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Factors Related to Muscle Dysmorphia Symptomology in Adolescent Males

Sylvania Ann Briseno-Jones
Walden University

Walden University

College of Social and Behavioral Sciences

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Sylvania Ann Jones

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Dr. Anthony Perry, Committee Chairperson, Psychology Faculty
Dr. Stephen Burgess, Committee Member, Psychology Faculty
Dr. James Carroll, University Reviewer, Psychology Faculty

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Eric Riedel, Ph.D.

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Abstract

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by

Sylvania Ann Jones

BS, Wayland Baptist University 1999

MA, Wayland Baptist University 2009

MA, Webster University 2006

Dissertation Submitted in Partial Fulfillment

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Abstract

The prevalence of muscle dysmorphia symptomology in adolescent males continues to increase, and yet remains under diagnosed in adolescents, supporting the need for a study to increase the understanding of the factors related to muscle dysmorphia symptomology. The purpose of this quantitative survey research study was to determine variables that predict the muscle dysmorphia symptomology in a nonclinical sample of high school adolescent males. The psycho-behavioral model of muscle dysmorphia was used as the conceptual model to explain the psychological factors such as self-esteem and body dissatisfaction and behavioral factors such as bodybuilding dependence that were hypothesized to be related to muscle dysmorphia. Quantitative surveys included the Body Dysmorphic Examination Self Report, Body Esteem Scale for Adolescents and Adults, Rosenberg Self-Esteem Scale, Body Building Dependence Scale and a researcher-developed demographic survey. The study participants included a sample of 97 high school males. Multiple regression analysis was used to determine the relative strength of the variables in predicting muscle dysmorphia. The results showed that there were several significant predictors of muscle dysmorphia symptomology including race/ethnicity, level of body dissatisfaction, and body building dependence. Sexual orientation and self-esteem were not significant predictors of muscle symptomology. The current study filled the gap in the literature regarding factors that predict muscle dysmorphia among adolescent males. This information supports the development of professional practice and psychoeducational programs designed to assist adolescent males with muscle dysmorphia. This study benefits this cohort by presenting awareness of muscle dysmorphia.

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Dedication

I dedicate this dissertation to my son Christopher Jones. He inspired me to continue my educational journey. He has been my rock whenever I needed to vent over the years. Christopher graduated from Texas A & M, with his degree in Kinesiology with a minor in Nutrition. He lives the life style of a Natural body builder and a professional trainer. Watching him grow in this field is what gave me the idea for my dissertation and the need for this study.

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Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Introduction

The purpose of this study was to identify factors related to muscle dysmorphia symptomology in adolescent males. Specifically, in this quantitative research study, I explored whether race/ethnicity, sexual orientation (gay, heterosexual, bisexual), self-esteem, body dissatisfaction, and bodybuilding dependence predict muscle dysmorphia symptomology in adolescent males. The prevalence of muscle dysmorphia symptomology in adolescent males continues to increase, and this phenomenon is under diagnosed in adolescents (Brewster, 2011). An understanding of the factors related to muscle dysmorphia symptomology in adolescents would help mental health practitioners to recognize, diagnose, and treat the disorder. This chapter includes a background of the study topic, problem statement, purpose of the study, research questions and hypotheses, theoretical framework, definitions, assumptions, scope and delimitations, limitations, significance, and summary.

Background

The prevalence of muscle dysmorphia symptomology in adolescent males is increasing but this disorder remains under diagnosed in adolescents. There is an increasing prevalence of muscle dysmorphia symptomology among adolescents (Brewster**,** 2011; Leone, Sedory, & Gray, 2005). The onset of body dysmorphic disorder (muscle dysmorphia is a type of body dysmorphic disorder) can occur in childhood or adolescence. Subclinical symptoms tend to begin several years before a disorder is identified (Bjornsson et al., 2013). These findings support the need to fully understand factors related to muscle dysmorphia in adolescents in order to help them sooner.

Numerous factors have been shown to be related to dysmorphia symptomology. Males demonstrating high levels of dysmorphic symptoms also report related factors of low self-esteem, body image disturbance, appearance controlling behavior, appearance dissatisfaction, and bodybuilding dependence (Bjornsson et al., 2013; Martin, 2010). In addition, race/ethnicity, age, and sexual orientation (gay, heterosexual, bisexual) are factors shown to be related to dysmorphic symptoms (Boroughs, Krawczyk, & Thompson, 2010; Cafri, Olivardia, & Thompson, 2008; Davies, Smith, & Collier, 2011; Hildebrandt, Schlundt, Langenbucher, & Chung, 2006; Readdy, Watkins, & Cardinal, 2011). Although these correlates of dysmorphic symptoms have been identified in adult male samples, they have not been studied in male adolescents. More information is needed to determine if these and other factors of race/ethnicity and sexual orientation are present in nonclinical adolescent males.

There is a lack of studies about muscle dysmorphic disorder in adolescents. Studies on adolescents tend to center around body discomfort issues rather than muscle dysmorphic disorder (Burlew & Shurts, 2013; Nishina, Ammon, Bellmore, & Graham, 2006; Petrie, Greenleaf, & Martin, 2010). For example, Burlew and Shurts (2013) found that male adolescents and men report experiencing body image dissatisfaction and or distress (BID), and these symptoms and related behaviors tend to be unrecognized or underdiagnosed. Nishina et al. (2006) studied body dissatisfaction in a group of ethnic minority adolescents and found that there were similarities across ethnic groups for levels of body dissatisfaction and related psychosocial maladjustment. Petrie et al. (2010) studied body satisfaction in middle school males and females and found that gender, physical self-concept, social pressure, and self-esteem were factors related to body

dissatisfaction. While this study was not specific to muscle dysmorphic disorder, findings provided information about body dissatisfaction, which may be related to muscle dysmorphic disorder.

While there are few in number, Bjornsson et al. (2013) conducted a study an adolescent sample with a focus on body dysmorphic symptoms. Bjornsson et al. found that the mean age of onset was age 16-17 years, and earlier onset was related to severe symptoms such as attempted suicide, eating disorders, substance use disorders, anxiety disorder, and social phobia. However, Bjornsson et al. did not study factors of age, race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, bodybuilding dependence, or muscle dysmorphia symptoms in this adolescent sample. Thus, there was a gap in knowledge about the prevalence of muscle dysmorphia symptomology and related factors in nonclinical adolescent males from local high schools (Bjornsson et al., 2013; Boroughs et al., 2010; Readdy, 2011). In this study, I addressed these factors.

Problem Statement

Body dysmorphic disorder (BDD) in adolescents tends to be underdiagnosed and treated, and the causes and factors related to this disorder are not well understood (Brewster, 2011; Leone et al., 2005). BDD can be severe enough to result in suicide attempts; rates of suicide attempts among adolescents with BDD are up to 44% (American Association of Suicidology, 2014; Bjornsson et al., 2013). More information is needed to fill the gap in the literature and determine the prevalence of muscle dysmorphia symptomology and related factors in nonclinical adolescent males from local high schools.

Muscle dysmorphia presents with unique symptoms. Leone et al. (2005) reported the need to identify the disorder because it does not present the same as other psychobehavioral conditions, such as anorexia or bulimia nervosa. This is because BDD patients tend to view themselves as healthy, and most tend to look healthy from an outward point of view. As noted by Bjornsson et al. (2013), because BDD can occur early on in childhood and adolescents with symptoms that may not be identified until later ages, it is difficult to diagnose these disorders in adolescents. Thus, the study of BDD must include adolescent samples for a more comprehensive understanding of incidence and predictive factors.

Researchers have revealed factors related to muscle dysmorphia symptomology that include race/ethnicity, sexual orientation, levels of dissatisfaction with appearance, and bodybuilding dependence (Boroughs et al., 2010; Cafri et al., 2008; Davies et al., 2011; Hildebrant et al., 2006; Readdy et al., 2011). However, these scholars used adult male samples only and do not include adolescent male samples. Studies of adolescents tend to center around body image and discomfort, and scholars have shown that body dissatisfaction is related to gender, physical self-concept, social pressure, and self-esteem, with similar findings across ethnic groups (Burlew & Shurts, 2013; Nishina et al., 2006; Petrie et al., 2010). In a study of body dysmorphia with adolescents, Bjornsson et al. (2013) revealed that mean onset was around age 16 years. However, more information regarding body dysmorphia in adolescents is needed (Bjornsson et al., 2013; Boroughs et al., 2010; Readdy, 2011).

There was a gap in the literature regarding the presence of factors related to muscle dysmorphia symptomology (e.g., age, race/ethnicity, sexual orientation, self-

esteem, body dissatisfaction, and bodybuilding dependence) in a nonclinical sample of male adolescents. Because the prevalence of muscle dysmorphia is increasing, and the causes and factors that predict this disorder are not well understood, continued investigation of these factors is needed with a focus on adolescent onset (Bjornsson et al., 2013). Readdy (2011) further supported the need to examine subclinical levels of the disorder and related factors among adolescents. This provided support for the need to further study muscle dysmorphia in adolescent males.

Purpose of the Study

The purpose of this quantitative research study was to determine the factors related to muscle dysmorphia symptomology in adolescent males. I determined the relative strength of race/ethnicity, sexual orientation (gay, heterosexual, bisexual), self-esteem, body dissatisfaction, and bodybuilding dependence in predicting muscle dysmorphia symptomology in a nonclinical sample of adolescent males.

Nature of the Study

A quantitative, nonexperimental survey research design was used for this study. Using surveys, gathered data to determine whether factors of race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence predict muscle dysmorphia symptomology in a nonclinical sample of adolescent males. This methodology was chosen because the quantitative method allows for the collection of numerical data for statistical analysis. The qualitative and mixed-research methodology were not chosen for this study because these approaches provide narrative data, which was not the focus of this study (Babbie, 2012). The use of numerical data for statistical analysis and hypothesis testing was the goal of this study rather than gathering more

detailed information. The use of quantitative surveys also allows for the inclusion of a larger sample. This research method allowed for the gathering of numerical data to determine factors that significantly predict muscle dysmorphia symptomology.

The key study variables included the independent variables of race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence and the dependent variable of muscle dysmorphia symptomology. Quantitative surveys were used to gather data from a group of high school adolescents. A multiple regression analysis was used to determine whether the independent variables predict the dependent variable.

Research Questions and Hypotheses

Research Question 1: Is race/ethnicity among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$1: Race/ethnicity, as measured by the Demographic Survey, will significantly predict muscle dysmorphia symptomology, as measured by the Body Dysmorphic Examination Self Report (BDDE-SR; Rosen & Reiter, 1996), among adolescent males.

$H_0$1 Race/ethnicity, as measured by the Demographic Survey, will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #2: Is sexual orientation(gay, heterosexual, bisexual) among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$2: Sexual orientation (gay, heterosexual, bisexual), as measured by the Demographic Survey, will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$2: Sexual orientation (gay, heterosexual, bisexual), as measured by the Demographic Survey, will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #3: Is self-esteem among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$3: Self-esteem, as measured by the Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1965), will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$3: Self-esteem, as measured by the RSE (Rosenberg, 1965), will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #4: Is body dissatisfaction among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$4: Body dissatisfaction, as measured by the Body Esteem Scale for Adolescents and Adults (Adkins & Stivers, 2006; Mendelson, Mendelson, & White, 2001), will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$4: Body dissatisfaction, as measured by the Body Esteem Scale for Adolescents and Adults (Adkins & Stivers, 2006; Mendelson et al., 2001), will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #5: Is bodybuilding dependence among adolescent males a significant predictor of muscle dysmorphia symptomology?

*H*15: Bodybuilding dependence, as measured by the Bodybuilding Dependence Scale (Smith, Hale, & Collins, 1998), will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$5: Bodybuilding dependence, as measured by the Bodybuilding Dependence Scale (Smith et al., 1998), will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Theoretical Foundation

The psycho-behavioral model of muscle dysmorphia, developed by Lantz, Rhea, and Mayhew (2001), was used as the conceptual model for this study. The use of this framework helps to explain the psychological factors, such as self-esteem and body dissatisfaction, and behavioral factors, such as bodybuilding dependence, that are related to muscle dysmorphia. For this conceptual model of muscle dysmorphia, Lantz et al. identified self-esteem and body dissatisfaction, as precipitating factors that increase a person's motivation to engage in exercises designed to develop the physique. With the development of muscles, self-esteem is increased. This increase in self-esteem leads to an increase in commitment to the exercise regimen, and a dependence on this regimen to maintain self-esteem levels.

In this model, there are six potential behavioral characteristics that develop from muscle dysmorphia and these include body size/symmetry, dietary constraints, physique protection or hiding, supplement use, pharmacological abuse, and bodybuilding dependence. Each of these characteristics has the potential to influence more

pathological behaviors (Lantz et al., 2001). Increases in pathological attitudes toward the body can lead to changes in diet or other changes in order to develop the physique, which reinforces the behavior. This reinforcement strengthens the connection between the precipitating factors of self-esteem and body dissatisfaction and the pathological attitudes regarding physical development (Lantz et al., 2001).

The use of this model is further discussed in Chapter 2. The psycho-behavioral model of muscle dysmorphia can be used to understand how factors of age, race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence predict muscle dysmorphia symptomology.

Definitions

Bodybuilding dependence: Bodybuilding dependence is conceptually defined as the perception of needing to spend hours each day devoted to physical activity to the point of neglecting other areas of functioning, physical and mental health, and life activities (Parnell, 2011). For this study, bodybuilding dependence was operationally defined as participant self-reports assessed by the Bodybuilding Dependence Scale (Smith et al., 1998).

Body dissatisfaction: Body dissatisfaction is conceptually defined as a person's perceptions of dissatisfaction with the body and distorted body images, characterized by unhappiness that an internal view of the ideal body is not being reached (Parnell, 2011). For this study, body dissatisfaction was operationally defined as participant self-reports to items assessed by the Body Esteem Scale for Adolescents and Adults (Adkins & Stivers, 2006; Mendelson et al., 2001).

Muscle dysmorphia symptomology: Muscle dysmorphia symptomology is conceptually defined as having a preoccupation with the muscles in the body with a perceived lack of muscularity even though the body is of average muscularity (Parnell, 2011). For this study, muscle dysmorphia symptomology was operationally defined as assessed by the BDDE-SR (Rosen & Reiter, 1996).

Race/ethnicity: Race/ethnicity was conceptually defined as the racial or ethnic group that an individual reports belonging to (Boroughs et al., 2010). For this study, race/ethnicity was operationally defined as participant self-reports of a White, African American, Hispanic, Asian, Pacific Islander, or other identity.

