6-12-2006

The Impact of Self-esteem, Media Internalization, Sexual Orientation, and Ethnicity on Drive for Muscularity in Men Who Work Out in Gyms

Jill Barker Baird

THE IMPACT OF SELF-ESTEEM, MEDIA INTERNALIZATION, SEXUAL ORIENTATION, AND ETHNICITY ON DRIVE FOR MUSCULARITY IN MEN WHO WORK OUT IN GYMS

by

JILL BARKER BAIRD

Under the direction of Lisa Lilenfeld

ABSTRACT

This study examined relationships among self-esteem, media internalization, sexual orientation, and ethnicity in predicting drive for muscularity in a diverse group of men (N = 217) who work out in gyms. Investigations examined media internalization and sexual orientation as moderators of the relationship between self-esteem and drive for muscularity. Additional analyses examined media internalization as a moderator of the relationships between a) sexual orientation and drive for muscularity and b) ethnicity and drive for muscularity. Standardized questionnaires were utilized to assess drive for muscularity, media internalization, self-esteem, sexual orientation, and ethnicity. While lower self-esteem predicted greater drive for muscularity, neither media internalization nor sexual orientation were significant moderators of this relationship. However, media internalization mediated the relationships between sexual orientation and drive for muscularity and between ethnicity and drive for muscularity. Findings suggest that the internalization of ideal muscularized images explain demographic differences in the drive to be more muscular.

INDEX WORDS: Drive for muscularity, Self-esteem, Media internalization, Sexual orientation, Ethnicity, Body image, Muscle dysmorphia

THE IMPACT OF SELF-ESTEEM, MEDIA INTERNALIZATION, SEXUAL ORIENTATION, AND ETHNICITY ON DRIVE FOR MUSCULARITY IN MEN WHO WORK OUT IN GYMS

by

Jill Barker Baird

A Thesis presented in Partial Fulfillment of Requirements for the Degree of

Master of Arts

in the College of Arts and Sciences

Georgia State University

2006

THE IMPACT OF SELF-ESTEEM, MEDIA INTERNALIZATION, SEXUAL ORIENTATION, AND ETHNICITY ON DRIVE FOR MUSCULARITY IN MEN WHO WORK OUT IN GYMS

by

JILL BARKER BAIRD

Major Professor:	Lisa Lilenfeld
Committee:	Greg Jurkovic
	Larry Riso

Electronic Version Approved:

Office of Graduate Studies
College of Arts and Sciences
Georgia State University
May 2006

To David,

Thank you for being my greatest support and life friend.

I could never have accomplished this without

your encouragement, unconditional love, and commitment.

Thank you for believing in me and for encouraging me to pursue my dreams.

You are an amazing creation of God,

and I am blessed beyond all to have you as my husband.

To Alaina and Angela,

Thank you both for letting your mommy work hard to pursue her dream.

I thank you for your sweet prayers each night and for all of your love, hugs, and kisses.

You are both my inspiration.

Thank you for keeping me focused on what is truly important-God and you!

Acknowledgements

I would like to thank my advisor Dr. Lisa Lilenfeld for her constant support, advice, and encouragement with this project. I am thankful for her expertise and am grateful to have been given the opportunity to work alongside her. I would also like to thank Greg Jurkovic for his invaluable statistical help. I also thank my family, David, Alaina, and Angela for their constant encouragement and for letting me spend the long hours to accomplish this goal.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

The Impact of Self-esteem, Media Internalization, Sexual Orientation, and Ethnicity on Drive for Muscularity in Men Who Work Out in Gyms

Body image, its importance, and its effects have not been studied nearly as extensively for men as they have been for women. While anorexia and bulimia nervosa occur primarily in females, it is estimated that 10-15% of eating disorders occur in males (Carlat & Camargo, 1991). Recent studies have suggested that many American men are dissatisfied with their bodies and that this dissatisfaction is associated with depression (Noles, Cash, & Winstead, 1985; Olivardia, Pope, Borowiecki, & Cohane, 2004**)**, eating pathology (Olivardia, Pope, Borowiecki, & Cohane, 2004; Stice, 2002), and low self-esteem (Olivardia, Pope, Borowiecki, & Cohane, 2004). The ideal image of men in the media has become increasingly muscularized, and more men are becoming obsessed with their body image and becoming more muscular.

Recent media attention has focused on athletes' steroid use in their pursuits of obtaining greater muscle mass and achieving more well-defined bodies. An unhealthy attempt to produce excessive muscle mass has been a concern among body builders for many years and is now a growing trend even among men who are not professional weightlifters (Pope, Phillips & Olivardia, 2000). The term "muscle dysmorphia" has been used to describe a "reverse anorexia nervosa" condition, in which one has comparably significant body dissatisfaction and body image distortion, but with the goal of achieving an excessively muscular build (Pope et al., 2000). These men also perceive

their bodies as thinner and less muscular than others see them. Although the presence of this condition has been documented worldwide (Cole, Smith, Halford, & Wagstaff, 2003; Olivardia, Pope, & Hudson, 2000; Pope, Katz, & Hudson, 1993; Stein, Hitzeroth, Wessels, Zungu-Dirwayi, & Oosthuizen, 2001), very little is known about potential risk factors for this condition. Standardized measures to evaluate body dissatisfaction and excessive muscularity idealization have been developed to explain how each factor may contribute to the development of disordered eating and dangerous muscle-building behavior.

Recent research suggests that among men who work out in gyms, those with lower self-esteem are most susceptible to media messages about the ideal male body, leading to increases in eating disordered behavior (Pope et al., 2000). Others suggest that sexual orientation may be an important risk factor for eating and body image problems in men, specifically with higher risk conferred by gay rather than heterosexual orientation (Herzog et al., 1991; Russell & Keel, 2002). Finally, little prior research has been conducted looking at the effects of ethnicity on muscle dysmorphia in men. The current study examined the effects of self-esteem on drive for muscularity among men who work out in gyms, and considered the impacts of media internalization, sexual orientation, and ethnicity. While the initial study design considered primarily the contributions of media internalization, self-esteem, and sexual orientation, the finding of ethnicity as an important covariate led to greater exploration of this particular variable as well. A depiction of the original model tested in this study is depicted in Figure 1.

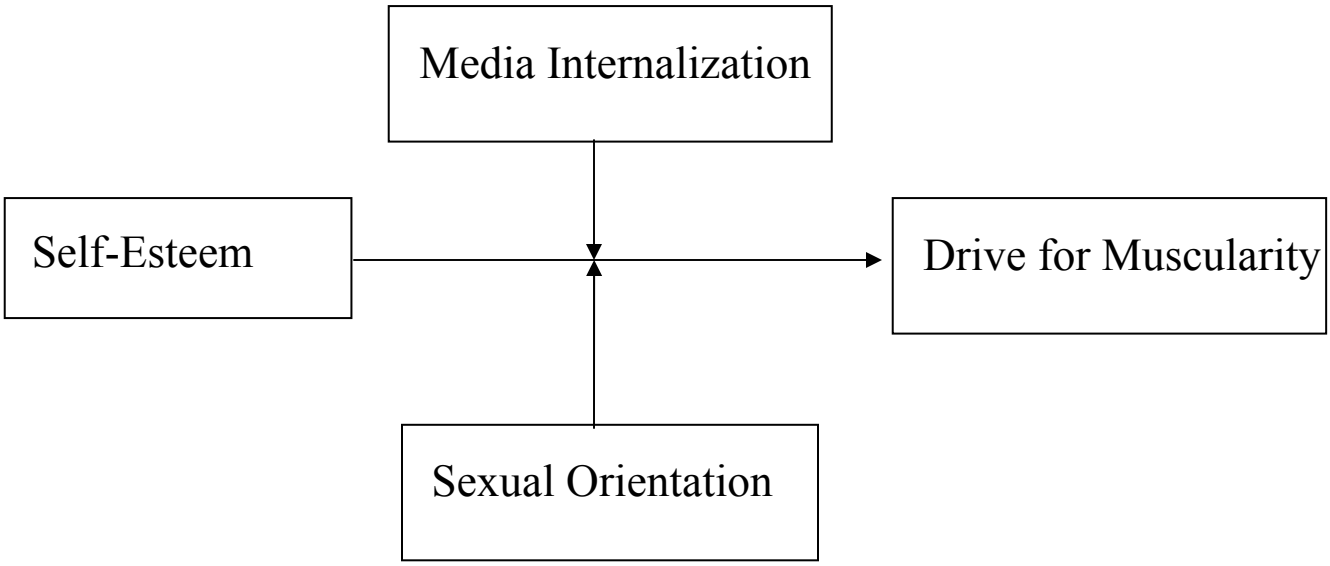


Figure 1. The impact of self-esteem, media internalization, and sexual orientation on drive for muscularity

The Rise of Male Body Obsession

While body dissatisfaction has long been a concern for women, there is evidence that body dissatisfaction among men is more widespread than previously believed and that disordered eating in men may be underreported (Pope, Phillips, & Olivardia, 2000; O'Dea and Abraham, 2002). Popular general surveys conducted in the U.S. in 1972, 1982, and 1996 have indicated an increasing trend in male body dissatisfaction (Cash, 1997; Garner, 1997). Men have reported more dissatisfaction with certain body parts than women, such as the chest or upper torso area (Cash, 1997; Garner, 1997). Also of concern is that an increasing number of men with eating disorders and body image problems were admitted into treatment from 1984 to 1997 in the U.S. (Braun, Sunday, Huang, and Halmi, 1999). This overly lean and muscular body shape ideal also has appeared to spread worldwide (Hitzeroth, Wessels, Zungu-Dirwayi, Oosthuizen, & Stein, 2001; O'Dea & Abraham, 2002; Pope et al., 2000). In a study of Venezuelan men, 47% reported that they constantly think about their appearance (Pope et al., 2000). In an Australian study of college men, one-fifth of the men reported concerns about their weight and shape and 9% to 12% reported unhappiness about their body shape (O'Dea & Abraham, 2002). With these growing trends, it is important to further elucidate the factors contributing to body dissatisfaction in men.

