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# The Relationship Between Eating Disorder Symptomology, Critical Body Comments, and Memory Recall

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THE RELATIONSHIP BETWEEN EATING DISORDER SYMPTOMOLOGY,  
CRITICAL BODY COMMENTS, AND MEMORY RECALL

A Thesis  
Presented to  
The Faculty of the Department of Psychology  
Western Kentucky University  
Bowling Green, Kentucky

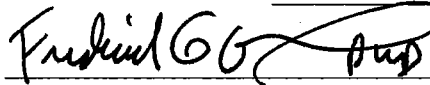
In Partial Fulfillment  
Of the Requirements for the Degree  
Master of Arts

By  
Morgan Littrell

December 2012

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BODY COMMENTS, AND MEMORY RECALL

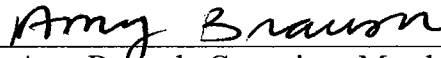
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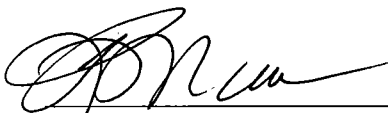
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## CONTENTS

List of Tables.....	vi
Abstract.....	vii
Introduction.....	1
Eating Disorder Criteria and Prevalence.....	1
Etiology.....	5
Critical Body Comments Research.....	12
Memory Recall Research.....	13
Limitations of Previous Research.....	14
The Present Study.....	15
Method.....	17
Participants.....	17
Measures.....	17
Demographics.....	17
Eating Disorder Inventory-3 RF.....	17
Social Hassles Questionnaire.....	18
Word Recall Task.....	19
Procedure.....	20
Results.....	22
Preliminary Analysis.....	22
Hypothesis Testing.....	23
Exploratory Analysis.....	26
Participants Who Recalled a Critical Body Comment.....	27

Discussion.....	30
Limitations.....	33
Conclusions.....	35
Appendix A.....	37
Appendix B.....	39
Appendix C.....	40
Appendix D.....	44
Appendix E.....	45
Appendix F.....	46
References.....	47

## List of Tables

Table 1. Positive, Negative, and Neutral Appearance and Non-Appearance Related Words.....	20
Table 2. EDI-3 RF Subscales Correlations.....	22
Table 3. Summary of Multiple Regression Analysis for Recall of Critical Body Comments.....	26
Table 4. Means and Standard Deviations for Word Recall in Participants Who Reported Critical Body Comments (n=112).....	29



# THE RELATIONSHIP BETWEEN EATING DISORDER SYMPTOMOLOGY, CRITICAL BODY COMMENTS, AND MEMORY RECALL

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Previous research done in the area of eating disorders suggests many different variables, such as cognitive, biological, and social, that are thought to influence eating disorder development and maintenance. The present study attempts to combine cognitive and sociocultural research findings, memory recall and critical body comments, in an effort to see how, if at all, these two variables affect eating disorder symptomology. Participants for this study were 120 female students that were recruited via Study Board. Participants completed the demographics form, the Eating Disorder Inventory-3 RF, and the Social Hassles Questionnaire. The participants then watched an E-prime presentation of different positive, negative, and neutral appearance and non-appearance related words. After this presentation, participants completed a word recall task in which they wrote down as many of the words from the presentation as they could remember. Results were consistent with previous research that has found a relationship between remembering a critical comment and subsequent negative emotions/ experiences and also research that has found a negative relationship between high body dissatisfaction and number of positive words recalled. Results also showed that eating disorder symptomology predicts less recall of positive words. Results from the present study shed light on the need for better treatment for those suffering from eating disorders or any amount of eating pathology, especially treatments aimed at increasing positive ways of thinking.

## **Introduction**

Many types of theories for the development and/or maintenance of eating disorders have been posited, such as cognitive and sociocultural theories. In general, cognitive theories suggest some sort of memory or attentional bias that ultimately leads to development or maintenance of eating disorder symptoms. Similarly, sociocultural theories center around how society, family members, and peers contribute to eating disorder symptoms, for example, by making negative comments about another person's body. There is arguably no single "right" theory, rather, it is most likely that theories from different realms in psychology (cognition, social, etc.) overlap and influence the development and persistence of eating disorders. In trying to understand the many variables that can affect eating disorder symptoms, it is best to look at eating disorders from a biopsychosocial standpoint, in which credence is given to multiple theories of development and/or maintenance. Ultimately, this provides a well-rounded and informed picture of eating disorders, which could, in turn, lead to more successful treatment of these disorders.

## **Eating Disorder Criteria and Prevalence**

Anorexia Nervosa is a psychological disorder afflicting mostly young women with an onset occurring in mid-late adolescence and a lifetime prevalence rate of 0.5 percent (APA, 2000). There are also many negative psychosocial and medical consequences associated with the development of Anorexia Nervosa. Psychosocial consequences mainly include emotional and social damage, such as a negative self-image, and social withdrawal (APA, 2000). Medical consequences may include anemia,

osteoporosis, dental problems, and cardiovascular dysfunction (APA, 2000). Persons with Anorexia Nervosa also have an increased risk of death due to starvation, cardiac arrest or suicide. In addition, Anorexia Nervosa is also highly co-morbid with other psychiatric disorders, such as substance abuse and depression.

According to the most recent edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM), a distinguishing feature of this diagnosis is a refusal to maintain a minimally normal body weight, usually less than 85% of what is expected for one's age and height (APA, 2000). Persons with Anorexia Nervosa also exhibit an intense fear of gaining weight or becoming fat, despite the fact that they are underweight. Disturbances in the way their body weight and shape are experienced, excessive influence of these disturbances on self-evaluation, and/or denial of the seriousness of their current body weight are also experienced. Lastly, in postmenarcheal females, the maintenance of such low body weight results in amenorrhea, the absence of at least three consecutive menstrual cycles (APA, 2000).

Although it has been shown that biological factors, such as the evidence provided for increased risk of Anorexia Nervosa among first-degree biological relatives, and psychosocial factors, such as stressful life events, can both play a role in the development of Anorexia Nervosa, there is also much evidence for a strong cognitive component in not only the development of Anorexia Nervosa, but also in its maintenance. Two of the four criteria for a diagnosis of Anorexia Nervosa reflect underlying problems in cognition; in fact, some researchers posit that body-image disturbance is the main feature of eating disorders and is also the key factor underlying vulnerability to and maintenance of them (Jansen, Nederkoorn, & Mulken, 2004).

Bulimia Nervosa is also a psychological disorder afflicting mostly young women. The age of onset for this disorder is late adolescence to early adulthood, with a lifetime prevalence rate of 1% to 3% percent in women, and approximately one-tenth of that in men (APA, 2000). Although similar to Anorexia Nervosa, Bulimia Nervosa is distinguished from other eating disorders because those suffering from this disorder are typically within the normal weight range. Individuals suffering from Bulimia Nervosa experience recurrent episodes of binge eating (eating within any two-hour period an amount of food larger than most would under the same circumstances) accompanied by a sense of lack of control during the binge eating episode. In addition, these individuals engage in recurrent inappropriate compensatory behaviors that they believe will help them prevent weight gain, such as self-induced vomiting, excessive fasting and/or exercise, and misuse of diuretics, laxatives, enemas or other similar means. To warrant a diagnosis of Bulimia Nervosa, both the binge eating episodes and inappropriate compensatory behaviors must occur, on average, at least twice a week for three months and must not occur exclusively during episodes of Anorexia Nervosa. Similar to Anorexia Nervosa, there is also a cognitive component to Bulimia Nervosa, as individuals' evaluations of themselves must be excessively influenced by their body shape and weight in order to warrant this diagnosis (APA, 2000).

Psychological consequences of Bulimia Nervosa include an increase in depressive symptoms, such as low self-esteem, and co-morbidity with some Mood Disorders, such as Dysthymic Disorder (APA, 2000). Frequently cited associated medical problems that accompany Bulimia Nervosa include fluid and electrolyte imbalances and significant or permanent loss of dental enamel. Although rare, there are some potentially fatal

complications as well, such as esophageal tears, gastric rupture, and cardiac arrhythmias (APA, 2000).

