia nervosa and bulimia nervosa. In. C. G. Fairburn & K. D. Brownell (Eds.), *Eating Disorders and Obesity: A Comprehensive Handbook, 2nd edition* (pp. 278-285). New York, NY: Guilford Press.

Roberts, J. E., Gilboa, E., & Gotlib, I. H. (1998). Ruminative response style and vulnerability to episodes of dysphoria: Gender, neuroticism, and episode duration. *Cognitive Therapy and Research, 22*, 401-423.

Schmidt, U., & Treasure, J. (2006). Anorexia nervosa: valued and visible. A cognitive-interpersonal maintenance model and its implications for research and practice. *British Journal of Clinical Psychology, 45*, 343-366.

Sebastian, S. B., Williamson, D. A., & Blouin, D. C. (1996). Memory bias for fatness stimuli in the eating disorders. *Cognitive Therapy and Research, 20*, 275-286.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002) *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse.* New York, NY: Guilford Press.

Singer, A. R. & Dobson, K. S. (2007). An experimental investigation of the cognitive vulnerability to depression. *Behaviour Research and Therapy, 45,* 563-575.

Smith, J., Floyd, T., Neeren, A., Hughes, M., & Alloy, L. B. (2004). Rumination and body dissatisfaction: A double whammy. Presented at the 38th annual meeting of the *Association for the Advancement of Behavior Therapy*. New Orleans, LA.

Stice, E. (2001). A prospective test of the dual-pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology, 110,* 124-135.

Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2 year prospective investigation. *Health Psychology, 21,* 131-138.Stice, E., & Agras, W. S. (1998). Predicting the onset and remission of bulimia nervosa and an exploration of the mechanisms of action. *Clinical Psychology Review, 14*, 1-29.

Strauss, J., Doyle, A. E., & Kreipe, R. E. (1994). The paradoxical effect of diet commercials on reinhibition of dietary restraint. *Journal of Abnormal Psychology, 103,* 441-444.

Striegel-Moore, R. H., Silberstein, L. R., Frensch, P., & Rodin, J. (1989). A prospective study of disordered eating among college students. *International Journal of Eating Disorders, 8*, 499-509.

Stroebe, M., Boelen, P. A., van den Hout, M., Stroebe, W., Salemink, E., & van den Bout, J. (2007). Ruminative coping as avoidance: A reinterpretation of its function in adjustment to bereavement. *European Archives of Psychiatry and Clinical Neuroscience, 257*, 462-472.

Teasdale, J. D. (1999). Emotional processing, three modes of mind and the prevention of relapse in depression. *Behaviour Research and Therapy, 37,* S53-S77.

Teasdale, J. D., Moore, R. G., Hayhurst, H., Pope, M., Williams, S, & Segal, Z. V. (2002). Metacognitive awareness and prevention of relapse in depression: Empirical evidence*. Journal of Consulting & Clinical Psychology, 70,* 275-287.

Telch, C. F., & Agras, W. S. (1996). Do emotional states influence binge eating in the obese? *International Journal of Eating Disorders, 20*, 271-279.

Telch, C. F., Pratt, E. M., & Niego, S. H. (1998). Obese women with binge eating disorder define the term binge. *International Journal of Eating Disorders, 24*, 313-317.

Thompson, J. K., & Stice, E. (2001). Thin-ideal internalization: Mounting evidencce for a new risk factor for body-image disturbance and eating pathology. *Current Directions in Psychological Science, 10,* 181-183.

Troop, N. A., Holbrey, A., & Treasure, J. L. (1998). Stress, coping, and crisis support in eating disorders. *International Journal of Eating Disorders, 24*, 157-166.

Troop, N. A., & Treasure, J. L. (1997). Psychosocial factors in the onset of eating disorders: responses to life-events and difficulties. *British Journal of Medical Psychology, 70*, 373-385.

Vitousek, K. B. & Hollon, S. D. (1990). The investigation of schematic content and processing in eating disorders. *Cognitive Therapy and Research, 14,* 191-214.

Watkins, E., & Moulds, M. (2005). Distinct modes of ruminative self-focus: Impact of abstract versus concrete rumination on problem solving in depression. *Emotion, 5,* 319-328.

Watkins, E., Scott, J., Wingrove, J., Rimes, K., Bathurst, N., Steiner, H., Kennell-Webb, S., Moulds, M., & Malliaris, Y. (2007). Rumination-focused cognitive behaviour therapy for residual depression: A case series. *Behaviour Research and Therapy, 45,* 2144-2154.

Watkins, E., & Teasdale, J. D. (2001). Rumination and overgeneral memory in depression: effects of self-focus and analytic thinking. *Journal of Abnormal Psychology, 110,* 353-357.

Watkins, E., & Teasdale, J. D. (2004). Adaptive and maladaptive self-focus in depression. *Journal of Affective Disorders, 82,* 1-8.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063-1070.

Williamson, D. A., Muller, S. L., Reas, D. L., & Thaw, J. M. (1999). Cognitive bias in eating disorders: Implications for theory and treatment. *Behavior Modification, 23,* 556-577.

Wilson, G. T. (1996). Acceptance and change in the treatment of eating disorders and obesity. *Behavior Therapy, 27,* 417-439.

Wilson, G. T. (2004). Acceptance and change in the treatment of eating disorders: the evolution of manual-based cognitive-behavioral therapy. In. S. C. Hayes, V. M. Follette, & M. M. Linehan (Eds.), *Mindfulness and acceptance: Expanding the cognitive-behavioral tradition* (pp. 243-260). New York, NY: Guilford Press.

Wilson, G. T. (2005). Psychological treatment of eating disorders. *Annual Review of Clinical Psychology*, *1,* 439-465.

Wilson, G. T., Grilo, C. M., & Vitousek, K. M. (2007). Psychological treatment of eating disorders. *American Psychologist, 62,* 199-216.

Wiser, S., & Telch, C. F. (1999). Dialectical behavior therapy for binge-eating disorder. *Journal of Clinical Psychology, 55,* 755-768.

Wolf, E. M., & Crowther, J. H. (1983). Personality and eating habit variables as predictors of severity of binge eating and weight. *Addictive Behaviors, 8*(4), 335-344.

Yamamiya, Y., Cash, T. F., Melnyk, S. E., Posavac, H. D., & Posavac, S. S. (2005). Women's exposure to thin-and-beautiful media images: body image effects of media-ideal internalization and impact-reduction intervention. *Body Image, 2,* 74-80.

Footnotes

1. Mixed model analyses of covariance (ANCOVA) were also conducted on each outcome variable in which BDI score and BMI were included as covariates. These analyses yielded the same pattern of results and are not reported.
2. Although it Figure 11a suggests that there was a baseline difference among participants in the high body dissatisfaction group in which participants in the acceptance group had lower VAS-DEP scores at time 1, an ANOVA examining effects of body image group and condition on time 1 VAS-DEP score and posthoc comparisons with Tukey's HSD failed to find a significant difference.
3. Mixed model analyses of covariance (ANCOVA) were also conducted on each outcome variable in which BDI score and BMI were included as covariates. These analyses yielded the same pattern of results and are not reported.
4. Analyses of covariance (ANCOVA) were also conducted on each outcome variable in which BDI score and BMI were included as covariates. These analyses yielded the same pattern of results and are not reported.

Table 1. *Sample characteristics*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination n = 20		Acceptance n = 18		Control n = 19		Rumination n = 19		Acceptance n = 21		Control n = 20	
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	19.55	1.28	20.00	1.97	20.68	1.77	21.66	4.70	21.86	6.99	20.40	2.14
BMI	22.93	2.42	26.60	5.47	24.20	2.97	19.75	1.97	21.32	2.34	19.62	2.14
BSQ	135.30	17.66	129.11	18.65	134.42	25.40	45.79	5.61	42.48	6.71	41.85	6.29
BDI	10.65	6.64	9.83	6.51	8.42	4.96	4.00	3.62	3.90	4.02	4.85	4.33
Race	%		%		%		%		%		%	
White	45.00		55.60		42.10		42.10		42.90		45.00	
Black	5.00		5.60		5.30		0.00		23.80		15.00	
Asian	25.00		11.10		31.60		42.10		19.00		25.00	
Hispanic	20.00		11.10		0.00		5.30		14.30		5.00	
Other	0.00		11.10		15.80		10.50		0.00		5.00	
More than one	5.00		5.60		5.30		0.00		0.00		0.00	

Table 2. *Correlations among self-report measures at Time 1*

Variable	1	2	3	4	5
1. VAS-BI	--				
2. BISS	-.88***	--			
3. VAS-DEP	.50***	-.52***	--		
4. PANAS-N	.35***	-.33***	.43***	--	
5. SSES	-.74***	.76***	-.55***	-.54***	--

Note: ***$p < .001$

Table 3. *Means and standard deviations of body image, mood, and self-esteem measures by condition and group at time 1 and time 2 in all participants*