Self-esteem: Self-esteem is conceptually defined as feelings toward the self and the appearance of the self (Parnell, 2011). For this study, self-esteem was operationally defined by the items assessed by the RSE (Rosenberg, 1965).

Sexual orientation: Sexual orientation was conceptually defined as how an individual views his or her sexual identity (Boroughs et al., 2010). For this study, sexual orientation was operationally defined as participant self-reports of a gay, heterosexual, or bisexual identity.

Assumptions

I assumed that the sample represented the population of adolescent high school students so that findings can be generalized to other adolescents of this age group. It was also assumed that the participants will provide accurate reports of their experience because all reports were anonymous. I assumed that the study design yielded quantitative data for statistical analysis regarding factors that predict muscle dysmorphia symptomology because I used surveys to assess factors of age, race/ethnicity, sexual

orientation, self-esteem, body dissatisfaction, and bodybuilding dependence, as well as muscle dysmorphia symptomology. These assumptions were necessary in the context of the study because accurate perceptions are needed to understand the factors that predict muscle dysmorphia symptomology in the adolescent population.

Scope and Delimitations

In this study, I addressed whether factors of age, race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence predict muscle dysmorphia symptomology. This focus was chosen because there was a lack of information about the factors related to this disorder in adolescents. Boundaries of the study included the adolescent high school population. The psycho-behavioral model of muscle dysmorphia, developed by Lantz et al. (2001), as a theoretical framework was chosen because this model helps explain how these factors may predict muscle dysmorphia symptomology. Learning theory was not used (Tod & Lavallee, 2010) because although this theory may help to explain how muscle dysmorphia is developed and maintained, it does not include multiple aspects that the psycho-behavioral model considers. Because adolescent high school students were included in the study, it was assumed that findings can be generalized to only other adolescent high school students.

Delimitations for this study included the use of the RSE (Rosenberg, 1965) for assessment of self-esteem, the Body Esteem Scale for Adolescents and Adults (Adkins & Stivers, 2006; Mendelson et al., 2001) for the assessment of body dissatisfaction, the Bodybuilding Dependence Scale (Smith et al., 1998) for the assessment of bodybuilding dependence, and the BDDE-SR (Rosen & Reiter, 1996) for the assessment of muscle dysmorphic symptomology. Delimitations also included the use of the Demographic

Survey to gather data regarding race/ethnicity, and sexual orientation. The use of these surveys may or may not reflect all factors related to muscle dysmorphia symptomology.

Limitations

The use of a quantitative study does not allow for the gathering of narrative information. However, the quantitative methodology does allow for the gathering of numerical data, which allows for statistical analysis and hypothesis testing. Because variables were not directly manipulated in this study, and results were observed from existing groups, the findings were descriptive.

Additional study limitations were related to the study sample, which was from an available volunteer population. The subjects represented the adolescent high school student population and, therefore, the results of this research may generalize to other like populations only. However, because the sample consisted of volunteers, the findings may not be generalizable to all adolescent high school students in other geographical locations which limits the external validity of the study. Characteristics such as race were assessed to help deal with confounding variables.

The testing has the potential to limit study findings, and this threat was dealt with by using identification numbers instead of names to ensure the confidentiality and anonymity of the participant. Threats to construct validity were controlled by the use of the psycho-behavioral model of muscle dysmorphia, developed by Lantz et al. (2001), which was connected to the variables and topic studied. Biases that have the potential to influence study outcomes included researcher interpretations. This tendency was overcome by the use of numerical data that are less subject to interpretation compared to qualitative data.

Significance of Study

The findings from this study will contribute to filling the gap in the literature regarding the presence of muscle dysmorphia symptoms and predictive factors of race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence in a nonclinical adolescent male sample. This research will support professional practice in that it will provide insights into the identification and treatment of males with muscle dysmorphia. Prevention is one method of treatment. Thus, study findings can be used to support the development of psychoeducational programs that can be presented at high schools as a prevention strategy (Burlew & Shurts, 2013).

Summary

The main points presented in this chapter included a discussion of the background of the study topic, a problem statement, the purpose of the study, research questions and hypotheses, the theoretical framework, definitions of independent and dependent variables, assumptions, scope and delimitations, limitations, and the significance of the study. Chapter 2 will provide a review of literature related to the study topic.

Chapter 2: Literature Review

Introduction

BDD in adolescents tends to be underdiagnosed and treated, and the causes and factors related to this disorder are not well understood (Brewster, 2011; Leone et al., 2005). More information is needed to fill the gap in the literature, and it is important determine the prevalence of muscle dysmorphia symptomology and related factors in nonclinical adolescent males. The purpose of this quantitative research study was to determine the factors related to muscle dysmorphia symptomology in adolescent males. I wished to determine if the independent variables of race/ethnicity, sexual orientation(gay, heterosexual, bisexual), self-esteem, body dissatisfaction, and bodybuilding dependence predict the dependent variable of muscle dysmorphia symptomology in a nonclinical sample of adolescent males.

In this chapter, I presented the literature search strategy, theoretical foundation, and a synopsis of the current literature regarding topics of a historical review of muscle dysmorphia, recent studies of muscle dysmorphia symptomology, and body image distress and muscle dysmorphia in adolescents.

Literature Search Strategy

The literature search strategy included gathering articles within the last 5 years from databases that included peer-reviewed journals such as are found at ProQuest PsycInfo, JSTOR, Social Work Abstracts (EBSCO), and online resources such as Google Scholar. Key words used for the search included the following: *muscle dysmporphia*, *body image*, *body distress*, *body dissatisfaction*, and *adolescence*. The scope of the literature review included an initial search with dates from 2010 onward,

followed by a search of all years to further explore the issues examined using the psycho-behavioral model of muscle dysmorphia.

Theoretical Foundation

The theoretical foundation for this study was based on the psycho-behavioral model of muscle dysmorphia, developed by Lantz et al. (2001). Lantz et al. identified factors of self-esteem and body dissatisfaction that increase motivation to engage in exercises in order to develop the physique. According to this model, muscle development increases self-esteem, which increases the commitment to more exercise. the individual then develops a dependence on the exercise regimen to maintain self-esteem levels. The psycho-behavioral model of muscle dysmorphia includes six potential behavioral characteristics that develop from muscle dysmorphia and have the potential to result in more pathological behaviors: body size/symmetry, dietary constraints, physique protection or hiding, supplement use, pharmacological abuse, and bodybuilding dependence (Lantz et al., 2001). Increases in pathological attitudes toward the body can result in diet changes or other changes designed to develop the physique, and this in turn, reinforces the behavior. The reinforcement strengthens the link between the self-esteem, body dissatisfaction, and pathological attitudes regarding physical development (Lantz et al., 2001). The use of this framework helps to explain the psychological factors such as self-esteem and body dissatisfaction and behavioral factors such as bodybuilding dependence that are related to muscle dysmorphia.

Parnell (2011) provided an example of the use of this framework. Parnell used the psycho-behavioral model as a conceptual framework in a study designed to explore the link between self-esteem, body dissatisfaction, muscle dysmorphia, and exercise

dependence. The study sample included 110 college men. All participants completed a demographic questionnaire, the RSE, the Body Part Satisfaction Scale, the Drive for Muscularity Scale, and the Exercise Dependence Scale-21. Parnell found no significant relationship between self-esteem and muscle dysmorphia. However, a significant relationship was found between body dissatisfaction and muscle dysmorphia and between muscle dysmorphia and exercise dependence. Parnell concluded that study findings partially supported the psycho-behavioral model of muscle dysmorphia. However, self-esteem was not linked to muscle dysmorphia. Thus, more information is needed to further explore the use of this framework with regard to muscle dysmorphia. Study limitations included a small sample size and the use of a convenience sample. This sample may have been more knowledgeable than the general population, which may have impacted self-esteem levels. Thus, there is a need to further study self-esteem as it relates to muscle dysmorphia because research findings are mixed.

Historical Review of Muscle Dysmorphia

Historical Reviews Based on Literature Findings

Muscle dysmorphia is a type of BDD, which is classified in the *Diagnostic and Statistical Manual of Mental Disorders (DSM IV-TR).* This disorder can include a dissatisfaction with anything on the human body, such as the skin or hair as well as muscles. Any perceived flaw in the body is real to the patient, but may not be understood by others. The flaw becomes a focus that leads to depression, obsessions, and loss of functioning (Leone et al., 2005). The individual is unable to distinguish between the imagined and the actual self (Leone et al., 2005). A negative view of an inadequately thin male would lead to compulsions such as spending endless hours in the gym

exercising, poor eating habits, or spending large amounts of money on supplements. Anyone can be affected by this disorder, but it is more commonly found among males. It is estimated that up to 100,000 or more people of the general population suffer from this disorder worldwide (Leone et al., 2005). Adolescents are at increased risk for developing body image disorders such as MDM. There is not one cause of this disorder but some believe that the media and popular culture are a cause while others believe that there are individual psychological predisposing factors.

The historical review of muscle dysmorphia considers the notion that this disorder may have begun in the gym where males sought to build their bodies. Bilger (1998) explored the term the "barbell blues," which was defined as initially healthy practice of muscle building turned into a pathological exercise. Bilger reported that bodybuilding started to feel unhealthy, and pathology drove many toward desperate attempts to build the body. According to Bilger, this bodybuilding became a mania and is now thought of by psychiatrists as an illness. Bilger claimed that for most, weight lifting can be a healthy pastime, but for others it can be a dangerous obsession. Individuals can work out 6 hours a day, use steroids, and lose jobs and loved ones due to BDD. These findings resulted in the identification and naming of the disorder as muscle dysmorphia (Bilger, 1998). Bilger reported that causes of muscle dysmorphia included a genetic predisposition that caused other obsessional behaviors. It has been difficult to arrive at a prevalence rate for the disorder because people are ashamed to admit symptoms. However, it was estimated that muscle dysmorphia could be found in all big gyms, along with steroid abuse. This bodybuilding was viewed as a defense against low self-esteem. Bilger supported his findings with quotes from for example, Alan M. Klein, professor of sociology and

anthropology at Northeastern University, Boston, Massachusetts, "As long as you don't accept the bodybuilders' rationalizations ...you'll find [muscle dysmorphia] in all the big gyms ... It's pretty widespread" (p. 10).

Older early studies investigated muscle dysmorphia and found that while it was becoming more prevalent, causes were not clear. For example, Leone et al. (2005) explored muscle dysmorphia and related psychobehavioral characteristics and treatment and referral options. Leone et al. reported that worldwide, the incidence of muscle dysmorphia was increasing, and the causes were not understood. Leone et al. also reported that although limited, treatment with therapy and medication have been shown to be effective. However, the main concern was the identification of the disorder because symptoms are not always understood as a problem due to patients perceiving themselves as healthy. Because causes and correlates of BDD were not well understood, Leone et al. concluded that more research was needed.

Causes of muscle dysmorphia were linked to the notion that views of masculinity may impact male behaviors. Leone et al. (2005) noted that muscle dysmorphia may be due in part to pressures for males to appear more muscular. Athletes may be particularly susceptible to developing a body image disorders due to this pressure. While other body image disorders such as anorexia nervosa and bulimia nervosa have been well studied and documented in the clinical literature, more information was needed regarding muscle dysmorphia. Dysmorphia (or dysmorphism) is defined as a malformation of the anatomy. The clinical term of muscle dysmorphia (MDM) has become more commonly used. The focus of this disorder is to become large and muscular to overcome the perceived malformation of a lack of size or strength. Muscle dysmorphia is not limited to the

athletes or the sporting world, and it is found in adolescents trying to obtain views of the ideal body. Leone et al. reported that body image dissatisfaction is not a new focus. For example, during medieval times, men would fill their shirts with hay to appear bigger. Muscle dysmorphia is a type of obsessive-compulsive disorder that is subcategorized as body dysmorphic disorder.

Another early view is that athletic males may be more susceptible to developing muscle dysmorphia. Esco, Olson, and Williford (2005) reported that muscle dysmorphia is a new body image problem for men. This body image disorder is found mostly in athletic men. Muscle dysmorphia was classified as a type of BDD. With BDD, people feel they have a defect in their appearance. According to the DSM-IV (1994), a BDD diagnosis includes a preoccupation with an imagined or exaggerated defect in a person's appearance, and significant distress or impairment due to this view, in daily living. Esco et al. noted that the causes of muscle dysmorphia are not clear, and they may include many factors such as media pressures. Because muscle dysmorphia involves obsessions, it may be related to obsessive-compulsive disorder. Esco et al. reported that men with muscle dysmorphia have poor body images, low self-esteem, and depression, and they will choose exercise over important obligations. This implies that when a male has low self-esteem and a poor body image, this male may be at risk for developing muscle dysmorphia. This implies the need to further study factors related to this disorder.

Muscle dysmorphia has been consistently found among males. Baghurst and Kissinger (2009) also reported on the disorder of muscle dysmorphia, noting that it originated in bodybuilding circles and tended to be found among males. This form of body image disturbance involves a pathological concern with perceptions of being too lean

and small. Baghurst and Kissinger stated that the causes of muscle dysmorphia are unclear, but characteristics have been described. Some believe that the disorder is caused from sociocultural factors and related pressures (Baghurst & Kissinger, 2009). Others believe that low self-esteem and body dissatisfaction or distortion are related, and these factors interact with biological and social factors (Baghurst & Kissinger, 2009). Variables resulting in muscle dysmorphia include body distortion and dissatisfaction and an internalized view of the ideal body. In addition, perfectionism, negative affect, low self-esteem, and media pressure may be causes of muscle dysmorphia (Baghurst & Kissinger, 2009).

The social comparison theory has been used to explain BDD. According to the social comparison theory, people compare themselves with others in the social environment to gather information about an ideal body (Baghurst & Kissinger, 2009). Because the media portrays the ideal male as muscular, some males aspire to this image. The drives to obtain the ideal body can lead to dehydration, dieting, illegal substance use, overtraining, exercise addiction or dependence, heart or renal failure, depression, anxiety, low self-esteem, drives for perfectionism, and even premature death when anabolic steroids are involved (Baghurst & Kissinger, 2009).

Early Studies of Muscle Dysmorphia

Although the prevalence of muscle dysmorphia is difficult to diagnose, Carter and Rudd (2005) reported that 1% of college student athletes fit a diagnosis of muscle dysmorphia. Choi, Pope, Olivardia, and Cash (2002) reported on muscle dysmorphia, noting that it was a new syndrome found among weightlifters. Choi et al. found that those with muscle dysmorphia syndrome had poorer body images and were less satisfied with

their bodies. These men wanted increased muscularity, with no fat gain. Those with MD do have a poor body image, and they consider themselves to be less healthy.

