An Examination of the Role of Anxiety and Obsessive-Compulsive Features in Muscle Dysmorphia Symptomatology

Christopher Chandler

Western Kentucky University

Follow this and additional works at: http://digitalcommons.wku.edu/theses

Part of the Mental and Social Health Commons, and the Psychology Commons

Recommended Citation


http://digitalcommons.wku.edu/theses/967

This Thesis is brought to you for free and open access by TopSCHOLAR®. It has been accepted for inclusion in Masters' Theses & Specialist Projects by an authorized administrator of TopSCHOLAR®. For more information, please contact topscholar@wku.edu.
AN EXAMINATION OF THE ROLE OF ANXIETY AND OBSESSIVE-COMPULSIVE FEATURES IN MUSCLE DYSMORPHIA SYMPTOMATOLOGY

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
Christopher Glenn Chandler

December 2007
AN EXAMINATION OF THE ROLE OF ANXIETY AND OBSESSIVE-COMPULSIVE FEATURES IN MUSCLE DYSMORPHIA SYMPTOMATOLOGY

Date Recommended 10/3/07

Frederick Grieve, Ph.D., Director of Thesis
Pitt Derryberry, Ph.D.
Phillip Pegg, Ph.D.

Dean, Graduate Studies and Research Date 12/11/07
Acknowledgements

I would first like to acknowledge my thesis adviser, Dr. Rick Grieve. Thanks for months of patience, dedication, and enthusiasm for my project. I would also like to thank Dr. Pitt Derryberry and Dr. Phillip Pegg for their suggestions. Their input simply made this a better project.

Next, I would like to acknowledge my mother for pushing me these last few months and reminding me that the completion of this project would mean having the life and job I have wanted for so long. I owe this same level of gratitude to the rest of my family, who have been equally supportive.

I would also like to thank the Clinical Psychology staff at Western Kentucky University. They have given me many wonderful opportunities to develop professionally. Finally, I would like to thank my friends and coworkers at Rivendell Behavioral Health Services who have offered me moral support as well as the chance to gain experience and training in the field of psychology.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>iii</td>
</tr>
<tr>
<td>List of Figures</td>
<td>iv</td>
</tr>
<tr>
<td>Abstract</td>
<td>v</td>
</tr>
<tr>
<td>Literature Review</td>
<td>1</td>
</tr>
<tr>
<td>Methods</td>
<td>12</td>
</tr>
<tr>
<td>Results</td>
<td>16</td>
</tr>
<tr>
<td>Discussion</td>
<td>21</td>
</tr>
<tr>
<td>References</td>
<td>29</td>
</tr>
<tr>
<td>Appendix A</td>
<td>34</td>
</tr>
<tr>
<td>Appendix B</td>
<td>38</td>
</tr>
<tr>
<td>Appendix C</td>
<td>41</td>
</tr>
<tr>
<td>Appendix D</td>
<td>43</td>
</tr>
<tr>
<td>Appendix E</td>
<td>46</td>
</tr>
<tr>
<td>Appendix F</td>
<td>48</td>
</tr>
</tbody>
</table>
Tables

Table 1. Descriptive Statistics for Measures........................................17

Table 2. Correlations among subscales of the MDI and scores on the YBOCS.....18

Table 3. Correlations among subscales of the MDI and scores on the trait anxiety portion of the STAI.................................................................19
Figures

Figure 1. A Muscle Dysmorphia Symptomatology Model that Incorporates Trait Anxiety and Obsessive Compulsive Features.................................................................20
AN EXAMINATION OF THE ROLE OF ANXIETY AND OBSESSIVE-COMPULSIVE FEATURES IN MUSCLE DYSMORPHIA SYMPTOMATOLOGY

Christopher G. Chandler

December 2007

49 Pages

Directed by: Frederick Grieve, Pitt Derryberry, Phillip Pegg

Department of Psychology

Western Kentucky University

Although Muscle Dsymorhia (MD) has received more attention in recent years, it still lacks an official classification. The current study incorporates trait anxiety and obsessive-compulsive features into an etiological model of MD in the hopes of establishing them as reliable predictors of such MD symptomatology as drive for muscularity, social physique anxiety, and negative body attitude (self). This model was based upon previous research that has linked trait anxiety and obsessive-compulsive features to eating disorders (ED). In this model, it was predicted that trait anxiety and obsessive-compulsive features would predict overall MD symptomatology, drive for muscularity, social physique anxiety, and body attitude. In all, 87 male participants from a mid-south university completed a demographics survey, the Muscle Dysmorphia Inventory, the Drive for Muscularity Scale, the Male Body Attitudes Scale, the Social Physique Anxiety Scale, an abbreviated version of the Yale-Brown Obsessive-Compulsive Scale, and the Speilberger State/Trait Anxiety Scale. Most predictor paths were significant. The results suggest that trait anxiety and obsessive-compulsive features are significant contributors to MD. This study also suggests that future research should conduct a similar study with Anorexia Nervosa (AN) and Bulimia Nervosa (BN) in the place of MD.
Literature Review

Although not officially listed in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000), Muscle Dysmorphia is recognized by many researchers as a legitimate psychological disorder. Olivardia (2001) provides thorough diagnostic criteria for Muscle Dysmorphia. First, one must have a preoccupation with the idea that his or her body is not sufficiently lean or muscular. Second, the preoccupation must cause clinically significant distress or impairment in social, occupational or other important areas of functioning as demonstrated by a) giving up important social, occupational, or recreational activities because of a compulsive need to maintain diet and workout schedules; b) avoiding situations in which one’s body is exposed to others; c) exhibiting clinically significant distress in social, occupational, or other areas of functioning; and d) continued exercise, diet, and use of performance enhancing substances despite negative physical or psychological consequences. Finally, the primary focus of the preoccupation and behavior must be on being too small or inadequately muscular rather than on being too fat, as in Anorexia Nervosa.

Grieve (2007), in his etiological model of Muscle Dysmorphia, describes the disorder as a collection of self-perceived attitudes and behaviors that reflect a desire to gain body mass and a dislike of one’s current shape. Behaviors of sufferers include excessive bodybuilding, protein consumption, and sometimes the use of anabolic steroids. The etiological model breaks down Muscle Dysmorphia via the biopsychosocial model of psychopathology (Kiesler, 1999) and includes socioenvironmental factors (media, sport participation), emotional factors (negative affect, body dissatisfaction),
psychological factors (ideal body internalization, self-esteem) and cognitive factors (perfectionism).

Research also shows that the media is a strong component in the etiology of Muscle Dysmorphia. As pervasive as the media is (through print ads, television, etc.), the images it projects about ideal body image can have a strong influence on how one feels about his or her body, as the literature illustrates. Leit, Gray, and Pope (2002) found that exposure to advertisements to muscular males in advertising lowered the overall body satisfaction of participants compared to those who viewed “neutral,” or product-only, advertising. Baird and Grieve (2006) found similar results. That is, participants exposed to print advertisements with muscular male models had lower personal body satisfaction than participants exposed to product only-advertisements. Cafri, et al. (2005) include media influence as one of the important societal contributors to body comparisons. They cite previous research (Cafri, Yamamiya, Brannick, & Thompson, 2004) that acknowledges the media’s influence in drive for thinness in women and, from that, speculates that the media may have similar effects on men and muscularity. Lorenzen, Grieve and Thomas (2004) speculate that media and advertising create unrealistic goals and expectations of male body image and that these unattainable goals lower body satisfaction in males. They found that even brief exposure to muscular images was enough to produce lower body satisfaction in male participants compared to those who viewed images of men with average physiques.