Outcome Variable	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination n = 20		Acceptance n = 18		Control n = 19		Rumination n = 19		Acceptance n = 21		Control n = 20	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
VAS - BI												
Time 1	63.51	10.25	63.40	10.30	62.28	11.33	24.06	11.85	25.55	11.16	21.44	8.64
Time 2	70.59	9.60	58.30	17.00	67.21	14.60	22.78	14.44	24.89	10.83	23.42	11.34
BISS												
Time 1	4.04	0.88	4.30	0.60	4.11	0.97	6.77	1.17	6.47	1.01	6.48	0.87
Time 2	3.35	0.95	4.55	1.34	3.37	1.36	6.73	1.19	6.25	0.93	6.41	1.03
VAS-DEP												
Time 1	4.90	2.03	4.00	2.80	4.50	2.55	2.15	1.84	2.70	2.73	1.82	1.80
Time 2	6.74	2.48	5.00	3.00	5.12	2.64	2.07	2.13	2.80	2.35	1.91	1.64
PANAS-N												
Time 1	19.45	6.96	16.10	7.70	17.89	7.89	13.95	7.41	14.19	5.53	11.80	2.42
Time 2	22.10	8.72	16.20	7.80	19.37	7.24	11.84	3.30	13.24	4.96	11.55	1.70
SSES												
Time 1	58.90	10.10	64.40	10.30	60.05	10.09	81.16	8.74	78.86	8.59	77.65	9.80
Time 2	57.50	10.73	66.10	11.10	58.95	8.17	82.05	7.81	80.00	9.89	76.95	9.51

Table 4. *Means and standard deviations of body image, mood, and self-esteem measures by condition and group at time 1 and time 2 among participants who passed the manipulation check*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination		Acceptance		Control		Rumination		Acceptance		Control	
Outcome	n = 11		n = 5		n = 19		n = 9		n = 7		n = 20	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
VAS - BI												
Time 1	61.21	11.25	67.29	8.10	62.28	11.33	26.92	11.97	20.14	8.72	21.44	8.64
Time 2	68.80	9.40	49.98	21.90	67.21	14.60	27.41	14.36	19.61	7.02	23.42	11.34
BISS												
Time 1	4.23	1.04	3.80	0.80	4.11	0.97	6.35	1.11	7.27	0.76	6.47	0.87
Time 2	3.55	1.03	4.97	1.78	3.37	1.36	6.31	1.23	6.60	0.77	6.41	1.03
VAS-DEP												
Time 1	5.19	2.27	2.25	2.28	4.50	2.55	2.78	1.71	2.44	2.93	1.82	1.80
Time 2	6.75	2.58	2.61	2.34	5.12	2.64	2.72	2.41	2.38	2.99	1.91	1.64
PANAS-N												
Time 1	16.73	7.35	13.40	4.28	17.89	7.89	13.67	4.12	15.14	8.82	11.80	2.42
Time 2	19.55	9.34	11.80	2.49	19.37	7.24	12.67	4.09	13.00	6.22	11.55	1.70
SSES												
Time 1	62.09	12.50	59.00	11.51	60.05	10.09	78.00	7.19	82.29	10.55	77.65	9.80
Time 2	61.64	11.41	68.20	16.08	58.95	8.17	78.44	8.43	82.57	9.47	76.95	9.51

Table 5. *Means and standard deviations of recall of attractive vs. unattractive words and thin vs. fat words by condition and group in all participants*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination		Acceptance		Control		Rumination		Acceptance		Control	
	n = 20		n = 18		n = 19		n = 19		n = 21		n = 20	
Word Type	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Attractive vs. Unattractive												
Attractive	2.35	1.39	2.11	1.45	2.32	1.06	2.21	1.23	2.57	1.17	2.40	1.19
Unattractive	1.90	1.29	1.89	1.13	2.32	1.67	2.05	1.43	2.33	1.02	2.00	1.21
Thin vs. Fat												
Thin	4.55	1.61	4.44	1.20	4.63	1.50	4.05	1.62	4.29	1.62	3.60	1.10
Fat	4.40	1.67	4.78	1.90	4.63	1.71	3.58	1.84	4.10	1.45	4.00	1.52

Table 6. *Means and standard deviations of recall of attractive vs. unattractive words and thin vs. fat words by condition and group among participants who passed the manipulation check*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination		Acceptance		Control		Rumination		Acceptance		Control	
	n = 11		n = 5		n = 19		n = 9		n = 7		n = 20	
Word Type	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Attractive vs. Unattractive												
Attractive	2.27	1.49	1.60	1.14	2.32	1.06	2.11	1.36	2.43	0.98	2.40	1.19
Unattractive	1.91	1.22	1.40	0.55	2.32	1.67	1.67	1.73	2.00	0.82	2.00	1.21
Thin vs. Fat												
Thin	4.82	1.47	4.20	0.45	4.63	1.71	4.33	1.73	5.00	1.63	3.60	1.10
Fat	4.64	1.50	5.20	2.28	4.47	1.50	3.44	1.51	3.83	1.22	4.00	1.52

Table 7. *Means and standard deviations of recognition of attractive vs. unattractive words and thin vs. fat words by condition and group in all participants*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination n = 20		Acceptance n = 18		Control n = 19		Rumination n = 19		Acceptance n = 21		Control n = 20	
Word Type	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Attractive vs. Unattractive												
Attractive	7.30	0.92	6.83	0.79	7.11	0.81	6.47	1.22	7.00	1.10	7.00	1.30
Unattractive	7.00	1.34	6.44	1.34	6.89	0.99	6.68	1.20	7.00	1.23	6.60	1.35
Thin vs. Fat												
Thin	8.40	0.82	8.00	1.28	8.16	1.07	8.11	1.29	7.52	1.97	7.90	1.21
Fat	8.00	1.03	7.56	1.15	7.32	1.70	7.79	1.40	7.81	0.87	7.50	1.10

Table 8. *Means and standard deviations of recognition of attractive vs. unattractive words and thin vs. fat words by condition and group among participants who passed the manipulation check*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination n = 11		Acceptance n = 5		Control n = 19		Rumination n = 9		Acceptance n = 7		Control n = 20	
Word Type	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Attractive vs. Unattractive												
Attractive	7.27	0.91	6.40	0.55	7.11	0.81	6.78	1.30	6.57	1.27	7.00	1.30
Unattractive	6.73	1.68	5.80	1.92	6.89	0.99	7.00	0.87	7.00	1.73	6.60	1.35
Thin vs. Fat												
Thin	8.36	0.92	8.40	0.89	8.16	1.07	8.44	0.73	7.14	1.77	7.90	1.21
Fat	7.91	1.22	7.60	0.89	7.32	1.70	8.33	0.71	7.71	0.49	7.50	1.10

Table 9. *Means and standard deviations of false recognition of attractive vs. unattractive words and thin vs. fat words by condition and group in all participants*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination n = 20		Acceptance n = 18		Control n = 19		Rumination n = 19		Acceptance n = 21		Control n = 20	
Word Type	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Attractive vs. Unattractive												
Attractive	1.45	1.76	2.06	1.47	1.68	1.25	1.84	1.74	1.43	0.93	1.95	1.54
Unattractive	1.10	1.02	0.94	0.80	0.89	0.66	1.53	1.35	0.76	0.70	0.80	0.89
Thin vs. Fat												
Thin	0.90	0.97	1.28	1.53	1.00	1.16	1.32	1.64	0.81	1.08	1.05	1.19
Fat	1.40	1.64	1.22	1.35	1.11	1.20	1.79	1.65	0.76	1.61	1.35	1.18

Table 10. *Means and standard deviations of false recognition of attractive vs. unattractive words and thin vs. fat words by condition and group among participants who passed the manipulation check*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination		Acceptance		Control		Rumination		Acceptance		Control	
	n = 11		n = 5		n = 19		n = 9		n = 7		n = 20	
Word Type	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Attractive vs. Unattractive												
Attractive	1.00	1.00	2.40	1.14	1.68	1.25	1.67	1.41	1.43	0.54	1.95	1.54
Unattractive	0.73	0.79	1.60	0.89	0.89	0.66	1.33	1.00	0.71	0.49	0.80	0.89
Thin vs. Fat												
Thin	0.64	0.67	1.80	2.17	1.00	1.16	1.33	1.41	0.71	1.11	1.05	1.19
Fat	0.91	1.04	1.80	1.64	1.11	1.20	2.11	2.15	0.43	0.54	1.35	1.18

Table 11. *Means and standard deviations of food intake by condition and group in all participants*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination		Acceptance		Control		Rumination		Acceptance		Control	
	n = 20		n = 18		n = 19		n = 19		n = 21		n = 20	
Outcome Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Food intake (grams)	23.58	20.66	23.07	18.25	28.44	17.91	26.96	18.05	36.19	20.28	34.83	20.87

Table 12. *Means and standard deviations of food intake by condition and group among participants who passed the manipulation check*

	High Body Dissatisfaction						Low Body Dissatisfaction					
	Rumination		Acceptance		Control		Rumination		Acceptance		Control	
Outcome	n = 11		n = 5		n = 19		n = 9		n = 7		n = 20	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Food intake (grams)	16.85	15.81	19.02	11.6	28.44	17.91	34.28	18.08	34.47	23.07	34.83	20.87

Figure 1. *Manipulation check by condition interaction including all participants*