Early studies of muscle dysmorphia included the exploration of male weightlifters and muscle dysmporphia. Olivardia, Pope, and Hudson (2000) studied muscle dysmorphia in a group of male weightlifters and found that men with muscle dysmorphia: differed significantly from the normal comparison weightlifters on body dissatisfaction; eating attitudes; anabolic steroid use; and lifetime prevalence of DSM-IV eating, mood, and anxiety disorders. The men with muscle dysmorphia reported feelings of embarrassment and shame and impairments in social and occupational functioning due to this condition (Olivardia et al., 2000). While the sample size was small and convenient, Olivardia et al. concluded that muscle dysmorphia is a valid diagnostic category with stereotypical features, which differ significantly from those of normal weightlifters. This means that it is important to understand the features of muscle dysmorphia as well as the risk and related factors in order to ensure early diagnosis or prevention of the disorder.

Research on muscle dysmorphia is limited. Hildebrandt et al. (2006) reported that there was limited research on muscle dysmorphia in men using nonclinical populations. Hildebrandt et al. included different types of respondents including muscle concerned, fat concerned, dysmorphic, normal behavior, and normal. The dysmorphic group reported body image disturbances that were consistent with muscle dysmorphia with high levels of body image disturbance, appearance controlling behavior, associated psychopathology, and steroid use. Hildebrandt et al. concluded the classification of muscle dysmorphia as a subtype of body dysmorphic disorder, as well as an obsessive-compulsive spectrum

disorder. Thus, muscle dysmorphia is a specific disorder worthy of further study to understand related factors in order to prevent and provide early treatment of the disorder.

Symptoms of muscle dysmorphia have been explored. Cafri et al. (2008) studied muscle dysmorphia to investigate the symptom characteristics and related psychiatric conditions. Cafri et al. found that males with muscle dysmorphia reported more negative body appearance symptoms, with recurrent thoughts about muscularity, appearance dissatisfaction and checking, bodybuilding dependence, and impairment in functioning. Those with a history of the disorder reported higher rates of mood and anxiety disorders compared to those with no history of muscle dysmorphia. Cafri et al. concluded that muscle dysmorphia is distinguishable from normal weight lifting, and it is related to other psychiatric conditions. Cafrie et al. provided information about muscle dysmorphia, that it may not be a part of normal weight lifting. This implies that more information is needed to understand related factors such as body dissatisfaction.

Recent Studies of Muscle Dysmorphia Symptomology

Causes of Muscle Dysmorphia

There may be multiple causes of muscle dysmorphia. Lemma (2009) reported that a psychoanalytic perspective of body dysmorphia can be used to understand causes of this disorder. An individual presenting with an excessive preoccupation with his or her body, or body part, due to the belief that it is ugly or deformed and in need of alteration or concealment is suffering from a narcissistic disturbance. Alternatively, Baghurst and Kissinger (2009) reported that there is an ideal human physique presented in the United States and other Western societies. For example, the male physique with muscle mass differs from the female. A lean and muscular physique with a mesomorphic body type is

considered the male ideal (Baghurst & Kissinger, 2009). There is a focus on obtaining this muscular body type for men because it is believed that this leads to social rewards (Baghurst & Kissinger, 2009). Thus, Baghurst and Kissinger concluded that it is important to understand culture as it relates to body ideals and disorders. This implies the need to study race/ethnicity as a factor that may be related to muscle dysmorphia.

Body dissatisfaction may be due to social pressures. Grieve, Jackson, Reece, Marklin, and Delaney (2008) studied factors related to social physique anxiety in men. Social physique anxiety was defined as the anxiety felt due to beliefs that the body is being evaluated. Grieve et al. examined the relationships between social physique anxiety and exercise reasons, symptoms of muscle dysmorphia, and self-esteem and found that men with higher levels of social physique anxiety exercised more for self-presentational reasons instead of fitness or recreational reasons. These men reported more symptoms of muscle dysmorphia and lower self-esteem (Grieve et al., 2008). Thus, lower self-esteem may be a factor related to muscle dysmorphia, which supports the need for further study of this factor.

Social pressures impact gender role stress, which may be related to body dissatisfaction and muscle dysmorphia. Readdy et al. (2011) conducted a study to explore gender role stress (GRS) and sociocultural appearance demands as related to muscle dysmorphia symptoms. The sample for this study included 219 college women and 154 college men. Readdy et al. found that age, sociocultural appearance demands, aerobic exercise, and five GRS subscales predicted muscle dysmorphia symptoms in women. However, only age, sociocultural appearance demands, and one GRS subscale predicted muscle dysmorphia symptoms in men. Readdy et al. concluded that muscle

dysmorphia may be related to perceptions of pressure to attain an attractive body more so than global gender role stress. Thus, it may be that social pressures lead to body dissatisfaction and muscle dysmorphia. This supports the need to further study body dissatisfaction as it relates to muscle dysmorphia.

The notion that culture impacts body image was explored by Pope, Gruber, Mangweth, and Bureau (2000). Pope et al. studied body image perception among men from three countries to determine if men in modern Western societies desire a leaner and more muscular body than they have. The men chose a computerized body image that they felt represented their own body, the ideal body wanted, the average body of a man their age, and the male body preferred by women. Fat and muscularity were compared with that of the four images. Pope et al. found that demographic and physical differences among the three groups of men were slight. There were modest differences between assessed fat and the fat of the images chosen. However, significant differences were found for measures of muscularity. For all three countries, men chose an ideal body of around 28 pounds more muscular than themselves, and they estimated women preferred a male body of around 30 pounds more muscular than themselves. Pope et al. concluded that this discrepancy between men's actual muscularity and their body ideals may explain the rise in muscle dysmorphia. These findings support the conclusion that culture impacts body image, which implies the need to explore race/ethnicity as a factor potentially related to muscle dysmorphia.

Culture provides standards for body appearance. Tylka and Calogero (2011) presented a discussion of the notion that culture provides specific standards for the body appearance and display for women and men. These standards are found in the society

and the media. In Western cultures, gendered body ideals are presented, revered, and aspired to. People try to live up to ideals and to do so, they constrict their relationships, behaviors, and views of the self and others. Gender combines with age, sexual orientation, race, and political affiliation as well as individual differences to develop a body ideal that a person aspires to achieve. Thus, while there are multiple factors that may impact body image, ethnicity and race are related factors.

Body image perceptions can lead to distress. Schrick, Sharp, Zvonkovic, and Reifman (2012) explored the need to appear perfect and related psychological distress. They assessed the influence feeling pressured by issues of body image, romance, peers, and academics on the relationship between silencing and distress. Findings from path analysis were that silencing (or being silent about views of about body), was positively related to all factors except academic engagement, which was negatively related. Silencing was also positively related to anxiety and depression. The internalization of the thin ideal and competitiveness predicted distress among women who tried to appear perfect to others. Females focused on what others think, had the highest levels of distress and lowest levels of academic engagement. Findings implied that attempting to appear perfect to others was related to higher levels of distress and this factor may be related to the relation between body image, and distress. These findings support conclusions that trying to appear perfect can be related to body distress. This need to look perfect along with body dissatisfaction require further study to understand how these issues can lead to muscle dysmorphia. More information is also needed to understand muscle dysmorphia in adolescents.

Factors Related to Muscle Dysmporphia

Factors related to muscle dysmorphia symptomology have been identified, but studies tend to use adult male samples. For example, Boroughs, Krawczyk, and Thompson (2010) studied Body Dysmorphic Disorder (BDD). The prevalence of BDD was assessed along with gender, race/ethnicity, and sexual orientation differences, and related factors of appearance comparison, body image disturbance, obligatory exercise, and self-esteem. Boroughs et al. found that the prevalence rate was 4.9% and women had more BDD symptoms than men. Caucasians and Latinas reported more symptoms than African Americans, and sexual minorities reported more symptoms than heterosexuals. BDD symptomatology was negatively related to body satisfaction and self-esteem and positively linked to appearance comparison and obligatory exercise. Thus, there is support for the further exploration of factors such as body dissatisfaction and low self-esteem as related to muscle dysmorphia.

Male bodybuilders may be at risk for muscle dysmorphia. Davies, Smith, and Collier (2011) also studied the prevalence and experience of muscle dysmorphia among males who were recreational bodybuilders and steroid users. Findings were that there were no significant differences between current and former steroid users regarding the experiences of muscle dysmorphia. Interview findings were that former users were more susceptible to muscle dysmorphia characteristics such as physique protection and body distortion/dissatisfaction. These findings provided support for the further study of body dissatisfaction as related to muscle dysmorphia. More information is also needed to understand muscle dysmorphia in adolescents.

Gender may be a factor in weight issues. Fikkan and Rothblum (2012) reviewed the literature and reported that gender is a factor in weight bias and weight-based stigma. A review of the literature on the weight-based stigma experienced by women in America in employment, education settings, romantic relationships, physical and mental health treatment, and portrayals in the media was conducted. Literature regarding the intersection of gender and ethnicity as related to weight stigma was also examined. Rothblum (2012) found that across settings, fat women reported worse outcomes compared to thinner women and men (fat or thin). These women experience outcomes of poor health, quality of life, and socioeconomic outcomes. This information implies that regardless of ethnicity, women face weight issues, however, more information is needed to fully understand how culture impacts body appearance issues.

Body Image Distress and Muscle Dysmorphia in Adolescents

Studies, recent or otherwise, of muscle dysmorphia in adolescents are limited. Burlew and Shurts (2013) reported that male adolescents and adults suffer from body image dissatisfaction/distress (BID) and yet the symptoms and behaviors of many tend to be unrecognized and under diagnosed. According to these authors, this lack of recognition takes place since symptoms may be at a subclinical level. However, they also noted that BID is more prevalent than ever and it is therefore important to understand the symptoms and related factors for early diagnosis and treatment.

Muscle dysmorphia can begin at an early age. Bjornsson, Didie, Grant, Menard, Stalker, and Phillips (2013) reported that the age of onset of body dysmorphic disorder is in childhood or adolescence. These authors also noted that subclinical symptoms tend to begin at these early ages, several years before the disorder is identified. In many

psychiatric disorders, early age of onset is linked with greater illness severity and comorbidity with other disorders and yet there are few studies of correlates of age of onset in BDD. This is an important consideration since a history of suicide attempts and comorbidity are found among patients with early age of onset of BDD. Since muscle dysmorphia, a type of BDD, can begin at an early age, it is important to study this disorder in adolescents.

Thus, the early onset of BDD had been demonstrated. Bjornsson et al. (2013) studied age at onset and other variables, assessed in two samples of adults with DSM-IV BDD. Those with early-onset BDD (age 17 or younger) were compared to those with late-onset BDD. Bjornsson et al. found that for each sample, BDD had a mean age at onset of 16.7 years. More females than males had early-onset BDD in the first sample. Those with early-onset BDD had more severe BDD symptoms and were more likely to have attempted suicide. This early age at BDD onset was also linked to physical violence due to BDD and psychiatric hospitalization. Early-onset BDD was linked to a gradual onset of BDD and more lifetime comorbid disorders on both Axis I and Axis II in sample 1 (such as anorexia nervosa or bulimia nervosa, or alcohol and non-alcohol substance abuse, borderline personality disorder, anxiety disorder, and social phobia. Bjornsson et al. concluded that BDD tends to begin in childhood or adolescence and this early onset is linked with gradual onset, attempted suicide, and increased comorbidity as was demonstrated in both samples. This information provides support for the further study of muscle dysmorphia, a type of BDD, in adolescents.

Body Image Distress in Adolescents

Body image distress can be found in adolescents. Studies of adolescents tend to center around body discomfort issues rather than muscle dysmorphic disorder. Brewster (2011) reported that while most have concerns about physical appearance in general, this is a particular focus during adolescence. For some, this concern leads to anxiety and distress and fear to the degree that these feelings interrupt daily living. Exaggerated fears with dysfunctional thoughts can lead to maladaptive behaviors with the onset and development body dysmorphic disorder (BDD). BDD is psychological condition that tends to be under recognized and misunderstood, and this is particularly true in the adolescent population. BDD is characterized by a preoccupation with thoughts that the body is flawed and these thoughts tend to be imagined. Since body image is a factor in adolescents, it is logical to study body dissatisfaction as a factor potentially related to muscle dysmorphia in adolescents.

BDD remains understudied. Brewster (2011) reported that BDD was first described in 1886 by Enrico Morselli, an Italian psychiatrist. The disorder was first called dysmorphophobia. In 1909, this disorder was described by Emil Kraepelin as a mental malfunction leading to beauty-based hypochondriasis. Sigmund Freud also observed this disorder in the late 1930s and described the patient as preoccupied about his nose to the degree that he was unable to function. In 1987, BDD was officially recognized as a somatoform disorder in the Diagnostic and Statistical Manual (DSM-III). Despite the ongoing prevalence of this disorder, much about it remains unknown or understudied. This supports the need for the current study.

BDD needs to be studied in adolescents due to the potential early onset of this disorder. Brewster (2011) reported that the onset of BDD typically tends to begin in early adolescence, but can also start in mid-late childhood. Clinical features vary depending on age of onset, but the key theme is that the individual has delusional obsessions about their physical appearance. These individuals describe themselves negatively with a lack of evidence to support this conclusion. This dysfunctional view of the appearance may focus on the head or facial area, skin appearance, or other body areas. While severity of symptoms varies, some may spend between up to 8 hours a day focused on or trying to change their appearance. Behaviors may be developed to change appearance and these may include extreme exercising, dieting, and more. Adolescents with BDD may also behave in ritualistic ways due to the anxiety, to include body rocking, skin picking, social withdrawal, aggressive outbursts, and suicidal ideation. They may have problems sleeping and focusing and may feel lethargic. These behaviors are consistent with other psychological disorders and conditions such as social anxiety, depression, obsessive compulsive disorder, social phobia, eating disorders (anorexia nervosa, bulimia nervosa, and binge-eating), and personality disorders. This overlap in symptoms makes the recognition and diagnosis of BDD in adolescents more difficult. Adolescents with BDD may have problems with interacting and the development of close friendships and intimate relationships. More information is needed to understand other factors that may be related to BDD and muscle dysmorphia in adolescents.

The cause of BDD remains unknown. Brewster (2011) noted that BDD is believed to be linked to many factors. The biopsychosocial model is used to understand this disorder since it allows for consideration of biological, psychological, and

sociological factors. For example, evidence points to the notion that BDD has biological causes such as neurological anomalies. Psychologically, research findings point to the link between personality traits and BDD; anxious, insecure, introverted, sensitive, narcissistic, and schizoid personality traits are linked with BDD. Sociological factors such as cultural views of beauty may also be linked to BDD. Thus, race and ethnicity may be factors related to BDD.