Eating Disorders Not Otherwise Specified (NOS) are those that do not meet criteria for any specific Eating Disorder (APA, 2000). Examples of Eating Disorder NOS mainly include instances in which full criteria for Anorexia or Bulimia Nervosa are not met. For example, an individual may meet all other criteria for Bulimia Nervosa, except that binge eating episodes occur less than twice a week or binge eating episodes occur without the regular use of inappropriate compensatory behaviors. Another example of an Eating Disorder NOS would be if all other criteria for Anorexia Nervosa were met, yet an individual is still within his or her normal weight range, despite significant weight loss. In addition to instances such as these, other forms of disordered eating, such as chewing and spitting out small amounts of food before swallowing, are also considered to be an Eating Disorder NOS, although these features are not typical of either Anorexia or Bulimia Nervosa. Given that Eating Disorder NOS diagnoses can encompass a number of wide ranging disordered eating features, there are no specific data provided in the *DSM-IV-TR* for age of onset or lifetime prevalence. Similar to Eating Disorder NOS, “subclinical” levels of any eating disorder may be manifested as less intense eating disorder symptomology, for example, restricting food intake, but not to the point of starvation, or purging after eating, but not purging after every meal or purging regularly. Also, a person may be considered “subclinical” as he or she begins to develop an eating disorder, such as initial mild body image dissatisfaction that eventually grows into full blown body image distortion, and thus, warrants a clinical diagnosis.

## **Etiology**

As with any psychological disorder, the development and maintenance of eating disorders is best understood from a biopsychosocial perspective. Proponents of biological models of development glean support from findings of disturbances in maturational changes in the brain during adolescence, a critical period of brain development.

Neurodevelopmental models posit that dysregulation of the Hypothalamic-Pituitary-Adrenal (HPA) axis is of primary importance as improper regulation of this axis can make individuals prone to experiencing chronic stress and, in turn, rely on maladaptive cognitive, emotional, and social coping strategies (Southgate, Tchanturia, & Treasure, 2005). It is the poor response to stress that is proposed by some to lead to a persistent state of high emotional stress which, in addition to malnutrition, can disrupt the critical brain transitioning and normal progression of hormonal changes that take place during adolescence (Southgate et al., 2005). Empirical findings that support this notion include functional magnetic resonance imaging (fMRI) studies of those suffering from eating disorders and subsequent findings of abnormal activation in certain regions of the brain that are presumed to be related to emotional processing, planning, and control of behavior (Ellison et al., 1998; Southgate et al., 2005; Uher et al., 2003; Uher et al., 2004; Uher et al., 2005).

Disturbances in emotional regulation also fall within the realm of biological explanations of eating disorders. In particular, those with Anorexia Nervosa have been found to experience pervasive anhedonia (inability to experience pleasure), as measured by diminished startle responses (Davis & Woodside, 2002; Southgate et al., 2005).

Reduced levels of dopamine, a neurotransmitter involved in the reward and pleasure

centers in the brain, have also been found (Brambilla, Bellodi, Arancio, Ronchi, & Limonta, 2001; Kaye, Frank, & McConaha, 1999; Southgate et al., 2005). Conversely, those with Bulimia Nervosa have been found to show increased sensitivity to reward and ability to experience pleasure from food (Southgate et al., 2005), thus highlighting a key difference between Bulimia Nervosa and Anorexia Nervosa.

Cognitive models (Kemps, Tiggeman, Wade, Ben-Tovim, & Breyer, 2006; Vitousek & Orimoto, 1993; Wojtowicz & von Ranson, 2007) suggest impaired cognitive functioning in persons with eating disorders, namely in attentional focus, selective working memory, and negatively biased memory. These models further propose that persons with eating disorders selectively attend to appearance cues. By doing this, appearance related stimuli are given priority while other stimuli are inhibited. Schemas, which refer to underlying structures of knowledge (Jansen et al., 2004), are also thought to play a part in the maintenance of Anorexia Nervosa, as research suggests that the schemas may filter out disorder irrelevant information and guide attention to and memory for disorder relevant information, thus maintaining the cognitive dysfunctions present in persons with eating disorders (Jansen et al., 2004). In addition, explanations of memory biases suggest that Anorexia Nervosa, in particular, is maintained by a vicious cycle in which an individual may not get the opportunity to seek out or experience disconfirming, positive information about his or her own body and the bodies of others. Given this constant focus on, and preoccupation with, food, dieting, and body shape and size, these individuals are more likely to misremember negative disorder related experiences and, consequently, overestimate their current body size.

Studies aiming to explore the relationship between visual attention and disordered eating may involve a means of objectively measuring visual attention, such as through electrooculography (eye movement registration) or a dot-probe task, and then comparing these results between a healthy control group and one or more disordered eating groups, those diagnosed with Anorexia Nervosa and/or Bulimia Nervosa. In a dot-probe task participants simultaneously view two pictures, one on the left side of the screen and one on the right side of the screen, and after a predetermined and usually varied amount of time one picture is singled out from the other by adding some form of an external stimulus, such as a different colored frame or a probe in the shape of a dot, to the picture. Naturally, participants will attend to one picture more than the other and their attentional focus will either shift to the other picture or stay on the same picture when probed. When saccade latency (how long it takes the eyes to move from one point to another) is measured, shorter latencies are associated with more attentional bias toward one picture. Previous research (Reiger et al., 1998, Shafran, Lee, Cooper, Palmer, & Fairburn, 2007; Blechert, Ansorge, & Tuschen-Caffier, 2010) has suggested that persons with eating disorders exhibit attentional biases toward negative body-appearance cues, such as word cues that describe larger physiques or the presentation of a plump body part; that is, when eye movement is measured, saccade latencies will be shorter when one of the pictures presented is related to a negative body-appearance cue.

A study done by Blechert and colleagues (2010) assessed attentional biases for body-related stimuli in healthy versus eating disordered participants. A dot-probe task was used, in which participants' saccade latency was the dependent variable in this experiment. Findings demonstrated that participants in the Anorexia Nervosa group had



shorter saccade latencies when the self-photo was the target than when the other photo was the target compared to healthy controls. Furthermore, after collecting information on participants' level of body dissatisfaction it was also found that higher dissatisfaction with one's body resulted in shorter latencies for self-target trials compared to the other-target trials (Blechert et al., 2010). These findings lend support for cognitive models of eating disorders, which claim that these individuals are intensely preoccupied with thoughts about their own body shape and weight, often to the point of rumination. Given this assumption, negative appraisals of one's own body become particularly problematic and can set the stage for the development of disordered eating habits.

It has also been noted that persons with Anorexia Nervosa, in a direct contrast to healthy controls, attend more to their own self-proclaimed "imperfect" or "ugly" body parts as well as more to the self-proclaimed "perfect" or "beautiful" body parts of others. Conversely, a person with Anorexia Nervosa will attend less to, or even avoid, looking at his or her own "beautiful" body parts as well as the "ugly" body parts of others (Tuschen-Caffier, Vogele, Bracht, & Hilbert, 2003). As such, this type of social comparison and negative attentional bias clearly sets the stage for high body dissatisfaction and the possibility of developing disordered eating habits in an effort to reduce dissatisfaction. A study done by Jansen and colleagues (2004) also explored visual attention in persons with eating symptomatic behaviors; however, in this study visual attention was further explored by determining the exact location of attention (specific body parts) on self and other pictures. Findings demonstrated participants in the eating symptomatic group attended more to their own self-proclaimed "ugly" body parts than their self-proclaimed "beautiful" parts. It was also demonstrated that, when looking at bodies of others, this

group attended to the “beautiful” parts of the other bodies, whereas normal controls did not show any differences in visual attention for the “ugly” and “beautiful” parts of the other bodies (Jansen et al., 2004). These findings not only corroborate findings from other studies of visual attention via eye movement, but also support schema based cognitive models for eating disorders. Schema based models suggest that persons with eating disorders preferentially process schema congruent information (in this case, that one’s body or a body part is “ugly”) and ignore schema incongruent information (that one has a beautiful body or body parts), which further reinforces the cognitive biases (Faunce, 2002). These implied negative schemas about one’s body could also perpetuate the aforementioned vicious cycle of eating disorders.

In recent years, it is, perhaps, the sociocultural influences on eating disorders that have received the most attention, given the potentially highly influential experiences that mass media messages, the family environment, and peer relationships provide. Television, movies, magazines, and other various forms of media have been charged by the public with promoting the idea that being thin, even unnaturally thin, is not only desirable, but a requirement of beauty. Given the constant bombardment with media that Western cultures receive, one could easily draw the conclusion that these messages lead young audiences to over value thinness.