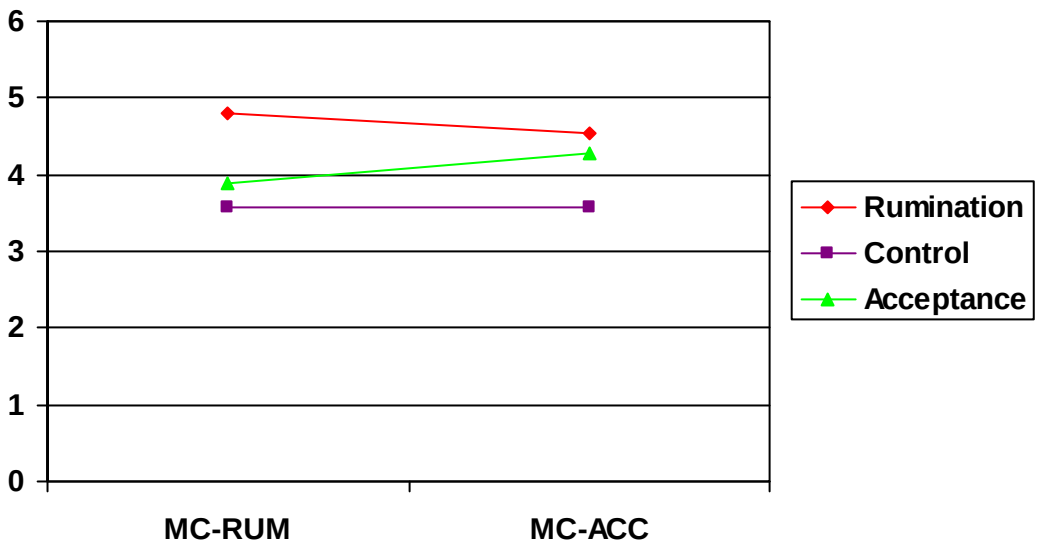


Figure 2. *Manipulation check by body image group interaction including all participants*

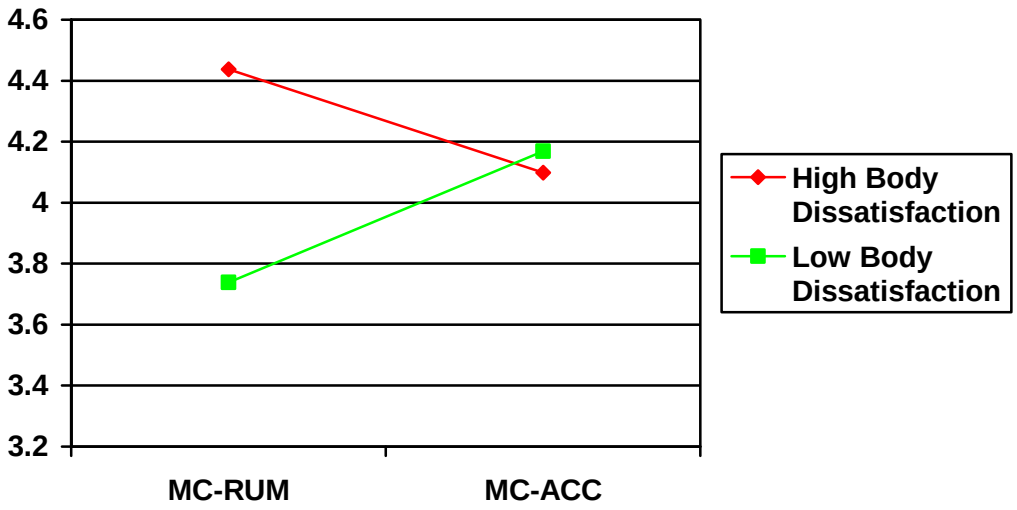


Figure 3. *Manipulation check by condition interaction including participants who passed manipulation check*

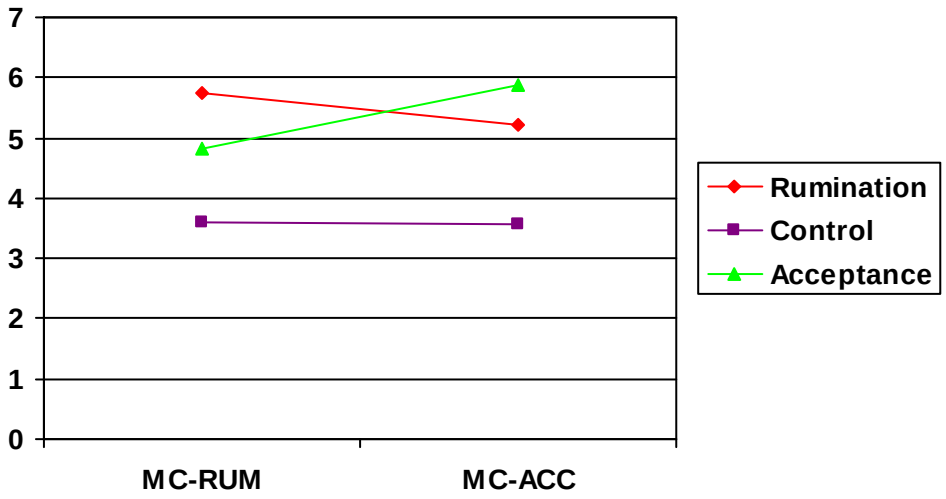
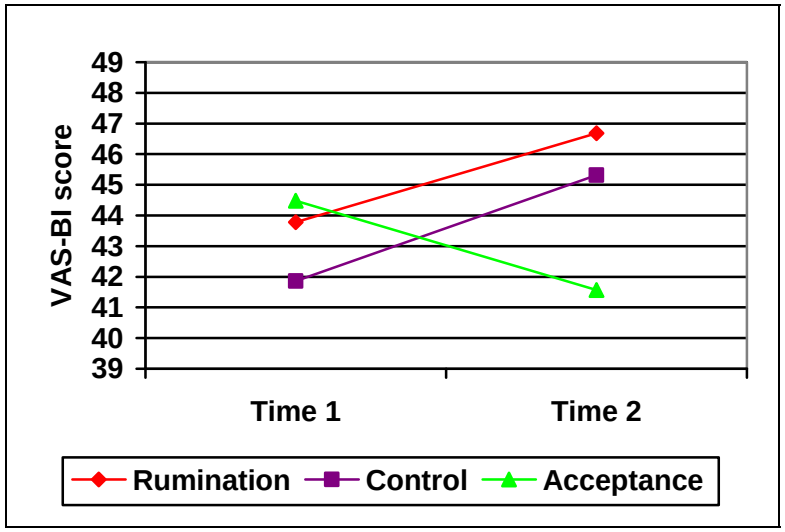
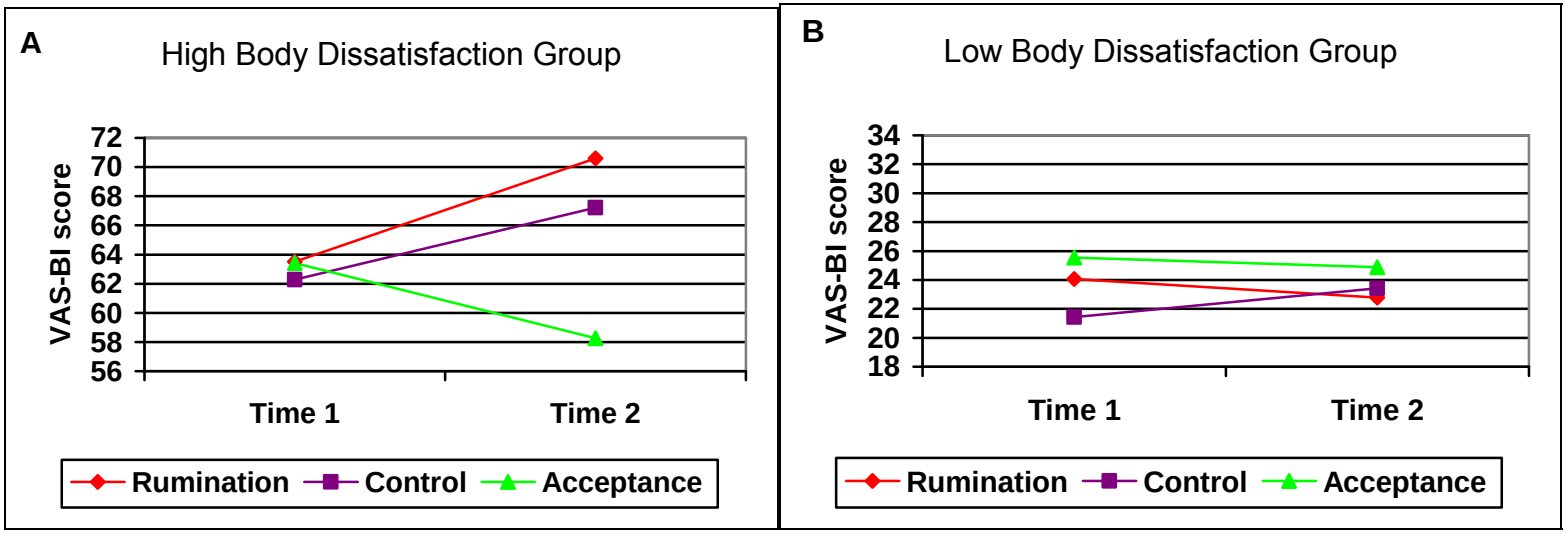