BDD is found in equal amounts across gender and culture (Brewster, 2011). However, these findings are based on community studies rather than the general population. Community sample studies show the general prevalence rate to be between 0.7 and 1.1%; rates in clinical samples are 2.2%, 4%, and 6%. Due to rates of comorbidity, it is difficult to arrive at an accurate prevalence rate in adolescents in either a community or a clinical settings. Psychotropic drugs (antidepressants) with cognitive behavior therapy (CBT) is shown to be the best treatment for BDD. Selective serotonin reuptake inhibitors (SSRIs) are used for those with moderate-severe delusions. CBT is designed to deal with dysfunctional thoughts and behaviors. Exercises help patients reduce negative thought patterns and behaviors (Brewster, 2011). However, while exercise can be helpful, obsessions with body building can be harmful, implying the need to understand factors related to harmful patterns of exercise.

BDD can lead to devastating consequences. According to the American Association of Suicidology (2014), BDD is linked to suicide. BDD is recognized more and more as a somatoform disorder that is distinct from eating disorders, obsessive-compulsive disorder, and depression. Prevalence rates of BDD in the United States are estimated at 2.4%, with slightly higher rates for women compared to men. In Germany,

rates are 1.7% with a decline after age 44 years. While skin is the most common area of concern in adolescents due to acne, 29% of those with BDD are focused on weight and these individuals have higher frequency rates of suicide attempts. Patients with BDD that have maladaptive views of their appearance that typically begin in adolescence, have high rates of suicide ideation, suicide attempt, and completed suicide. When age of onset is 16 years, lifetime rates of suicide ideation have been shown to range from 58% to 78%, with adolescents having rates of 81%. Rates of suicide attempts among adolescents with BDD are up to 44%. Risk factors include poor self-esteem, impaired functioning, poor grades, excessive school absences due to self-consciousness, and shame. These individuals feel distressed and are preoccupied with their appearance despite being assured by others. They may feel hopeless and suicidal. Serotonin reuptake inhibitors (SRIs) and cognitive-behavioral therapy (CBT) are currently recommended for treatment, but BDD may go undiagnosed and the link to suicidality may not be understood (American Association of Suicidology, 2014). Since BDD can have such negative outcomes, it is important to understand related factors in order to avoid these consequences.

Clinical features of body dysmorphic disorder in adolescents and adults. Studies with adolescents tend to investigate BDD, but findings are important to consider since muscle dysmorphia is a type of BDD. BDD can begin in adolescence. Phillips, Didie, Menard, Pagano, Fay, and Weisberg (2006) reported findings from a study of the clinical features of body dysmorphic disorder (BDD) in adolescents and adults. These authors also noted that BDD usually starts in adolescence, but there is a lack of studies of this age group. Findings were that the adolescents were preoccupied with their

appearance, with a focus on skin, hair, and stomach areas. For the adolescents, 94.3% reported moderate, severe, or extreme distress, 80.6% reported a history of suicidal ideation, and 44.4% reported an attempted suicide. Adolescents also reported high rates and levels of impairment in school, work, and other social areas. Adolescents and adults were similar, but adolescents had significantly more delusional BDD beliefs and a rate of suicide attempts. Thus, while adolescents and adults with BDD may be similar in some ways, adolescents have high levels of distress and suicidal ideation and attempts. This information supports the need for further study of muscle dysmorphia, a type of BDD in adolescents.

Studies with Adolescents

Body dissatisfaction is a factor in adolescents. Blodgett-Salafia and Lemer (2012) conducted a study to explore the link between stress and body dissatisfaction and disordered eating among girls and boys in middle school. These authors pointed out that adolescents tend to experience stress and there are different kinds of stress such as that related to relationships, performance, education, finances, and family. For their study, Blodgett-Salafia and Lemer explored sex differences as related to these different types of stress. They also explored the links between multiple types of stress, body dissatisfaction, and bulimic symptoms. Blodgett-Salafia and Lemer found that females reported higher levels of stress compared to males and the link between stress and disordered eating differed for both. A path model in which stress led to body dissatisfaction, and then led to dieting and finally bulimic symptoms was supported for females reporting performance, relationship, and family stress. Stress was linked to body dissatisfaction, and then dieting in males, but dieting was not significantly related to

bulimic symptoms. Thus, Blodgett-Salafia and Lemer concluded that each sex has unique experiences related to stress and body dissatisfaction and related behaviors. Thus, a study is needed to comprehend how body dissatisfaction uniquely impacts male adolescents.

Male adolescents strive to control their bodies. McCabe and Ricciardelli (2003) conducted a longitudinal study of body change strategies among adolescent males, ages 11 to 16 years. McCabe and Ricciardelli explored five body change strategies: increase weight, increase muscles, eating and exercise to lose weight, bingeing, and food supplements. The role of parent and peer pressure to lose or increase weight, or to increase muscles was evaluated. Outcomes of Body Mass Index (BMI) over an 8-month period were evaluated. Each variable was controlled at Time 1 and only bingeing and food supplement use were predicted by other body change variables. Bingeing and all other variables predicted bingeing at Time 2. Food supplement use and bingeing at Time 1 predicted food supplement use at Time 2. Perceived parent and peer pressure to lose (or increase) weight at Time 1 predicted strategies to lose (or increase) weight at Time 2. Perceived pressure to lose or increase weight, and increase muscles at Time 1 predicted food supplement use at Time 2. This study was limited by the location of sample. However, McCabe and Ricciardelli concluded that extreme body change strategies were predicted by the use of normative body change strategies at an earlier point in time. It was also concluded that the range of body change strategies was impacted by perceived parent and peer pressure. This study supported the need to consider body change strategies in adolescents and further understand factors that put these males at risk for developing muscle dysmorphia.

Ethnicity may be a factor in adolescent body change strategies. Nishina, Ammon, Bellmore, and Graham (2006) studied body dissatisfaction and physical development among a group of over 1100 ethnic minority adolescents (African American, Asian, Caucasian, Latino, and multi-ethnic). Nishina et al, found that across ethnic groups, there were more similarities than differences. Male participants reported similar areas and levels of body dissatisfaction, and similar links between body dissatisfaction and psychosocial maladjustment. Female participants reported differences, with lower levels of body dissatisfaction in African American girls, compared other ethnic backgrounds. For both genders, higher levels of body dissatisfaction led to more psychological and social maladjustment. Faster development in males predicted a stronger relationship between feeling overweight and peer victimization and feeling too small was only a predictor of victimization in cases where boys were actually small. Physical development directly predicted less peer victimization in females; perceptions of faster development predicted increased victimization. Nishina et al. concluded that physical development impacts outcomes: it directly protects females and buffers against body dissatisfaction in males, thus protecting both from peer victimization. Nishina et al. also concluded that faster timing of development exacerbates peer victimization. Thus, while there are multiple factors involved in adolescent behaviors, body dissatisfaction was found among all groups, implying the need to further study this factor as it relates to outcomes such as muscle dysmorphia.

There are multiple factors that are involved in body dissatisfaction. Petrie, Greenleaf, and Martin (2010) studied the biopsychosocial and physical correlates of body satisfaction in a group of 629 U.S. middle school boys and 650 girls, from grades six

through eight. Self-report measures of weight pressures, pubertal development, internalization, self-esteem, social appearance comparison, physical self-concept, and depression, and objective measures of BMI and cardiorespiratory fitness were used. Findings from a regression analyses were that gender influenced the strength of the relationships between the variables assessed and body satisfaction. Females were most influenced by weight loss pressures and males were most influenced by gaining weight and musculature. Thus, issues such as self-esteem appear to impact body dissatisfaction, which implies the need for further study of this factor as it potentially relates to muscle dysmorphia.

Summary and Conclusion

In summary, major themes in the literature were that psychiatrists have confirmed that bodybuilding can be a disease referred to as muscle dysmorphia (Bilger, 1998; Esco et al., 2005; Leone et al., 2005). Originating in bodybuilding circles among males, it is now recognized among females and adolescents (Baghurst & Kissinger, 2009). This disorder can result in dehydration, dieting, illegal substance use, over-training, exercise addiction or dependence, heart or renal failure, depression, anxiety, low self-esteem, drives for perfectionism, and suicide, even premature death when anabolic steroids are involved (Baghurst & Kissinger, 2009). While causes of this disorder remain unclear (Schrick et al., 2012; Tylka & Calogero, 2011), characteristics are known and include a preoccupation with the body that leads to dysfunction. Those suffering from the disorder may report high levels of body image disturbance, appearance-controlling behavior, associated psychopathology, and steroid use with feelings of shame and embarrassment (Choi et al., 2002; Fikkan & Rothblum, 2012; Hildebrandt et al., 2006; Olivardia et al.,

2000; Phillips et al., 2006). Studies also confirm that there is a difference between normal and pathological concern for the body (Cafri et al., 2008).

Potential causes of muscle dysmorphia include the psychoanalytic view that it is based on narcissistic tendencies (Lemma, 2009), and that it is based on the need to meet cultural views of the ideal body (Baghurst & Kissinger, 2009; Grieve et al., 2008; Pope et al., 2000; Readdy et al., 2011). The psycho-behavioral model of muscle dysmorphia, developed by Lantz, Rhea, and Mayhew (2001), which is the theoretical framework for this study, posits that there are factors of self-esteem and body dissatisfaction, that lead to the disorder. These factors lead to potential behavioral characteristics and muscle dysmorphia with more pathological behaviors.

Present studies of muscle dysmporphia show that that disorder includes body image dissatisfaction and distress (Burlew & Shurts, 2013), with symptoms that can be found in adolescence (Bjornsson et al., 2013). Yet most studies of the disorder rely on adult samples (Boroughs et al., 2010; Davies et al., 2011; Readdy et al., 2011). Studies of adolescents tend to focus on body discomfort issues (Brewster, 2011) and even these studies show the link between this distress and potential devastating outcomes of suicide (Brewster, 2011; American Association of Suicidology, 2014). Studies with adolescents show the link between stress, pressure, body development, and body dissatisfaction (Blodgett-Salafia & Lemer, 2012; McCabe & Ricciardelli, 2003; Nishina et al., 2006; Petrie et al., 2010).

Thus, while factors related to muscle dysmorphia such as race/ethnicity, sexual orientation, dissatisfaction with appearance, and bodybuilding dependence have been identified, studies include adult samples (Cafri et al., 2008). More information is needed

to understand the prevalence of muscle dysmorphia symptomology and related factors in nonclinical adolescent males from local high schools (Bjornsson et al., 2013; Boroughs et al., 2010; Readdy, 2011). The present study fills this gap and will extend knowledge in the discipline regarding factors of age, race/ethnicity, sexual orientation(gay, heterosexual, bisexual), self-esteem, body dissatisfaction, and bodybuilding dependence, that may predict muscle dysmorphia in adolescents. Chapter three will present methodology used in the study to include an introduction, research design procedures, and data processing and analysis.

Chapter 3: Methodology

Introduction

The purpose of this quantitative research study was to determine the factors related to muscle dysmorphia symptomology in adolescent males. I determined the relative strength of race/ethnicity, sexual orientation (gay, heterosexual, bisexual), self-esteem, body dissatisfaction, and bodybuilding dependence in predicting muscle dysmorphia symptomology in a nonclinical sample of adolescent males. In this chapter, I present the research design and rationale, methodology, threats to validity, ethical procedures, and summary.

Research Design and Rationale

Study Variables

The study variables included the independent variables of race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence and the dependent variable of muscle dysmorphia symptomology.

Research Design

A quantitative, nonexperimental survey research design was used for this study. Via surveys, I gathered data to determine whether factors of race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence predict muscle dysmorphia symptomology in a nonclinical sample of adolescent males. The use of quantitative surveys to gather data from a group of high school male adolescents allowed for a fast and easy gathering of data. A multiple regression analysis was used to determine whether the independent variables predict the dependent variable.

Rationale

The quantitative method was chosen to allow for the inclusion of a large sample and the collection of numerical data for statistical analysis (Babbie, 2012). This research method will allow for the gathering of numerical data to determine factors that significantly predict muscle dysmorphia symptomology.

Methodology

Population

The population included nonclinical high school males. The study participants include a minimum sample of 91 high school males determined by power analysis.

Sampling and Sampling Procedures

Convenience sampling was used because there were participants to choose from locally. Inclusion criteria included high school males of all ages and males with no previous clinical diagnosis. Exclusion criterion included any student with a previous clinical diagnosis. The number of participants that served as the sample was estimated based on a power analysis of 91. A power analysis was conducted to determine the sample size needed to accurately reject a null hypothesis for a regression analysis with a power level of .80. The alpha level was set at .05 and the beta level was set at .80. Cohen (1977) recommended that with five independent variables (race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence), for a medium effect (.3 to .5), a sample of 91 was needed to yield a power of around 0.8 in testing hypotheses. Thus, it was determined that a sample size of 91 participants would be sufficient to test each of the hypotheses with a power of .80.

Procedures

Data collection. Following institutional review board (IRB) approval, all participants were recruited on a volunteer basis according to availability. This convenience sample was chosen because participants were available locally. Participants were chosen to participate in the study based on their gender, high school student, and nonclinical status. Because there were enough students available at one high school, I contacted a local high school principal regarding study approval. Following IRB and high school principal approval, I distributed research packets to the teachers to be given to all male students. Quantitative surveys were used to gather data from a group of high school adolescents. After contacting IRB and receiving approval, the participants received a packet containing a letter of introduction, a letter of consent/assent, and the research surveys. Participants willing to participate were instructed to complete packet contents and return them to me, via the teacher. I gathered the packets from the teachers, hand-scored the surveys, and computed the statistical results. Participants were informed that their participation was voluntary, they may ask questions at any time, they may withdraw from the study at any time, and that confidentiality regarding the participant was maintained with the use of identification numbers in place of names.

Instrumentation

Body Building Dependence Scale. The Bodybuilding Dependence Scale (BDS) was developed by Smith et al. (1998). This scale is appropriate to the current study because I measured the independent variable of bodybuilding dependence. Permission from the developer to use and obtain the instrument was acquired by contacting Dr. Smith. This is a 9-item, Likert-scored scale designed to determine a total score for BBD

from subscales of social dependence, training dependence, and mastery dependence. Each of these subscales demonstrates satisfactory internal consistency with Cronbach alphas of 0.78, 0.76, and 0.75 respectively (Smith & Hale, 2004). Validity reports regarding this scale are that there are significant and moderate correlations between all BDS and muscle dysmorphia inventory subscales, and there are significant and moderate correlations between five out of eight exercise dependence questionnaire subscales (Smith & Hale, 2004).