Research suggests, however, that mere exposure to the media does not correlate with body image dissatisfaction; rather, it is the internalization of media messages that promote this thin ideal that contributes to the development of eating disturbances (Thompson & Heinberg, 1999; Tiggemann & Pickering, 1996). Similarly, cross-cultural research has found that adolescent girls from non-Western cultures showed an increase in

rates of eating disorders after being exposed to media that focused on Western ideals of beauty (Becker, Burnwell, Herzog, Hamberg, & Gilman, 2002; Lock, & Kirz, 2008). Numerous studies have been done in the area of media influence on eating disorders that indicate that exposure to the thin-ideal results in higher levels of body dissatisfaction, yet it has also been documented that this effect is much stronger for women with preexisting higher levels of body dissatisfaction than those without (Groesz, Levine, & Murnen, 2002; Stice, 2002). For males, although there is less cultural pressure to be thin than for women, recent studies have found that the ideal male figure has become increasingly leaner and muscular than in previous decades (Grieve, Newton, Kelley, Miller, & Kern, 2005; Leit, Pope, & Gray, 2001; Lock & Kirz, 2008; Pope, Olivardia, Gruber, & Borowiecki, 1999)

A summary of media influence is found in Stice, Nemeroff, and Shaw's (1996) dual pathway model, which suggests that body dissatisfaction is fueled by sociocultural pressure to be thin, given that recurring messages that one is not thin enough eventually foster body dissatisfaction. Furthermore, internalization of the thin ideal specifically contributes to body dissatisfaction, as it is extremely difficult for most women to attain (Stice et al., 1996). Despite these findings, media messages alone cannot account for the development of eating disorders.

Another well-researched area of social influences on eating disorders is the family environment, specifically, children's modeling of parent and sibling eating behaviors. Craighead and Smith (2008) hypothesize that familial emphasis on thinness, dieting, and appearance can communicate these values to children at a young age, which in turn can influence eating disorder development. For example, family members may either directly

tell another family member that he or she needs to lose weight or they may criticize his or her eating habits and appearance. Given that eating disorders primarily affect women, of particular concern is the relationship between mothers and daughters and sisters.

Coomber and King (2008) found that sisters were more important influences than parents as a whole, but specifically found that sisters were equally important as mothers, but more important than fathers. They also found that pairs of sisters reported similar body dissatisfaction, dieting and bulimic behaviors, and that sister modeling had a direct effect on disordered eating habits.

Peer influence on eating disorders is another well-researched area in eating disorder literature. Given that the socialization process is such a key component of development, it is easy to see why peer relationships are thought to play such a large part in the development and maintenance of eating disorders. Two of the main ways in which peers can influence these disorders is through appearance-based teasing and modeling of disordered eating. Fabian and Thompson (1989) noted that how distressing peer teasing is to an individual could influence eating disturbances and body dissatisfaction (Fabian & Thompson, 1989; Oliver & Thelen, 1996). It has also been shown (Desmond, Price, Gray, & O'Connell, 1986) that peer discussion about dieting and managing weight, with great enough frequency, contributes to children's development of weight management techniques as well as eating disturbances (Desmond et al., 1986; Oliver & Thelen, 1996). Finally, previous research has shown that, even with children, the perception that being thin will make one more likeable to his or her peers was a major contributor to the development of eating and body concerns (Oliver & Thelen, 1996).

## **Critical Body Comments Research**

Adolescence, which is the typical onset time period for eating disorders, is such a time in an individual's life where he or she is unduly influenced by others' evaluation of his or her body; this is especially true for girls (Mash & Wolfe, 2005). The tendency to be overly concerned with one's own body shape and weight, as is characteristic of those with eating disorders, can make one even more sensitive to negative comments from others about his or her body. In addition, individuals who have been diagnosed with an eating disorder are more prone to react negatively to remarks made about their bodies (Lask & Bryant-Waugh, 2000; Menees, Grieve, Mienaltowski, & Pope, 2011).

A study done by Muscat and Long (2008) investigated the relationship between critical body comments and eating disorder symptoms in female athletes. In a previous study done by Muscat in 2001 it was found that, among female athletes that reported disordered eating habits, critical comments made by those they considered to be significant others (i.e., coaches, parents, peers) were key events that related to their disordered eating. The 2008 study focused on the relationship between degree of disordered eating, recall of critical body comments, intensity of negative and positive emotions, severity of the emotional reaction to those comments, and type of athlete (competitive vs. sport participant). Results revealed that those who recalled critical body comments had higher levels of disordered eating and also experienced more intense negative emotions than positive emotions, compared to those who could not recall critical comments. It was also found that, for those who recalled critical comments, the severity of those comments was positively correlated with disordered eating (the more severe the

comment, the greater the disordered eating). This research shows the impact that critical body comments can have on the development of eating disorders.

### **Memory Recall Research**

Research has shown that persons with eating disorders often exhibit biases in many areas of memory, such as in recall. In general, the results of these studies suggest that those with eating disorders have a preoccupation with thoughts related to food, dieting, and body shape and size and, thus, have almost a complete inability to disengage from thinking about these things, which in turn, perpetuates their disordered eating habits. A study done by Agliata, Tantleff-Dunn, and Renk (2007) aimed to investigate the effect of teasing on the cognitive processes of those with high body dissatisfaction. The basis for this study was that previous research has shown that prior history of being teased affects what one remembers about being teased, with more teasing being related to remembering more specific details about the teasing incident. This can cause one to misremember the past more negatively than it actually occurred and set the stage for maladaptive cognitive biases, such as the confirmation bias, that can lead to the development of disordered eating habits.

In Agliata et al.'s (2007) study, participants' level of body dissatisfaction was assessed as either high or low. Participants then watched a video of a woman being teased by a man about her appearance and were then asked to perform a free recall task about the video. Finally, participants were presented with a list of words containing positive and negative appearance-based words and neutral words. After this list was presented,

participants completed a word recall task in which they wrote down as many words as they could remember during a five-minute period.

Findings support the existence of maladaptive cognitive process in that it was found that women with higher body dissatisfaction recalled significantly fewer positive words than women with lower body dissatisfaction. Findings from this study show that the cognitive characteristics of adolescents may predispose them to the negative effects of teasing (Agliata et al., 2007). The results also suggest that perhaps those who feel negatively about their appearance may ignore positive appearance stimuli, whereas those who feel positively about their appearance may disregard negative appearance stimuli, as they are inconsistent with their self-view. This study provides evidence for the presence of biased memory recall, specifically that negative experiences related to body image are more easily recalled than positive experiences related to body image. This finding can help to explain why persons with eating disorder symptomology have difficulty viewing their bodies accurately and in a positive manner.

### **Limitations of Previous Research**

Although studies have described the relationships between critical body comments and eating disorder symptomology and cognitive explanations of eating disorder development and maintenance, research is lacking on tying these variables together. With the push to understand psychological disorders from a biopsychosocial perspective, it would naturally follow that research be done that aims to show if the extensively cited memory biases and social environment factors that can influence the development of eating disorders also simultaneously work together to maintain these disorders.

Some of the limitations of research done on biases in memory revolve around the inability to determine whether or not these biases are actually a reflection of disordered eating and high body dissatisfaction. For example, given that eating disorders are highly co-morbid with mood disorders, specifically depression, similar findings of negatively biased memory can also be found in those who are clinically depressed; therefore, it becomes difficult to determine if the presence of the biases are due to disordered eating or a problem with core negative beliefs.

### **The Present Study**

The study of the role of critical body comments and their effects, if any, on memory recall in persons with eating disorders is worthy of consideration because of its implication for the prevention and treatment of eating disorders. Biological predispositions are unchangeable and stressful life events or traumas cannot always be avoided; however, learning to recognize and correct maladaptive thought patterns in high-risk populations is reasonably within human control. The present study has the potential to call attention to the maladaptive thought patterns that persist in participants as a result of previously made negative critical body comments, the potential rehearsal of these comments, and the increased attention paid to disorder relevant information. In addition, the threat of results being distorted due to the presence of depressive symptoms, as eating disorders are highly comorbid with depression (APA, 2000), is a non-issue. In the present study, hypotheses are made about the *recall* of either appearance or non-appearance related words, rather than about the affect attached to these words, in which it is more likely that eating disorder symptomology or depression symptomology could account for greater recall of negative words. Lastly, whereas previous studies (Muscat &



Long, 2008) have focused on the relationship between critical comments and eating disorder symptomology in athletes, the present study will examine this relationship in a general student population, which allows for generalizability whereas previous research could not.

The purpose of the present study was to examine the relationship, if any, between eating disorder symptomology, critical body comments, and their effect on memory recall. The hypotheses under study are (1) participants who can recall critical comments about their bodies will have more eating disorder symptomology than participants who cannot recall critical comments; (2) out of the participants who can recall critical comments, those who reported more negative emotions/experiences from the comment will have higher levels of eating disorder symptomology than those without negative emotions/experiences; (3) participants with higher levels of eating disorder symptomology will exhibit greater recall for appearance related words than non-appearance related words on the word recall task; (4) participants with higher levels of eating disorder symptomology will exhibit greater recall for appearance related words than participants with lower levels of eating disorder symptomology; and (5) level of eating disorder symptomology for participants who recall critical comments will have an influence on the type of word recalled (appearance or non-appearance).