While many researchers recognize this symptomatology and agree that Muscle Dysmorphia is a psychological disorder, there is a lack of consensus about its classification. Olivardia, Pope, and Hudson (2000) regard Muscle Dysmorphia as a form
of Body Dysmorphic Disorder. They state that sufferers form a pathological
preoccupation with their own musculature. Olivardia et al. also carefully explain the
difference between healthy weightlifting and behaviors more commonly associated with
persons suffering from Muscle Dysmorphia. They state that, compared to normal
weightlifters, people with Muscle Dysmorphia believe they have significantly less control
over their urge to lift weights and spend considerably more time thinking about
weightlifting and working out. Sufferers of Muscle Dysmorphia also reported abusing
anabolic steroids more than normal weightlifters. They also reported giving up well-
paying jobs to devote more time to lifting weights at the gym. According to this research,
the connection between Muscle Dysmorphia and Body Dysmorphic Disorder appears to
be the emphasis on body focus, although Olivardia et al. are careful to say that the focus
of most people with Body Dysmorphic Disorder is on one body part whereas the focus of
most people with Muscle Dysmorphia is generally an all-over body focus on
musculature.

Maida and Armstrong (2005) discuss the possibility of placing Muscle
Dysmorphia in the Obsessive-Compulsive Spectrum of disorders. Utilizing the Brief
Symptom Inventory (Derogatis, 1984), they noted positive correlations between Muscle
Dysmorphia symptoms and such variables as anxiety and obsessive-compulsive
symptoms. Maida and Armstrong acknowledge that Muscle Dysmorphia shares common
factors with Body Dysmorphic Disorder. However, they argue that Body Dysmorphic
Disorder itself may be more akin to an obsessive-compulsive disorder than a somatoform
disorder. They cite several studies (i.e., Bienvenu, Samuels, Jack, & Riddle, 2000) that
examine the relationship between Body Dysmorphic Disorder and obsessive-compulsive
symptoms such as ritualistic behavior and obsessional fears. They noted that these studies revealed similar ages of onset, course of illness, and commorbidity rates between Body Dysmorphic Disorder and Obsessive Compulsive Disorder.

While these studies illustrate Muscle Dysmorphia’s possible relationship to both Somatoform and Obsessive Compulsive Disorders, a third area of research hypothesizes that Muscle Dysmorphia should actually be classified as an eating disorder. Goodale, Watkins, and Cardinal (2001) found strong correlations between Muscle Dysmorphia symptomatology and eating disorder pathology. Research by Blouin and Goldfield (1995) acknowledges the presence of maladaptive eating habits (binging, purging, etc.) in bodybuilders with Muscle Dysmorphia.

Grieve (2007) hypothesizes that Muscle Dysmorphia is best categorized as an eating disorder. As Cafri (2005) and others have already found etiological similarities via media studies, the current research explores the relationship that Muscle Dysmorphia symptomatology has with anxiety and obsessive-compulsive features. Eating disorder research has found strong relationships between Anorexia Nervosa, Bulimia Nervosa, and anxiety. This study anticipates similar correlations and relationships among symptoms of Muscle Dysmorphia, anxiety, and obsessive-compulsive features.

It is also important to understand the importance of properly classifying Muscle Dysmorphia. If this disorder can be placed within an appropriate spectrum, it will help clinicians to treat it more effectively. For example, if Muscle Dysmorphia appears to closely resemble an eating disorder, then it would give clinicians a better idea of how to treat it.
Anorexia Nervosa/Bulimia Nervosa

Anorexia Nervosa and Bulimia Nervosa are frequently discussed in the literature. Before comparing Muscle Dysmorphia and these two disorders, an overview of both shared and unique etiological factors of each will be provided. Then, the link between these disorders, anxiety, and obsessive-compulsive features will be examined.

To be diagnosed with Anorexia Nervosa, four criteria must be met (American Psychiatric Association, 2000). The individual must refuse to maintain body weight at or above a minimally normal weight for his or her age and height. There is an intense fear of weight gain, even if the person is already underweight. There is also a disturbance in the way the individual perceives his or her body shape, as well as denial of the seriousness of his or her condition. Finally, there is an absence of at least three consecutive menstrual cycles in post-menarcheal females.

For a diagnosis of Bulimia Nervosa, the individual must have recurrent episodes of binge eating. Binge eating is eating significantly large amounts of food in a discrete period of time and having a perceived lack of control while eating. There must also be some type of inappropriate compensatory behavior to prevent weight gain (self induced vomiting, laxative use, enemas, etc.). The binging and compensatory behaviors occur at least twice a week for three months and the sufferer’s self-evaluation is strongly influenced by body shape and weight (American Psychiatric Association, 2000). Similar to Muscle Dysmorphia, these eating disorders differ from Body Dysmorphic Disorders in that they tend to focus on all-over body appearance as opposed to one particular part of the body.

Kaye, Klump, Frank, and Strober (2000) offered an in-depth look at
phenomenological and etiological factors for both Anorexia Nervosa and Bulimia Nervosa. Anorexia Nervosa, they note, is divided into two subtypes that refer to either the patient being a restricted eater and in an ongoing malnourished state (restricted type) or the patient having periods of restricted eating followed by episodes of binge eating and some compensatory action for food-removal (binge eating/purging type). Sufferers of both types of Anorexia Nervosa exhibit traits such as conformity, obsessionality, constriction of emotions, and reduced social spontaneity.

Fairburn and Harrison (2003) note that Anorexia Nervosa and Bulimia Nervosa are united by a distinctive psychopathology seen in both male and female patients. For both disorders, Fairburn and Harrison say that the fundamental problem is the over-evaluation of shape and body by the patient. They note that, while the general population may evaluate themselves in terms of work performance, parenting skills, relationships, etc., patients with Anorexia Nervosa or Bulimia Nervosa are almost exclusively focused on shape, weight, and the ability to control both. Another feature found in the core psychology of both disorders is the tendency to mislabel certain emotional states or adverse physical feelings as “feeling fat.”

Schmidt (2003), in examining the etiological backgrounds of both disorders, illustrates the multi-factorial nature of their etiology. He first discusses the socio-cultural “breeding ground” in which the Western world resides. Conflicts arise, says Schmidt, when easily accessible, high caloric foods and the media-touted thin ideal for women contrast with one another. The weight gain and body changes experienced in puberty also play a role, as Schmidt notes that the onset of most eating disorders coincides with pubertal development. Schmidt also mentions the heritability factor and says that these
disorders tend to cluster within families.

*Anxiety, Obsessive-Compulsive Features, and Eating Disorders*

Research suggests that anxiety and obsessive-compulsive features correlate on several levels with disorders such as Anorexia Nervosa and Bulimia Nervosa. Kaye, Frank, Ursula, Bailer, and Henry (2005) looked closely at the link between 5-HT, a neurochemical long associated with anxiety, and Anorexia Nervosa. They noted that there is frequent commorbidity of anxiety, depression, and compulsiveness with the disorder. Kaye et al. state that both ill and recovering women with Anorexia Nervosa have elevations in attitudes and behaviors commonly associated with imbalanced 5-HT levels (such as perfectionism, inflexible thinking, harm avoidance, etc.). They next note that measures of anxiety, as well as obsessions, compulsions, and harm avoidance, were elevated for ill and recovering women with Anorexia Nervosa. Kaye et al. note that, while patients make physiological recoveries, these neurophysiological and mood characteristics remain abnormal even after recovery is made. With that information, they hypothesize that elevated levels of 5-HT and symptoms of anxiety are actually life-long traits in women with Anorexia Nervosa that merely intensify during illness. They make another theoretical statement, saying that self-starvation (anorexic behavior) decreases the amounts of 5-HT in the brain and, therefore, lessens the anxiety state of the patient. In other words, the self-starvation of women with Anorexia Nervosa reduces anxiety.