Operationalization of Bodybuilding Dependence. BBD was conceptually defined as the perception of needing to spend hours each day devoted to physical activity to the point of neglecting other areas of functioning, physical and mental health, and life activities (Parnell, 2011). For this study, BBD was operationally defined as participant self-reports and was measured with the BBDS (Smith et al., 1998). Higher scores mean higher degrees of BBD. An example of a scale item is, "If I miss a weight training workout, I feel as though my muscle mass has shrunk."

Body Dysmorphic Examination Self Report. The BDDE-SR was developed by Rosen and Reiter (1996). This scale is appropriate to the current study because I measured the dependent variable of muscle dysmorphia symptomology. Permission from the developer to use the instrument was not required because the instrument is readily available online. This 30-item, self-administered questionnaire is used to measure the cognitive and behavioral symptoms of body dysmorphia yielding a total score for muscle dysmorphia symptomology (Rosen & Reiter, 2003). The BDDE-SR has concurrent validity with the global Eating Disorder Examination Questionnaire scores with a correlation of $r = 0.79$, $p < 0.001$ (Mitchison, Crino, & Hay, 2013).

Operationalization of Muscle Dysmorphia Symptomology. Muscle dysmorphia symptomology was conceptually defined as having a preoccupation with the muscles in the body with a perceived lack of muscularity even though the body is of average muscularity (Parnell, 2011). For this study, muscle dysmorphia symptomology was operationally defined as participant self-reports and was measured with the BDDE-SR (Rosen & Reiter, 1996). Scale Items 1 through 15 and 17 through 26 are summed with higher numbers meaning higher symptom levels. An item example where participants rate their frequency of dissatisfaction over a period of 4 weeks is "How often have you felt that other people were noticing or paying attention to your appearance feature?"

Body Esteem Scale for Adolescents and Adults. The Body Esteem Scale for Adolescents and Adults was developed by Mendelson et al. (2001). This scale is appropriate to the current study because I measured the independent variable of body dissatisfaction. Permission from developer to use the instrument was not required because the instrument is readily available online. This scale has 21 items that evaluate body esteem with a total score based on items regarding weight, positive outcomes of weight, and appearance. The scale is reliable with an alpha of .93 (Adkins & Stivers, 2006; Mendelson et al., 2001). The scale demonstrated concurrent validity with the Body Image Self-Schema Scale and the Body Image Possible Selves Scale (Rangkakulnuwat, Pothiban, Metzger, Tiansawad, & Teaukul, 2008).

Operationalization of body dissatisfaction. Body dissatisfaction was conceptually defined as a person's perceptions of dissatisfaction with the body and

distorted body images, characterized by unhappiness that an internal view of the ideal body is not being reached (Parnell, 2011). For this study, body dissatisfaction was operationally defined as participant self-reports and was measured with the Body Esteem Scale for Adolescents and Adults (Adkins & Stivers, 2006; Mendelson et al., 2001). Appropriate items are reversed scored, and all are totaled with higher numbers meaning higher degrees of satisfaction with the body. An item example is "I am preoccupied with trying to change my body weight."

Demographic survey. The demographic survey that I constructed consisted of items related to age, ethnicity/race, and sexual orientation (gay, heterosexual, bisexual). These items are needed to address the research questions and provide data for hypothesis testing.

Operationalization of race/ethnicity. Race/ethnicity was conceptually defined as the racial or ethnic group that an individual reports belonging to (Boroughs et al., 2010). For this study, race/ethnicity was operationally defined as participant self-reports of a White, African American, Hispanic, Asian, Pacific Islander, or other identity and measured with the demographic survey.

Operationalization of sexual orientation. Sexual orientation was conceptually defined as how an individual views his or her sexual identity (Boroughs et al., 2010). For this study, sexual orientation was operationally defined as participant self-reports of a gay, heterosexual, or bisexual identity as measured with the demographic survey.

Rosenberg Self-Esteem Scale. The RSE was developed by Rosenberg (1965). This scale is appropriate to the current study because I measured the independent variable of self-esteem. Permission from the developer to use the instrument was not required

because the instrument is readily available online. Self-esteem, which was defined as attitudes of approval or disapproval toward self, is assessed with the RSE. The RSE contains 10 Likert-format items and subjects respond with *strongly agree*, *agree*, *disagree*, and *strongly disagree* for a total score reflecting self-esteem levels. A 2-week test-retest reliability coefficient of .85 has been shown. A concurrent validity Pearson's correlation coefficient with other self-esteem measures ranging from .56 to .83 has also been demonstrated, and satisfactory construct validity was reported (Rosenberg, 1979). Specifically, Pearson's correlation of .67 with the Kelly Repertory Test, .83 with the Health Self-Image Questionnaire, and .56 with interviewers' ratings of self-esteem were reported by Silbert and Tippett (1965).

Operationalization of self-esteem. Self-esteem was conceptually defined as feelings toward the self and the appearance of the self (Parnell, 2011). For this study, self-esteem was operationally defined by participant self- reports and was measured with the RSE (Rosenberg, 1965). The scale ranges from 0-30. Scores between 15 and 25 are within normal range; scores below 15 suggest low self-esteem. An item example is "I feel that I am a person of worth, at least on an equal plane with others."

Data Analysis Plan

SPSS statistical software was used for the analysis of data. In the analysis, I addressed the following research questions and hypotheses:

Research Question 1: Is race/ethnicity among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$1: Race/ethnicity, as measured by the Demographic Survey, will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$1 Race/ethnicity, as measured by the Demographic Survey, will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #2: Is sexual orientation (gay, heterosexual, bisexual) among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$2: Sexual orientation (gay, heterosexual, bisexual), as measured by the Demographic Survey, will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$2: Sexual orientation (gay, heterosexual, bisexual), as measured by the Demographic Survey, will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #3: Is self-esteem among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$3: Self-esteem, as measured by the RSE (Rosenberg, 1965), will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$3: Self-esteem, as measured by the RSE (Rosenberg, 1965), will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #4: Is body dissatisfaction among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$4: Body dissatisfaction, as measured by the Body Esteem Scale for Adolescents and Adults (Adkins & Stivers, 2006; Mendelson e tal., 2001), will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$4: Body dissatisfaction, as measured by the Body Esteem Scale for Adolescents and Adults (Adkins & Stivers, 2006; Mendelson et al., 2001), will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #5: Is bodybuilding dependence among adolescent males a significant predictor of muscle dysmorphia symptomology?

H15: Bodybuilding dependence, as measured by the Bodybuilding Dependence Scale (Smith, Hale, & Collins, 1998), will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$5: Bodybuilding dependence, as measured by the Bodybuilding Dependence Scale (Smith et al., 1998), will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Analysis plan. Multiple regression analysis was used to determine whether the independent variables predict the dependent variable in order to address the research questions and test the hypotheses.

Threats to Validity

Threats to internal validity included instrumentation because self-report measures were used. I used identification numbers instead of names to address this issue. Threats to external validity included testing reactivity, which was also addressed with the anonymity assurance. Threats to construct validity were dealt with by using valid and reliable test instruments.

Ethical Procedures

IRB approval was obtained prior to participant selection**.** Participants were informed that anonymity, confidentiality, and privacy of the participant was maintained with the use of identification numbers instead of names. Informed consent/assent was obtained from each participant and parent prior to study participation. Participants were informed that they may withdraw from the study at any time with no consequence. Data were kept in a secure place available only to me. Participants were informed that they may ask questions at any time to avoid any confusion, risk, or harm. The sample was not from a vulnerable population.

Summary

The main points presented in this chapter included a discussion of the research design and rationale, methodology, threats to validity, and ethical procedures. A quantitative, nonexperimental survey research design was used for this study. Chapter 4 will provide results of the study.

Chapter 4: Results

Introduction

The purpose of this study was to determine the factors related to muscle dysmorphia symptomology in adolescent males. Specifically, I determined if the independent variables of (a) race/ethnicity, (b) sexual orientation (gay, heterosexual, bisexual), (c) self-esteem, (d) body dissatisfaction, and (e) bodybuilding dependence predicted the dependent variable of muscle dysmorphia symptomology in a nonclinical sample of adolescent males. The research questions and hypotheses were as follows:

Research Question 1: Is race/ethnicity among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$1: Race/ethnicity, as measured by the Demographic Survey, will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$1 Race/ethnicity, as measured by the Demographic Survey, will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #2: Is sexual orientation(gay, heterosexual, bisexual) among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$2: Sexual orientation (gay, heterosexual, bisexual), as measured by the Demographic Survey, will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$2: Sexual orientation (gay, heterosexual, bisexual), as measured by the Demographic Survey, will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #3: Is self-esteem among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$3: Self-esteem, as measured by the RSE (Rosenberg, 1965), will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$3: Self-esteem, as measured by the RSE (Rosenberg, 1965), will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #4: Is body dissatisfaction among adolescent males a significant predictor of muscle dysmorphia symptomology?

$H_1$4: Body dissatisfaction, as measured by the Body Esteem Scale for Adolescents and Adults (Adkins & Stivers, 2006; Mendelson et al., 2001), will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$4: Body dissatisfaction, as measured by the Body Esteem Scale for Adolescents and Adults (Adkins & Stivers, 2006; Mendelson et al., 2001), will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Research Question #5: Is bodybuilding dependence among adolescent males a significant predictor of muscle dysmorphia symptomology?

*H*15: Bodybuilding dependence, as measured by the Bodybuilding Dependence Scale (Smith, Hale, & Collins, 1998), will significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

$H_0$5: Bodybuilding dependence, as measured by the Bodybuilding Dependence Scale (Smith et al., 1998), will not significantly predict muscle dysmorphia symptomology, as measured by the BDDE-SR (Rosen & Reiter, 1996), among adolescent males.

Chapter 4 provides a description of sample representativeness and data collection. The chapter includes a review of the descriptive statistics and summary of the statistical assumptions. The statistical results are then presented to the research questions and hypotheses.

Sample Representativeness and Data Collection

The Walden University IRB approved my data collection in May of 2015. I began my research in August 2015 and completed my research in April 2016. The research data were gathered at George Gervin Academy in San Antonio, Texas. The sample for the study represents the population of nonclinical high school male students. Teachers issued the survey to the 97 students who volunteered to participate by completing the surveys and returning to the teacher.

Descriptive Statistics

Table 1 presents the descriptive data for the demographic and information variables (gender, age, race/ethnicity, sexual identity). The sample consisted of 97 male students. Most participants reported their ethnicity as being African American (37.1%),

28.9% reported their ethnicity as Hispanic, and 15.5% reported as other. The majority of the participants in this study reported their sexual identity to be heterosexual (84.5%). The sample size was 97.

Table 1
Demographic Data for Participants

	Frequency	Percent
Race/Ethnicity		
White	5	5.2
Non-White	92	94.8
Sexual Identity		
Gay/Bisexual	5	5.2
Heterosexual	92	94.8

Statistical Assumptions

Assumptions for the regression analysis included that the underlying relationship between the independent and the dependent variables is linear. Data points in the scatterplot tended to be dispersed equally about all parts of the prediction line (Appendix G). Homoscedasticity is the assumption that the dependent variable exhibits similar amounts of variance across the range of values for an independent variable. Homoscedasticity was met (Appendix G). Skewness and kurtosis were analyzed to check for normal distribution. In order to use the proposed statistical analyses, the variables were assumed to be normally distributed. Dysmorphia symptomology scores were approximately normally distributed, with a skewness of .567 (*SE* = 247) and a kurtosis of -.525 (*SE* =.490). Body esteem total scores were approximately normally distributed with a skewness of .072 (*SE* =.246) and a kurtosis of -.503 (*SE* = .488). The RSE total

scores were approximately normally distributed with a skewness of -.205 (*SE* =.245) and a kurtosis of -1.036 (*SE* =.485). Mastery dependence (bodybuilding dependence) total scores were approximately normally distributed with a skewness of .365 (*SE* =.245) and a kurtosis of -.893 (*SE* = 485). Training dependence (bodybuilding dependence) total scores were approximately normally distributed with a skewness of -.116 (*SE* =.245) and a kurtosis of -.907 (*SE* =.485). Social dependence (bodybuilding dependence) total scores were approximately normally distributed with a skewness of .250 (*SE* =.245) and a kurtosis of -.450 (*SE* = 485) (Appendix F). Multicollinearity assumption results are shown in Table 2. Table 3 shows the means and standard deviations for all variables.

Table 2

Multicollinearity Results

Factor	Collinearity Statistics: Tolerance	VIF
Body Esteem	.703	1.42
Self Esteem	.735	1.36
Bodybuilding Dependence		
Mastery Dependence	.530	1.88
Training Dependence	.216	4.62
Social Dependence	.248	4.03
Ethnicity Binary	.977	1.02
Sexuality Binary	.952	1.05

Table 3

Means and Standard Deviations All Variables

Variable	N	Min	Max	Mean	Std Deviation
Dysmorphia Symptomology	95	2.00	116.00	47.82	30.30
Body Esteem	96	27.00	95.00	66.66	14.99
Self Esteem	97	13.00	30.00	22.84	5.04
Bodybuilding Dependence					
Mastery Dep.	97	2.00	14.00	6.36	3.75
Training Dep.	97	3.00	21.00	11.13	5.39
Social Dep.	97	5.00	35.00	16.91	8.42

Study Results

The findings from a regression analysis were designed to determine if race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence among adolescent makes significantly predicts muscle dysmorphia symptomology. These factors significantly predicted the outcome [$F(7, 86) = p<.01$]. The full model was significant with adjusted R^2 of .332.

Research Question 1

RQ 1 asked the following**:** Is race/ethnicity (White, non-White) among adolescent males a significant predictor of muscle dysmorphia symptomology? The null hypothesis stated that race/ethnicity will not significantly predict muscle dysmorphia symptomology among adolescent males. In the analysis, I found that race/ethnicity was a significant

predictor of muscle dysmorphia symptomology (t=-3.030, p =.003, B =-4.142). Whites reported a higher level of muscle dysmorphia symptomology compared to non-Whites.

Research Question 2

RQ 2 asked the following: Is sexual orientation (gay/bisexual, heterosexual) among adolescent males a significant predictor of muscle dysmorphia symptomology? The null hypothesis stated that sexual orientation (gay/bisexual, heterosexual) will significantly predict muscle dysmorphia symptomology among adolescent males. The findings were not significant and did not support the hypothesis. Coefficients based on a regression analysis showed that sexual orientation was not a significant predictor of muscle dysmorphia symptomology (t= 1.753, p=.083).