## Method

### Participants

Participants for this study were 120 female students recruited online through the Western Kentucky University Psychology Department Study Board. Participants received course credit or extra credit in a course for their participation in this study. Demographic data showed that the mean age of participants in this study was 20.29 ( $SD = 4.17$ ), with a range of 18 to 54. The mean education level of participants was 13.85 years ( $SD = 1.21$ ), with a range of 13 to 18 years. Out of the 120 participants, 94 (78.3%) were Caucasian, 17 (14.2%) were African-American, 7 (5.8%) were classified as other, and 2 (1.7%) participants chose not to report their ethnicity.

### Measures

***Demographics.*** Participants were asked to complete a demographics survey (see Appendix A) that assessed their age, sex, ethnicity, and education level.

***Eating Disorder Inventory-3 (EDI-3 RF).*** The EDI-3 Referral Form was completed by participants to assess their current level of risk for eating disorders, where higher scores indicated a greater chance of meeting criteria for an eating disorder (Garner, 2004). This form is an abbreviated version of the EDI-3 (Garner, 2004) and is comprised of the three scales that make up the Eating Disorder Risk Composite (Drive for Thinness, Bulimia, and Body Dissatisfaction). Participants completed Part A of the Referral Form, which assessed their eating concerns. Part A is comprised of 13 items that contain statements such as, “I am terrified of gaining weight” and “I think that my stomach is too big.” Participants indicated how often they have experienced these

thoughts with response six options, “A” (*Always*) “U” (*Usually*), “O” (*Often*), “S” (*Sometimes*), “R” (*Rarely*), and “N” (*Never*). Part B of the form included questions assessing participants’ current height and weight, age, gender, highest weight ever, lowest weight ever, and desired weight. In addition to these questions, there were also five items that assessed eating disorder pathology, such as, “In the past three months how often have you made yourself sick (vomited) to control your weight?” Response options for these questions were “never”, “once a month or less”, “2-3 times per month”, “once a week”, “2-6 times per week” or “once a day or more.” Participants’ body mass index (BMI) was calculated by the examiner upon completion of the Referral Form. Previous research suggests high internal consistencies for females on each of the three scales that compose the EDI-3 RF with alphas of .91 and .86 for Drive for thinness, .63 and .62 for Bulimia, and .91 and .90 for Body Dissatisfaction (Garner, 2004; Grabarek & Cooper, 2008).

***Social Hassles Questionnaire (SHQ).*** Participants completed the SHQ (Muscat & Long, 2008; see Appendix B) to assess critical comments made about their bodies, the emotional impact of these comments, and by whom these comments were made. The SHQ is a 13-item assessment that contains questions such as, “Do you remember someone ever making a critical comment that your body should be a certain shape or weight?” and “To what degree did you feel your self-esteem was threatened by the comment about your body shape, diet, or need to change your weight?” The response choices for this questionnaire vary from question to question. In addition, one of the questions asked participants to evaluate the emotions that they felt after receiving comments made about their bodies. Participants responded to a list of positive

(*happiness, relief, hope, love, gratitude, compassion, and pride,*) and negative (*anger, anxiety, fright, guilt, shame, sadness, envy, and jealousy*) emotions, and then rated the extent to which they experienced each emotion; responses ranged from 0 (*Not at all*) to 5 (*Extremely*). The Chronbach's alpha calculated for the upset score was .88 and the Chronbach's Alphas for the negative and positive emotions scores were .88 and .93, respectively.

**Word Recall Task.** To examine the cognitive aspects of the impact of critical comments made about participants' bodies, a word recall task was designed that used an Eprime presentation. A series of 18 positive, negative, and neutral words related to appearance (e.g., beautiful, hideous, hand) and a series of 18 positive, negative, and neutral non-appearance (e.g., intelligent, stupid, book) related words were chosen for this task. The words were obtained from a pilot study (see Appendix A) in which participants were asked to rate the affect of each word on a scale of -3 (negative) to 3 (positive) and also specify whether each word was appearance related or non-appearance related. The words were randomly ordered for each session and appeared one at a time for three seconds on a classroom projector screen. Participants were run in groups with no more than 20 participants per group. Each group watched the Eprime presentation together from a single classroom projector. Participants viewed all of the words chosen for this task and then immediately completed a recall task afterwards. The recall task instructed participants to write down as many words from the screen as they could remember in five minutes. The amount of positive, neutral, and negative words in each category (appearance related and non-appearance related) was calculated (see Table 1).

Table 1

*Positive, Negative, and Neutral Appearance and Non-Appearance Related Words*

<i>Positive Appearance:</i>	<i>Negative Appearance:</i>	<i>Neutral Appearance:</i>
Beautiful	Hideous	Thick
Smile	Obese	Short
Attractive	Overweight	Tattooed
Pretty	Skanky	Large
Sexy	Ugly	Hand
Cute	Unattractive	Stomach
<i>Positive Non-Appearance:</i>	<i>Negative Non-Appearance:</i>	<i>Neutral Non-Appearance:</i>
Intelligent	Dumb	Quiet
Charming	Stupid	Cold
Fun	Idiot	Book
Outgoing	Rude	Squirrel
Peaceful	Moron	Cup
Confident	Retarded	Park

**Procedure**

After obtaining Institutional Review Board (IRB) approval, participants were recruited from the Department of Psychology Study Board website to participate in this study. The participants first filled out an informed consent form (see Appendix D). Then,

participants completed the EDI-3 RF. Next, the participants completed the SHQ. Finally, the participants watched the presentation of the appearance and non-appearance related words and completed the word recall task. Upon completion of the recall task, the participants were presented with a debriefing statement (see Appendix E) and their participation in the study was concluded.

## Results

### Preliminary Analysis

The EDI-3 RF yielded scores on three subscales, Drive for Thinness (DT), Bulimia (B), and Body Dissatisfaction (BD). Pearson correlations were performed to ensure that the subscales were correlated with one another (see Table 2). The scores on the DT, B, and BD subscales were then summed to create a total EDI-3 RF score as a measure of eating disorder symptomology ( $M = 32.14$ ,  $SD = 19.47$ , actual range = 1 to 76, potential range = 0 to 100). A median split for the total EDI-3 RF was performed (median = 31.5) to differentiate between high and low symptomology groups. An independent samples  $t$ -test showed significant differences in high ( $M = 49.0$ ,  $SD = 11.34$ ) and low ( $M = 15.28$ ,  $SD = 7.63$ ) EDI-3 RF groups,  $t(118) = -19.10$ ,  $p < .001$ .

Table 2

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*EDI-3 RF Subscales Correlations*

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	DT	B	BD
DT	-	< .001	< .001
B	.52	-	< .001
BD	.67	.52	-

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*Note.* Below the diagonal is correlation, above the diagonal is  $p$ -value. DT = Drive for Thinness subscale, B = Bulimia subscale, and BD = Body Dissatisfaction subscale.

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To determine how upset participants were in response to a critical comment made about their bodies, questions 5 through 9 on the SHQ were summed to create an upset

score (Chronbach's Alpha = .88). This score yielded a mean score of 12.15 ( $SD = 4.39$ , actual range = 5 to 20, potential range = 0 to 40). Participants' emotional reactions to critical body comments were calculated by averaging scores for both positive and negative emotions. The mean for the negative emotions was 1.76 ( $SD = 1.23$ ), with a range of 0 to 4.50. The mean for the positive emotions was .54 ( $SD = .97$ ), with a range of 0 to 4.14. Chronbach's Alphas for the negative and positive emotions scores were .88 and .93, respectively.

### **Hypothesis Testing**

The first hypothesis under study was that participants who recalled critical comments about their bodies would have more eating disorder symptomology than participants who did not recall critical comments. In the study, 93.33% ( $n = 112$ ) of participants recalled a critical comment and 6.66% ( $n = 8$ ) of participants did not recall a critical comment. To evaluate this hypothesis, an independent samples  $t$ -test was performed on scores from the EDI-3 RF. Results did not support the hypothesis as the difference between groups was not statistically significant,  $t(118) = -1.19, p = .24$ . It is suspected that results would have approached significance if the number of participants in each group were equal, as the means for each group were in the expected direction, with those reporting remembering comments ( $M = 32.71, SD = 19.62$ ) having more symptoms than those who did not recall comments ( $M = 24.25, SD = 16.26$ ). Cohen's  $d$  was calculated and revealed a moderate effect size for this analysis;  $d = 0.44$ .

The second hypothesis stated that, out of the participants who recalled critical comments, there would be a significant relationship between negative emotions/experiences and eating disorder symptomology. For hypothesis 2, a correlation



analysis was performed to determine if a correlation between negative emotions/experiences resulting from critical comments and higher levels of eating disorder symptomology existed. This hypothesis was supported as results yielded a positive correlation between these two variables,  $r = .683$ ,  $n = 112$ ,  $p < .001$ . No such correlation was found between these two variables for those who could not recall critical comments,  $r = .006$ ,  $n = 8$ ,  $p = .99$ .