Several other studies examine the lifetime commorbidity between anxiety and eating disorders. Milos, Spindler, and Schnyder (2004) took a sample of 248 women with diagnosed eating disorders (Anorexia Nervosa and Bulimia Nervosa) and administered both the Eating Disorders Inventory (EDI; Garner, Olmstead, and Polivy, 1983) and a
clinical interview. They found that 54% of their sample had a comorbid anxiety disorder in addition to an eating disorder. Godardt, Flament, Perdereau and Jeammet (2001) conducted an extensive literature review that examined the comorbidity of anxiety and eating disorders. Although they admit to some heterogeneous results when looking at Generalized Anxiety Disorder, they found that Obsessive Compulsive Disorder had higher lifetime prevalence in patients with Eating Disorders than in controls. Despite some heterogeneous results, the existence of strong correlations in some studies warrants further investigation of the link between Generalized Anxiety Disorders and Eating Disorders.

Sullivan, Bulik, Carter, and Joyce (1996) examined the correlates of anxiety severity in Bulimia Nervosa. They examined such factors as family background, personality, and the presence of Axis I disorders. In their results, Sullivan et al. note that, among participants, 64% of women in their sample met the diagnostic criteria for at least one anxiety disorder. They caution, however, that their subject-to-predictor ratio was too low to make any definitive statements and that their data should instead be used as grounds for hypotheses in this area of research.

Existing research has examined the comorbidity of Muscle Dysmorphia with anxiety. For example, Olivardia (2001) noted that anxiety disorders co-occurred with Muscle Dysmorphia in 29% of his participants. Maida and Armstrong (2005) discussed placing Muscle Dysmorphia in the Obsessive-Compulsive Spectrum rather than with Somatoform Disorders. Utilizing the Brief Symptom Inventory (Derogatis, 1984) they noted positive correlations between Muscle Dysmorphia symptoms and such variables as anxiety and obsessive-compulsive symptoms. They speculated that obsessive-compulsive
features are the root factor of Muscle Dysmorphia and that its influence is exerted through mediating variables such as Body Dysmorphic Disorder, body dissatisfaction, and hostility.

Furthermore, it is important to remember that previous research has also found links between Obsessive Compulsive Disorder and Eating Disorder symptomatology. Jarry and Vaccarino (1996) found both neurochemical and phenomenological similarities between eating disorders and obsessive-compulsive disorders. They noted elevated levels of obsessive-compulsive features in patients with eating disorders as well as similar 5-HT levels and patterns in the neurochemical activity of both patients with eating disorders and patients with obsessive-compulsive disorder. They also found that eating disorder patients exhibited premorbid obsessive-compulsive personality styles. Roberts (2006) examined three subtypes of obsessive-compulsive behaviors (checking, order, and contamination) and symptoms of Anorexia Nervosa. He used the Obsessive-Compulsive Inventory-Revised (OCI-R; Foa et al., 2002) to assess obsessive-compulsive behaviors. He used both the Eating Attitudes 26 (EAT; Garner, Olmstead, Bohn, and Garfinkle, 1982) and the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn and Beglin, 1993) to assess for disordered eating. He found that high levels of all three types of behaviors were predictors for disordered eating patterns. Particularly, he noted that high scores on the ordering/arranging portion of the OCI-R were the strongest predictor.

The current research hypothesizes that Muscle Dysmorphia symptomatology correlates strongly with symptoms of anxiety and obsessive-compulsive features. People with Muscle Dysmorphia put heavy emphasis on their body shape and are actively trying to control their body size. This study hypothesizes that this unhealthy desire to control
one’s body is a manifestation of anxiety. As one example, a person with Muscle
Dysmorphia may suffer from clinical levels of anxiety and may fear losing control of him
or herself. Therefore, excessive exercise and attempting to control body size becomes one
way in which the person feels he or she exerts control over something. In another
hypothetical example, a person with Muscle Dysmorphia may find that excessive
exercise alleviates his or her physical symptoms of anxiety. Similarly, a high drive for
muscularity could represent a manifestation of compulsive behavior that alleviates
distress from obsessive thoughts about body size. While the current study will not be able
to make any definitive statements regarding this relationship, strong correlations between
Muscle Dysmorphia symptomatology, anxiety, and obsessive-compulsive features is
motivation for future research in the area.

The existing research, while offering some evidence for these hypotheses, does
not attempt to create any sort of model in which anxiety and obsessive-compulsive
features are included. Furthermore, most of the research appears to deal simply with
comorbidity issues and occurrences of dual diagnoses. The current study is unique in that
it actually measures the strength of the associations between anxiety, obsessive-
compulsive symptomatology, and the features of Muscle Dysmorphia. Maida and
Armstrong (2005) have already suggested that, based upon their research, anxiety alone
would not be a statistically significant independent factor for predicting Muscle
Dysmorphia. However, their research measured anxiety-related symptoms via a brief
symptom inventory, whereas the current study utilized a comprehensive measure
specifically designed to assess trait anxiety.
The Present Study

With this in mind, the current study will seek to create a model that integrates anxiety and obsessive-compulsive features into the Muscle Dysmorphia framework. This model will examine the strength of the relationships between anxiety, obsessive-compulsive features, and the various factors that influence Muscle Dysmorphia. Higher levels of anxiety and obsessive-compulsive features should serve as significant predictors of higher scores for measures that assess Muscle Dysmorphia symptomatology.

It is hypothesized that higher scores on the STAI will predict higher scores on the MDI, MBAS, and SPAS. Similarly, it is expected that higher scores on the YBOCS will predict higher scores on the MDI, MBAS, SPAS, and DMS. However, it is not believed that scores on the YBOCS will be as predictive as scores on the STAI.
Methods

Participants and Design. Participants were 97 male volunteers recruited from Western Kentucky University. However, ten participants returned questionnaires with either missing or incomplete variables and were therefore left out of the analysis. Therefore, the total number of participant’s data used in the analysis was 87. The average age of the participants was 21 years old with a standard deviation of 4.53 years. In all, 74 participants were Caucasian, five were African American, one was Hispanic, four were Asian, one was Pacific Islander, and two Biracial.

Demographics. Participants completed a 22-item demographics survey assessing age, weight, height, and ethnicity. Additionally, the survey also asked about such things as whether or not the participants had an active gym membership, worked out on a regular basis, or used supplements to try to gain more body mass. See Appendix A.

Muscle Dysmorphia. To assess for symptoms of Muscle Dysmorphia, the Muscle Dysmorphia Inventory (MDI; Short, 2005) was used. The MDI is a 25-item questionnaire that assesses eight Muscle Dysmorphia components. The components are as follows: inadequacy, preoccupation, compulsivity, muscularity drive, “more”, body anxiety, social sacrifice, and persistence. These eight components were identified by Short after administering the MDI to 306 research participants and analyzing the responses. The items were derived from Grieve’s (2007) etiological model of Muscle Dysmorphia. Included in the MDI are such items as “I feel badly when I do not get to work out.” Participants are asked to rank these items on a six-point Likert-type scale, from 1 (strongly disagree) to 6 (strongly agree). Higher scores indicate higher Muscle Dysmorphia symptomatology. Short found that the MDI has a Cronbach’s alpha of .87.
See Appendix B for the MDI.