Research Question 3

RQ 3 asked the following: Is self-esteem among adolescent males a significant predictor of muscle dysmorphia symptomology? The null hhypothesis stated that self-esteem will significantly predict muscle dysmorphia symptomology among adolescent males. The findings were not significant and did not support the hypothesis. Coefficients based on a regression analysis showed that self-esteem was not a significant predictor of muscle dysmorphia symptomology (t=1.587, p=.116).

Research Question 4

RQ 4 asked the following: Is body dissatisfaction among adolescent males a significant predictor of muscle dysmorphia symptomology? The null hhypothesis stated that body dissatisfaction will significantly predict muscle dysmorphia symptomology among adolescent males. The findings were significant and did support the hypothesis. Coefficients based on a regression analysis showed that body dissatisfaction was a

significant predictor of muscle dysmorphia symptomology, with higher dissatisfaction scores resulting in higher symptomology scores (t=-5.166, p =.000, B=-.540).

Research Question 5

RQ 5 asked the following: Is bodybuilding dependence (mastery, training, and social dependence) among adolescent males a significant predictor of muscle dysmorphia symptomology? The null hhypothesis stated that bodybuilding dependence (mastery, training, and social dependence) will significantly predict muscle dysmorphia symptomology among adolescent males. This hypothesis was broken down into three parts. Null Hypothesis 5a stated that mastery dependence will significantly predict muscle dysmorphia symptomology among adolescent males. Null Hypothesis 5b stated that training dependence will significantly predict muscle dysmorphia symptomology among adolescent males. Null Hypothesis 5c stated that social dependence will significantly predict muscle dysmorphia symptomology among adolescent males. Only training and social dependence were significant predictors, partially supporting the hypothesis, with higher levels of training and social dependence resulting in higher levels of muscle dysmorphia symptoms. Coefficients based on a regression analysis showed that mastery dependence was not a significant predictor of muscle dysmorphia symptomology (t= 1.483, p=.142, B =172). Coefficients based on a regression analysis showed that training dependence was a significant predictor of muscle dysmorphia symptomology (t=-3.649, p =.000, B =-.677) Coefficients based on a regression analysis showed that social dependence was a significant predictor of muscle dysmorphia symptomology (t=3.814, p =.000, B =.662) .

Summary

In the results, I found that race/ethnicity, body dissatisfaction, and bodybuilding dependence were significant predictors of muscle dysmorphia symptomology among adolescent males. For the variable of body building dependence, the subscales of body training and social dependence significantly predicted muscle dysmorphia symptomology among adolescent males. The subscale of mastery dependence did not significantly predict muscle dysmorphia symptomology among adolescent males. In the next chapter, I present a discussion of these findings with recommendations for future research.

Chapter 5: Summary, Discussion, and Conclusion

Introduction

The purpose of this quantitative research study was to determine if the independent variables of race/ethnicity, sexual orientation (gay/bisexual and heterosexual), self-esteem, body dissatisfaction, and bodybuilding dependence predict the dependent variable of muscle dysmorphia symptomology in a nonclinical sample of adolescent males. A quantitative, nonexperimental survey research design was used, and quantitative surveys were used to gather data from a group of high school male adolescents. The key study variables included the independent variables of race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence and the dependent variable of muscle dysmorphia symptomology. Multiple regression analysis was used to determine whether the independent variables predict the dependent variable. This study was conducted because BDD is a problem in adolescents that tends to be underdiagnosed and treated, and the causes and factors related to this disorder are not well understood (Brewster, 2011; Leone et al., 2005). In this chapter, I present a summary of research objectives and findings related to research questions. I explain the significance of the findings and their relevance to previous research as well as study limitations. In the conclusion, I address implications of the results and recommendations for future studies.

Research Objective

The general research objective was to demonstrate whether race/ethnicity, sexual orientation (gay/bisexual and heterosexual), self-esteem, body dissatisfaction, and bodybuilding dependence predict the dependent variable of muscle dysmorphia

symptomology in a nonclinical sample of adolescent males. The research objective was to demonstrate the predictive ability of each factor separately and together.

Summary of Key Findings

The main findings from the study included that race/ethnicity was a significant predictor of muscle symptomology, which supported the study hypothesis. Another finding was that sexual orientation was not a significant predictor of muscle symptomology, which did not support the study hypothesis. Self-esteem was not a significant predictor of muscle symptomology, which did not support the study hypothesis. Body dissatisfaction was a significant predictor of muscle symptomology, which supported the study hypothesis. Bodybuilding dependence (training and social dependence) was a significant predictor of muscle symptomology, which supported the study hypothesis.

Interpretation of the Findings

There are several observations and conclusions that can be drawn based on the study findings. First, race/ethnicity significantly predicted muscle symptomology. Therefore, culture and ethnicity may be factors involved in this symptomology as was pointed out by Baghurst and Kissinger (2009) and Brewster (2001) because culture impacts race/ethnicity. Baghurst and Kissinger reported that the White males had desires for a lean and muscular physique, which may be related to symptomology, indicating the need to understand how race/ethnicity relates to symptomology. The finding that self-esteem was not a significant predictor of muscle symptomology was not consistent with previous literature. However, it is important to consider other factors such as body dissatisfaction that might impact self-esteem that had the potential to influence the study

findings. As noted by the American Association of Suicidology (2014) and Phillips et al. (2006), there are multiple factors that impact self-esteem, such as impaired functioning; poor grades; excessive school absences due to self-consciousness; shame; and high rates and levels of impairment in school, work, and other social areas that need to be controlled for or measured to determine and explain the effects of the self-esteem variable. Body dissatisfaction was found to be a significant predictor of muscle symptomology, which supported findings from previous studies. However, although certain aspects of bodybuilding dependence (training and social dependence) were significant predictors of muscle symptomology, mastery dependence was not found to be significant. This was not consistent with previous studies in which researchers showed that mastery dependence was a predictor of muscle dysmorphia, which implies the need to further study this factor.

Comparison to Previously Published Studies

The finding that race/ethnicity significantly predicted muscle dysmorphia symptomology among adolescent males was consistent with the previous claims by Readdy et al. (2011) who reported that sociocultural appearance demands were among the factors that predicted muscle dysmorphia. Readdy et al. concluded that muscle dysmorphia is related to perceptions of pressure to attain an attractive body. In this study, I examined Whites and non-Whites and found that race/ethnicity was a significant predictor of muscle dysmorphia symptomology. Sociocultural appearance demands may be predictive factors of muscle dysmorphia. I reported a higher rate of muscle dysmorphia in Whites as well, which was consistent with reports by Baghurst and Kissinger (2009) and Brewster (2001) who noted that culture and ethnicity impact views

of the ideal body. Baghurst and Kissinger reported that there is an ideal human physique presented in the United States and other Western societies. For Baghurst and Kissinger's study, all of the study participants were White, and in this culture, the male physique is lean and muscular, which would result in men attempting to obtain this body type to receive related social rewards. While their study included only White participants, Baghurst and Kissinger concluded that it is important to understand race and culture as it relates to body ideals and disorders because this factor may be related to outcomes such as muscle dysmorphia. Ideals found among different races may impact behaviors that can lead to muscle dysmorphia. My study results are also consistent with the findings presented by Brewster (2011) who reported that there are biological, psychological, and sociological factors that contribute to a body dysmporphic disorder. There can be sociological factors, such as cultural views related to what beauty is, that are linked to this disorder. Also consistent with my study findings were those presented by Fikkan and Rothblum (2012) and Tylka and Calogero (2011). Fikkan and Rothblum found that ethnicity was a factor in weight stigma issues, with non-White populations having more body weight and being more satisfied with this weight. Tylka and Calogero reported that culture provides standards for body appearance and display for both men and women. For example, in Western cultures, gendered body ideals are presented, revered, and aspired to. Tylka and Calogero concluded that race was related to body ideals that a person aspires to achieve.

The finding that self-esteem did not significantly predict muscle dysmorphia symptomology among adolescent males was not consistent with the findings presented by Bilger (1998) who reported that muscle dysmorphia is common in body builders because

bodybuilding is a defense against low self-esteem; however, this conclusion was not specifically assessed. In addition, my study findings are not consistent with claims by Baghurst and Kissinger (2009) who reported that muscle dysmorphia may be result from sociocultural factors and related pressures, low self-esteem, and body dissatisfaction or distortion. Body distortion and dissatisfaction with an internalized view of the ideal body can lead to low self-esteem and result in muscle dysmorphia. This cycle can also result in overtraining, exercise addiction or dependence, and further low self-esteem. Grieve et al. (2008) also reported that social physique anxiety, or the anxiety felt due to beliefs that the body is being evaluated, can lead to symptoms of muscle dysmorphia and low self-esteem. Grieve et al. found that men with this social physique anxiety tended to have lower self-esteem, exercise more for self-presentational reasons, and had more symptoms of muscle dysmorphia. The findings by Grieve et al. were not consistent with my study results.

The finding that body dissatisfaction significantly predicted muscle dysmorphia symptomology among adolescent males was consistent with the previous claims by Leone et al. (2005) who found that muscle dysmorphia is due in part to pressures for males to appear more muscular. Thus, a male, and in particular a male athlete, may suffer from a body image disorder due to this pressure. In this manner, body dissatisfaction is linked to muscle dysmorphia. The need to become large and muscular and overcome body dissatisfaction or the need to obtain an ideal body predicts muscle dysmorphia. This disorder is a part of the body dysmorphic disorder classification. Leone et al. also reported that adolescents are at increased risk for developing body image disorders, such as muscle dysmorphia because they may be preoccupied with

obtaining an ideal body. My study findings can be explained by the results presented by Esco et al. (2005) who also reported that muscle dysmorphia is due to a body image problem. Those with this disorder feel that they have a defect in their appearance; they suffer from poor body images and low self-esteem, and this leads to body building dependence because they will choose exercise over other obligations.

Current study findings regarding the presence of body dissatisfaction in those with muscle dysmorphia are consistent with those presented by multiple researchers. For example, Olivardia et al. (2000) reported that men with muscle dysmorphia suffer from body dissatisfaction and other disorders. These men reported feelings of embarrassment and shame, resulting impairments in social and occupational functioning (Olivardia et al., 2000). Choi et al. (2002) reported that men with muscle dysmorphia had poorer body images and were less satisfied with their bodies. They wanted to increase muscularity. Pope et al. (2000) studied the influences of race and culture on body image perception and found little differences in outcomes except for measures of muscularity. For all countries assessed, men chose an ideal body of around 28 pounds more muscular than themselves, and they estimated that women preferred a male body of around 30 pounds more muscular than themselves (Pope et al., 2000). Pope et al. concluded that this body discrepancy and dissatisfaction was a factor in muscle dysmorphia. Burlew and Shurts (2013) reported that male adolescents and adults suffer from body image dissatisfaction/distress that tends to be unrecognized and under diagnosed.

Hildebrandt et al. (2006) reported that those with muscle dysmorphia were muscle concerned and had body image disturbances with appearance-controlling behavior. Cafri et al. (2008) reported that males with current muscle dysmorphia reported more negative

body appearance symptoms, with recurrent thoughts about muscularity, appearance dissatisfaction and checking, and bodybuilding dependence. Nishina et al. (2006) studied body dissatisfaction and physical development among a group of ethnic minority adolescents. These authors found that across ethnic groups, there were more similarities than differences related to body dissatisfaction. Male participants reported similar levels of body dissatisfaction and related psychosocial maladjustment. Female participants reported differences with lower levels of body dissatisfaction in African American girls compared other ethnic backgrounds.

Petrie et al. (2010) studied the biopsychosocial and physical correlates of body satisfaction in U.S. middle school boys and girls from grades six through eight. Findings were that gender was a factor in body satisfaction. Females were most influenced by weight loss pressures and males were most influenced by gaining weight and musculature regarding body satisfaction. Schrick et al. (2012) reported that the need to appear perfect is related to psychological distress. The internalization of the thin ideal and competitiveness predicts distress among women who tried to appear perfect. Schrick et al. concluded that attempting to appear perfect to others was related to higher levels of distress and this is related to the relationship between body image and distress. Thus, trying to appear perfect results in body distress.

In addition to the above mentioned studies, the current study findings were mostly consistent with those presented by researchers who investigated body dysmorphia issues with adolescents. For example, current study findings are consistent with those presented by Brewster (2011) who reported findings that during adolescence, concerns about physical appearance are a particular focus. This can lead to severe distress and anxiety

that interrupts daily living. Exaggerated fears with dysfunctional body dissatisfaction thoughts can lead to maladaptive behaviors and development body dysmorphic disorder. Muscle dysmorphia is a type of body dysmorphic disorder that is characterized by a preoccupation with thoughts that the body is flawed (Brewster, 2011).

Current study findings are also consistent with those presented by the American Association of Suicidology (2014). Body dysmorphia disorder is related to maladaptive views of the appearance that typically begins in adolescence. These individuals are preoccupied with their appearance despite being assured by others. In addition, findings show that risk factors include poor self-esteem, which is a finding not consistent with current study results. Phillips, Didie, Menard, Pagano, Fay, and Weisberg (2006) also reported findings consistent with current study results that maladaptive appearance views are found in body dysmorphic disorder in adolescents and adults. These authors noted that the adolescents were preoccupied with their appearance and more delusional than adults. However, as noted bythe American Association of Suicidology (2014) and Phillips et al. (2006), there are other factors to consider that might impact outcomes such as impaired functioning, poor grades, excessive school absences due to self-consciousness, shame, and high rates and levels of impairment in school, work, and other social areas. These areas require further research and are considered in recommendations for future research.

The finding that bodybuilding dependence (training and social dependence) significantly predicted muscle dysmorphia symptomology among adolescent males, is consistent with the previous claims. McCabe and Ricciardelli (2003) conducted a longitudinal study of body change strategies among adolescent males and explored

change strategies of increase weight, increase muscles, eating and exercise to lose weight, bingeing, and food supplements. McCabe and Ricciardelli concluded that extreme body change strategies predicted early use of normative body change strategies and these were impacted by perceived parent and peer pressure. Thus, adolescent males may use strategies such as increasing muscles (training) to change their body when dissatisfied (social dependence).

As noted above, Baghurst and Kissinger (2009) reported that muscle dysmorphia may result from sociocultural factors and related pressures, low self-esteem, and body dissatisfaction or distortion. Consistent with this study findings, they also reported that body distortion and dissatisfaction, with an internalized view of the ideal body, can lead to low self-esteem and result in muscle dysmorphia, over-training, exercise addiction or dependence, and further a person's low self-esteem. These findings are consistent with current study results that social dependence and training were related to muscle dysmorphic symptoms. However, while Baghurst and Kissinger found that exercise addiction or dependence was also related to muscle dysmorphic symptoms, findings from this study were that mastery dependence was not a significant predictor.