Hypothesis 3 was that participants with higher levels of eating disorder symptomology would exhibit greater recall for appearance related words than non-appearance related words on the word recall task. To evaluate hypotheses 3, the number of positive, negative, and neutral appearance words recalled were summed to generate a total appearance related word recall score ( $M = 8.42$ ,  $SD = 2.45$ ) and the number of positive, negative, and neutral non-appearance related words recalled were summed to create a total non-appearance related word recall score ( $M = 6.04$ ,  $SD = 2.39$ ). Results partially supported this hypothesis. A paired samples  $t$ -test was performed; results showed that participants with higher levels of eating disorder symptomology exhibited greater recall for appearance related words ( $M = 8.10$ ,  $SD = 2.45$ ) than non-appearance related words ( $M = 5.80$ ,  $SD = 2.07$ ),  $t(59) = 7.29$ ,  $p < .001$ . It is important to note that this result was also found for participants with lower levels of eating disorder symptomology,  $t(59) = 6.80$ ,  $p < .001$ ; appearance related words ( $M = 8.73$ ,  $SD = 2.43$ ), non-appearance related words ( $M = 6.28$ ,  $SD = 2.66$ ).

An independent samples  $t$ -test was performed to evaluate hypothesis 4, which stated that participants with higher levels of eating disorder symptomology would exhibit greater recall for appearance related words than participants with lower levels of eating

disorder symptomology. This hypothesis was not supported, as results yielded no significant difference between the high group ( $M = 8.10$ ;  $SD = 2.45$ ) and the low group ( $M = 8.73$ ;  $SD = 2.43$ ) on this variable,  $t(118) = 1.421$ ,  $p = .16$ .

Finally, hypothesis 5, stated that higher levels of eating disorder symptomology for those who recalled critical comments would have an influence on the type of word recalled (appearance or non-appearance), was tested. A series of six stepwise regression equations were performed to evaluate this hypothesis using only participants who recalled critical comments. The regression equations retained variables that were significant at the .05 level. In each analysis, the independent variables included eating disorder symptomology, as measured by the EDI-3 RF, and word recall. The dependent variable was the specific type of word recalled. The analysis showed eating disorder symptomology to be a significant predictor only for (A) recall of positive appearance words,  $\beta = -.017$ ,  $t(58) = -2.75$ ,  $p < .001$ , and (B) positive non-appearance related words,  $\beta = -.011$ ,  $t(58) = -2.00$ ,  $p = .04$ . There were no other significant predictors.

Table 3

*Summary of Multiple Regression Analysis for Recall of Critical Body Comments (n=112)*

	$R^2$	$\beta$	t-value	p-value
Positive appearance	.06	-.017	-2.75	< .001
Negative appearance	.02	-.004	-.560	.57
Neutral appearance	.01	.000	.048	.96
Positive non-appearance	.03	-.011	-2.00	.048
Negative non-appearance	.019	.001	.124	.901
Neutral non-appearance	.060	-.017	.2.396	.018

### **Exploratory Analysis**

In order to further define the relationship between eating disorder symptomology, reported positive and negative emotions, and the type of word recalled, a multiple regression equation in which the type of word was predicted by eating disorder symptomology and ability to recall critical comments was performed. Results showed two significant negative relationships, a significant relationship between eating disorder symptomology and recall of positive appearance related words ( $r = -.25$ ;  $p = .007$ ), and a

significant relationship between eating disorder symptomology and recall of positive non-appearance related words ( $r = -.18$ ;  $p = .05$ ).

**Participants who recalled a critical body comment.** Given that the number of participants who could not recall a critical comment ( $n = 8$ ) was small, the following additional analyses were performed using results only from the group of participants who could recall a critical comment ( $n = 112$ ). A correlation between eating disorder symptomology and positive appearance related words was found ( $r = -.24$ ;  $p = .011$ ,  $n = 112$ ), but no correlation was found between eating disorder symptomology and positive non-appearance related words ( $r = -.18$ ;  $p = .057$ ;  $n = 112$ ). There was also a correlation between eating disorder symptomology and negative valenced words ( $r = .68$ ;  $p < .001$ ;  $n = 112$ ). Overall, appearance related words were recalled more than non-appearance related words,  $t(111) = 9.94$ ;  $p < .001$ , positive appearance related words were recalled more than positive non-appearance related words,  $t(111) = 12.32$ ;  $p < .001$ , and negative appearance related words were recalled more than negative non-appearance related words,  $t(111) = 5.35$ ;  $p < .001$ .

It was also found that, in general, valenced words (positive or negative) were recalled more than neutral words with the total amount of positive words recalled being greater than the total amount of neutral words,  $t(111) = 2.97$ ;  $p = .004$ , and the total amount of negative words recalled being greater than the total amount of neutral words,  $t(111) = 2.97$ ;  $p = .004$ .

Similarly, it was found that valenced appearance related words (positive or negative appearance related) were also recalled better than neutral appearance related

words; positive appearance  $t(111) = 8.66$ ;  $p < .001$ , negative appearance  $t(111) = 5.30$ ;  $p < .001$ .

Table 4

*Means and Standard Deviations for Word Recall in Participants Who Reported Critical Body Comments (n=112)*

	M	SD
Appearance	8.46 <sup>a</sup>	2.43
Non-appearance	6.03 <sup>b</sup>	2.30
Positive	5.04 <sup>b</sup>	1.88
Negative	5.01 <sup>a</sup>	1.72
Neutral	4.45 <sup>b</sup>	1.66
Positive appearance	3.40 <sup>a</sup>	1.31
Negative appearance	2.91 <sup>b</sup>	1.14
Neutral appearance	2.15 <sup>b</sup>	1.13
Positive non-appearance	1.63 <sup>b</sup>	1.11
Negative non-appearance	2.10 <sup>b</sup>	1.21
Neutral non-appearance	2.29	1.14

*Note.* Means with different superscripts differ at the  $p < .05$  level

## **Discussion**

The present study sought to explore the relationship between eating disorder symptomology, critical body comments and their effect on memory recall. Previous research (Blechert, Ansorge, & Tuschen-Caffier, 2010, Reiger et al., 1998, Shafran et al., 2007;) has suggested that persons with eating disorders exhibit attentional biases toward negative body-appearance cues, such as word cues that describe larger physiques or the presentation of a plump body part. In the word recall task for the present study, participants were shown both appearance and non-appearance related words and the total number of each type of word recalled was calculated. It has also been found that individuals who have been diagnosed with an eating disorder are more prone to react negatively to remarks made about their bodies (Lask & Bryant-Waugh, 2000; Menees, Grieve, Mienaltowski, & Pope, 2011).

In regards to critical body comments, previous research has shown that those who recalled critical body comments had higher levels of disordered eating and also reported experiencing more intense negative emotions than positive emotions, compared to those who could not recall critical comments (Muscat & Long, 2008). In addition, previous research has also shown that the more upset participants reported being in response to a critical body comment, the more symptoms they reported (Menees et al., 2011). To evaluate these variables, participants filled out the EDI-3 RF to evaluate eating disorder symptomology and the SHQ to evaluate critical comments, if any, and how upsetting these comments were to participants. Overall results of the present study provide information on how these three variables (eating disorder symptomology, critical body comments, and memory recall) all influence one another.

The first hypothesis stated that participants who recalled critical comments about their bodies would have more eating disorder symptomology than participants who did not recall critical comments. The difference between groups was not statistically significant; however, this hypothesis was supported by Cohen's  $d$ , which indicated a moderate effect size. Had these two groups been equal in number, it is likely that results would have been consistent with Muscat and Long's (2008) finding that those who recalled critical body comments had higher levels of disordered eating than those who could not recall critical body comments. It is also important to note that most of the participants in this study, 93.33%, were able to recall a critical comment. With such a high percentage, it is possible that this study overestimated the prevalence of eating disorders in the general population.

The second hypothesis stated that, out of the participants who recalled critical comments, there would be a significant relationship between negative emotions/experiences and eating disorder symptomology. Results supported this hypothesis. For participants who recalled a critical body comment, there was a positive correlation between negative emotions and eating disorder symptomology; that is, as negative emotions increased, eating disorder symptomology increased. This finding was also consistent with previous research on critical comments and reported negative emotions (Menees et al., 2011, Muscat & Long, 2008). This finding is also consistent with the *DSM-IV* (APA, 2000) mentioning that eating disorder sufferers, specifically persons suffering from Bulimia Nervosa, experience an increase in depressive symptoms.