Steroid use is another major concern as men attempt to achieve more lean and muscular bodies. Studies suggest that the bodies achieved by male body builders and many male models are impossible to acquire by natural means (Kouri, Pope, Katz, & Olivardia, 1995; Pope & Brower, in press). Today, men are inundated with images of

muscular men whose bodies are indicative of steroid use. According to Pope and colleagues (2000), images of men in the media that could only be achieved by steroid use have become prevalent, creating insecurity in men and adolescent boys.

Muscle Dysmorphia and Drive for Muscularity

Unlike healthy men, those with body image problems often have distorted views of their bodies and are obsessed with trying to become more lean and muscular. This type of obsessive focus on becoming more muscular was first called "reverse anorexia nervosa", as it was viewed as the male counterpart to anorexia nervosa in women (Pope et al., 1993). Certain personality traits seen in anorexic women, such as neuroticism, perfectionism, and rigidity, are also characteristic of men who exercise obsessively (Pope et al., 2000). However, because men with this condition do not really have an eating disorder, but rather misperceptions and obsessions concerning their muscularity, the problem was renamed "muscle dysmorphia," a subtype of the psychiatric condition "body dysmorphic disorder" (Pope, Gruber, Choi, Olivardia, & Phillips, 1997). Although muscle dysmorphia is not currently recognized in the DSM-IV, criteria have been published using the DSM-IV format (Olivardia, 2001). Characteristics of this problem include excessive preoccupation with becoming leaner and more muscular, extreme concern about eating habits, and long hours spent working out and lifting weights. Excessive preoccupation often takes the form of giving up important social events and job related or recreational activities to maintain a diet and workout schedule. Social and other areas of functioning are often impaired because of the preoccupation with exercise.

Also, these individuals continue their workout, dieting, and often steroid use, even though they know that it is detrimental to their physical and mental health.

A drive for increased musculature, which is often an integral part of muscle dysmorphia, has been associated with body image concerns and increased eating disturbances (Pope et al., 1993; McCreary & Sasse, 2000; Yelland & Tiggeman, 2000). Drive for muscularity has also been associated with poor self-esteem in adolescents (McCreary & Sasse, 2000). However, these relationships need to be studied further both in adolescents and adult men.

The Influence of the Media

The media has contributed to the notion of a hypermuscular ideal, further fueling men's ideas about ideal appearance. A study by Pope, Olivardia, Gruber and Boroweicki (1999) revealed that current GI Joe action figures are disproportionately muscular and are characterized by overly developed chest and shoulder muscles with wide shoulders and a narrow waist. These unrealistic images have also become quite common in magazines and on television (Leit, Pope, & Gray, 2001; Spitzer, Henderson, & Zivian, 1999). For example, Leit et al. (2001) found that the average centerfold in *Playgirl* had lost fat while putting on 27 pounds of muscle over the last 25 years. Popular figures such as "Hulk Hogan" and professional wrestlers also contribute to the image of an ideal masculine body that is generally achieved through steroid use (Pope et al., 2000). These images can be particularly dangerous, as such unrealistic body types are generally not attainable without the use of steroids or other body-enhancing drugs (Pope et al., 2000).

The number of undressed men in advertisements has also increased over the last thirty to forty years, and men's magazines such as GQ and Men's health have become more popular (Pope et al., 2000). Viewing of muscle and fitness magazines by men has been shown to correlate positively with greater levels of body dissatisfaction (Duggan & McCreary, 2004). This same study also found a positive correlation between pornography exposure and social physique anxiety for gay men. Studies also suggest that media images can affect men's perceptions and evaluations of their bodies. A recent study of college men revealed that students exposed to more muscular images showed greater differences in their perception of their own muscularity and their reported ideal muscularity (Leit, Gray, & Pope, 2001). In another study of college men, those who were shown advertisements with ideal male body images became more depressed and had higher levels of muscle dissatisfaction than those exposed to non-ideal images (Agliata & Tantleleff-Dunn, 2004). These data suggest that men who internalize ideal body images are susceptible to more dissatisfaction in many areas. However, it is unclear what causes some men to internalize these images more than others.

The Importance of Self-esteem

Body dissatisfaction is closely associated with depression, eating pathology, and low self-esteem in boys and men (Olivardia, Pope, Borowiecki, & Cohane, 2004; Cohane & Pope, 2001). In a recent study by Olivardia et al. (2004), self-esteem was found to be more positively correlated with muscularity than with degree of obesity, indicating that muscularity may be more of a predictor of overall body image for men. Self-esteem also has been implicated as a significant predictor of body image dissatisfaction in obese men

(Grilo, Masheb, Robin, & Grody, 2005). In addition, self-esteem has been shown to have a large effect on muscle dissatisfaction specifically (Cafri, Strauss, & Thompson, 2002). In women, low self-esteem has been linked to the onset of disordered eating behaviors (Button, Sonuga-Barke, Davies, & Thompson, 1996). While it is likely that poor self-esteem is a factor in predicting the onset of eating pathology, its influence is also probably dependent on other related factors, such as body dissatisfaction (Keel, Leon, & Fulkerson, 2001; Stice, 2004) and negative affectivity (Stice, 2002). In women, prospective risk-factor studies have shown thin-ideal internalization, dieting, and body mass to be risk factors for the development of eating disorders (Stice, 2002). Harter (1990) found that physical appearance was highly valued by males and females in their formation of self-esteem. Global self-worth was related to self-evaluations of appearance when appearance was rated as important. One recent model has proposed that psychological factors, such as self-esteem, exhibit a reciprocal relationship with health risk behaviors, such as dieting, to increase muscularity and steroid use in men (Cafri, Thompson, Ricciardelli, McCabe, Smolak, & Yesalis, 2004). It is likely that men who focus on muscularity and who consider physical appearance important to their self-evaluation will be more impacted by ideal media images when determining their global self worth than those who do not depend as much upon these factors in evaluating their global self-worth.

The Role of Sexual Orientation

Men who identify themselves as gay have been found to have higher rates of eating disturbance and body dissatisfaction than men who identify themselves as

heterosexual (Balsam & Rothblum, 2001; Beren, Hayden, Wilfley, & Grilo, 1996; Lakkis, Ricciardelli, & Williams, 1999; Russell, & Keel, 2002). Many studies have suggested that gay men tend to place greater emphasis on physical appearance than do heterosexual men (Herzog et al., 1991; Siever, 1994; Silberstein, Mishkind, Striegel-Moore, Timko, & Rodin, 1989). A national survey found that gay men were somewhat more unhappy with their bodies than straight men and that more gay men reported dieting behaviors (Garner, 1997). However, other research indicates that the association between gay men and eating disorders may not be so clear-cut (Olivardia, Pope, & Mangweth, 1995). Harvey and Robinson (2003) suggest that gay and heterosexual men experience eating disorders in the same way, but perceive their bodies differently. While gay men have exhibited a greater drive for muscularity than straight men (Yelland & Tiggeman, 2003), the gay ideal involves being both lean and muscular (Atkins, 1998), while the male ideal in the general population as presented in the media is based primarily upon larger musculature in the upper body (Franzoi & Herzog, 1987). To better understand eating disorders in men, it is important to continue to study the differences between gay and straight men in order to understand to what extent overall body image and manifestations of muscle dysmorphia may be similar or different between these two groups.

Ethnicity

Most research on eating disorders has indicated that Caucasians have a higher rate of disordered eating than those who are of other races *(*Miller, Gleaves, Hirsch, Green, Snow, & Corbett, 2000*;* Wildes & Emery, 2001). Though most research combining body

dissatisfaction and race has concerned women, studies on men indicate that European American men show either equal or more dissatisfaction with their bodies than African American men (Gray, Ford, & Kelly, 1987; Harris, Walters, & Waschull, 1991). Although African American men may report higher body satisfaction, an analysis of personal advertisements revealed that black men reported higher BMI levels and a higher frequency of being overweight than their European American counterparts (Espel, Spanakos, Kasl-Godley, & Brownell, 1995). However, there is a significant gap in the literature concerning the impact of ethnicity on body dissatisfaction and muscle building in men. In fact, a review of the muscle dysmorphia literature revealed no studies dedicated to understanding ethnic differences with regard to this phenomenon.