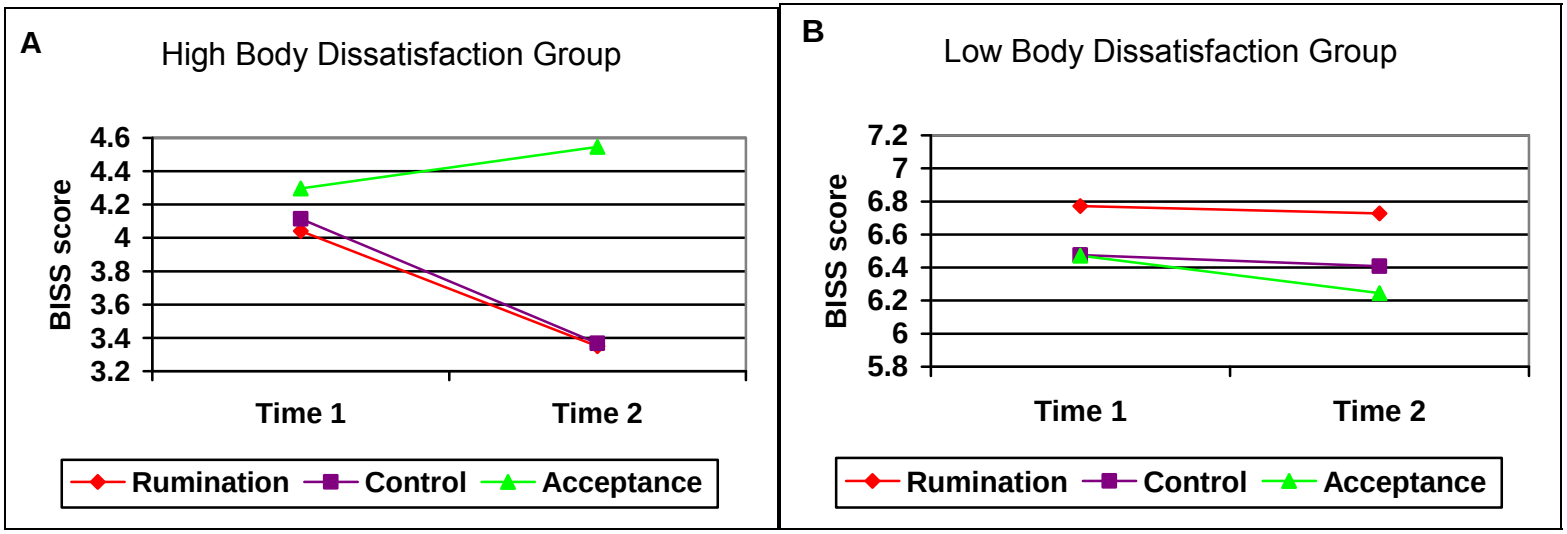
Figure 4. *The effects of rumination, acceptance, and control conditions on VAS-BI score among all participants*



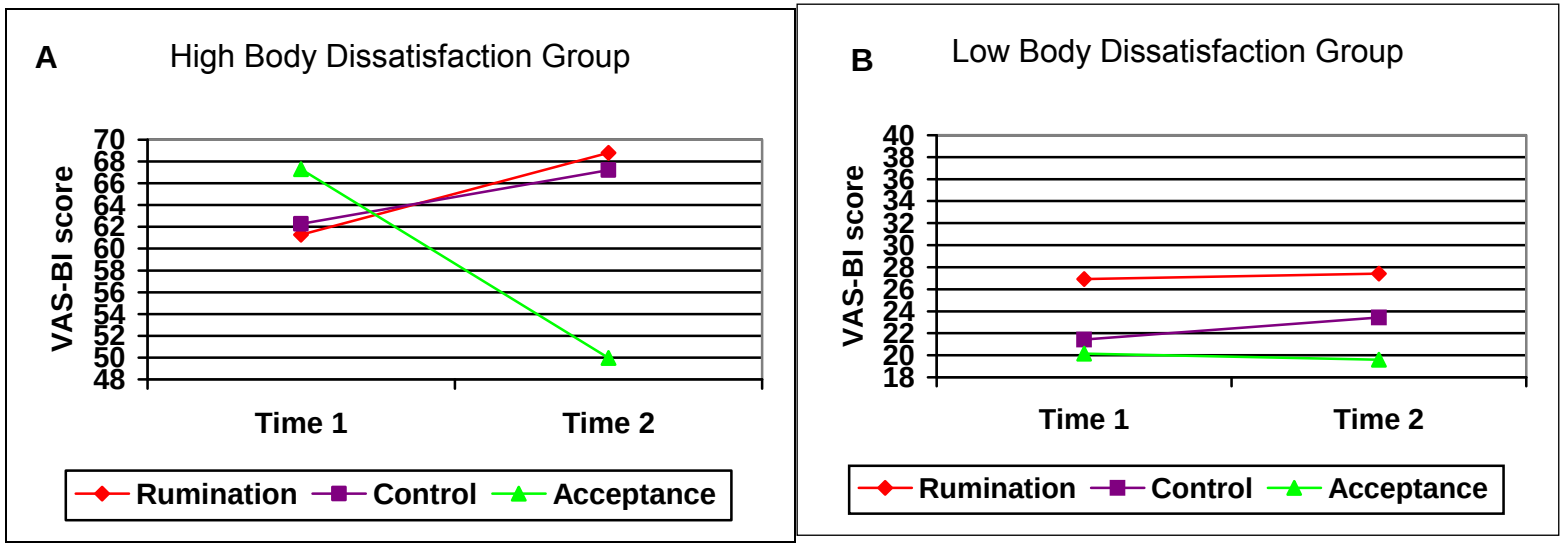
Figures 5a and 5b. *The effects of rumination, acceptance, and control conditions by body image group on VAS-BI score in all participants*



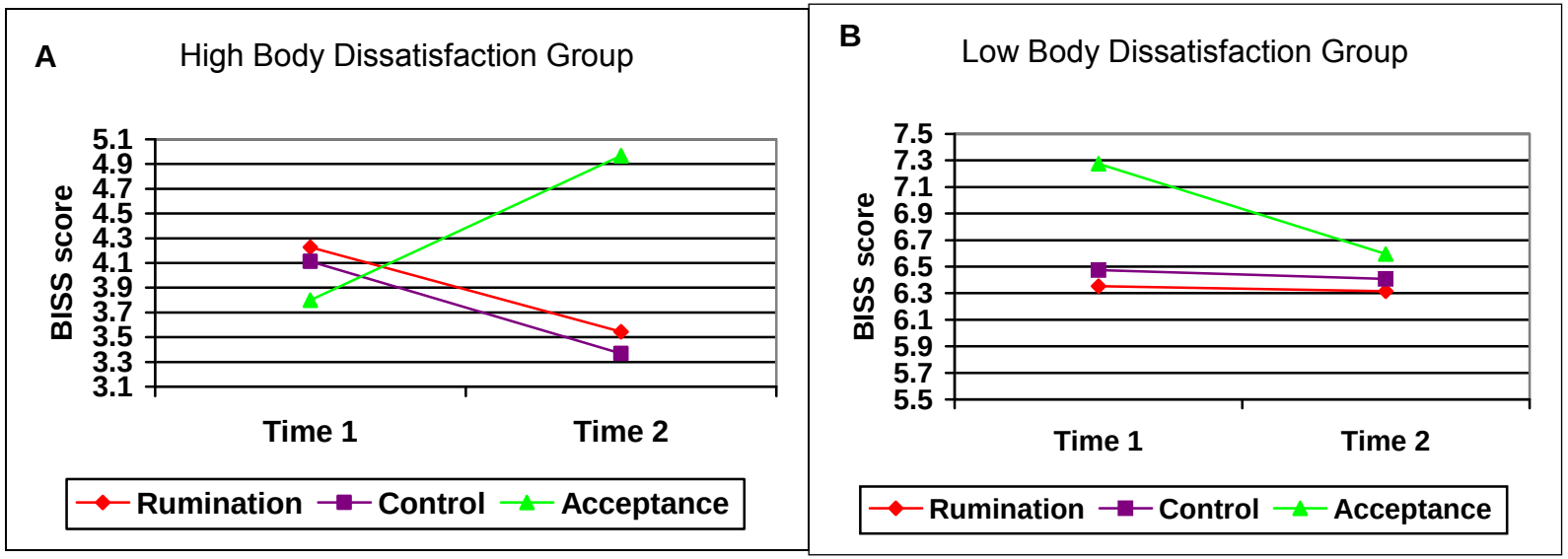
Figures 6a and 6b. *The effects of rumination, acceptance, and control conditions by body image group on BISS score in all participants*