The third hypothesis stated that participants with higher levels of eating disorder symptomology would exhibit greater recall for appearance related words than non-



appearance related words on the word recall task. Results supported this hypothesis; however, results also showed that participants with lower levels of eating disorder symptomology recalled more appearance related words than non-appearance related words. It appears that, regardless of level of symptomology, participants were more likely to recall appearance related words. The finding that participants recalled more appearance related words is consistent with previous research that has found that women consider overall appearance to be more important than do men, as all of the participants in the present study were women (Jackson, Sullivan, & Hymes, 2001).

The fourth hypothesis stated that participants with higher levels of eating disorder symptomology would exhibit greater recall for appearance related words than participants with lower levels of eating disorder symptomology. This hypothesis was not supported by the results; however, results showed that participants with higher levels of symptomology recalled less positive words than those with lower levels of symptomology. Similar to the findings from hypothesis 2, perhaps having higher levels of eating disorder symptomology makes participants less likely to remember positive words (but not necessarily more likely to remember more negative words), just as reporting more negative emotions/experiences was correlated with higher levels of eating disorder symptomology. The finding that participants with higher levels of symptomology recalled less positive words is consistent with previous research (Agliata et al., 2007).

The fifth hypothesis stated that higher levels of eating disorder symptomology and being able to recall critical body comments would have an influence on the type of word (appearance or non-appearance) recalled. Results found that lower levels of eating disorder symptomology predicted higher numbers of positive appearance and non-

appearance related words recalled. Given this finding, it is likely that eating disorder symptomology impacts recall of positive words. These findings suggest that participants with higher levels of eating disorder symptomology were more focused on their appearance than participants with lower levels of eating disorder symptomology, which is reflected in the criteria for a diagnosis of either Anorexia Nervosa or Bulimia Nervosa (APA, 2000).

The finding that there is a negative relationship between eating disorder symptomology and positive appearance related words, that is, as eating disorder symptoms increase, recall of positive appearance related words decreases, may suggest that those high in symptomology may engage in a type of thinking in which positive things (including words), in general, are shut out. If such is the case, then the finding that positive appearance related words were less likely to be recalled is not surprising.

It was also found that participants in the present study recalled abstract words (appearance related words) better than concrete words (neutral words). This finding is interesting as it goes against what previous research suggests; that concrete words have processing advantages over abstract words and, therefore, should be more easily recalled (Paivio, 1986, 1991).

### **Limitations**

One limitation of the present study is its lack of generalizability. Although the average age of the sample was within the typical onset of eating disorders, all the participants selected for the study came from a university and were mostly Caucasian. This makes results difficult to generalize to non-student populations and those of different ethnicities. Given this, it is possible that results might have differed if this

research was done with participants of different ethnicities or with non-student participants; however, the present study offers more generalizability than previous research.

Another limitation of this study was that the words selected for the word list presentation were words that were most highly rated as representative of their category (positive, negative, or neutral appearance or non-appearance related words) by women and *men*. The present study was limited to women; therefore, it is possible that some of the words in the word list presentation were not entirely representative of how women typically classify positive, negative, and neutral appearance or non-appearance related words. The pilot study contained men as the present study was originally proposed to evaluate women and men, but was later decided to be limited to women.

Whereas previous research (Agliata et al., 2007) incorporated a delay between presentation and recall task, in the present study there was no delay between these two tasks. This may present problems as it deviates from previous research using a similar design; however, because of the lack of delay in the present study participants were still primed and, thus, may have recalled more words than they would have after a delay.

Finally, as with all studies that employ self-report methods, it is important to reiterate the fact that self-report of eating disorder symptoms are usually severely underreported (Vitousek, Daly, & Heiser, 1990). Given this, it is likely that some participants deliberately completed the EDI-3 RF in a manner that would make them appear less symptomatic than they actually are, as self-report measures present participants with the potential to answer dishonestly. Other problems, such as skipping

questions or misreading questions are also possible with self-report measures and could have impacted results. Similarly, even out of those in the high symptomology group, the majority of participants in this study would be classified as having subclinical levels of an eating disorder; therefore, the relationships in the present study may have differed had there been more participants who met clinical criteria for an eating disorder.

## **Conclusions**

The present study has implications in the research area of eating disorders, specifically for treatment of eating disorders. Given that cognitive biases discussed earlier in the introduction (Kemps, Tiggeman, Wade, Ben-Tovim, & Breyer, 2006; Vitousek & Orimoto, 1993; Wojtowicz & von Ranson, 2007) obviously alter how persons with eating disorders evaluate and think about their bodies, a logical main goal of treatment that could be inferred from the present study's results would be to identify the negative thoughts and feelings about body image that are the root of unhealthy eating behaviors, and to replace those thoughts with healthier and less distorted thoughts and attitudes.

The finding in the present study that participants who remembered critical comments were more likely to recall appearance related words than non-appearance related words, could be used to support a treatment intervention that has eating disorder sufferers focus on describing their bodies in a more positive way and to use more positive words in their self-evaluations. As Jansen and colleagues (2004) suggest, the self-serving bias that causes one to favor his or her own beautiful body parts might protect those with high body esteem, whereas a reduced self-serving bias (as seen in those with eating disorders) results in focusing less or not at all on positive body parts and more on

negative body parts. This reduced self-serving bias might maintain the low self-esteem and body image concerns seen in persons with eating disorders. Given that research has demonstrated that persons with Anorexia Nervosa exhibit a failure to focus on their own beautiful body parts, treatments might benefit from incorporating procedures in which patients learn to focus on their body parts in a more positive way (Jansen et al., 2004). The findings from the present study corroborate this suggestion in the aforementioned research.

Overall, the findings of the present study are consistent with previous research that has found a relationship between remembering a critical comment and subsequent negative emotions/ experiences (Menees et al., 2011, Muscat & Long, 2008) and also research that has found a negative relationship between high body dissatisfaction and number of positive words recalled (Agliata et al. 2007). In conclusion, the findings of the present study show that eating disorder symptomology only predicts less recall of positive words, that is, the higher the amount of eating disorder symptomology the less likely participants are to recall positive words in a word recall task. In light of this particular finding, the need for better treatment for those suffering from eating disorders or any amount of eating disorder pathology is apparent, especially treatments aimed at increasing positive ways of thinking.

## Appendix A

### Pilot Study

The pilot study was conducted to determine which words would be used in the Eprime presentation for the present study. The Clinical and Applied Research (CAR) Group brainstormed 89 words to be evaluated. These words were then compiled into a randomized list and presented to participants. Participants rated each word on valence with response options ranging from -3 (*negative*) to 3 (*positive*) and also whether each word was appearance related or non-appearance related using a forced choice response.

The words selected to be positive appearance related words were the six words that had the highest (most positive) average valence ratings and were most often chosen as appearance related; beautiful ( $M = 2.80$ ,  $SD = 0.47$ ), smile ( $M = 2.77$ ,  $SD = 0.46$ ), attractive ( $M = 2.67$ ,  $SD = 0.66$ ), pretty ( $M = 2.65$ ,  $SD = 0.57$ ), sexy ( $M = 2.61$ ,  $SD = 0.63$ ), cute ( $M = 2.55$ ,  $SD = 0.59$ ). Similarly, the words selected to be positive non-appearance related words were the six words that had the highest average valence ratings and were most often chosen as non-appearance related; confident ( $M = 2.74$ ,  $SD = 0.59$ ), intelligent ( $M = 2.68$ ,  $SD = 0.98$ ), charming ( $M = 2.59$ ,  $SD = 0.63$ ), fun ( $M = 2.58$ ,  $SD = 0.79$ ), outgoing ( $M = 2.52$ ,  $SD = 0.95$ ), peaceful ( $M = 2.48$ ,  $SD = 0.95$ ).

The words selected to be negative appearance related words were the six words that had the lowest (most negative) average valence ratings and were most often chosen to be appearance related; obese ( $M = -2.03$ ,  $SD = 1.78$ ), hideous ( $M = -2.02$ ,  $SD = 1.76$ ), over-weight ( $M = -1.98$ ,  $SD = 1.65$ ), skanky ( $M = -1.97$ ,  $SD = 1.72$ ), ugly ( $M = -1.86$ ,  $SD = 1.88$ ), unattractive ( $M = -1.85$ ,  $SD = 1.64$ ). Negative non-appearance related words consisted of the six lowest average valence ratings and were also most often chosen to be

non-appearance related; dumb ( $M = -2.39$ ,  $SD = 1.02$ ), stupid ( $M = -2.20$ ,  $SD = 1.10$ ), idiot ( $M = 2.15$ ,  $SD = 1.23$ ), rude ( $M = -2.11$ ,  $SD = 1.47$ ), moron ( $M = -1.94$ ,  $SD = 1.35$ ), retarded ( $M = -1.74$ ,  $SD = 1.60$ ).