Study Objectives

The current study attempted to understand the relationships among self-esteem, drive for muscularity, media internalization, sexual orientation, and ethnicity in a racially diverse sample of gay and straight men. It was expected that self-esteem would be negatively associated with drive for muscularity and that media internalization and sexual orientation would moderate this relationship. To a lesser extent, the relationships between ethnicity and media internalization, as well as the relationship between ethnicity and drive for muscularity, were explored. Specifically, it was predicted that:

1. Those with lower global self-esteem would demonstrate a higher drive for muscularity than those with higher self-esteem.
2. The effect of self-esteem on drive for muscularity was expected to be moderated by the degree to which a person has internalized ideal body images presented in

the media. For those demonstrating higher media internalization, self-esteem was expected to be a stronger predictor of drive for muscularity than for persons who internalize ideal media images less.

3. Finally, the way in which media internalization moderates the effect of self-esteem on drive for muscularity was expected to vary based on sexual orientation. It was predicted that the interaction between media internalization and self-esteem will be more pronounced for straight men than for gay men. This is because straight men may be more susceptible to media images of the "ideal" muscularized man, while gay men may prefer a leaner body image that is not portrayed as often in popular media (Atkins, 1998; Franzoi & Herzog, 1987).
4. While ethnicity was not initially considered in the original hypotheses of this study, its presence as an important covariate led to the exploratory investigation of this variable, as well. It was predicted that European American men would have a greater drive for muscularity than African American men. Additionally, it was predicted that European American men would show a stronger degree of media internalization than African American men.

Methods

Participants

Men were recruited from six diverse gyms across Atlanta. Several urban and suburban gyms were asked to participate and studies were conducted at six of the gyms who responded favorably. One gym was selected to maximize the number of gay men, while another gym was selected to maximize sampling of African American men. Only men aged 18 and over were considered for this study. There were no other exclusion criteria.

Measures

Standardized self-report questionnaires were used for the current study. The Drive for Muscularity Scale includes questions regarding the importance placed upon being muscular and was used to determine men's drive for muscularity. The Internalization subscale of the Multidimensional Media Influence Scale was used to determine the degree to which each participant internalized popular media messages. Finally, global self-esteem was measured using the Rosenberg Self-Esteem Scale. Demographic information was collected regarding age, height, weight, ethnicity, income level, sexual orientation, sexual identity, relationship status, occupation, and educational level. In addition, participants' actual height and weight were also measured on-site.

Drive for Muscularity Scale: The Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000) is a 15 question Likert scale, which measures one's drive for muscularity, defined as "the desire, typically found in males, to achieve a muscular mesomorphic

body" (Morrison, Hopkins, Rowan, & Morrison, 2004). It is one of the most effective tools for measuring body image in men by evaluating attitudes and behaviors related to appearance (Cafri & Thompson, 2004; McCreary & Sasse, 2000). The DMS has exhibited good validity and internal consistency (coefficient alpha = .84), as well as test-retest reliability (McCreary & Sasse, 2000). In the current study, high internal consistency (α = .86) was demonstrated.

The Multidimensional Media Influence Scale (Adult Version) (MMIS-A): Internalization subscale: The Internalization subscale of the Multidimensional Media Influence Scale (MMIS) (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004) consists of 13 items presented on a five-point Likert scale and is used to determine the degree to which dominant culture body ideals have been accepted and integrated into one's personal beliefs. This measure allows a person to examine how much one is influenced by and compares oneself to images presented by the media, such as television and magazine figures and sports athletes. For the entire measure, internal consistency was superior for the current sample (overall α = .95). The measure consists of three subscales which also demonstrated high internal consistency in the current study, including a scale that measures the influence of TV and magazine images (α=.94), a scale measuring the influence of athletic images (α=.86), and a scale measuring the amount of comparison of one's body and appearance to ideal images presented in multiple forms of media (α=.97). The MMIS-A is a revised version of the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ; Heinberg, Thompson, & Stromer, 1995. The SATAQ was revised to include an assessment of athleticism and sports, variables that

have recently been indicated as important components of internalization of physical appearance.

Rosenberg Self-Esteem Scale: The Rosenberg Self-Esteem Scale (Rosenberg, 1965) evaluates overall self-concept using ten items presented on a four-point Likert scale. This scale is one of the most widely used measures of self-esteem and has demonstrated superior validity and reliability (Rosenberg, 1979). Previous studies have indicated reliability ranging from .72 to .88 (Gray-Little, Williams, & Hancock, 1997). In the current study, the scale demonstrated high internal consistency ($\alpha = .83$).

Procedure

IRB approval was obtained and data collection occurred over a two year period. Men were recruited either before or after working out at local gyms and surveys indicated the order of survey completion and workout for each participant. After the nature of the study was discussed and informed consent was obtained, each participant completed self-report instruments at the gym, which took approximately 20 minutes. Subjects were then weighed and measured. Subjects were compensated $10 for participation at the end of the study. It was stressed that the information obtained for the current study would be coded with an identification number, and therefore, would remain strictly confidential. Consent was obtained for all participants and potential risks and benefits were discussed before participants engaged in the study.

Data Analytic Plan

This study was conducted in the context of a larger study examining media internalization, personality traits, and other risk factors upon body image, eating, exercise

habits and steroid use among men. The Statistical Package for the Social Sciences, Version 12.0© (SPSS) was used to record and analyze data. Screening and checking procedures were conducted at Georgia State University in the Eating Disorders Laboratory.

Preliminary Analyses

Frequency diagnostics were run on the categorical variable of sexual orientation and univariate statistics were conducted on the two continuous variables self-esteem and media internalization. Before primary analyses were performed, the assumptions of regression were tested. Univariate distributions were examined for normalcy and outliers. Additionally, bivariate scattergrams and residual plots were checked for homoskedasticity, normalcy, and linearity. The contribution of potentially influential cases was also examined. In order to determine the impact of confounding variables, Chi Square tests and ANOVAs were run for noncontinuous variables and Pearson product moment correlations were examined for continuous variables of interest. Even though data were archival, a power analysis was conducted to determine the sample size needed to detect a medium effect size with a power of .80 and an alpha of .05.

Primary Analyses

Centering. Because interaction terms were computed from the predictor variables in the model, the independent variable and both moderators were each centered to give a "deviation score" for each variable. Centering was expected to reduce extreme values and reduce the threat of multicollinearity (Aiken & West, 1991). After centering continuous variables, an interaction term was created by multiplying the centered values for each

variable together. One variable, sexual orientation, was not centered because it was categorical. In this case, dummy coding was used to further evaluate the gay and straight sample of men (coded 0= straight men and 1= gay men).

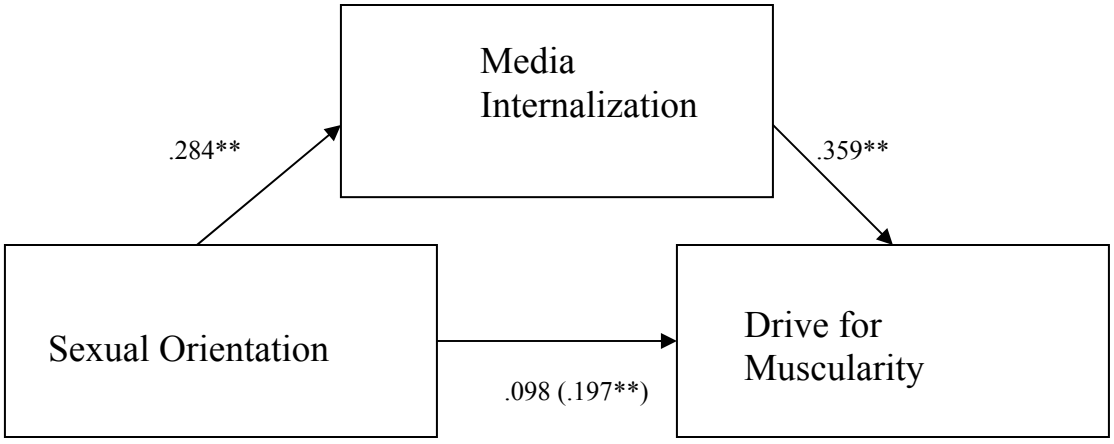
Hierarchical Multiple Regression. Hierarchical multiple regression analyses were used to analyze the data. In order to determine the individual contributions of main effects and interactions among self-esteem, media internalization, and sexual orientation upon drive for muscularity, four separate hierarchical regressions were performed. The first model examined the effects of self-esteem, media internalization, and their interaction. The second model tested for the effects of self-esteem, sexual orientation and their interaction. Media internalization and sexual orientation main effects and their interaction were tested by the third model. Finally, the fourth model considered the main effects of self-esteem, media internalization, and sexual orientation, two-way interactions between each of the variables, and a three-way interaction among self-esteem, media internalization, and sexual orientation. Figure 1 presents a detailed outline of this model.

Statistical results were examined to determine the effects of self-esteem, media internalization, and sexual orientation on drive for muscularity and to look for potential moderation. Individual effects of media internalization and sexual orientation as potential moderators were examined by looking at the R^2_{change} values, each individual F-statistic, and β in each step. Statistics, including R^2_{change}, F-statistic, and β, were also examined for each of the three interactions.

Post-hoc Analyses

Additional analyses considering sexual orientation and its relationship with media internalization and drive for muscularity were conducted as post-hoc tests. All tests conducted on ethnicity were also conducted as post-hoc tests.