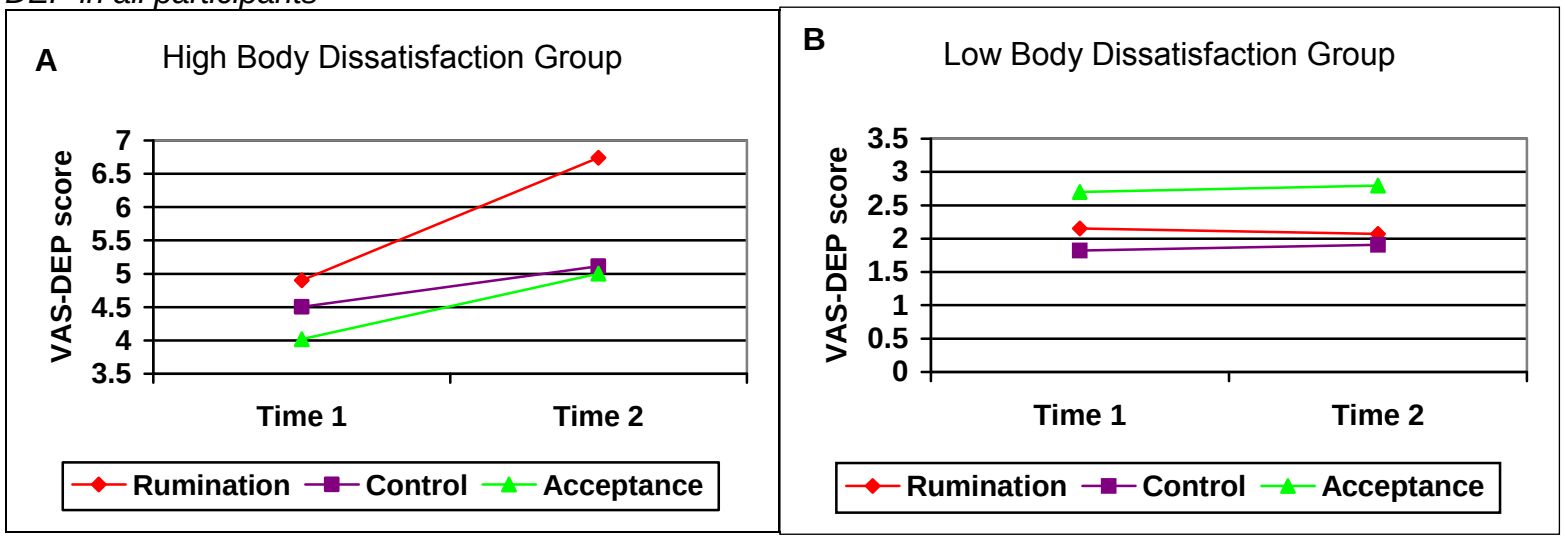
Figures 7a and 7b. *The effects of rumination, acceptance, and control conditions by body image group on VAS-BI score among participants who passed the manipulation check*



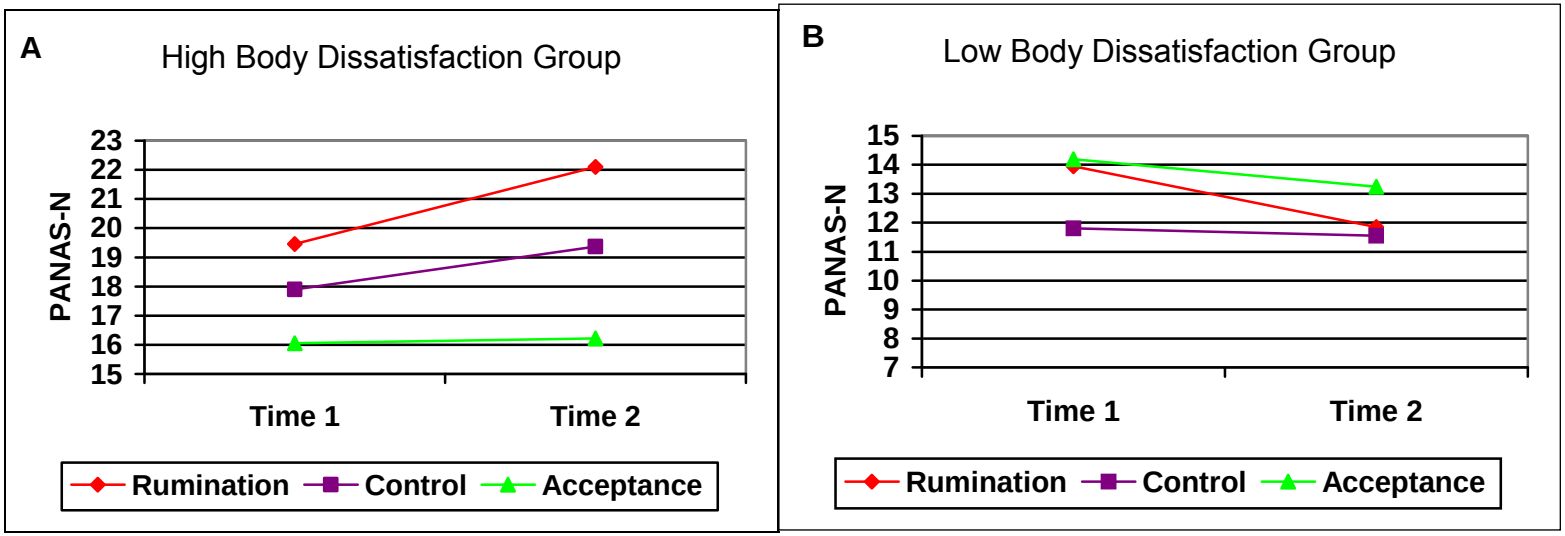
Figures 8a and 8b. *The effects of rumination, acceptance, and control conditions by body image group on BISS score among participants who passed the manipulation check*



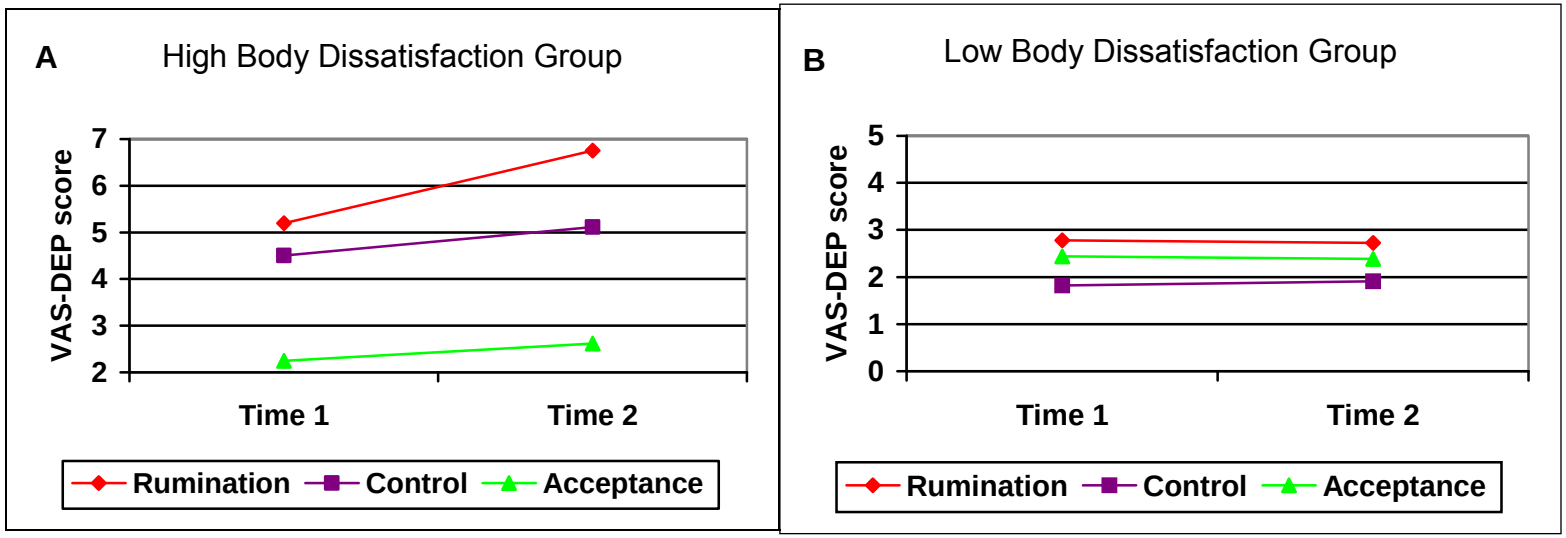
Figures 9a and 9b. *The effects of rumination, acceptance, and control conditions by body image group on VAS-DEP in all participants*