**Drive for Muscularity.** To assess a participant’s drive for muscularity, the Drive for Muscularity Scale (DMS; McCreary and Sasse, 2004) was administered. This is a 15-item questionnaire with statements such as “I wish I were more muscular” and “Other people think I work out with weights too much.” Participants ranked these items on a six-point Likert-type scale, from 1 (always) to 6 (never). The DMS is a reverse-scored instrument; therefore a low score indicates a high drive for muscularity, while a higher score shows less preoccupation with becoming muscular. A DMS factorial validity study by McCreary and Sasse (2004) found that the full 15 item scale had a Cronbach’s alpha of .87 among male subjects. See Appendix C for the DMS.

**Body Focus.** To assess attitudes about personal body image, participants were given the Male Body Attitudes Scale (MBAS; Tylka, Bergeron, and Schwartz, 2005). This 29 item measure allows participants to answer on a seven-point Likert-type scale from 0 (never) to 6 (always). Lower scores indicate higher levels of body focus and negative body opinion. The MBAS assesses body focus on four dimensions, including muscularity, body fat, height, and overall body. According to Tylka, Bergeron, and Schwartz, the MBAS has adequate test-retest reliability ($r = .88$). See Appendix D for the MBAS.

**Anxiety.** To assess for anxiety related to a belief that one’s body is being viewed negatively by others, the Social Physique Anxiety Scale (SPAS; Hart, Leary, and Rejeski, 1989) was administered. The SPAS consists of 12 self-report items that participants rate on a five-point Likert-type Scale from 1 (not at all) to 5 (extremely). Higher scores on the SPAS indicate higher levels of social physique anxiety. Hart et al. found that the SPAS
demonstrates good internal consistency \( (r = .90) \) and test-retest reliability \( (r = .82) \) with an eight week inter-test interval. See Appendix E for the SPAS.

To assess for obsessive-compulsive symptomatology, an abbreviated version of the Yale Brown Obsessive-Compulsive Scale (YBOCS; Goodman, Price, Rasmussen, and Mazure, 1989) was administered. The YBOCS consists of 10 self-report items on which participants rank, on a scale of 0 to 4, how much control they perceive themselves as having over their obsessions or compulsions. The questionnaire is divided into two sections: Obsessions and Compulsions. Each section asks how much time participants spend on obsessions or compulsions, how much distress they are suffering, how much interference their obsessions and compulsions cause them, how much perceived resistance they have over their obsessions and compulsions, and how much perceived control they feel they have over obsessions and compulsions. Higher scores indicate higher levels of obsessive-compulsive features. Frost, Steketee, Krause, and Trepanier (1995) reported internal consistencies for the total score, obsessions subtotal, and compulsions subtotal to be .88, .78, and .84 respectively.

The Speilberger State-Trait Anxiety Inventory (STAI; Speilbergerer, Gorsuch, and Lushene, 1983) was used to assess for anxiety. The STAI is a 40-item self report measure that assesses both how a person feels in the moment (state anxiety) and how he or she generally feels (trait anxiety). The STAI includes such statements as “I feel calm” and “I make decisions easily” and has the person rate them on a four-point Likert-type scale from 1 \( (not \ at \ all) \) to 4 \( (very \ much \ so) \). Because this study is examining the overall personality and long-term characteristics of the participants, only the scores on trait anxiety were analyzed. Higher scores indicate higher levels of trait anxiety. Sansoni,
Vellone, and Piras (2004) report a Cronbach’s alpha of .95 for the STAI.

Procedure. Participants first completed the demographics survey. Then, they completed the MDI, DMS, MBAS, SPAS, YBOCS, and STAI in that order. The entire process took about 20 minutes for each participant.
Results

A total of 87 participants’ data was used in this study’s analysis. In all, 32 participants acknowledged using some form of supplement while working out. Creatine, protein shakes, and vitamins were the supplements mentioned most. In all, 44 participants reported having an active gym membership. A total of 64 participants said they participated in cardiovascular exercise. Six participants said that they used topical analgesics before working out while 12 reported using them afterwards. Only 12 participants said they used pain medication before a workout while 21 reported using them afterwards. A path analysis was performed on the data to determine the strength of the relationships between the anxiety/obsessive-compulsive measures and the Muscle Dysmorphia symptomatology measures.

Each instrument demonstrated sufficient internal consistency. The MDI had a Cronbach’s alpha of .82, indicating high internal consistency. The DMS, MBAS, and SPAS also displayed impressive internal consistency; each had a Cronbach’s alpha of .92. Finally, the STAI showed strong internal consistency with a Cronbach’s alpha of .95. Descriptive statistics for the measures are provided in Table 1.
Table 1

Descriptive Statistics for Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Sample Size (N)</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range of Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>YBOCS</td>
<td>87</td>
<td>7.76</td>
<td>6.82</td>
<td>0.00-27.00</td>
</tr>
<tr>
<td>DMS</td>
<td>87</td>
<td>40.23</td>
<td>15.57</td>
<td>16.00-75.00</td>
</tr>
<tr>
<td>MBAS</td>
<td>87</td>
<td>98.45</td>
<td>21.10</td>
<td>50.00-141.00</td>
</tr>
<tr>
<td>MDI</td>
<td>87</td>
<td>66.01</td>
<td>19.59</td>
<td>27.00-126.00</td>
</tr>
<tr>
<td>SPAS</td>
<td>87</td>
<td>16.47</td>
<td>6.42</td>
<td>7.00-35.00</td>
</tr>
<tr>
<td>STAI</td>
<td>87</td>
<td>72.52</td>
<td>22.60</td>
<td>40.00-139.00</td>
</tr>
</tbody>
</table>

Note: YBOCS = Yale Brown Obsessive-Compulsive Scale; DMS = Drive for Muscularity Scale; MBAS = Male Body Attitudes Scale; MDI = Muscle Dysmorphia Inventory; SPAS = Social Physique Anxiety Scale; STAI = Spielberg State-Trait Anxiety Inventory.

Bivariate correlation analyses were conducted in order to assess the relationships between the subscales of the MDI, scores on the YBOCS, and scores on the STAI. It was hypothesized that higher scores on each subscale of the MDI would correlate significantly with both high scores on the YBOCS and STAI. Table 2 summarizes the correlations of the YBOCS while table 3 summarizes the correlations of the STAI.
Table 2
Correlations among subscales of the MDI subscales and scores on the YBOCS

<table>
<thead>
<tr>
<th></th>
<th>OCD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Anxiety</td>
<td></td>
<td>.380</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td>.05</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td>Compulsivity</td>
<td>.299</td>
<td>.170</td>
<td></td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Inadequacy</td>
<td>.475</td>
<td>.629</td>
<td>.295</td>
<td></td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Increased</td>
<td></td>
<td>.439</td>
<td>.372</td>
<td>.726</td>
<td>.599</td>
<td></td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Muscularity</td>
<td>-.129</td>
<td>.109</td>
<td>.358</td>
<td>-.193</td>
<td>.059</td>
<td></td>
<td></td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Drive</td>
<td></td>
<td>.365</td>
<td>.178</td>
<td>.645</td>
<td>.426</td>
<td>.680</td>
<td>.208</td>
<td></td>
<td>.01</td>
</tr>
<tr>
<td>Persistence</td>
<td>.244</td>
<td>.188</td>
<td>.679</td>
<td>.368</td>
<td>.656</td>
<td>.244</td>
<td>.622</td>
<td></td>
<td>.01</td>
</tr>
<tr>
<td>Preoccupation</td>
<td>.363</td>
<td>.203</td>
<td>.583</td>
<td>.278</td>
<td>.487</td>
<td>.168</td>
<td>.507</td>
<td>.607</td>
<td></td>
</tr>
</tbody>
</table>