During the initial analysis, it was noted that media internalization was a much stronger predictor of drive for muscularity than sexual orientation, which demonstrated only modest effects in predicting drive for muscularity. Moreover, it was discovered that media internalization actually eliminated the effects of sexual orientation in predicting drive for muscularity when media internalization was entered into a multiple regression equation before sexual orientation. These observations led to the investigation of another model in which media internalization was expected to mediate the relationship between sexual orientation and drive for muscularity (Figure 2). Hierarchical multiple regression was used to examine the relationship of media internalization as a mediator of the relationship between sexual orientation and drive for muscularity. The results of this analysis led to an additional analysis of the relationship of media internalization as a mediator of the relationship between ethnicity and drive for muscularity. Statistics, including R^2_{change}, F-statistic, and β, were examined for each strep in both mediation models. A Sobel test was conducted on each to determine whether or not each relationship constituted mediation.



**p<.01

Figure 2: Path diagram (with standardized regression coefficients from multiple regression analysis) of the mediating role of media internalization in the relationship between sexual orientation and drive for muscularity. The impact of sexual orientation without including media internalization in the regression is given in parentheses.

Results

Power Analysis

Even though data were archival, a power analysis was conducted to determine the sample size needed to detect a medium effect size with a power of .80 and an alpha of .05. The power analysis was conducted using the GPower computer software program (Erdfelder., Faul, & Buchner, 1996). Power was set at .80 with an alpha level of .05. The effect size, measured by the change in R^2 for step one (covariates) was set at .05 ($df_{change} = 2$), indicating a small effect size. Next, the effect size associated with step 2 (main effects) was set at .20 ($df_{change} = 3$), indicating a moderate effect size. The effect size for steps three (two-way interaction terms) and four (three way interaction term) was estimated at .05 ($df_{change} = 4$), a small effect size. In order to detect all desired effects, this power analysis indicated that a sample of 204 would be required. The power to detect two-way interactions for the current sample of 217 men given the above parameters is .99 and the power to detect a three-way interaction is .81.

Regression Assumption Diagnostics

Before analyses were conducted, continuous predictor variables and the outcome variable were examined and graphed to look for deviations from the normal curve. Descriptive statistics were computed for self-esteem, media internalization, and drive for muscularity (Table 1). Histograms and boxplots were created to assess for outliers and for skewness of continuous variables. Minimum and maximum values were examined.

Table 1

Descriptive Statistics for Self-Esteem, Media Internalization, and Drive for Muscularity

	M	SD	MIN	MAX
Self-Esteem [a]	33.5	4.7	18	40
Media Internalization [b]	37.4	12.5	13	65
TV/ Magazine subscale	17.2	6.0	6	30
Athlete subscale	9.3	3.2	3	15
Comparison subscale	10.9	4.9	4	20
Drive for Muscularity [c]	45.5	13.8	15	83

[a] Rosenberg Self-Esteem Scale (Rosenberg, 1965)

[b] Multidimensional Media Influence Scale-Adult Version: Internalization subscale (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004)

[c] Drive for Muscularity Scale (DMS) (McCreary & Sasse, 2000)

No outliers were observed when using the criterion of three standard deviations above or below the mean of the distribution to signify an outlier. Highly influential cases were examined using Leverage and Cook's D. No highly influential cases were found, and thus all data were retained. In addition to visually inspecting histograms for each variable of interest, a skewness statistic was calculated for each variable by dividing its skewness by its standard error of skewness. Values equal to or exceeding +/- 1.96 are considered significantly skewed. In this analysis, the skewness statistic for self-esteem was -4.35, which is considerably above the limit of -1.96 (Figure 3). Considering that this was a nonclinical sample of men who work out in gyms, it is reasonable to expect a negatively skewed distribution for self-esteem, indicating that many of the scores fell on the higher end of the distribution with fewer falling at the lower end. In order to maintain the natural variability of the data, recoding was not considered to address skew. Rather, a power transformation was performed on the self-esteem variable to reduce the skew. Although a squared transformation did not significantly reduce skew, a cubed transformation did sufficiently reduce the skewed distribution. Since a transformation was necessary, a parallel analysis was run using both raw and transformed data. Because results were similar, only those obtained with the raw data are reported.

A correlation matrix for all continuous variables was created to examine their relatedness (Table 2). Both self-esteem and media internalization, as well as self-esteem and drive for muscularity demonstrated significant negative relationships. A significant positive relationship was found between media internalization and drive for muscularity.

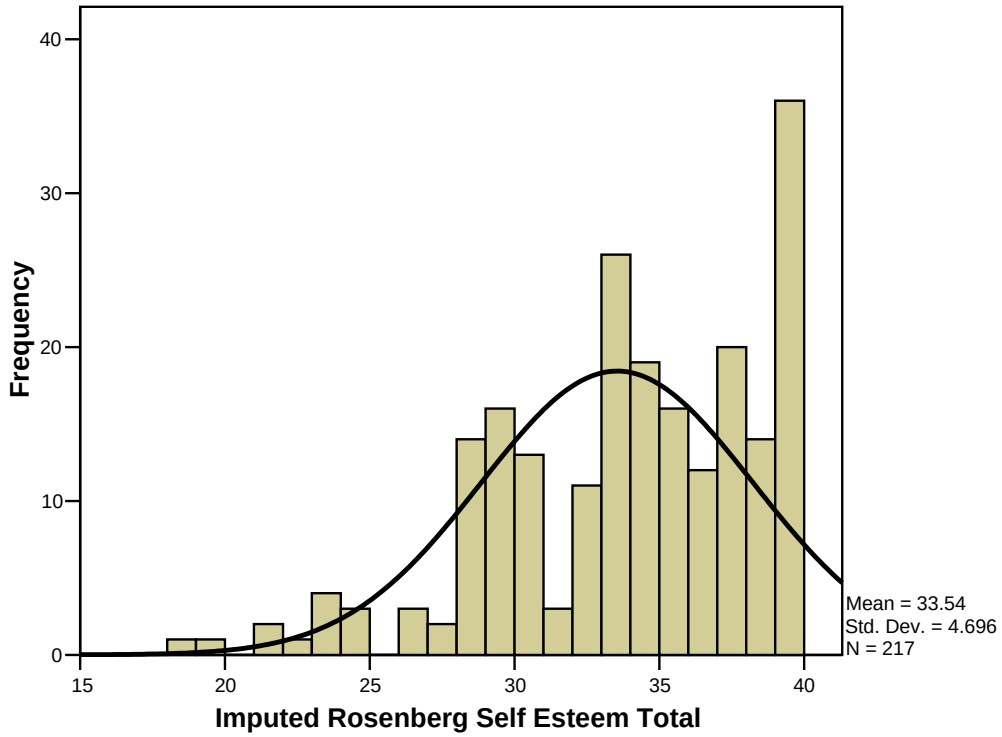


Figure 3: Histogram of negatively skewed self-esteem

Table 2

Intercorrelations among Self-esteem, Media Internalization, and Drive for Muscularity

	Self-Esteem	Media Internalization	Drive for Muscularity
Self-Esteem [a]	--	--	--
Media Internalization [b]	-.294**	--	--
Drive for Muscularity [c]	-.256**	.410**	--

[a] Rosenberg Self-Esteem Scale (Rosenberg, 1965)

[b] Multidimensional Media Influence Scale-Adult Version: Internalization subscale (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004)

[c] Drive for Muscularity Scale (DMS) (McCreary & Sasse, 2000)

**p<.01

However, all correlations were relatively small, indicating that multicollinearity was not an issue.

In order to determine whether or not a linear model would best suit this set of data, bivariate scatterplots between each continuous independent variable and the dependent variable were examined. Although distributions showed scatter, the overall relationship between each independent and the dependent variable appeared to be linear. To assess for homoskedasticity, standardized residuals were plotted against standardized values of the predictor variables and were found to be evenly distributed. Interaction terms and their predictor variables were also assessed for multicolinearity. Although several correlations were noted between predictor variables and their interaction terms, none of the correlations suggested multicollinearity. Finally, correlations between predictor variables and their standardized residuals were calculated to assess for specification error, and no correlations were found. Therefore, assumptions of regression were not violated, indicating that linear regression models were appropriate.

To determine the contributions of each main effect, three separate hierarchical regressions were performed on the centered values for self-esteem and drive for muscularity, sexual orientation and drive for muscularity, and media internalization and drive for muscularity. Variances were interpreted only if the change in variance (R^2 change) was significant above and beyond the previous step.

Potential Confounds

Potential confounds were examined by performing several tests. Pearson product moment correlations were conducted if two continuous variables were present, ANOVAs

were used for cases with one categorical and one continuous variable, and Chi Square tests were used to examine potential confounding relationships containing two categorical variables. Variables examined included ethnicity, income, age, marital status, and measured BMI. Ethnicity emerged as a significant confound, with significant differences between groups emerging for media internalization ($F (4, 211) = 6.51$, $p<.01$) and sexual orientation ($\chi^2(4, N = 208) = 25.2$, $p < .01$). Ethnicity was also found to significantly affect drive for muscularity ($F (4, 214) = 7.16$, $p < .01$). Therefore, ethnicity was included as covariate in subsequent analyses. Additionally, the percentage of participants that were married differed by sexual orientation, ($\chi^2 (3, N = 209) = 31.0$, $p <.01$) and significant group differences in marital status were found for media internalization ($F (3, 212) = 4.43$, $p<.01$) and drive for muscularity ($F (3, 212) = 5.44$, $p<.01$). Therefore, marital status was also included as a covariate in subsequent analyses.