The words selected to be neutral appearance related words were those that were, on average, rated in the middle of the scale (around zero), had small standard deviations, and were most often chosen to be appearance related; thick ( $M = 0.32$ ,  $SD = 1.85$ ), short ( $M = 0.32$ ,  $SD = 1.61$ ), tattooed ( $M = 0.39$ ,  $SD = 1.86$ ), large ( $M = -0.48$ ,  $SD = 1.88$ ), hand ( $M = 0.56$ ,  $SD = 1.02$ ), stomach ( $M = 0.62$ ,  $SD = 1.39$ ). Neutral non-appearance related words consisted of words with average ratings close to zero, small standard deviations, and most often chosen to be non-appearance related; quiet ( $M = 0.51$ ,  $SD = 1.39$ ), cold ( $M = -0.92$ ,  $SD = 1.70$ ), book ( $M = 1.02$ ,  $SD = 1.26$ ), squirrel ( $M = 0.59$ ,  $SD = 1.38$ ), cup ( $M = 0.45$ ,  $SD = 1.07$ ), park ( $M = 1.03$ ,  $SD = 1.35$ ).

## Appendix B

### Demographics

**Directions:** Please answer the following questions in an honest manner. **DO NOT** include your name or any other identifying information.

1. AGE: \_\_\_\_\_
2. ETHNICITY: \_\_\_\_\_
3. EDUCATION LEVEL: \_\_\_\_\_



## Appendix C

### Social Hassles Questionnaire (SHQ)

We are interested in how people respond when they confront a difficult or stressful interpersonal event in their lives. There are lots of ways to deal with stress. The questionnaire asks you to indicate what *you* felt, when *you* experienced a difficult or stressful interpersonal event.

1. Do you remember someone ever making a critical comment that your body should be a certain shape, weight, or that there was a need to lose weight and/or gain muscle mass? Please circle one.

Yes or No

2. If you answered Yes to Question #1, please describe the situation below. If there was more than one situation, describe the most stressful one.

3. Identify the person from Question #1, who suggested you change your body shape, weight, to diet or increase your food intake. (Please circle the appropriate answer(s)).

- a. Friend
- b. Parent-Mom
- c. Parent- Dad
- d. Teacher
- e. Coach
- f. Boyfriend
- g. Girlfriend
- h. Partner
- i. Other \_\_\_\_\_

4. To what degree did the comment about your body have an impact on your behavior/attitude towards your body? (Circle one please).

1 = no impact at all  
2 = a little bit of impact  
3 = quite a bit of impact  
4 = a lot of impact

5. To what degree did you feel upset by the person's comment about your body? (Circle one please).

1 = not at all upset  
2 = a little bit upset  
3 = quite a bit upset  
4 = very upset

6. To what degree do you feel the comment made by this person about your body has had an impact on how conscious you are about your body shape, diet, or need to change your weight? (Circle one please).

1 = not at all conscious  
2 = a little bit conscious  
3 = quite a bit conscious  
4 = very conscious

7. To what degree did you feel the comment made by this person about your body has resulted in you attempting to make changes to your body? (Circle one please).

1 = no changes at all attempted  
2 = a little bit of change attempted  
3 = quite a bit of change attempted  
4 = definitely attempted a lot of changes

8. To what degree did you feel your self-esteem was threatened by the comment about your body shape, diet, or need to change your weight? (Circle one please).

1 = Not threatened at all  
2 = Felt a little threatened  
3 = Felt somewhat threatened  
4 = Felt very threatened

9. To what degree did you feel you had failed the person's expectations when you heard the person comment about your body shape, or need increase muscle mass? (Circle one please).

- 1 = Did not feel like I failed
- 2 = Felt a little bit like I failed
- 3 = Felt somewhat like I failed
- 4 = Felt like a failure

10. The scale consists of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to the word. Indicate to what extent you felt the emotion in reaction to the comment made about your body? Please write a number beside each word.

0	1	2	3	4	5
Not at all	Very slightly	A Little	Moderately	Quite a bit	
Extremely					

\_\_\_ Anger    \_\_\_ Sadness    \_\_\_ Relief

\_\_\_ Anxiety    \_\_\_ Envy    \_\_\_ Hope

\_\_\_ Fright    \_\_\_ Jealousy    \_\_\_ Love

\_\_\_ Guilt    \_\_\_ Happiness \_\_\_ Gratitude

\_\_\_ Shame    \_\_\_ Pride    \_\_\_ Compassion

\_\_\_ Other feeling? (please describe)

11. How long ago did the stressful comment about your body occur? (Please circle one).

Past 6 months	8 years ago
1 year ago	9 years ago
2 years ago	10 years ago
3 years ago	11 years ago
4 years ago	12 years ago
5 years ago	13 years ago
6 years ago	14 years ago
7 years ago	15+ years ago

12. How well do you remember the comment about your body? (Circle one please).

1 = quite vague  
2 = remember parts of the event  
3 = fairly clear in my mind  
4 = remember the event very clearly (as if it happened yesterday)

13. Can you remember any other critical comments that someone made about your body? (Please Circle One.)

Yes or No

If yes, approximately how many comments can you recall?

## Appendix D

### Memory Recall Task

PLEASE WRITE DOWN AS MANY WORDS AS YOU CAN REMEMBER FROM THE SLIDESHOW YOU JUST VIEWED. YOU WILL HAVE FIVE MINUTES TO COMPLETE THIS TASK. PLEASE PRINT YOUR RESPONSES AND WRITE LEGIBLY.

## Appendix E

### Informed Consent

### Informed Consent

You are being asked to participate in a research project. Before verbally giving your permission to participate we would like to explain the following.

1. Your participation is completely voluntary. This means you have the right to not answer any question you do not want to, or to quit at any time without any penalty.
2. For this study, you will remain completely anonymous. That is, you will not be asked to write down any identifying information, such as your name.
3. This study appears to have minimal risks and discomfort. However, there is always a chance that a question could cause discomfort or problems. Please let the researchers know if any questions are upsetting.
4. Benefits of this study include a sense of well being for contributing to scientific research, helping a WKU graduate student, and providing information that will be used to help better understand eating behaviors.
5. During participation you will be asked to complete a section asking about age, education level, ethnicity, gender, height, and weight. You will be asked to complete two short measures (18 items and 13 items) that evaluate eating habits and comments, if any, that have previously been made about your body. Also, you will view a PowerPoint slide show after completing the two measures. These surveys and slideshow collectively should take about 15 - 20 minutes to complete.
6. Although your individual responses will remain anonymous, your data will be combined with the data of others and may be submitted for publication in scholarly journals or presented at conventions.

Rick Grieve, Ph.D., is the Faculty Sponsor for this research project and can be contacted at (270) 745-4417, Monday through Friday from 9:00 am until 4:00 pm. with any questions in regards to the study Dr. Grieves' office is located in Gary Ransdell Hall room 3028. Questions or complaints about research participants' rights can be directed to the Human Subjects Review Board, Western Kentucky University, Bowling Green, KY 42101, or by phone at (270)-745-4652.

## Appendix F

### Debriefing Statement

Thank you for taking part in this study. This study examines the relationship between eating disorder symptomology, critical body comments, and memory recall. You first completed a questionnaire, which provided us with basic information about yourself. Next, you completed a questionnaire used to measure eating disorder symptomology. You then completed a survey that asked about critical comments others made toward your body and how distressing you found these comments to be. Then, you viewed a powerpoint slideshow of words. Finally, you completed a memory recall task in which you wrote down as many of the words as you could remember from the slideshow. The results of this study will be used to examine how level of eating disorder symptomology and critical body comments effect memory recall. I want to remind you that your responses in this study will remain anonymous. If you have any questions regarding your participation, you may contact the primary investigator, Morgan Lee, at [morgan.lee543@topper.wku.edu](mailto:morgan.lee543@topper.wku.edu), or my supervising professor, Dr. Rick Grieve, at (270) 745-4417. Also, if you feel any discomfort from participating in this study, you may contact the Western Kentucky University Counseling and Testing Center at (270)-745-3195.