Note: Significance values are above the diagonal; correlations are below the diagonal
Table 3

Correlations among subscales of the MDI subscales and scores on the trait anxiety portion of the STAI

<table>
<thead>
<tr>
<th></th>
<th>STAI 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Anxiety (1)</td>
<td>.346</td>
<td>-</td>
<td>.01</td>
<td>.01</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Compulsivity (2)</td>
<td>.264</td>
<td>.170</td>
<td>-</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Inadequacy (3)</td>
<td>.469</td>
<td>.629</td>
<td>.295</td>
<td>-</td>
<td>.01</td>
<td>-</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Increased</td>
<td>.379</td>
<td>.372</td>
<td>.726</td>
<td>.599</td>
<td>-</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Muscularity Drive</td>
<td>- .054</td>
<td>.109</td>
<td>.358</td>
<td>.193</td>
<td>.059</td>
<td>-</td>
<td>.05</td>
<td>-</td>
</tr>
<tr>
<td>Persistence (6)</td>
<td>.381</td>
<td>.178</td>
<td>.645</td>
<td>.426</td>
<td>.680</td>
<td>.208</td>
<td>-</td>
<td>0.01</td>
</tr>
<tr>
<td>Preoccupation (7)</td>
<td>.250</td>
<td>.188</td>
<td>.679</td>
<td>.368</td>
<td>.656</td>
<td>.244</td>
<td>.622</td>
<td>-</td>
</tr>
<tr>
<td>Social Sacrifice (8)</td>
<td>.342</td>
<td>.203</td>
<td>.583</td>
<td>.278**</td>
<td>.487</td>
<td>.168</td>
<td>.507</td>
<td>.607</td>
</tr>
</tbody>
</table>

Note: Significance values are above the diagonal; correlations are below the diagonal.

A path analysis was performed on the data in which beta-weights were calculated between pairs of instruments. Figure 1 shows the beta-weights for each analysis in the form of a flow chart that incorporates anxiety and obsessive-compulsive features into a Muscle Dysmorphia model. Overall, the model was able to account for 77% of the variance in the symptoms of Muscle Dysmorphia.
Figure 1. A Muscle Dysmorphia Symptomatology Model that IncorporatesTrait Anxiety and Obsessive Compulsive Features
Discussion

The purpose of this study was to examine the relationship between anxiety, obsessive-compulsive features, and Muscle Dysmorphia symptomatology. In doing so, this study hoped to establish anxiety and obsessive-compulsive features as significant contributors to symptoms of Muscle Dysmorphia, much in the same way previous research (Roberts, 2006; Jarry and Vaccarino, 1996) has suggested they are for eating disorders. A significant relationship strengthens the argument for classifying Muscle Dysmorphia as an eating disorder.

This study proposed that trait anxiety was a key factor in Muscle Dysmorphia symptomatology and that high levels of anxiety would predict higher levels of Muscle Dysmorphia features such as overall symptomatology, body attitude, and social physique anxiety. A similar relationship was also expected between obsessive-compulsive features and Muscle Dysmorphia. It was believed that higher levels of anxiety and obsessive-compulsive features would serve as statistically reliable predictors of higher scores for measures that assess Muscle Dysmorphia symptomatology.

The results of this study found several strong relationships between anxiety, obsessive-compulsive features, and Muscle Dysmorphia symptomatology. Trait anxiety was found to be highly predictive of social physique anxiety and vice versa. Baird and Grieve (2006) as well as Cafri (2005) found evidence that media influences may lead to the development of body comparisons and social physique anxiety. The significant relationship noted between social physique anxiety and trait anxiety suggests that those who are most affected by these media images are already anxious people by nature and are therefore more susceptible to such effects. Trait anxiety and social physique anxiety
appear to have a similar relationship among those with disturbed eating patterns, as demonstrated in a study by Bas, Asci, Karabudak, and Kiziltan (2004). Participants in their study were administered the SPAS, STAI, and Eating Attitudes Test (EAT; Garner and Garfinkle, 1979). Participants who scored high enough on the EAT to be classified as having disturbed eating patterns were also found to have higher levels of both social physique and trait anxiety than those whose EAT scores were in the normal range.

In the present study, trait anxiety was also significantly associated with body attitude. That is, a higher level of trait anxiety was a reliable predictor of negative body attitude and focus. This is a significant finding in that it may help explain the source of another key feature of Muscle Dysmorphia. Olivardia (2001) lists excessive body focus as one of his diagnostic criteria. Likewise, Grieve (2007) acknowledges body dissatisfaction as crucial to his etiological model of Muscle Dysmorphia. Again, a similar trend has been found with eating disorders. Kashima, et al. (2003) found that higher scores on the Body Attitude Test (BAT) correlated with higher scores on both the STAI and Self-Rating Depression Scale. These results suggested that those who suffer from eating disorders also experience negative appreciation of body size, unfamiliarity with their bodies, and general body dissatisfaction also have high trait anxiety. The participants in the current study echoed these results as evidenced by the relationship between the MBAS and MDI scores.

Trait anxiety also had a strong, predictive relationship with overall Muscle Dysmorphia symptomatology as illustrated by the relationship between the STAI and MDI. As Short (2005) based the eight components of the MDI on Grieve’s (2007) conceptual model of Muscle Dysmorphia, these results suggest that trait anxiety
integrates well into existing models of Muscle Dysmorphia. Trait anxiety has already been studied in the context of other eating disorder symptomatology, as illustrated by Nagata, McConaha, Rao, Sokal, and Kaye (1996). Their study looked at whether or not restricting-type anorexics, bulimic anorexics, and restricting anorexics with purging behaviors had similar psychopathology. Among other findings, the researchers found that each subgroup of patients with Anorexia Nervosa scored similarly on both the EDI and the STAI. They concluded that the psychopathology of underweight patients with anorexia, including levels of trait anxiety, is similar regardless of their binging and purging behaviors.

Similar to trait anxiety, obsessive-compulsive features strongly related to and predictive of several factors of Muscle Dysmorphia. In the present study, a strong predictive relationship was found between obsessive-compulsive features and body attitude. As Tylka, Bergeron, and Schwartz (2005) based the MBAS on dimensions of muscul arity, height, and body fat, this observed relationship with the YBOCS could indicate unhealthy obsessions in each of these three areas. For example, an individual may be able to find relief from his or her intrusive, obsessive thoughts about his or her body by working out excessively or consuming a high protein and supplement diet.

Obsessive-compulsive features, as measured by the YBOCS, were also strongly correlated with and highly predictive of social physique anxiety and overall Muscle Dysmorphia symptomatology. As Hart et al. (1989) designed the SPAS to measure one’s belief that his or her body is being viewed negatively by others, this finding suggests that an underlying obsession with one’s own body magnifies these concerns. One’s fear of his or her body being viewed negatively by others could be a sign of underlying obsessive-
compulsive features. Body focus could therefore be one’s outlet for these obsessions and compulsions.

Obsessive-compulsive features and overall Muscle Dysmorphia symptomatology were also strongly related in this study. This is to be expected, considering that compulsivity and persistence are among the eight components of the MDI as outlined by Short (2005). It could be hypothesized that a predisposition towards obsessive thinking and compulsive behaviors, when paired with other factors leading to Muscle Dysmorphia, lead to the expression of those obsessions and compulsions through bodily preoccupation. For example, an individual who suffers from obsessive thinking and is exposed to media images of muscular men may manifest his or her compulsions by working out to try to obtain an idealized body shape.