Primary Analyses

Demographic Features of Total Sample. Demographics were examined for the total sample and are reported in Table 3. Of the 217 male subjects recruited, 128 identified themselves as straight or mostly straight, 81 identified themselves as gay or mostly gay, and 8 identified themselves as bisexual. Because of the minimal number of men who considered themselves bisexual, subsequent analyses only compared gay and straight men. Ethnicity distributions were as follows: 59.4% Caucasian or European American, 32.7% African American or Black, 2.8% Latino or Hispanic, 2.8% Native American, and 1.8% Asian American. Of this sample, approximately 66% had obtained a four-year college or advanced professional degree, and the majority were either single

Table 3

Demographic Characteristics of the Total Sample

	Total Sample n = 217	
	N	(%)
Ethnicity		
European American/ White	129	(59.4)
African-American/ Black	71	(32.7)
Latino/ Hispanic	6	(2.8)
Native American/ Pacific Islander	6	(2.8)
Asian-American	4	(1.8)
Sexual Orientation		
Straight	128	(59.0)
Gay	81	(37.3)
Bisexual	8	(3.7)
Marital Status		
Never married, not in long-term relationship	107	(49.3)
Long-term relationship	60	(27.6)
Married	32	(14.7)
Divorced	18	(8.3)
Education Level		
Middle/ junior high school	1	(.5)
High school or GED	30	(13.8)
Two-year college degree	43	(19.8)
Four-year college degree	92	(42.4)
Graduate or Professional Degree	51	(23.5)
	M	**(SD)**

Table 3 (continued)

	N	(%)
Age	34.3	(8.7)
Self-reported BMI	26.2	(3.5)
Measured BMI	26.9	(9.9)
Difference between measured and reported BMI	0.7	

(49.3%) or in a long-term committed relationship (27.6%).

Straight and Gay Men. Group differences between straight men and gay men on demographic variables were examined using t-tests for continuous variables and Chi Square tests for categorical variables. All were tested for homogeneity of variance. Frequencies and means are reported in Table 4. The percentage of participants that were married differed by sexual orientation, as expected ($\chi^2(3, N = 209) = 31.0, p < .01$). A significantly larger number of straight men were married, as expected, and a larger number of gay men indicated they were in a long-term relationship. The percentage of participants that were of different ethnicities also differed by sexual orientation, ($\chi^2(4, N = 208) = 25.2\ p < .01$). This was also expected because the gym targeted for recruitment of gay men was in a mostly Caucasian neighborhood, while the gym targeted for the recruitment of black men was a predominantly heterosexual gym. Additionally, group differences were found for self-reported BMI ($t = 4.29$, $p<.01$), but not for measured BMI, with straight men reporting higher BMI levels. This is interesting, since straight men slightly overestimated their BMI levels, yet had lower actual BMI levels than gay men, while gay men underestimated their actual BMI levels. Significant age differences were also found between gay and straight men ($t= -4.99$, $p<.01$), with gay men being older.

European American and African American Men. Because the number of non African American minorities in this study was too small to warrant sufficient comparison, ethnicity studies using t-tests for continuous variables and Chi square tests for discrete

Table 4

Demographic Characteristics of Straight Men and Gay Men

	Straight Men n = 128 N (%)	Gay Men n = 81 N (%)
Ethnicity		
European American/ White	62 (48.4)	64 (79.0)
African-American/ Black	57 (44.5)	11 (13.6)
Latino/ Hispanic	3 (2.3)	2 (2.5)
Native American/ Pacific Islander	4 (3.1)	1 (1.2)
Asian-American	1 (.8)	3 (3.7)
Marital Status		
Never married, not in long-term relationship	62 (48.4)	38 (46.9)
Long-term relationship	23 (18.0)	37 (45.7)
Married	31 (24.4)	1 (1.2)
Divorced	12 (9.4)	5 (6.2)
Education Level		
Middle/ junior high school	1 (.8)	0 (0)
High school or GED	17 (13.3)	11 (13.6)
Two-year college degree	31 (24.2)	10 (12.3)
Four-year college degree	59 (46.1)	30 (37.0)
Graduate or Professional Degree	20 (15.6)	30 (37.0)
	M (SD)	**M (SD)**
Age	32.2 (7.9)	38.1 (8.8)
Self-reported BMI	27.0 (3.8)	25.1 (2.6)
Measured BMI	26.8 (5.0)	27.1 (14.9)
Difference between measured and reported BMI	0.2	-2.0

data were conducted to compare European American to African American men. All variables were tested for homogeneity of variance. As reported above, the percentage of participants that were of different ethnicities differed by sexual orientation, ($\chi^2(4, N = 208) = 25.2$ $p < .01$) because of the distribution of a large number of gay white men compared to the relatively low number of gay black men. Group means are reported in Table 5. African American men were more likely to be married than European American men ($\chi^2(12, N = 216) = 32.1$, $p < .01$) and as a group had less education ($\chi^2(16, N = 216) = 31.5$, $p < .05$). African American men demonstrated both higher reported BMIs ($t = 2.58$, $p<.05$) and measured BMIs ($t = 2.13$, $p<.05$) than their European American counterparts. No ethnic differences existed for differences in reported versus measured BMI.

Descriptive Statistics for Variables of Interest. Descriptive statistics for all variables of interest were examined (Table 1). Group differences based on sexual orientation (Table 6) and ethnicity (Table 7) were also examined for self-esteem, drive for muscularity and for total media internalization, as well as each media internalization subscale (TV/ magazine, athlete and comparison). Straight men exhibited significantly higher levels of self-esteem than gay men ($t = 2.31$, $p<.05$). Additionally, gay men showed significantly higher levels of drive for muscularity ($t = -4.39$, $p<.01$) and media internalization ($t = -4.85$, $p<.01$) than straight men. On the media internalization subscales, gay men showed significantly higher internalization of TV/magazine images ($t = -4.79$, $p<.01$), of athletic images ($t = -2.74$, $p<.05$), and more comparison to media images ($t = -4.64$, $p<.01$) than straight men.

Table 5

Demographic Characteristics of Straight European American and African American Men

	European America Men n = 62 N (%)	African American Men n = 57 N (%)
Marital Status		
Never married, not in long-term relationship	36 (58.1)	23 (40.4)
Long-term relationship	12 (19.4)	10 (17.5)
Married	9 (14.5)	19 (33.3)
Divorced	5 (8.1)	5 (8.8)
Education Level		
Middle/ junior high school	1 (1.6)	0 (0)
High school or GED	6 (9.7)	11 (19.3)
2 year college degree	8 (12.9)	20 (35.1)
4 year college degree	35 (56.5)	20 (35.1)
Graduate or Professional Degree	12 (19.4)	6 (10.5)
	M (SD)	**M (SD)**
Age	31.7 (8.0)	32.3 (7.3)
Self-reported BMI	26.2 (3.3)	28.0 (4.2)
Measured BMI	26.0 (5.7)	28.0 (4.3)
Difference between measured and reported BMI	0.2	0.0

Table 6

Comparisons between Straight and Gay Men on Media Internalization, Drive for Muscularity, and Self-esteem

	Straight Men n = 128		Gay Men n = 81	
	M	SD	M	SD
Variable				
Self-Esteem [a]	34.1*	4.8	32.6*	4.5
Media Internalization [b]	34.3**	12.9	42.5**	10.3
TV/ Magazine subscale	15.8**	6.0	19.7**	5.2
Athlete subscale	8.9**	3.5	10.1**	2.5
Comparison subscale	9.6**	4.9	12.7**	4.3
Drive for Muscularity [c]	42.0**	13.7	50.2**	12.1

[a] Rosenberg Self-Esteem Scale (Rosenberg, 1965)

[b] Multidimensional Media Influence Scale-Adult Version: Internalization subscale (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004)

[c] Drive for Muscularity Scale (DMS) (McCreary & Sasse, 2000)

* $p<.05$, ** $p<.01$

Table 7

Comparisons between European-American and African-American Men on Media Internalization, Drive for Muscularity, and Self-esteem

	African American Men n = 71 M (SD)	European American Men n = 129 M (SD)
Variable		
Self-Esteem	33.7 (5.2)	33.3 (4.5)
Media Internalization	33.1** (13.7)	40.0** (10.7)
TV/ Magazine subscale	14.9 (6.3)	18.5** (5.2)
Athlete subscale	8.5** (3.7)	9.8** (2.8)
Comparison subscale	9.7** (5.3)	11.7** (4.5)
Drive for Muscularity	39.3** (12.4)	49.1** (14.0)

[a] Rosenberg Self-Esteem Scale (Rosenberg, 1965)

[b] Multidimensional Media Influence Scale-Adult Version: Internalization subscale (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004)

[c] Drive for Muscularity Scale (DMS) (McCreary & Sasse, 2000)

* p<.05, **p<.01

**p<.01

Variables were examined with both the entire sample and with only straight men to compare ethnicity. Because similar results were achieved, results for the entire sample are reported here. European American men reported significantly higher levels of media internalization ($t= 3.6$, $p<.01$) than black men, as well as a higher drive for muscularity ($t=4.3$, $p<.01$). No significant differences existed in levels of self-esteem based on ethnicity.