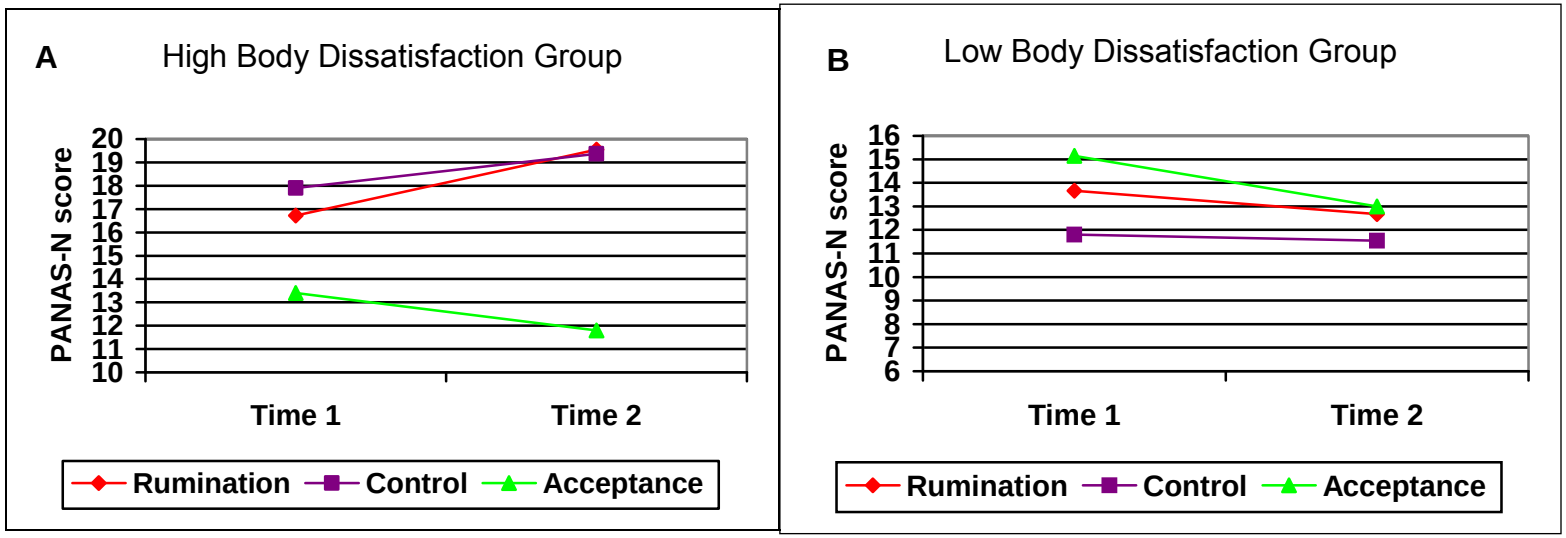
Figures 10a and 10b. *The effects of rumination, acceptance, and control conditions by body image group on PANAS-N in all participants*



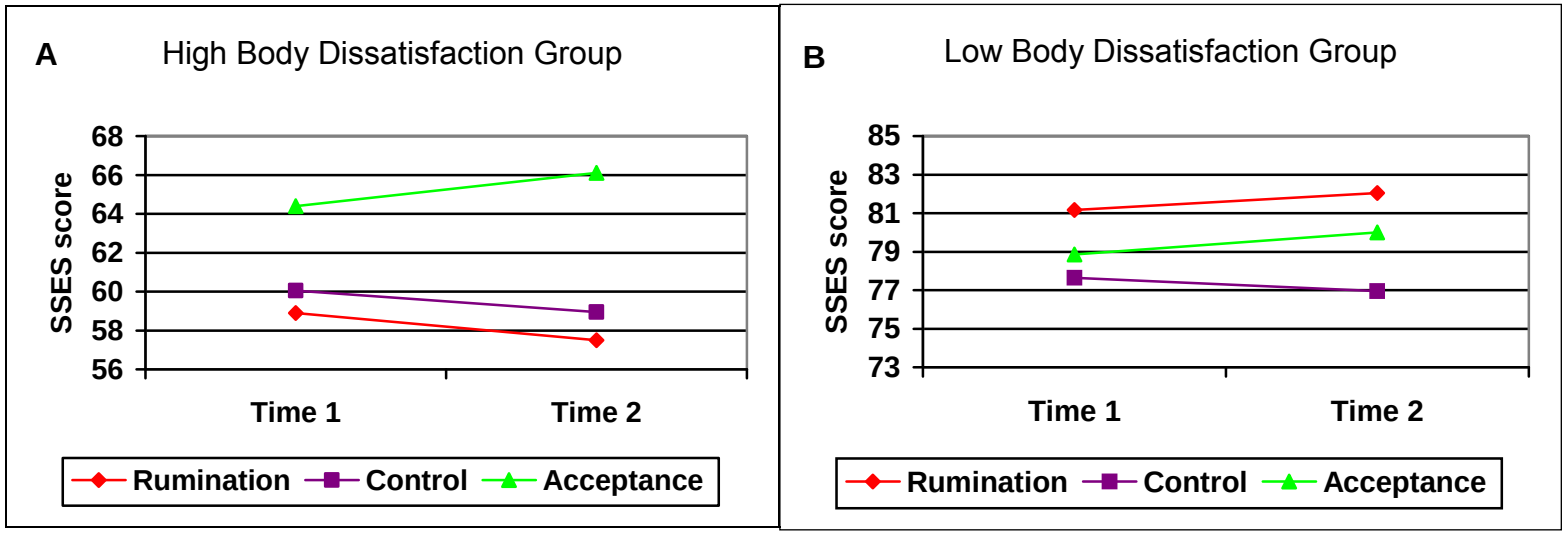
Figures 11a and 11b. *The effects of rumination, acceptance, and control conditions by body image group on VAS-DEP score among participants who passed the manipulation check*



Figures 12a and 12b. *The effects of rumination, acceptance, and control conditions by body image group on PANAS-N score among participants who passed the manipulation check*



Figures 13a and 13b. *The effects of rumination, acceptance, and control conditions by body image group on SSES score in all participants*



Figures 14a and 14b. *The effects of rumination, acceptance, and control conditions by body image group on SSES score among participants who passed the manipulation check*

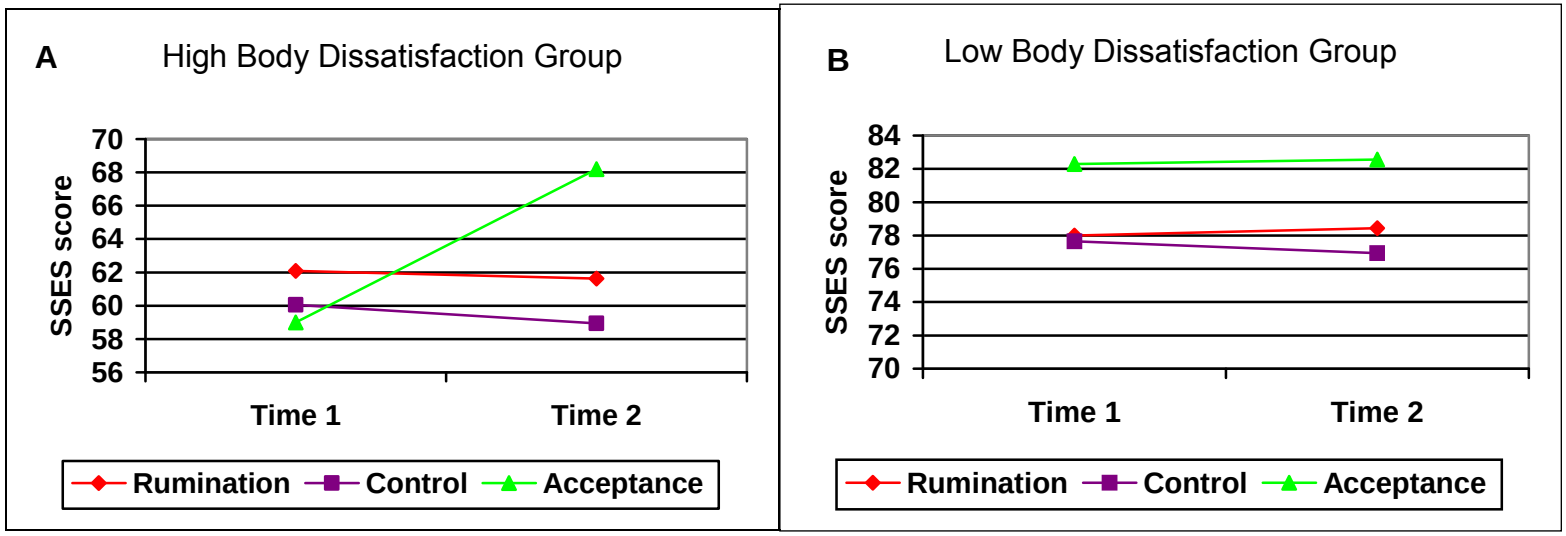


Figure 15. *The effects of rumination, acceptance, and control conditions on false recognition of attractive and unattractive words in all participants*