No significant relationship between obsessive-compulsive features and drive for muscularity was noted. Before the analysis, it was believed that a drive for muscularity could represent a more focused and specific form of compulsive behavior. However, the results indicate that YBOCS scores are a weak predictor of scores on the DMS. It is possible that obsessive-compulsive features and drive for muscularity are not directly related but rather work within the model through some other mediating factor, such as social physique anxiety or body attitudes. Another possibility is that the abbreviated version of the YBOCS used for this study lacked the depth and factorial design to measure obsessive-compulsive features at the same level as the DMS.

Interestingly, this study found a relationship between two components of negative affect and Muscle Dysmorphia whereas previous research (Jonda, 2007; Henson, 2004) did not note any relationship between Muscle Dysmorphia and negative affect. The
The current study found both trait anxiety and obsessive-compulsive features to be predictive of Muscle Dysmorphia symptomatology. Jonda’s model of Muscle Dysmorphia symptomatology noted a weak standardized beta-weight (.101) between negative affect and Muscle Dysmorphia symptomatology. This difference may be caused by how each study measured negative mood state. Whereas the current study used specific assessment tools to assess trait anxiety and obsessive-compulsive features, the study by Jonda used the Positive and Negative Affect Scales (PANAS; Watson, Clark, and Tellegen, 1988). The PANAS is a two-part 20-item assessment that measures positive and negative mood states in participants. The difference in the significance of negative affect in the two studies may be caused by the specificity of the instruments used in the current study. The study by Jonda used one 20-item assessment to examine the relationship with Muscle Dysmorphia and ten affective states. The current study, on the other hand, used a 20-item assessment for anxiety alone.

Because the current study found that both obsessive-compulsive features and trait anxiety were predictive of Muscle Dysmorphia, future research may wish explore how other psychological mood states relate to Muscle Dysmorphia symptomatology. Future research could expand the current study’s model by incorporating, for example, measures of depression and anger. Based upon the current study’s results, one could hypothesize that other negative psychological mood states would be predictive of Muscle Dysmorphia as well.

This study analyzed the relationship between anxiety, obsessive-compulsive features, and Muscle Dysmorphia symptomatology to see whether those factors would play as prominent a role in Muscle Dysmorphia as they appear to play in other eating...
disorders. The neurochemical links between anxiety and eating disorders as examined by Kaye et al. (2005) as well as the anxiety/eating disorder comorbidity rates discussed by Sullivan, Bulik, Carter, and Joyce (1996) were among the evidence used in this study to establish a close relationship between eating disorders and anxiety. Furthermore, in addition to the anxiety/Muscle Dysmorphia comorbidity findings by Olivardia (2001), the results of the present study give evidence for a strong trait anxiety and obsessive-compulsive element in Muscle Dysmorphia symptomatology.

While trait anxiety had a significant relationship with several Muscle Dysmorphia features, obsessive-compulsive features were, according to the data, as much a contributor to body attitude and overall Muscle Dysmorphia symptomatology as trait anxiety. While the present study expected a strong relationship, it was not originally believed that the relationship would be this strong. Trait anxiety was expected to have the most statistically significant relationship with other Muscle Dysmorphia features. However, the data suggests that the assertion by Maida and Armstrong (2007) that Muscle Dysmorphia is associated enough with obsessive-compulsive features to be included in the Obsessive-Compulsive spectrum of disorders. Their study found that body dissatisfaction and body dysmorphic symptoms were mediators of obsessive-compulsive symptoms. That obsessive-compulsive features were found to be strong predictors for Muscle Dysmorphia symptomatology, body attitude, and social physique anxiety in the current study suggests that the Maida and Armstrong may be correct in characterizing Muscle Dysmorphia under the Obsessive-Compulsive spectrum.

However, as stated earlier, Obsessive-Compulsive features also figure prominently into eating disorder etiology. With that in mind, future research could
expand upon the findings of the current study by designing and then testing a model for eating disorders that resembles the one used in this research. Future research could explore the relationship between trait anxiety, obsessive-compulsive features, and eating disorders by using the STAI and YBOCS in a study with measures that assess for Anorexia Nervosa or Bulimia Nervosa symptomatology. If those models appeared statistically similar to the one in the current study, it would suggest that anxiety and obsessive-compulsive features play a very similar role in Anorexia Nervosa and Bulimia Nervosa as they do in Muscle Dysmorphia.

This study also has some limitations worth addressing. The most obvious improvement would be a larger sample size. While the overall reliability of the study was strong, more participants would improve statistical power and give great opportunity to find clinical levels of Muscle Dysmorphia features. This study also lacked a measure for media influence. As the existing literature has shown how important media influence is in people with Muscle Dysmorphia, a future study should include such a measure.

Another possibility to consider would be that Muscle Dysmorphia may not fit into any existing spectrum of disorders. While the literature attempts to classify Muscle Dysmorphia under a particular heading, it may also be possible that Muscle Dysmorphia presents us with a unique symptomatology and etiology that warrants its own classification. Perhaps the most effective way to treat patients with Muscle Dysmorphia is to treat it as its own disorder rather than trying to classify it with existing disorders.

While this study does not make any definitive statement regarding the classification of Muscle Dysmorphia, it does reveal new information regarding the etiology of the disorder. It also sets the groundwork for more research comparing the
etiological similarities of Muscle Dysmorphia and eating disorders. This study also gives researchers the chance to begin exploring psychological state and Muscle Dysmorphia. This study brings researchers one step closer to being able to classify Muscle Dysmorphia appropriately based upon its etiology and psychological commorbidity.
References


dwelling Italian Alzheimer’s disease caregivers. *International Journal of Nursing
Practice, 10*, 93-100.


Inventory. San Francisco, CA: Consulting Psychologists’ Press.


evaluation of the male body attitudes scale (MBAS). *Body Image, 2*, 161-175.

measures of positive and negative affect: The PANAS scales. *Journal of
Personality and Social Psychology, 54*, 1063-1070.
APPENDIX A

DEMOGRAPHIC INFORMATION
You are being asked to participate in a survey research project. As such, we would like you to have an understanding of the following:

1. Your participation is strictly voluntary and you do not have to answer any questions you do not want to. In addition, you may discontinue your participation at any time.
2. All of your responses will remain anonymous. Therefore, do not write your name or any other identifying information on this or any other form.
3. The purpose of this study is to gain a better understanding of how anxiety may or may not relate to Muscle Dysmorphia symptomatology. You will be asked to take a variety of surveys that address both the features and symptoms of Muscle Dysmorphia as well as levels of anxiety. The entire survey should take about 30 minutes.
4. Although your individual responses will not be made public (they will remain anonymous), your data will be combined with the data of others and submitted for presentations at conventions and/or for publication in scholarly journals.
5. Your completion of these forms indicates your consent to participate.

The faculty sponsor for this research project is Rick Grieve, Ph.D. He can be contacted at 1-120-745-4417, Monday through Friday from 9:00am until 4:00pm. His office is in Tate Page Hall, room 258. He is willing to answer any questions that may arise. Questions about research participants’ rights can be directed to the Human Subjects Review Board, Western Kentucky University, Bowling Green, Ky, 42101, 1-270-745-2129.

THE DATED APPROVAL ON THIS CONSENT FORM INDICATES THAT THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY THE WESTERN KENTUCKY UNIVERSITY HUMAN SUBJECTS REVIEW BOARD.