## References

- Agliata, A. K., Tantleff-Dunn, S., & Renk, K. (2007). Interpretation of teasing during early adolescence. *Journal of Clinical Psychology, 63*, 23-30.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th edition, revised). Washington D. C.: American Psychiatric Association.
- Becker, A. E., Burnwell, R. G., Herzog, D. B., Hamberg, P., & Gilman, S. E. (2002). Eating behaviors and attitudes following prolonged exposure to television among ethnic Fijian adolescent girls. *British Journal of Psychiatry, 180*, 509-514.
- Blechert, J., Ansorge, U., & Tuschen-Caffier, B. (2010). A body related dot-probe task reveals distinct attentional patterns for bulimia nervosa and anorexia nervosa. *Journal of Abnormal Psychology, 119*, 575-585.
- Brambilla, F., Bellodi, L., Arancio, C., Ronchi, P., & Limonta, D. (2001). Central dopaminergic function in anorexia and bulimia nervosa: A psychoneuroendocrine approach. *Psychoneuroendocrinology, 26*, 393 – 409.
- Craighead, L. W., & Smith, L. T. (2008). Eating disorders: Bulimia nervosa and binge eating. In W. E. Craighead, D. J. Miklowitz, & L. W. Craighead (Eds.), *Psychopathology history, diagnosis, and empirical foundations* (pp. 435-466). Hoboken, New Jersey: John Wiley & Sons, Inc.
- Coomber, K., & King, R. M. (2008). The role of sisters in body image dissatisfaction and disordered eating. *Sex Roles, 59*, 81-93.
- Davis, C., & Woodside, B. (2002). Sensitivity to the rewarding effects of food and exercise in the eating disorders. *Comprehensive Psychiatry, 43*, 189 – 194.



- Desmond, S. M., Price, J. H., Gray, N., & O'Connell, J. K. (1986). The etiology of adolescents' perceptions of their weight. *Journal of Youth and Adolescence*, 15, 461-474.
- Ellison, Z., Foong, J., Howard, R., Bullmore, E., Williams, S., & Treasure, J. (1998). Functional anatomy of calorie fear in anorexia nervosa. *Lancet*, 352, 1192.
- Fabian, L. J., & Thompson, L. K. (1989). Body image and eating disturbance in young females. *International Journal of Eating Disorders*, 8, 63-74.
- Faunce, G. J. (2002). Eating disorders an attentional bias: A review. *Eating Disorders*, 10, 125-139.
- Garner, D. M. (2004). *Eating Disorder Inventory - Third Edition (EDI-3)*. Lutz, FL: Psychological Assessment Resources.
- Grabarek, C., & Copper, S. (2008). Graduate students' social and emotional functioning relative to characteristics of eating disorders. *The Journal of General Psychology*, 135, 425-451.
- Grieve, F.G., Newton, C., Kelley, L., Miller, R., & Kerr, N. (2005). The preferred male body shapes of college men and women. *Individual Differences Research*, 3, 188-192.
- Groesz, L. M., Levine, M. P., & Murnen, S. K. (2002). The effects of experimental presentation of thin media images on body image dissatisfaction: A meta-analytic review. *International Journal of Eating Disorders*, 31, 1-16.
- Jackson, L.A., Sullivan, L. A., & Hymes, J.S. (2001). Gender, gender role, and physical appearance. *The Journal of Psychology*, 121, 51-56.

- Jansen, A., Nederkoorn, C., & Mulkens, S. (2004). Selective visual attention for ugly and beautiful body parts in eating disorders. *Behaviour and Research Therapy*, 43, 183-196.
- Kaye, W. H., Frank, G. K., & McConaha, C. (1999). Altered dopamine activity after recovery from restricting-type anorexia nervosa. *Neuropsychopharmacology*, 21, 503 – 506.
- Kemps, E., Tiggemann, M., Wade, T., Ben-Tovim, D., & Breyer, R. (2006). Selective working memory deficits in anorexia nervosa. *European Eating Disorders Review*, 14, 97-103.
- Lask, B., & Bryant-Waugh, R. (2000). *Aetiology: Anorexia nervosa and related eating disorders in childhood and adolescence*. London: Psychology Press.
- Leit, R., Pope, H.G., & Gray, J. (2001). Cultural expectations of muscularity in men: The evolution of the playgirl centerfolds. *International Journal of Eating Disorders*, 29, 90-93.
- Lock, J., & Kirz, N. (2008). Eating disorders: Anorexia nervosa. In W. E. Craighead, D. J. Miklowitz, & L. W. Craighead (Eds.), *Psychopathology history, diagnosis, and empirical foundations* (pp. 467-494). Hoboken, New Jersey: John Wiley & Sons, Inc.
- Mash, E.J., & Wolfe, D.A (2005). *Abnormal child psychology*. United States: Thomson Wadsworth.

- Menees, L., Grieve, F. G., Mienaltowski, A., Pope, J. (2011). *Critical comments about the body and muscle dysmorphia symptoms in collegiate men*. Manuscript submitted for publication.
- Muscat, A. (2001). *Adolescent stress, coping resources, and the development of eating disordered behaviors*. Unpublished manuscript, University of British Columbia, Vancouver, B. C.
- Muscat, A. C., & Long, B. C. (2008). Critical comments about body shape and weight: Disordered eating of female athletes and sport participants. *Journal of Applied Sports Psychology*, 20, 1-24.
- Oliver, K. K., & Thelen, M. H. (1996). Children's perceptions of peer influence on eating concerns. *Behavior Therapy*, 27, 25-39.
- Paivio, A. (1986). *Mental representations: A dual coding approach*. New York: Oxford University Press.
- Paivio, A. (1991). Dual coding theory: Retrospect and current status. *Canadian Journal of Psychology*, 45, 255-287.
- Pope, H. G., Olivardia, R., Gruber, A., & Borowiecki, J. (1999). Evolving ideals of male body image as seen through action toys. *International Journal of Eating Disorders*, 26, 65-72.
- Rieger, E., Schotte, D. E., Touyz, S. W., Beumont, P. J., Griffiths, R., & Russell, J. (1998). Attentional biases in eating disorders: A visual probe detection procedure. *International Journal of Eating Disorders*, 23, 199-205.

- Shafran, R., Lee, M., Cooper, Z., Palmer, R. L., & Fairburn, C. G. (2007). Attentional bias in eating disorders. *International Journal of Eating Disorders*, 40, 369–380.
- Southgate, L., Tchanturia, K., & Treasure, J. (2005). Building a model of the aetiology of eating disorders by translating experimental neuroscience into clinical practice. *Journal of Mental Health*, 14, 553-566.
- Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta analytic review. *Psychological Bulletin*, 128, 825-848.
- Stice, E., Nemeroff, C., & Shaw, H. (1996). A test of the dual pathway model of bulimia nervosa: Evidence for restrained-eating and affect-regulation mechanisms. *Journal of Social and Clinical Psychology*, 15, 340-363.
- Thompson, J. K., & Heinberg, L. J. (1999). The media's influence on body image disturbance and eating disorders: We've reviled them, now can we rehabilitate them? *Journal of Social Issues*, 55, 339-353.
- Tiggemann, M., & Pickering, A. S. (1996). Role of television in adolescent women's body dissatisfaction and drive for thinness. *International Journal of Eating Disorders*, 20, 199-203.
- Tuschen-Caffier, B., Voge, C., Bracht, S., & Hilbert, A. (2003). Psychological responses to body shape exposure in patients with bulimia nervosa. *Behaviour Research and Therapy*, 41, 573-586.
- Uher, R., Brammer, M. J., Murphy, T., Campbell, I. C., Ng, V. W., Williams, S. C. R., & Treasure, J. (2003). Recovery and chronicity in anorexia nervosa: Brain activity associated with differential outcomes. *Biological Psychiatry*, 54, 934-942.

- Uher, R., Murphy, T., Brammer, M. J., Dalgleish, T., Phillips, M. L., Ng, V. W., Andrew, C. M., Williams, S. C. R., Campbell, I. C., & Treasure, J. (2004). Medial prefrontal cortex activity associated with symptom provocation in eating disorders. *American Journal of Psychiatry*, *161*, 1238-1246.
- Uher, R., Murphy, T., Friederich, H. C., Dalgleish, T., Brammer, M., Giampietro, V., Phillips, M. L., Andrew, C. M., Ng, V. W., Williams, S. C. R., Campbell, I. C., & Treasure, J. (2005). Functional neuroanatomy of body shape perception in healthy and eating disordered women. *Biological Psychiatry*, *58*, 990-997.
- Vitousek, K.B., Daly, J., & Heiser, C. (1990). Reconstructing the internal world of the eating-disordered individual: Overcoming denial and distortion in self-report. *International Journal of Eating Disorders*, *10*, 647-666.
- Vitousek, K. B., & Orimoto, L. (1993). Cognitive-behavioral models of anorexia nervosa, bulimia nervosa, and obesity. In K. S. Dobson & P. C. Kendall (Eds.), *Psychopathology and Cognition* (pp. 191-243). San Diego: Academic Press.
- Wojtowicz, A. E., & von Ranson, K. M., (2007). Word lists for testing cognitive biases toward body shape among men and women. *Behavior Research Methods*, *39*, 151-155.