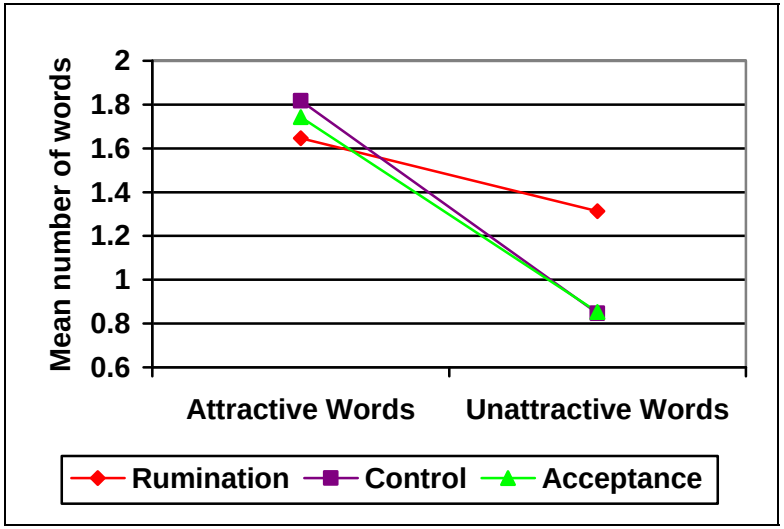
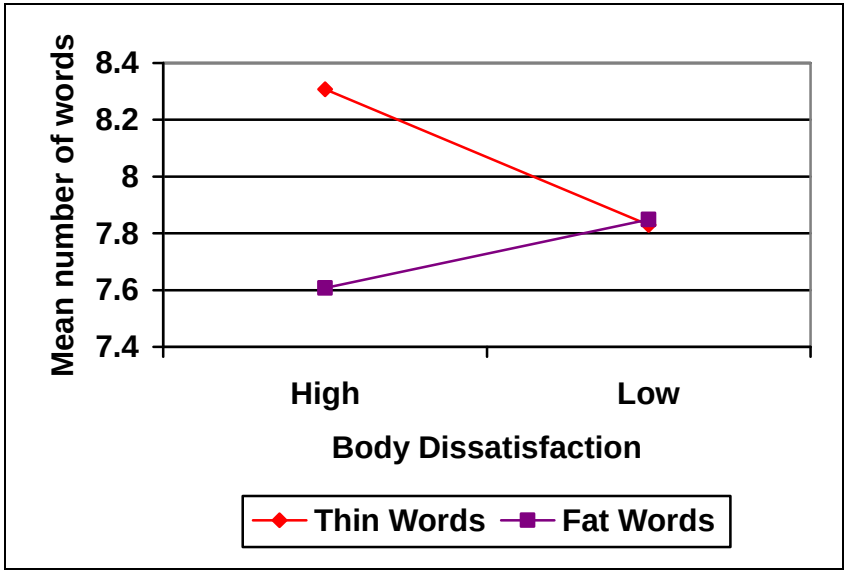
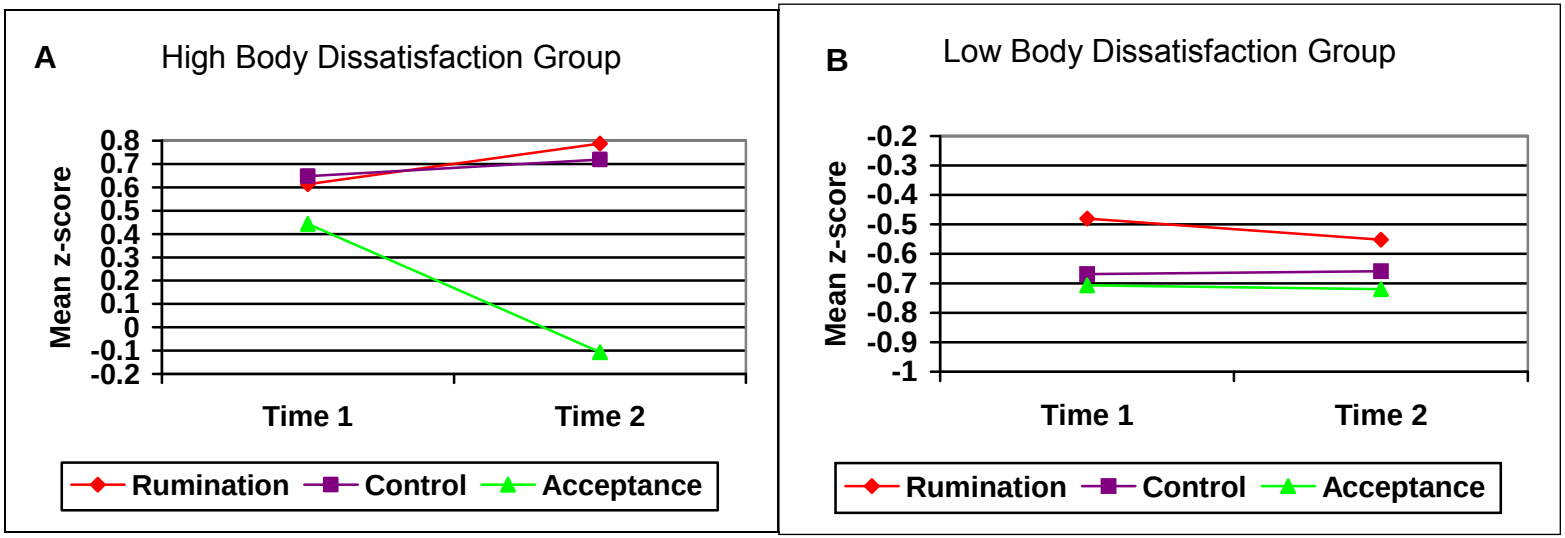


Figure 16. *The effects of body image group on the recognition of fat and thin words among subjects who passed the manipulation check*



Figures 17a and 17b. *The effects of rumination, acceptance, and control conditions by body image group on z-score among participants who passed the manipulation check*



Appendix 1: Manipulation Scripts

Acceptance

In a few minutes, you will be asked to view a series of pictures. I would like to you listen to the following discussion about how to deal with thoughts and emotions about your shape and weight that arise during and after your picture viewing.

People experience a variety of thoughts and emotions while viewing these pictures. Most people also think that their negative emotions must be controlled or stopped. However, it is often *not* easy to control or stop your thoughts or emotions. Just think of how difficult it is to follow through on another person's suggestion to "just calm down" or "just relax" when you are feeling upset. It's not as easy as it sounds, right? There are situations in which it might be difficult or even impossible to control them. Sometimes, the more we fight our thoughts, the stronger they become. There is an alternative to struggling or battling with your emotions and it is called acceptance. Accepting your emotions means that you are willing to experience them fully and that you don't try to control or change them in any way.

What I'm suggesting is that you can come to think about your thoughts and emotions in a different way; not as something that always needs to be contained or controlled in order for you to be okay, but as natural reactions that occur, peak, and fade without leading to any awful consequences and without you having to struggle or fight with your feelings at all.

So, while you are viewing the pictures, try to give up the struggle to control your thoughts and emotions. If you have a thought about your shape, weight, or

appearance, try to notice the thought and note that you had the thought, but then allow it to pass through you without a fight. Try to “accept” your thoughts for what they are – just thoughts.

To help you do this, I want you to try something. Try to imagine a conveyor belt in front of you; just like one you’d see at the baggage claim at the airport. As you sit here, noticing any thoughts about your shape, weight, or appearance, try to imagine these thoughts like luggage on a conveyor belt. Think of the thoughts, like labels on the luggage, just circling around the belt. Watch the thought as it moves away from you and then around the corner. Notice as the thought comes back again, slides in front of you, and then continues on, circling away from you again. Just notice as the thought stays on the belt, around and around. You may feel the urge to do something with the thought. You may want to pick it up, put it down on the ground, or stop it from circling around and around. You may feel the urge to turn away or distract yourself; to get bored by the circling luggage. When you notice this happening, just turn your attention back to the thought and just appreciate that it is circling gently on the belt in front of you. Sometimes, thoughts will suddenly disappear from the belt. When this happens, simply let them go. No reason to keep a thought on the belt when it doesn’t want to be there. Just keep noticing the thoughts that come through your mind, and keep allowing them to stay there, circling around on the conveyor belt, for as long as they choose to do so.

Included with this tape, you should find a brief written description of these instructions. Please use these instructions in order to help you understand your

thoughts and feelings while you view the pictures and for 5 minutes after the slide show ends. The experimenter will return to the room after 5 minutes have expired.

Rumination

In a few minutes, you will be asked to view a series of pictures. I would like to you listen to the following discussion about how to deal with thoughts and emotions about your shape and weight that might arise during and after your picture viewing.

People experience a variety of thoughts and emotions after viewing these pictures. In addition, many people do not do anything to try to understand what they are thinking and feeling, which makes the experience even more distressing. Although experiencing thoughts about your appearance is normal when watching these pictures, it is possible to minimize any distress you might feel if you really concentrate on trying to understand your thoughts and feelings.

People often find it helpful to analyze their thoughts and feelings. By trying to understand your feelings, you will learn to identify the causes of unpleasant thoughts and feelings. As a result, you will be better prepared to deal with similar thoughts and feelings in the future. You will also begin to recognize how certain thoughts affect you. Basically, I am suggesting that by concentrating on understanding your thoughts and feelings you will have more control over your emotions.

Try to understand the thoughts and feelings you have about your shape, weight, or appearance. Try to understand what you are thinking and feeling, why you are experiencing the thoughts that you are, and how your thoughts are affecting you.

For example, people have reported being better able to understand their thoughts and feelings by asking themselves questions such as:

- Why am I feeling the way I am right now?
- What would it be like if my present feelings lasted?
- Why do I always react this way?
- Why am I the weight that I am?
- Why do I have the body shape that I do?
- How has my appearance impacted different aspects of my life?
- How do I feel about my body shape and weight?
- Why do I feel the way that I do about my shape and weight? What are the possible consequences of the way I feel about my weight and shape?
- Are my weight and shape acceptable to me?
- What parts of my shape and weight are acceptable to me? Which parts are unacceptable?
- How successful have I been at maintaining my ideal body shape and weight?
- What could I do to be more successful at controlling my shape and weight?