Grieve et al. (2008) also reported that social physique anxiety or the anxiety felt due to beliefs that the body is being evaluated, can lead to symptoms of muscle dysmorphia, low self-esteem, and increased exercise for self-presentational reasons. Additionally, study findings regarding the relationship between body building dependence and body dissatisfaction, are consistent with those presented by Bilger (1998). The link between body building dependence and body dissatisfaction was noted by Bilger (1998) who discussed "barbell blues". With this view, healthy practices of

muscle building can become pathological in a desperate attempt to build the body and overcome feelings of body dissatisfaction. This unhealthy exercise regimen is identified as muscle dysmorphia (Bilger, 1998).

The finding that body dissatisfaction is related to muscle dysmorphia is also consistent with those presented by Davies, Smith, and Collier (2011), who reported that among male recreational bodybuilders and steroid users, former users were more susceptible to muscle dysmorphia characteristics to include physique protection and body distortion or dissatisfaction. Brewster (2011) reported that body dysmporphia is related to delusional obsessions about physical appearance. Individuals suffering from this disorder, describe themselves negatively with regard to a body part. This can lead to behaviors designed to change appearance such as extreme exercising. The findings that race/ethnicity, body dissatisfaction, and bodybuilding dependence significantly predicted muscle dysmorphia symptomology among adolescent males, are consistent with the many previous claims noted above.

The psycho-behavioral model of muscle dysmorphia was used as the theoretical framework for this study (Lantz, Rhea, & Mayhew, 2001). This framework can be used to help understand that psychological factors such as self-esteem and body dissatisfaction and behavioral factors such as bodybuilding dependence may predict muscle dysmorphia. However, current study findings did not show that self-esteem predicted muscle dysmorphia. Specifically, Lantz et al. identified self-esteem and body dissatisfaction as factors that lead to increased motivation to engage in exercises for physique development. When muscles are developed, self-esteem increases which leads to an increased commitment to the exercise regimen and a dependence on this regimen. The

study finding that self-esteem did not significant predict muscle dysmorphia symptomology among adolescent males, did not support this psycho-behavioral model. The notion that adolescents build muscles to build their self-esteem, which leads to a dependence and muscle dysmorphia symptoms, was not fully supported by current study findings.

Current study findings were more consistent with those presented by Parnell (2011). Parnell used the psycho-behavioral model as a theoretical framework in a study designed to explore the relationship between self-esteem, body dissatisfaction, muscle dysmorphia, and exercise dependence. Parnell found no significant relationship between self-esteem and muscle dysmorphia. However, the significant relationship between body dissatisfaction and muscle dysmorphia, and between muscle dysmorphia and exercise dependence was supported. Thus, Parnell provided only partial support for the psycho-behavioral model of muscle dysmorphia.

For psycho-behavioral model of muscle dysmorphia, there are potential behavioral characteristics that develop from muscle dysmorphia and these include body size/symmetry, physique protection or hiding, and bodybuilding dependence. Each of these factors can lead to pathological attitudes and behaviors (Lantz et al., 2001). Negative attitudes toward the body can lead to diet and other behavioral changes to develop the physique and this development reinforces the behaviors. This reinforcement further strengthens the link between self-esteem and body dissatisfaction and pathological attitudes regarding physical development (Lantz et al., 2001). The study findings that body dissatisfaction and bodybuilding dependence significantly predicted muscle dysmorphia symptomology among adolescent males, helps to support this theory. In

addition, the psycho-behavioral model of muscle dysmorphia can be used to explain study findings. The pathological attitude of body dissatisfaction leads to behaviors such as bodybuilding to overcome these negative attitudes and this results in bodybuilding dependence. Current study findings were in part consistent with those presented by Parnell (2011). Again, Parnell used the psycho-behavioral model as a theoretical framework and found a significant relationship between body dissatisfaction and muscle dysmorphia, and between muscle dysmorphia and exercise dependence. The psycho-behavioral model of muscle dysmorphia did not help explain current study finding that race/ethnicity predicted muscle dysmorphia symptomoloty and sexual orientation did not predict muscle dysmorphia symptomology among adolescent males.

Limitations

There were study limitations due to sample, method and design, measurement tools, and procedures. The sample selected for this study was from a low social economic high school located on the Northeast side of San Antonio, Texas. This volunteer population of this research may not be generalizable to nonvolunteers or other samples in other locations. The study is further limited by the use of adolescents which may not represent students of a higher socioeconomic background, limiting generalizabilty. Thus, the subjects represented the adolescent high school student population, but the use of a volunteer, convenience sample limits the external validity of the study since findings may not be generalizable to all non-volunteer adolescent high school students of all other socioeconomic backgrounds. Since adolescent high school students were included in the study, it is assumed that findings can be generalized to only other male adolescent high school students.

The use of a quantitative study allowed for the gathering of numerical data and statistical analysis for hypothesis testing. However, since the study variables were not and cannot be directly manipulated results were observed from existing groups and this limited the findings to descriptions. There are limitations of a correlation design which include that findings do not show causal relationships; this study showed the predictive value of factors which does not imply causality.

Recommendations

Since there are study limitations due to the sample, it is recommended that it be replicated in a future study and include a larger sample of clinical and nonclinical samples of adolescent males. A comparison of the two groups would determine which predictor variables are significantly related to muscle dysmorphia symptomology for each groups. The assessment of additional characteristics such as age, multiple geographic location, socioeconomic status, academic performance, family support, clinical and nonclinical groups is recommended for a future study since these variables may have influenced outcomes of the current study.

Since the study is limited by its design, the use of a mixed study would allow for the gathering of both quantitative and qualitative data which would have helped to further explain or verify findings since participants would have a chance to provide more detailed information to explain quantitative results. Further, it is recommended that a future study explore multiple variables that were not controlled for in the current study or that might have influenced the factors assessed. For example, there can be multiple factors that impact self-esteem such as impaired functioning, poor grades, excessive school absences due to self-consciousness, shame, and high rates and levels of

impairment in school, work, and other social areas, that need to be controlled for or measured to determine and explain the effects of the self-esteem variable (American Association of Suicidology, 2014; Phillips et al., 2006).

While this study provided important and useful information regarding whetherrace/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence to predict muscle dysmorphia symptomology, a more comprehensive of understanding of the topic would be beneficial. For example, it would be helpful to understand whether factors such as socioeconomic status which might be related to self-esteem and other factors, such as body issues or eating disorders that may impact outcomes regarding predictors of muscle dysmorphic symptoms.

Implications

Implications based on the psycho-behavioral model of muscle dysmorphia are that body dissatisfaction and bodybuilding dependence predict muscle dysmorphia, which was supported by the current study findings. These results align with this theory since these factors were theorized to be related to muscle dysmorphia. Implications for adolescent students, practitioners, and educators are that factors that predict muscle dysmorphia must be understood and provided to help educate teens and the public, to recognize predictors of muscle dysmorphia and help prevent this outcome.

Positive Social Change

Findings help fill the gap in the literature regarding the presence of muscle dysmorphia symptoms and predictive factors of race/ethnicity, body dissatisfaction, and bodybuilding dependence in a nonclinical adolescent male sample. These findings have a potential positive impact on social change at the individual and professional level. At the

individual level, findings support the individual at risk for development of muscle dysmorphia symptoms with new information regarding factors that predict this outcome. For example, an individual who is more informed about the risk factors may be more able to change behaviors before they become a problem. At the professional level, findings support professional practice with new insights into the identification and treatment of males with muscle dysmorphia. Findings provide information that race, body dissatisfaction, and body building dependence, if present, may indicate an individual is at risk for developing muscle dysmorphia. In this manner, schools could provide teens with information to help them deal with symptoms that may lead to muscle dysmorphia which may alter the outcome. Study results point to the need for practitioners treating this disorder or adolescents in general and to consider the importance of race/ethnicity, body dissatisfaction, and bodybuilding dependence. These factors must be considered predictors of muscle dysmorphia and potential treatment issues. Prevention is another method of treatment. Implications for positive social change include that study findings can be used as a prevention strategy, to support the development of psychoeducational programs presented at high schools designed to help high school students become aware of muscle dysmorphia and risk factors.

The findings from this study provided information related to factors that can lead to muscle dysmorphia. Study findings also support the theoretical framework used for the study, the psycho-behavioral model of muscle dysmorphia. This framework posits that factors such as self-esteem, body dissatisfaction, and bodybuilding dependence predict muscle dysmorphia, which was partially supported by the current study findings.

Conclusions

Body dysmorphic disorder is a problem in adolescence that is under diagnosed and untreated (Bjornsson et al., 2013; Boroughs et al., 2010; Readdy, 2011). The causes and factors related to this disorder are not well understood (Burlew & Shurts, 2013). This problem can be severe enough to result in suicide attempts (Bjornsson et al., 2013). The specific problem for this study was that more information was needed to fill the gap in the literature to determine factors that predict muscle dysmorpic disorder in nonclinical adolescent males from local high schools. The purpose of this quantitative research study was to determine factors related to muscle dysmorphia symptomology in adolescent males. Specifically the purpose was to determine the relative strength of race/ethnicity, sexual orientation (gay/bisexual, heterosexual), self-esteem, body dissatisfaction, and bodybuilding dependence in predicting muscle dysmorphia symptomology in a nonclinical sample of adolescent males. A study was conducted with adolescent males using surveys to assess the variables.

Research findings have revealed factors related to muscle dysmorphia symptomology including race/ethnicity, levels of dissatisfaction with appearance, and bodybuilding dependence. However since these studies used adult male samples only, the current study was needed to explore these factors in an adolescent male sample. Studies of adolescents show that physical self-concept, social pressure, and self-esteem are critical issues with similar findings across ethnic groups. The current study filled the gap in the literature regarding factors that predict muscle dysmorphia symptomology (race/ethnicity, sexual orientation, self-esteem, body dissatisfaction, and bodybuilding dependence) using a nonclinical sample of male adolescents. While there were

limitations, this study is important since results provided information to help identify predictive factors which can provide information to individuals and health care providers to help prevent muscle dysmorphic disorder in adolescent males.

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Appendix A: Body Esteem Scale for Adolescents and Adults

Directions: For questions 1-21 indicate how often you agree with the following statements. Circle the appropriate number beside each statement.

Never = 1 Seldom = 2 Sometimes = 3 Often = 4 Always = 5

1. I like what I look like in pictures. 1 2 3 4 5

2. Other people consider me good looking. 1 2 3 4 5

3. I am proud of my body. 1 2 3 4 5

4. I am preoccupied with trying to change my body weight. 1 2 3 4 5

5. I think my appearance would help me to get a job. 1 2 3 4 5

6. I like what I see when I look in the mirror. 1 2 3 4 5

7. There are lots of things I'd change about my looks if I could. 1 2 3 4 5

8. I am satisfied with my weight. 1 2 3 4 5

9. I wish I looked better. 1 2 3 4 5

10. I which I looked like someone else. 1 2 3 4 5

11. People my own age like my looks. 1 2 3 4 5

12. My looks upset me. 1 2 3 4 5

13. I 'm as nice looking as most people. 1 2 3 4 5

14. I 'm satisfied with how I look. 1 2 3 4 5

15. I feel I weigh the right amount for my height. 1 2 3 4 5

16. I feel ashamed of how I look. 1 2 3 4 5

17. My weight makes me unhappy. 1 2 3 4 5

18. My looks help me to get dates. 1 2 3 4 5

19. I worry about the way I look. 1 2 3 4 5

20.I think I have a good body. 1 2 3 4 5

21. I look as nice as I'd like to. 1 2 3 4 5

Appendix B: Rosenberg Self-Esteem Scale (RSE)

Please answer the questions by choosing the most appropriate rating:

Strongly agree = 3

Agree = 2

Disagree = 1

Strongly disagree = 0

1. I feel that I am a person of worth, at least on an equal plane with others.
2. I feel that I have a number of good qualities.
3. All in all, I am inclined to feel that I am a failure.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I take a positive attitude toward myself.
7. On the whole, I am satisfied with myself.
8. I wish I could have more respect for myself.
9. I certainly feel useless at times.
10. At times I think I am no good at all.

Appendix C: Information Survey

Please answer the following questions by checking the appropriate response or filling in the blank:

1. Gender

__Male __Female

2. Age:_____

3. Race/ethnicity:

__White

__African American

__Hispanic

__Asian

__Pacific Islander

__Other identity

4. Please list your sexual identity:

__Gay

__Heterosexual

__Bisexual

Appendix D: Bodybuilding Dependence Scale

1. Do you ever weight train when you have a cold or flu?

1	2	3	4	5	6	7
Strongly disagree			Neither agree nor disagree			Strongly agree

2. Do you ever continue to weight train when you are injured?

1	2	3	4	5	6	7
Strongly disagree			Neither agree nor disagree			Strongly agree

3. I will not miss a scheduled weight training workout, even if I do not feel like training.

1	2	3	4	5	6	7
Strongly disagree			Neither agree nor disagree			Strongly agree

4.I feel guilty if I miss a weight training workout.

1	2	3	4	5	6	7
Strongly disagree			Neither agree nor disagree			Strongly agree

5. If I miss a weight training workout, I feel as if my muscle mass has shrunk.

1	2	3	4	5	6	7
Strongly disagree			Neither agree nor disagree			Strongly agree

6. My family and/or friends have complained about the amount of time I spend in weight training.

1	2	3	4	5	6	7
Strongly disagree			Neither agree nor disagree			Strongly agree

7. Weight training has totally changed my lifestyle.

1	2	3	4	5	6	7

Strongly	Neither agree	Strongly
disagree	nor disagree	agree

8.I plan my other daily activities around my weight lifting.

1	2	3	4	5	6	7
Strongly			Neither agree			Strongly
disagree			nor disagree			agree

9.In the event of a conflict of interest between my weight training and my job, my weight training would always come first.