Self-esteem x Media Internalization . To assess for main effects and a potential interaction between self-esteem and media internalization, a hierarchical linear regression was conducted. The covariates ethnicity and marital status were entered in the first step. In the second and third steps, the main effects for self-esteem and media internalization were added, respectively. Finally, in the fourth step, the two-way interaction between media internalization and self-esteem was examined. Significant main effects were found for self-esteem ($R^2_{change} = .068$, $F_{change}(1,211) = 17.8$, $\beta =-.260$, $p<.01$) and media internalization ($R^2_{change} = .080$, $F_{change}(1,210) = 23.3$, $\beta =.306$, $p<.01$). However, the interaction between self-esteem and media internalization did not account for any variability above and beyond the main effects. These results are presented in Table 8.

Self-esteem x Sexual Orientation . A hierarchical linear regression was used to assess for main effects and a potential interaction between self-esteem and sexual orientation. After adding ethnicity and marital status in the first step, the main effects for self-esteem and sexual orientation were entered into the second and third steps. Finally, in the fourth step, the two-way interaction between self-esteem and sexual orientation

Table 8

Stepwise Hierarchical Linear Regression Analysis to Examine the Potential Main Effects and Interaction between Self-Esteem and Media Internalization in Predicting Drive for Muscularity

Predictors	β	ΔR^2
Step 1:		.127**
Ethnicity	.237**	
Marital Status	.241**	
Step 2:		.068**
Self-Esteem	-.260*	
Step 3:		.080**
Media Internalization	.306**	
Step 4:		.001
Self-Esteem x Media Internalization	.026	

**p<.01

was examined. Significant main effects were found for self-esteem (R^2_{change} = .067, F_{change} (1,203) = 16.8, β =-.260, p<.01) and for sexual orientation (R^2_{change} = .020, F_{change} (1,202) = 5.2, β =.154, p<.05) with gay orientation predicting higher drive for muscularity. No significant interaction existed between self-esteem and sexual orientation. Results are detailed in Table 9.

Media Internalization x Sexual Orientation. Again, using hierarchical linear regression, main effects and a potential interaction between media internalization and sexual orientation were examined. After adding ethnicity and marital status in the first step, the main effects for media internalization and sexual orientation were entered into the second and third steps, respectively. Finally, in the fourth step, the two-way interaction between media internalization and sexual orientation was examined. A significant main effect was found for media internalization (R^2_{change} = .132, F_{change} (1, 203) = 35.8, β =.375, p<.01). However, with media internalization entered first into the regression, no main effect was found for sexual orientation (p=.143) in predicting drive for muscularity. Additionally, no interaction existed between media internalization and sexual orientation. These results are presented in Table 10.

Self-esteem x Media Internalization x Sexual Orientation. An exploratory three-way interaction among self-esteem, media internalization, and sexual orientation was examined. Using hierarchical linear regression, the covariates ethnicity and marital status were added in the first step, followed by self-esteem, media internalization, and sexual orientation in the second step. All two-way interactions were entered in the third step, including self-esteem x media internalization, self-esteem x sexual orientation, and

Table 9

Stepwise Hierarchical Linear Regression Analysis to Examine the Potential Main Effects and Interaction between Self-Esteem and Sexual Orientation in Predicting Drive for Muscularity

Predictors	β	ΔR^2
Step 1:		.119**
Ethnicity	.214**	
Marital Status	.245**	
Step 2:		.067**
Self-Esteem	-.260*	
Step 3:		.020*
Sexual Orientation	.154*	
Step 4:		.001
Self-Esteem x Sexual Orientation	-.029	

*p<.05, **p<.01

Table 10

Stepwise Hierarchical Linear Regression Analysis to Examine the Potential Main Effects and Interaction between Media Internalization and Sexual Orientation in Predicting Drive for Muscularity

Predictors	β	ΔR^2
Step 1:		.119**
Ethnicity	.214**	
Marital Status	.245**	
Step 2:		.132**
Media Internalization	.375**	
Step 3:		.008
Sexual Orientation	.098	
Step 4:		.000
Self-Esteem x Sexual Orientation	-.013	

*p<.05, **p<.01

media internalization x sexual orientation. Finally, in the fourth step a three-way interaction among self-esteem, media internalization, and sexual orientation was entered. Two significant main effects were found, for both self-esteem (β = -.155, $p<.05$) and media internalization (β =.303, $p<.01$) that accounted for 16.1% of the variance ($F_{change}(3,201) = 15.0$, p= <.01) above and beyond that accounted for by ethnicity. In the complete model, sexual orientation did not emerge as a significant predictor of drive for muscularity. For the two-way interactions, none were found to be significant (R^2_{change} = .001, F_{change} = .137, p=.94). The three-way interaction was also not significant (R^2_{change} = .002, F_{change} = .436, p=.51). These results for the complete model are outlined in Table 11.

Post-Hoc Analyses

Analysis of Overlapping Constructs

Regression models with three or more predictors, as in the current study, may suffer from multicollinearity if there is a strong linear relationship among any three or more of the predictor variables. Some of the questions appeared, at face value, to tap into the concept of self-worth based on body appearance. Therefore, correlational analyses were run for individual questions and subscales on the Rosenberg Self-Esteem scale, the Media Internalization scale, and the Drive for Muscularity Scale. Generally, multicollinearity is not considered to be an issue if correlations remain below .7. In this study, the correlations between questions on different scales were .5 for all questions except two. The Drive for Muscularity Scale item which reads, “I think I would feel

Table 11

Hierarchical Linear Regression Analysis to Examine the Potential Main Effects and Interactions among Self-Esteem, Media Internalization, and Sexual Orientation in Predicting Drive for Muscularity

Predictors	β	ΔR^2
Block 1:		.119**
Ethnicity	.214**	
Marital Status	.245**	
Block 2:		.161**
Ethnicity	.158*	
Marital Status	.170**	
Self-Esteem	-.155*	
Media Internalization	.303**	
Sexual Orientation	.083	
Block 3:		.001
Ethnicity	.161*	
Marital Status	.173**	
Self-Esteem	-.153*	
Media Internalization	.307**	
Sexual Orientation	.080	
Self Esteem x Sexual Orientation	-.034	
Self-Esteem x Media Internalization	.012	
Media Internalization x Sexual Orientation	-.021	

*p<.05, **p<.01

Table 11(continued)

Hierarchical Linear Regression Analysis to Examine the Potential Main Effects and Interactions among Self-Esteem, Media Internalization, and Sexual Orientation in Predicting Drive for Muscularity

Predictors	β	ΔR^2
Block 4:		.002
Ethnicity	.159*	
Marital Status	.171**	
Self-Esteem	-.173*	
Media Internalization	.313**	
Sexual Orientation	.088	
Self Esteem x Sexual Orientation	-.018	
Self-Esteem x Media Internalization	.016	
Media Internalization x Sexual Orientation	-.021	
Self-Esteem x Sexual Orientation x Media Internalization	-.050	

*p<.05, **p<.01

more confident if I had more muscle mass" had a correlation of .53 ($p<.01$) with one question on the media scale which reads, "I wish I looked as athletic as the people in magazines". This same question on the Drive for Muscularity scale was also similarly correlated ($r = .51$, $p<.01$) with the total media internalization score and approached .5 on two questions composing the magazine and TV internalization subscale, including "I would like my body to look like the models who appear in magazines" ($r = .467$, $p<.01$) and "I wish I looked like the models in music videos" ($r = .452$, $p<.01$). While several questions on the Rosenberg Self-esteem scale correlated significantly with questions on the Drive for Muscularity Scale and on the Media Internalization Scale, all correlations were well below the .5 level, indicating an acceptable amount of correlation between questions. Given that no relationships were sufficiently large (at or above $r = .70$), it was determined that multicollinearity was not a problem in the current study.

Analysis of Sexual Orientation

Because sexual orientation has been shown to impact drive for muscularity by others (Yelland & Tiggeman, 2003), it was expected that sexual orientation would have more of an effect than identified in the previous regressions. Gay men and straight men differed significantly in their levels of media internalization, self-esteem, and drive for muscularity. Another hierarchical regression analysis was run after splitting the file between gay and straight men. This allowed for further examination of potential group differences in other variables. The covariates ethnicity and marital status were added in the first step, followed by self-esteem and media internalization in the second and third

steps, respectively. The two-way interaction between self esteem and media internalization was entered in the fourth step.

While ethnicity and marital status were found to be significant covariates for straight men (R^2_{change} = .112, F_{change} (1, 123) = 7.7, p <.01; β ethnicity =.193, p=.01; β marital status =.191, p<.01), these variables were not significant covariates for gay men (R^2_{change} = .015, F_{change} (1, 78) = .610, p = .546). In straight men, main effects existed for self-esteem (β =-.191, p<.05) that accounted for 6.8% of the variance (F_{change} (1, 122) = 10.1) and media internalization (β =.295, p<.01) that accounted for 7.5% of the variance (F_{change} (1, 121) = 12.1) in predicting drive for muscularity above and beyond that accounted for by self-esteem. In gay men, self-esteem did not account for a significant amount of variance seen in the drive for muscularity. Media internalization (β =.306, p<.01) accounted for 8.0% of the variance in drive for muscularity (F_{change} (1,76) = 7.2). The interaction between self-esteem and media internalization was not significant for either straight or gay men. Results are presented in Table 12.