Dr. Phillip E. Myers, Human Protections Administrator, TELEPHONE 1-270-745-4652
philip.myers@wku.edu

DEMOGRAPHICS SURVEY
PLEASE CIRCLE OR FILL IN THE APPROPRIATE INFORMATION.

GENERAL INFORMATION

1. AGE: ___
2. GENDER: MALE
   FEMALE
3. HEIGHT: ______
4. WEIGHT: ______
5. ETHNICITY: WHITE/NON-HISPANIC
   AFRICAN AMERICAN
   HISPANIC
   ASIAN
   MIDDLE EASTERN/WEST ASIAN
   NATIVE AMERICAN
   PACIFIC ISLANDER
   BIRACIAL/MULTIRACIAL
   OTHER
6. EDUCATIONAL LEVEL: ________________ (example: freshman)
EXERCISE HISTORY

7. DO YOU HAVE AN ACTIVE GYM MEMBERSHIP? YES  NO

8. DO YOU LIFT WEIGHTS? YES  NO

9. IF YOU LIFT WEIGHTS, HOW MANY DAYS PER WEEK DO YOU ENGAGE IN THESE ACTIVITIES? ________________

10. HOW MANY TIMES PER DAY DO YOU LIFT WEIGHTS? ________________

11. HOW LONG DOES EACH WEIGHT LIFTING SESSION LAST? ________________

12. DO YOU HAVE A SCHEDULED TIME THAT YOU LIFT WEIGHTS?
    YES  NO

13. IF SO, WHAT TIME/S OF DAY DO YOU TYPICALLY LIFT WEIGHTS?
    ________________

14. DO YOU USE SUPPLEMENTS? YES  NO

15. WHICH OF THE FOLLOWING SUPPLEMENTS DO YOU CURRENTLY USE?

    STEROIDS __
    CREATINE __
    VITAMINS __
    PROTEIN SHAKES __

    PLEASE LIST ANY OTHER SUPPLEMENTS THAT YOU USE:

16. DO YOU PARTICIPATE IN CARDIOVASCULAR EXERCISE (e.g. TREADMILL, SWIMMING, ELLIPTICAL TRAINER, BIKE, AEROBICS, ETC.)? YES  NO

17. IF YOU PARTICIPATE IN CARDIOVASCULAR EXERCISE, HOW MANY DAYS PER WEEK DO YOU ENGAGE IN THESE ACTIVITIES? ________________

18. HOW MANY TIMES PER DAY DO YOU PARTICIPATE IN CARDIOVASCULAR EXERCISE? ________________

19. HOW LONG DOES EACH CARDIOVASCULAR SESSION USUALLY LAST? ________________

20. DO YOU HAVE A SCHEDULED TIME THAT YOU PARTICIPATE IN CARDIOVASCULAR EXERCISE? YES  NO

21. WHAT TIME/S OF DAY DO YOU PARTICIPATE IN CARDIOVASCULAR EXERCISE? ________________
22. LIST ALL FORMS OF EXERCISE THAT YOU DO.

23. LIST ALL THE ORGANIZED SPORTS THAT YOU HAVE EVER PLAYED (e.g. BASEBALL, FOOTBALL, BASKETBALL).

24. LIST ALL THE ORGANIZED SPORTS THAT YOU CURRENTLY PLAY.

HEALTH HISTORY

25. DO YOU HAVE TO USE TOPICAL ANALGESICS (e.g. ICY HOT, BENGAY, FLEXALL 454) BEFORE YOU ENGAGE IN ANY TYPE OF EXERCISE? YES NO

26. DO YOU HAVE TO USE TOPICAL ANALGESICS (e.g. ICY HOT, BENGAY, FLEXALL 454, CAPCASIN) AFTER YOU FINISH EXERCISING? YES NO

27. DO YOU EVER HAVE TO USE PAIN MEDICATION BEFORE YOU EXERCISE (e.g. ANTI-INFLAMMATORIES, OVER-THE-COUNTER OR PRESCRIPTION PAIN MEDICINES)? YES NO

28. DO YOU EVER HAVE TO USE PAIN MEDICATION AFTER YOU EXERCISE (e.g. ANTI-INFLAMMATORIES, OVER-THE-COUNTER OR PRESCRIPTION PAIN MEDICINES)? YES NO

29. DO YOU HAVE ANY MEDICAL CONDITIONS THAT WOULD LIMIT OR INHIBIT EXERCISE? YES NO

30. IF SO, PLEASE LIST THE CONDITIONS.

31. ARE YOU PRESENTLY ON ANY MEDICATIONS (OVER THE COUNTER OR PRESCRIPTION)? YES NO

32. IF SO, PLEASE LIST THESE MEDICATIONS.
APPENDIX B

MUSCLE DYSMORPHIA INVENTORY
MUSCLE DYSMORPHIA INVENTORY

**INSTRUCTIONS:** Please respond to each of the following statements. Circle response choice that best describes you.

<table>
<thead>
<tr>
<th>STRONGLY</th>
<th>SOMEWHAT</th>
<th>SLIGHTLY</th>
<th>SLIGHTLY</th>
<th>SOMEWHAT</th>
<th>STRONGLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISAGREE</td>
<td>DISAGREE</td>
<td>DISAGREE</td>
<td>AGREE</td>
<td>AGREE</td>
<td>AGREE</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

1. I am more muscular than others.
   1 2 3 4 5 6
2. I am not as muscular as others.
   1 2 3 4 5 6
*3. I am muscular enough.
   1 2 3 4 5 6
4. I am not muscular enough.
   1 2 3 4 5 6
5. I feel bad when I do not get to work out.
   1 2 3 4 5 6
6. Working out causes problems in my romantic relationships.
   1 2 3 4 5 6
7. Working out causes problems in my friendships.
   1 2 3 4 5 6
8. If I could increase my muscle mass, I would.
   1 2 3 4 5 6
9. I have difficulty focusing on schoolwork because of thoughts about my body.
   1 2 3 4 5 6
10. I feel that I am way too focused on my body shape or size.
    1 2 3 4 5 6
11. I have difficulty maintaining relationships because of thoughts about my body.
    1 2 3 4 5 6
12. I feel insecure about my body.
    1 2 3 4 5 6
13. I have difficulty maintaining relationships because of thoughts of working out.
    1 2 3 4 5 6
14. I would not be inclined to participate in activities that require minimal clothing.
    1 2 3 4 5 6
15. I would not be inclined to participate in activities that require wearing swimsuits.
    1 2 3 4 5 6
16. The less clothing I wear the more anxious I become.
    1 2 3 4 5 6
17. I have difficulty focusing on schoolwork because of thoughts of working out.
    1 2 3 4 5 6
18. I feel anxious when I miss a workout.
    1 2 3 4 5 6
19. I feel anxious when I deviate from my diet.
    1 2 3 4 5 6
<table>
<thead>
<tr>
<th>STRONGLY</th>
<th>SOMEWHAT</th>
<th>SLIGHTLY</th>
<th>SLIGHTLY</th>
<th>SOMEWHAT</th>
<th>STRONGLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISAGREE</td>
<td>DISAGREE</td>
<td>DISAGREE</td>
<td>AGREE</td>
<td>AGREE</td>
<td>AGREE</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

20. I would be inclined to work out against doctor’s orders.
   1 2 3 4 5 6

21. I am ashamed of my body shape or size.
   1 2 3 4 5 6

22. When I see my reflection in the mirror or a window, I feel badly about my body size or shape.
   1 2 3 4 5 6

23. When I see muscular men, it makes me feel badly about my body shape or size.
   1 2 3 4 5 6

24. I would be inclined to work out when I am sick.
   1 2 3 4 5 6

25. I want to be more muscular than I currently am.
   1 2 3 4 5 6
APPENDIX C

DRIVE FOR MUSCULARITY SCALE
The Drive for Muscularity Scale

Please read each item carefully then, for each one, circle the number that best applies to you.