1	2	3	4	5	6	7
Strongly			Neither agree			Strongly
disagree			nor disagree			agree

Scoring:
Social Dependence = Items 5+6+7+8+9
Training Dependence = Items 3+4+5
Mastery Dependence = Items 1+2

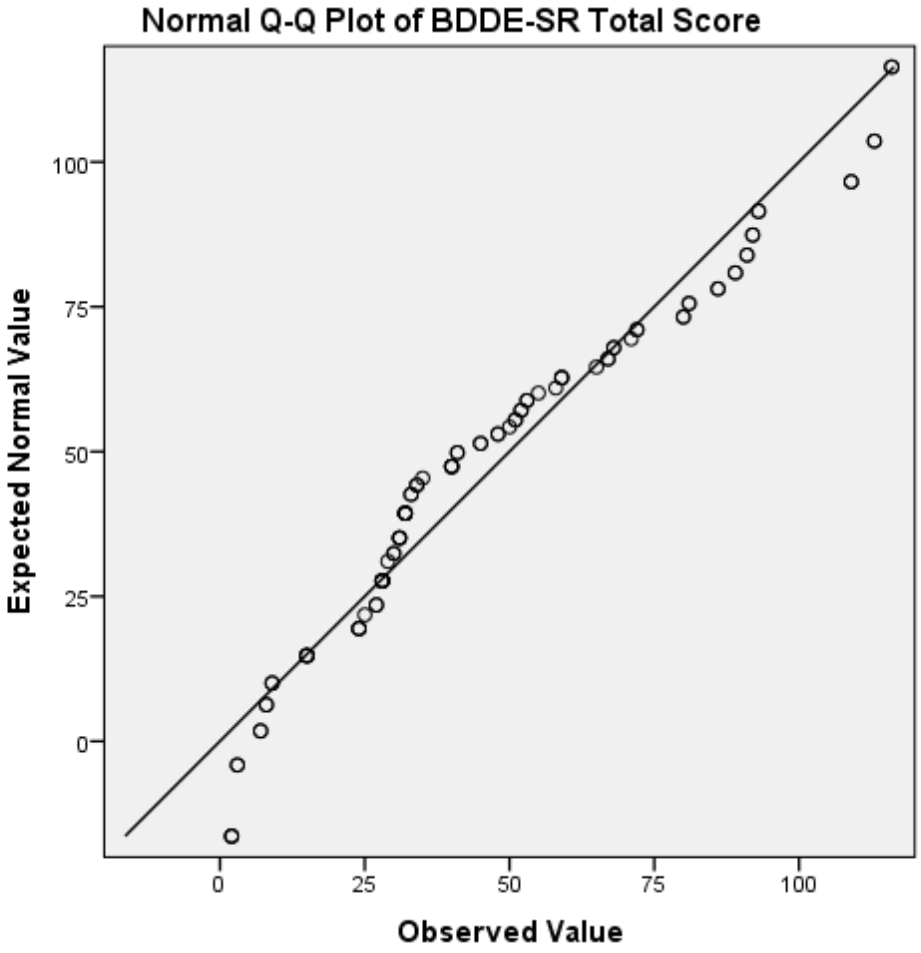
Appendix E: Skewness and Kurtosis

Descriptive Statistics

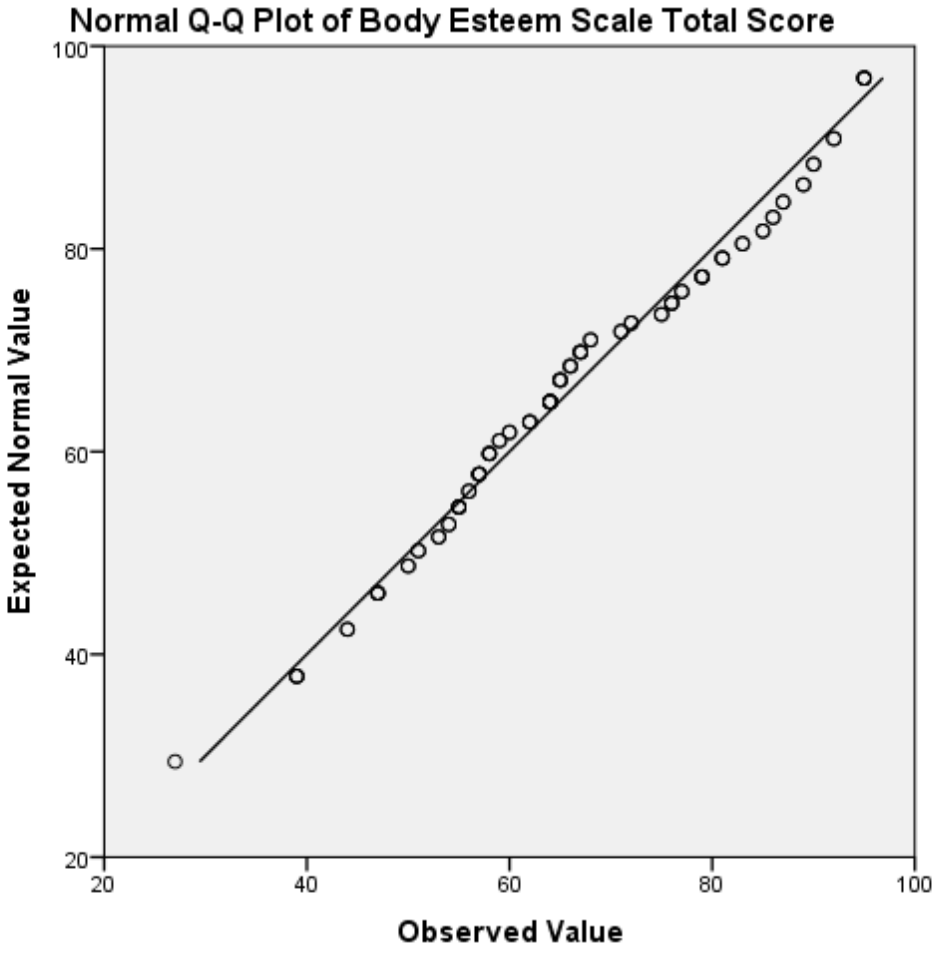
	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
BDDE-SR Total Score	.247	-.525	.490
Body Esteem Scale Total Score	.246	-.503	.488
Rosenberg Self Esteem Scale Total Score	.245	-1.036	.485
Mastery Dependence	.245	-.893	.485
Training Dependence	.245	-.907	.485
Social Dependence	.245	-.450	.485
Valid N (listwise)			

Appendix F: Q-Q Plots

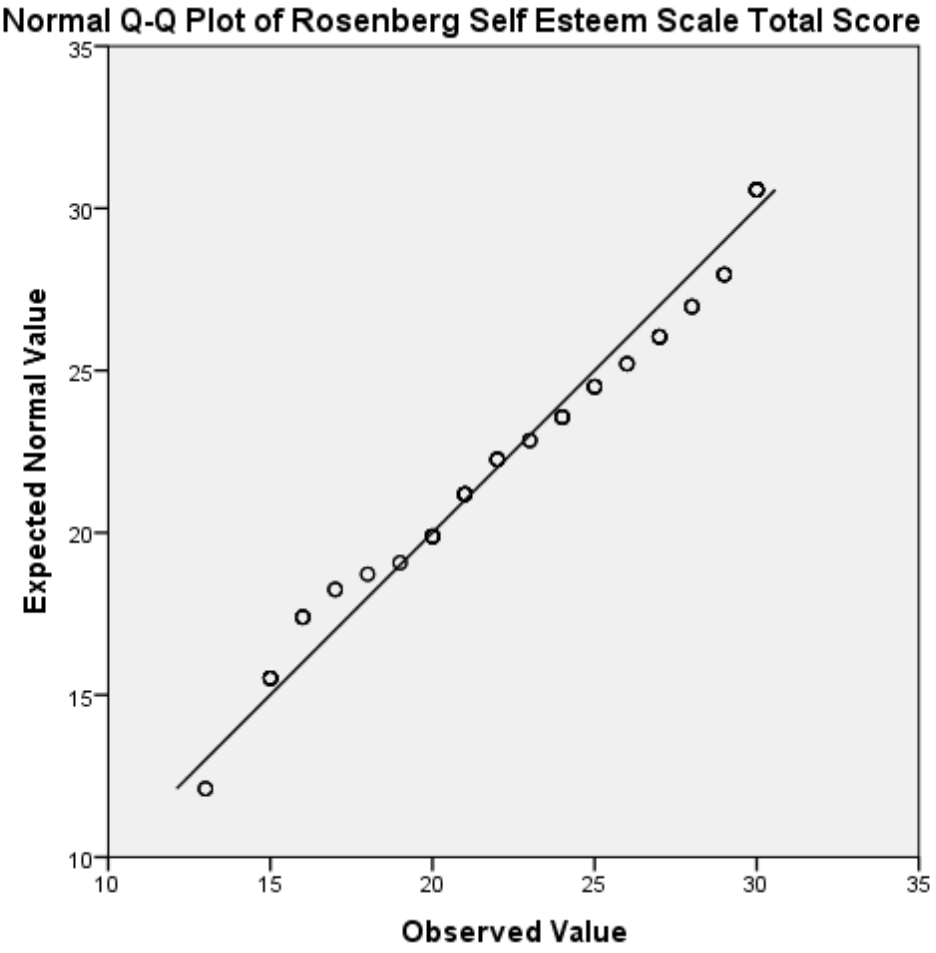
BDDE-SR Total Score



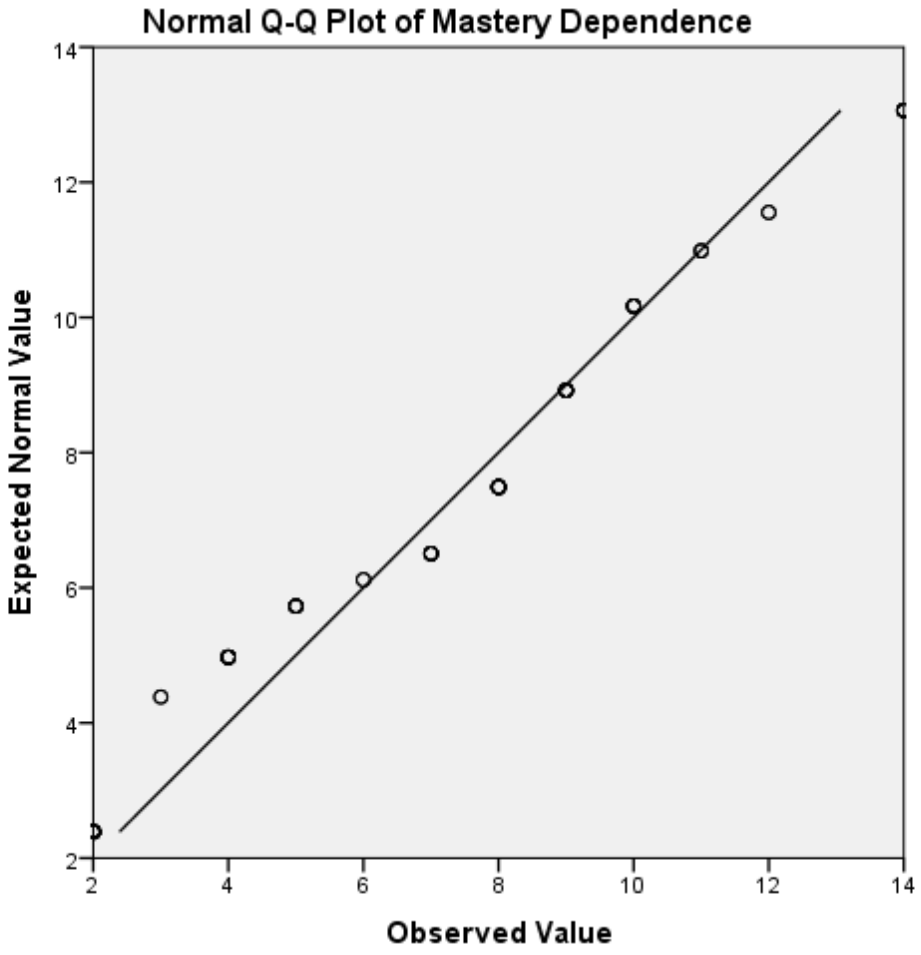
Body Esteem Scale Total Score



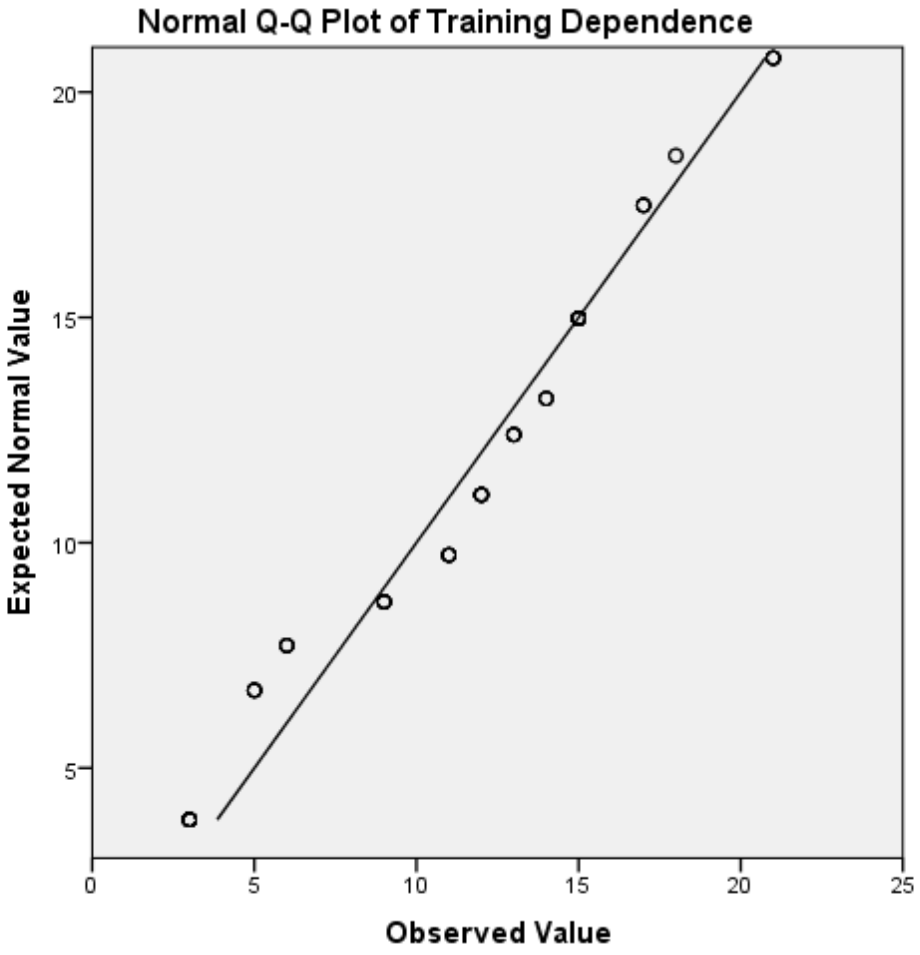
Rosenberg Self Esteem Scale Total Score



Mastery Dependence



Training Dependence



Social Dependence