Analysis of Media Internalization as a Mediator of the Relationship between Sexual Orientation and Drive for Muscularity

In the previous analyses, it was noted that sexual orientation did predict drive for muscularity as expected. However, it was noted that media internalization proved to be an even greater predictor of drive for muscularity than sexual orientation. Additionally, it was noted that when media internalization was entered into the regression first, sexual orientation dropped out as a significant predictor. Additionally, ANOVAs and Chi-square tests indicated that there were significant group differences based on sexual

Table 12

Hierarchical Linear Regression Analysis to Examine the Potential Main Effects and Interaction between Self-Esteem and Media Internalization in Predicting Drive for Muscularity in a Sample of Gay and Straight Men

	Straight Men		Gay Men	
Predictors	β	ΔR^2	β	ΔR^2
Step 1:		.112**		.015
Ethnicity	.193*		.080	
Marital Status	.191*		.120	
Step 2:		.068**		.041
Self-Esteem	-.191*		-.168	
Step 3:		.075**		.082**
Media Internalization	.295**		.306**	
Step 4:		.000		.006
Self-Esteem x Media Internalization	-.022		.099	

*p<.05, **p<.01

orientation with regard to amount of media internalized. This pattern of findings suggested a relationship in which media internalization may mediate the relationship between sexual orientation and drive for muscularity (Figure 3). Indeed, previous studies have shown that media images can affect and change men's perceptions of their bodies (Leit, Gray, Pope, 2001) and that men who internalize more ideal images may be more susceptible to body dissatisfaction (Agliata, Tantletuff-Dunn, 2004).

Sexual orientation predicts media internalization. Mediation was analyzed using four separate hierarchical regression models. First, a hierarchical regression was run to establish that the independent variable, sexual orientation, affected the mediator, media internalization (Step a). With media internalization as the dependent variable, ethnicity and marital status were added in the first step as covariates, followed by sexual orientation in the second step. Sexual orientation was found to be predictive of media internalization ($R^2_{change} = .072$, $F_{change}(1,203) = 16.7$, $\beta = .284$, $p<.01$), with gay men demonstrating higher levels of media internalization. Results are listed in Table 13.

Media Internalization predicts drive for muscularity. In order to determine whether media internalization had a unique and significant impact on drive for muscularity, a regression analysis was run with media internalization as the independent variable and drive for muscularity as the dependent variable (Step b). After entering ethnicity and marital status in the first step, media internalization was added in the second step. Higher levels of media internalization were found to predict greater levels of drive for muscularity ($R^2_{change} = .122$, $F_{change}(1,211) = 34.3$, $\beta = .359$, $p<.01$). See Table 14 for details.

Table 13

Step a of Mediation Model: Hierarchical Linear Regression Analysis to Examine the Potential Main Effect of Sexual Orientation on Media Internalization

Predictors	β	$\Delta R^{2\ change}$
Step 1:		.059**
Ethnicity	.134	
Marital Status	.187*	
Step 2:		.072**
Sexual Orientation	.284**	

*p<.05, **p<.01

Table 14

Step b of Mediation Model: Hierarchical Linear Regression Analysis to Examine the Potential Main Effect of Media Internalization on Drive for Muscularity

Predictors	β	$\Delta R^{2\ change}$
Step 1:		.127**
Ethnicity	.237**	
Marital Status	.241**	
Step 2:		.122**
Media Internalization	.359**	

*p<.05, **p<.01

Sexual orientation predicts drive for muscularity. In order to establish that the independent variable significantly affected drive for muscularity in the absence of media internalization, a third regression was conducted (Step c). With drive for muscularity as the dependent variable, ethnicity and marital status were added in the first step as covariates, followed by sexual orientation in the second step. Sexual orientation was found to be a significant predictor of drive for muscularity with gay men demonstrating higher levels of drive for muscularity ($R^2_{change} = .035$, $F_{change}(1,203) = 8.28$, $\beta = .197$, $p < .01$). Results are detailed in Table 15.

Media Internalization as a Mediator of the Relationship between Sexual Orientation and Drive for Muscularity. In order to test for mediation, a final hierarchical linear regression was conducted. Ethnicity and marital status were added in the first step. Sexual orientation was added in the second step, and finally media internalization was added in the third step to see if it acted as an intervening variable between sexual orientation and drive for muscularity. In the second step, sexual orientation accounted for 3.5% of the variance in drive for muscularity ($F_{change}(1,203) = 8.28$, $\beta = .197$, $p < .01$). However, in the final step, media internalization was found to eliminate the effects of sexual orientation such that the influence of sexual orientation was no longer significant ($\beta = .098$, $p = .143$). Media internalization, however, accounted for 10.6% of the variance in the final step ($F_{change}(1,202) = 28.8$, $\beta = .348$, $p < .01$). See Table 16 for the full mediation model. The regression weight of sexual orientation on drive for muscularity was reduced from $\beta = .197$ to $\beta = .098$ by including media internalization ($\beta = .348$) in the regression model (Figure 3).

Table 15

Step c of Mediation Model: Hierarchical Linear Regression Analysis to Examine the Potential Main Effect of Sexual Orientation on Drive for Muscularity

Predictors	β	ΔR^2
Step 1:		.119**
Ethnicity	.214**	
Marital Status	.245**	
Step 2:		.035**
Sexual Orientation	.197**	

*p<.05, **p<.01

Table 16

Hierarchical Linear Regression Analysis to Examine the Potential Mediation of Sexual Orientation by Media Internalization in Predicting Drive for Muscularity

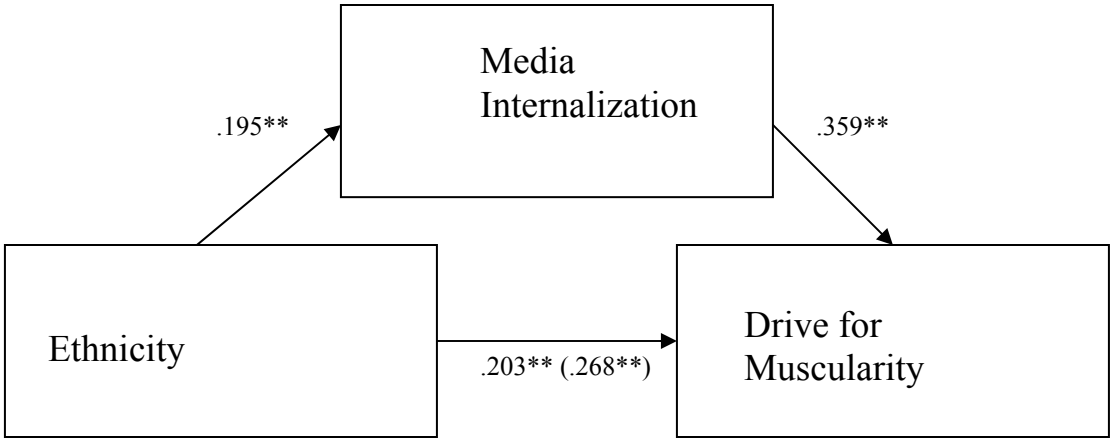
Predictors	β	$\Delta R^{2\ change}$
Step 1:		.119**
Ethnicity	.214**	
Marital Status	.245*	
Step 2:		.035**
Sexual Orientation	.197**	
Step 3:		.106**
Sexual Orientation	.098	
Media Internalization	.348**	

*p<.05, **p<.01

The Sobel test measures whether a mediator is actually carrying the influence of an independent variable to a dependent variable (Sobel, 1982). To conduct the Sobel test, an interactive calculation tool for mediation (Preacher and Leonardelli, 2001) was conducted on the data. Both the unstandardized regression coefficient (a = 7.23) and the standardized error (sa = 1.77) were entered from the first regression where sexual orientation predicted media internalization. Next, the unstandardized regression coefficient (b = .399) and the standardized error (sb = .068) were entered from the second regression equation where media internalization predicted drive for muscularity. The Sobel test statistic indicated that media internalization is a full mediator of the relationship between sexual orientation and drive for muscularity (Sobel t (200) = 3.3552, $p<.01$).

Analysis of Ethnicity

Given that ethnicity appeared to be a contributing factor in these analyses, an exploratory investigation of the impact of ethnicity upon media internalization and drive for muscularity was conducted. Virtually no prior research has been conducted on the impact of ethnicity on drive for muscularity. In the current investigation, ANOVAs and Chi-square analyses on ethnicity indicated that there were significant ethnic group differences regarding the degree to which media images are internalized. Because media internalization proved to be a strong mediator of the relationship between sexual orientations and drive for muscularity, it was thought that a similar relationship might exist in which media internalization served to mediate a relationship between ethnicity and drive for muscularity (Figure 4). This would be supported by previous research



**p<.01

Figure 4: Path diagram (with standardized regression coefficients from multiple regression analysis) of the partial mediating role of media internalization in the relationship between ethnicity and drive for muscularity. The impact of ethnicity without including media internalization in the regression is given in parentheses.

suggesting that Caucasian men are more dissatisfied with their bodies than African American men (Gray, Ford, & Kelly, 1987; Harris, Walters, & Waschull, 1991).