Please feel free to use these questions or any others to help you understand your feelings.

Included with this tape, you should find a brief written description of these instructions. Please use these instructions in order to help you understand your

thoughts and feelings while you view the pictures and for 5 minutes after the slide show ends. The experimenter will return to the room after 5 minutes have expired.”

Directions for No Training Control

In a few minutes you will be asked to view a series of pictures. After they are finished, an experimenter will provide you with additional questionnaires to complete. It will take several minutes to gather all of the questionnaires. Please remain in the room until the experimenter returns.

Curriculum Vita

Vicki L. Clark

Education:

2003-2008 Rutgers, the State University of New Jersey
Ph.D. in Clinical Psychology received in October 2008
M.S. in Clinical Psychology received in May 2005

1997-2001 University of Pennsylvania
B.A. in Psychology received in May 2001

Principal Occupations and Positions:

2007-2008 Clinical Psychology Intern, Western Psychiatric Institute and Clinic, University of Pittsburgh Medical Center, Pittsburgh, PA

2006-2007 Project Director, Eating Disorders Clinic, Rutgers, the State University of New Jersey

2005-2007 Instructor, Rutgers, the State University of New Jersey

2003-2006 Graduate Research Assistant, Eating Disorders Clinic, Rutgers, the State University of New Jersey

2001-2003 Research Assistant, Weight and Eating Disorder Program, University of Pennsylvania School of Medicine

2000 Research Assistant, Weight and Eating Disorder Program, University of Pennsylvania School of Medicine

1998-2001 Research Assistant, Weight and Eating Disorder Program, University of Pennsylvania School of Medicine/Children's Hospital of Philadelphia Department of GI/Nutrition

Publications:

Clark, V. L., Wadden, T. A., & Primyani, D. (in press). Behavioural treatment. In: P. Kopelman, I. Caterson, & W. Dietz (eds.) *Clinical Obesity and Related Metabolic Disease in Adults and Children, 3rd edition.*

Lichtenthal, W.G., Cruess, D.G., **Clark, V.L.**, & Ming, M.E. (2005). Investment in body image among patients diagnosed with or at risk for malignant melanoma. *Body Image*, *2,* 41-51.

Wadden, T.A. & **Clark, V.L.** (2005). Behavioural treatment of obesity: achievements and challenges. In: P. Kopelman, I. Caterson, & W. Dietz (eds.) *Clinical Obesity and Related Metabolic Disease in Adults and Children 2nd edition,* (pp. 350-362). Malden, MA: Blackwell Publishing.

Sarwer, D.B., Magee, L., & **Clark, V.L.** (2003). Physical appearance and cosmetic medical treatments: physiological and sociocultural influences. *Journal of Cosmetic Dermatology, 2,* 29-39.

Wadden, T.A., Womble, L.G., Sarwer, D.B., Berkowitz, R.I., **Clark, V.L.**, & Foster, G.D. (2003). Great expectations: I'm going to lose 25% of my weight no matter what you say. *Journal of Consulting and Clinical Psychology, 71,* 1084-1089.

Clark, V.L. & Wadden, T.A. (2002). Advances in the treatment of obesity. In: J. Bacallao, M. Pena, E. Kidd, E.A. Reece, & E. Morrison (Eds.). *Proceedings of the 8th International Conference on Diabetes and Obesity.* Ocho Rios: Pan American Health Organization, pp. 164-186.

Womble, L.G., **Clark, V.L**., & Wadden, T.A. (2002). Diet and exercise for obesity: how effective are they? *Journal of Endocrinological Investigation, 25,* 922-924.

MANUSCRIPT UNDER REVIEW

Dobrow DiMarco, I., Klein, D. A., **Clark, V. L.**, & Wilson, G. T. (under review). The use of motivational interviewing techniques to enhance the efficacy of guided self-help behavioral weight loss treatment.

MANUSCRIPT IN PREPARATION

Clark, V. L. & Wilson, G. T. (in preparation). The effect of rumination about body image on eating disorder symptoms: A prospective investigation.

PRESENTATIONS

Dobrow DiMarco, I., Klein, D.A., **Clark, V.L.**, & Wilson, G.T. (November, 2008). The use of motivational interviewing techniques to enhance the efficacy of guided self-help behavioral weight loss treatment: 6 Month Follow-Up. Poster presented at the 42nd annual meeting of the Association for Behavioral and Cognitive Therapies, Orlando.

Clark, V.L., Ringham, R.M., Wildes, J.E., Gaskill, J.A., & Marcus, M.D. (September, 2008). Maximizing weight gain in the treatment of anorexia nervosa: A pilot study. To be presented at the 14th annual meeting of the Eating Disorders Research Society.

DiMarco, I.D., Klein, D.A., **Clark, V.L.**, & Wilson, G.T. (May, 2008). Motivational interviewing in behavioral weight loss treatment: The role of motivational predictors. Presented at the International Conference on Eating Disorders, Seattle, WA.

DiMarco, I.D., Klein, D.A., **Clark, V.L.**, & Wilson, G.T. (November, 2007). The use of motivational interviewing techniques to enhance the efficacy of guided self-help behavioral weight loss treatment. Presented at the 41st annual meeting of the Association for Behavioral and Cognitive Therapies (formerly the Association for the Advancement of Behavior Therapy), Philadelphia, PA.

Clark, V.L. & Wilson, G. T. (November, 2006). Body Checking and Avoidance Predicts Change in Eating Disorder Symptoms in Undergraduate Females. Presented at the 40th annual meeting of the Association for Behavioral and Cognitive Therapies (formerly the Association for the Advancement of Behavior Therapy), Chicago, IL.

Clark, V.L. (November, 2006). A prospective investigation of body checking and avoidance. Presentation at the Clinical Psychology Data Blitz at Rutgers, the State University of New Jersey, Piscataway, NJ.

Clark, V.L. & Latner, J.D. (October, 2006). Predictors of weight loss and duration of treatment in a self-help behavior modification program. Presented at the annual meeting of NAASO, The Obesity Society (formerly the North American Association for the Study of Obesity), Boston, MA.

Clark, V.L. & Latner, J.D. (October, 2006). Weight goals in participants in a self-help behavior modification program. Presented at the annual meeting of NAASO, The Obesity Society (formerly the North American Association for the Study of Obesity), Boston, MA.

Clark, V. L. & Wilson, G. T. (May, 2006). Rumination about Body Image/Attractiveness Predicts Change in Eating Disorder Psychopathology. Presented at the 18th annual meeting of the Association for Psychological Science (formerly the American Psychological Society), New York, NY.

Clark, V.L. & Wilson, G.T. (November, 2005). Can Rumination Predict Change in Body Dissatisfaction and Eating Disorder Symptoms Over Time? Presented at the 39th annual meeting of the Association for Behavioral and Cognitive Therapies (formerly the Association for the Advancement of Behavior Therapy), Washington, DC.

Green, K.E., **Clark, V.L.**, McCrady, B.S., & Epstein, E.E. (November, 2005). Comorbid eating and alcohol use disorders: Do they require specialized treatment? Presented at the 39th annual meeting of the Association for Behavioral and Cognitive Therapies (formerly the Association for the Advancement of Behavior Therapy), Washington, DC.

Clark, V.L. (May, 2005). Rumination about body image: Relationship to body dissatisfaction and eating disorder symptoms. Presentation at the Clinical Psychology Data Blitz at Rutgers, the State University of New Jersey, Piscataway, NJ.

Clark, V.L. & Wilson, G.T. (April, 2005). An Examination of the Relationship Between Rumination About Body Image/Attractiveness, Body Dissatisfaction, Eating Disorder Psychopathology, and Depressive Symptoms. Presented at the International Conference on Eating Disorders, Montreal, Quebec.

Clark, V.L., Wadden, T.A., Foster, G.D., Sargent, S., Fonshell, K., Walker, K., Verde, T., & Job, K. (October, 2003). Effects of Treatment Expectations on Short- and Long-term Weight Loss. Poster presented at the annual meeting of the North American Association for the Study of Obesity, Fort Lauderdale, FL.

Lichtenthal, W.G., Cruess, D.G., **Clark, V.L.**, & Ming, M.E. (March, 2003). Personality styles and gender differences related to investment in body image among patients diagnosed with or at risk for malignant melanoma. Poster presented at the 24th annual meeting of the Society of Behavioral Medicine. Salt Lake City, UT and at the Eunice and Irving Leopold Annual Scientific Symposium and Retreat, University of Pennsylvania Cancer Center (April, 2003).

Clark, V.L., Cruess, D.G., Lichtenthal, W., Schuster, L., & Ming, M.E. (April, 2002). Investment in body image among patients with malignant melanoma (MM) or dysplastic nevi (DN). Poster presented at the 23rd annual meeting of the Society of Behavioral Medicine. Washington, DC and at the Eunice and Irving Leopold Annual Scientific Symposium and Retreat, University of Pennsylvania Cancer Center (March, 2002).