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Very Often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
</table>
| 1 | I wish that I were more muscular.  
   | 1  | 2  | 3  | 4  | 5  | 6     |
| 2 | I lift weights to build up muscle.  
   | 1  | 2  | 3  | 4  | 5  | 6     |
| 3 | I use protein or energy supplements.  
   | 1  | 2  | 3  | 4  | 5  | 6     |
| 4 | I drink weight gain or protein shakes.  
   | 1  | 2  | 3  | 4  | 5  | 6     |
| 5 | I try to consume as many calories as I can in a day.  
   | 1  | 2  | 3  | 4  | 5  | 6     |
| 6 | I feel guilty if I miss a weight training session.  
   | 1  | 2  | 3  | 4  | 5  | 6     |
| 7 | I think I would feel more confident if I had more muscle mass.  
   | 1  | 2  | 3  | 4  | 5  | 6     |
| 8 | Other people think I work out with weights too often.  
   | 1  | 2  | 3  | 4  | 5  | 6     |
| 9 | I think that I would look better if I gained 10 pounds in bulk.  
   | 1  | 2  | 3  | 4  | 5  | 6     |
| 10 | I think about taking anabolic steroids.  
    | 1  | 2  | 3  | 4  | 5  | 6     |
| 11 | I think that I would feel stronger if I gained a little more muscle mass.  
    | 1  | 2  | 3  | 4  | 5  | 6     |
| 12 | I think that my weight training schedule interferes with other aspects of my life.  
    | 1  | 2  | 3  | 4  | 5  | 6     |
| 13 | I think that my arms are not muscular enough.  
    | 1  | 2  | 3  | 4  | 5  | 6     |
| 14 | I think that my chest is not muscular enough.  
    | 1  | 2  | 3  | 4  | 5  | 6     |
| 15 | I think that my legs are not muscular enough.  
    | 1  | 2  | 3  | 4  | 5  | 6     |
APPENDIX D

MALE BODY ATTITUDE SCALE
MBAS

Please indicate whether each question is true about you always, usually, often, sometimes, or never.

<table>
<thead>
<tr>
<th>Question</th>
<th>Always</th>
<th>Usually</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I think I have too little muscle on my body</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I think that my body should be leaner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I wish my arms were stronger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I feel unsatisfied with the definition in my abs (stomach muscles).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I think that my legs are not muscular enough</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I think my chest should be broader</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I think my shoulders are too narrow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I am concerned that my stomach is too flabby</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I think that my arms should be larger (more muscular).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I feel dissatisfied with my overall body build</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I think that my calves should be larger (more muscular).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I wish I was taller</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I think that I have too much fat on my body</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
14. I think that my abs are not thin enough
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

15. I think my back should be larger and more defined.
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

16. I think my chest should be larger and more defined.
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

17. I feel satisfied with the definition in my arms.
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

18. I feel satisfied with the size and shape of my body.
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

19. I am satisfied with my height.
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

20. Has eating sweets, cakes, or other high calorie food made you feel fat or weak?
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

21. Have you felt excessively large and rounded (fat)?
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

22. Have you felt ashamed of your body or shape?
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

23. Has seeing your reflection (ex: mirror or window) made you feel bad about your size or shape?
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |

24. Have you been so worried about your body size or shape that you been feeling that you ought to diet?
   | Always | Usually | Often | Sometimes | Rarely | Never |
   | 1      | 2       | 3     | 4        | 5      | 6     |
APPENDIX E

SOCIAL PHYSIQUE ANXIETY SCALE
Social Physique Anxiety Scale

For each of the following questions, please circle the number that best describes the degree to which the statement is characteristic or true of you.

1. I wish I wasn't so uptight about my physique/appearance
   not at all 1 a little 2 moderately 3 quite a bit 4 extremely 5

2. There are times when I am bothered by thoughts that other people are evaluating my weight or muscle development negatively
   not at all 1 a little 2 moderately 3 quite a bit 4 extremely 5

3. Unattractive features of my physique/appearance make me nervous in certain social settings.
   not at all 1 a little 2 moderately 3 quite a bit 4 extremely 5

4. In the presence of others, I feel apprehensive about my physique/figure.
   not at all 1 a little 2 moderately 3 quite a bit 4 extremely 5

5. I am comfortable with how fit my body appears to others.
   not at all 1 a little 2 moderately 3 quite a bit 4 extremely 5

6. It would make me more uncomfortable to know others were evaluating my physique/figure.
   not at all 1 a little 2 moderately 3 quite a bit 4 extremely 5

7. When it comes to displaying my physique/figure to others, I am a shy person.
   not at all 1 a little 2 moderately 3 quite a bit 4 extremely 5
APPENDIX F

YALE BROWN OBSESSIVE-COMPULSIVE SCALE
Instructions: Circle the appropriate score below. Choose only one number per item. Scores should reflect the composite effect of all obsessive compulsive symptoms. Rate the average occurrence of each item during the prior week up to and including now.

<table>
<thead>
<tr>
<th><strong>Obsessions</strong></th>
<th>0 hrs/day</th>
<th>1 hrs/day</th>
<th>1-3 hrs/day</th>
<th>3-8hrs/day</th>
<th>8+hrs/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Time Spent On Obsessions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Interference from Obsessions</td>
<td>None</td>
<td>Mild</td>
<td>Definite but Manageable</td>
<td>Substantial Impairment</td>
<td>Incapacitating</td>
</tr>
<tr>
<td>3. Distress from Obsessions</td>
<td>None</td>
<td>Little</td>
<td>Moderate but Manageable</td>
<td>Substantial Impairment</td>
<td>Incapacitating</td>
</tr>
<tr>
<td>4. Resistance to Obsessions</td>
<td>Always Resists</td>
<td>Much Resistance</td>
<td>Some Resistance</td>
<td>Often Yields</td>
<td>Completely Yields</td>
</tr>
<tr>
<td>5. Control over Obsessions</td>
<td>Complete Control</td>
<td>Much Control</td>
<td>Some Control</td>
<td>Little Control</td>
<td>No Control</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Compulsions</strong></th>
<th>0 hrs/day</th>
<th>1 hrs/day</th>
<th>1-3 hrs/day</th>
<th>3-8hrs/day</th>
<th>8+hrs/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Time Spent On Compulsions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Interference from Compulsions</td>
<td>None</td>
<td>Mild</td>
<td>Definite but Manageable</td>
<td>Substantial Impairment</td>
<td>Incapacitating</td>
</tr>
<tr>
<td>3. Distress from Compulsions</td>
<td>None</td>
<td>Little</td>
<td>Moderate but Manageable</td>
<td>Severe</td>
<td>Near constant Disabling</td>
</tr>
<tr>
<td>4. Resistance to Compulsions</td>
<td>Always Resists</td>
<td>Much Resistance</td>
<td>Some Resistance</td>
<td>Often Yields</td>
<td>Completely Yields</td>
</tr>
<tr>
<td>5. Control over Compulsions</td>
<td>Complete Control</td>
<td>Much Control</td>
<td>Some Control</td>
<td>Little Control</td>
<td>No Control</td>
</tr>
</tbody>
</table>