Ethnicity predicts media internalization. Based on the findings in the exploratory analysis, a simple regression analysis was conducted to see if ethnicity significantly predicted media internalization (Step a). The ethnicity variable was dummy coded. Based on previous findings, sexual orientation and marital status were entered as covariates. No other covariates for the relationship among ethnicity, media internalization, and drive for muscularity were found. Ethnicity was entered into the second step of the equation. Ethnicity was found to be predictive of media internalization ($R^2_{change} = .035$, $F_{change}(1, 195) = 7.8$, $\beta = .195$ $p<.01$), with European American men demonstrating higher levels of media internalization than African American men. Results are in presented in Table 17.

Media Internalization predicts drive for muscularity. The relationship of media internalization as a predictor of drive for muscularity (Step b) was established in the previous mediation model that examined media internalization as a mediator between sexual orientation and drive for muscularity (Table14).

Ethnicity as a predictor of drive for muscularity. Based on the findings in the exploratory analysis, another simple regression analysis was also conducted to see if ethnicity significantly predicted drive for muscularity (Step c). Sexual orientation and marital status were entered as covariates, and ethnicity was entered into the second step. Ethnicity was found to be predictive of drive for muscularity ($R^2_{change} = .066$, $F_{change}(1,$

Table 17

Step a of Mediation Model: Hierarchical Linear Regression Analysis to Examine the Potential Main Effects of Ethnicity on Media Internalization

Predictors	β	ΔR^2
Step 1:		.097**
Sexual Orientation	.234**	
Marital Status	.059	
Step 2:		.035**
Ethnicity	.195**	

*p<.05, **p<.01

195) = 15.5, β = .268 p<.01), with European American men showing more drive for muscularity than African American men. See Table 18 for results.

Media Internalization as a Mediator of the Relationship between Ethnicity and Drive for Muscularity. In order to test for mediation, a final hierarchical linear regression was conducted. Sexual orientation and marital status were added in the first step. Ethnicity was added in the second step, and finally media ethnicity. In the second step, ethnicity accounted for 6.6% of the variance in drive for muscularity (F_{change} (1,195) = 15.5, β =.268, p<.01). In the final step, media internalization decreased the influence of ethnicity; however, the contribution of ethnicity remained significant (β =.203, p <.01). Media internalization, accounted for 9.8% of the variance in the final step (F_{change} (1,194) = 26.1, β =.335, p<.01). The regression weight of ethnicity on drive for muscularity was reduced from β =.268 to β =.203 by including media internalization (β=.335) in the regression model (Figure 4), suggesting the possibility of a partial but not full mediator. These results are presented in Table 19.

In order to determine whether or not media internalization was acting as a partial mediator of the relationship between ethnicity and drive for muscularity, a Sobel test was conducted as previously described (Sobel, 1982). Both the unstandardized regression coefficient (a = 5.01) and the standardized error (sa = 1.79) were entered from the first regression where ethnicity predicted media internalization. Next, the unstandardized regression coefficient (b = .399) and the standardized error (sb = .068) were entered from the second regression equation where media internalization predicted drive for muscularity. The Sobel test statistic indicated that media internalization is a partial

Table 18

Step c of Mediation Model: Hierarchical Linear Regression Analysis to Examine the Potential Main Effects of Ethnicity on Drive for Muscularity

Predictors	β	ΔR^2
Step 1:		.111**
Sexual Orientation	.161*	
Marital Status	.259*	
Step 2:		.066**
Ethnicity	.268**	

*p<.05, **p<.01

Table 19

Hierarchical Linear Regression Analysis to Examine the Potential Mediation of Ethnicity by Media Internalization in Predicting Drive for Muscularity

Predictors	β	$\Delta R^{2\ change}$
Step 1:		.111**
Sexual orientation	.220**	
Marital Status	.199**	
Step 2:		.066**
Ethnicity	.268**	
Step 3:		.098**
Ethnicity	.203**	
Media Internalization	.335**	

*p<.05, **p<.01

mediator of the relationship between ethnicity and drive for muscularity (Sobel t (195) = 2.52, p=.01).

Discussion

This study sought to understand the relationships among self-esteem, drive for muscularity, media internalization, sexual orientation, and ethnicity in a sample of men who work out in gyms. It was expected that men with lower global self-esteem would demonstrate a higher drive for muscularity than those with higher self-esteem. Additionally, it was hypothesized that the men with the greatest drive for muscularity would be not only those with lower self-esteem, but also those who were gay and those who were more likely to internalize media images. For those who internalized ideal media images more, self-esteem was expected to be a stronger predictor of drive for muscularity than for men who internalize these images less. Finally, it was predicted that a two-way interaction between media internalization and self-esteem would be more pronounced for gay men than for straight men. The findings that neither media internalization nor sexual orientation were significant moderators of the relationship between self-esteem and drive for muscularity were unexpected.

Findings from this initial analysis combined with existing research literature led to the exploration of a new model in which media internalization was predicted to mediate the relationship between sexual orientation and drive for muscularity. It previously has been established that gay men generally have a higher drive for muscularity than straight men (Yelland & Tiggeman, 2003). Additionally, studies have shown that men who internalize more ideal images may be more susceptible to body dissatisfaction (Agliata, Tantletuff-Dunn, 2004) and that ideal media images can change

men's perceptions of their bodies, causing them more dissatisfaction (Leit, Gray, Pope, 2001). Gay men, in particular, may be more susceptible to media images and have shown greater levels of anxiety in response to idealized media images (Duggan & McCreary, 2004). The finding that media internalization mediated, or "carried" the influence of the relationship between sexual orientation and drive for muscularity is supported by these previous findings.

While ethnicity was not initially considered in the original hypotheses of this study, its presence as an important covariate led to an exploratory investigation of this variable, as well. The prediction that European American men would internalize ideal media images more and a have a greater drive for muscularity than African American men was supported. This led to the investigation of media internalization as a potential mediator of the relationship between ethnicity and drive for muscularity. Research in women has found that exposure to media images significantly affected body esteem scores (Esteban, 2003). According to another study, women of different ethnicities responded differently to, and were differently affected, by images of thin women (Botta, 2000). While the literature is unclear about the relationship among ethnicity, media internalization, and drive for muscularity, the relationships found in the current study indicate that ethnicity is associated with drive for muscularity, and this relationship can in part be explained by differences in amount of media internalization in Caucasian versus Black men.

Findings and Implications

Influences of self-esteem, sexual orientation, and media internalization on drive for muscularity. Several important findings emerged from this study. First, the relationship between self-esteem and drive for muscularity demonstrated in previous studies (Olivardia et al., 2004) was confirmed in the current study. Men with lower levels of global self-esteem demonstrated a significantly higher drive for muscularity than those with higher self-esteem. Men with higher levels of media internalization were also found to have a higher drive for muscularity, while those who internalized media images less demonstrated a lower level of drive for muscularity. The degree to which media was internalized by men explained the greatest amount of difference seen in drive for muscularity, suggesting that how media is consumed and internalized by men may contribute to their attempts to become more muscular. This is supported by previous research that shows greater levels of dissatisfaction immediately after consuming media images of ideal men (Leit, Gray, Pope, 2001). As expected, gay men were found to have a higher drive for muscularity than straight men. However, of the variables examined, sexual orientation demonstrated the smallest effect for differences seen in drive for muscularity. This suggests that while sexual orientation is associated with drive for muscularity, another factor can better explain why gay men have a higher drive for muscularity than straight men. Perhaps the most surprising finding was that sexual orientation ceased to influence drive for muscularity in the presence of media internalization, suggesting that media internalization might be an intervening variable

between sexual orientation and drive for muscularity. This led to further examination of these variables.

Comparing Gay Men to Straight Men. While sexual orientation was related to differences seen in drive for muscularity, its impact was less than predicted and was strongly affected by an intervening variable, namely media internalization. As expected, gay men had a significantly higher drive for muscularity, significantly higher levels of media internalization, and significantly lower levels of self-esteem than straight men in this study. Also, both gay and straight men who internalized media images more demonstrated higher levels of drive for muscularity. In contrast only straight men with lower self-esteem levels showed a higher drive for muscularity, while in gay men, self-esteem did not influence drive for muscularity.

It was notable in this study that most men rated their self-esteem as being quite high. Thus, there were fewer men to compare the effects of low versus high self-esteem. This finding is in accordance with previous studies indicating that adolescent males who participate in sports may have higher levels of self-esteem (Holland & Andre, 1994). Straight men had significantly higher levels of self-esteem overall than gay men, indicating that straight men may view their participation in exercise differently and may benefit more in their view of self-worth from exercising. Those with high levels of self-esteem may not be as influenced by media images regardless of amount of internalization, while those with lower levels of self-esteem may be more impacted by their internalization of media images. Longitudinal studies have found that self-esteem may influence the perception of sociocultural messages, including media internalization

and strategies to increase weight and muscle mass in adolescent males (McCabe & Riciardelli, 2003; Ricciardelli & McCabe, 2001; Riciardelli & McCabe, 2003). While these findings were not demonstrated in the current study based on the relationship between media internalization and drive for muscularity, it should be noted that the previous study also found that only those with low self-esteem and high negative affect who perceived more pressure from the media and from friends were more likely to engage in methods to increase muscle mass. It is possible that self-esteem was not found to influence the relationship between media internalization and drive for muscularity because the current sample exhibited such high levels of self-esteem; however, differences could also be accounted for by the use of slightly different constructs.

Further examination of the moderators in the original model led to a new model in which it was predicted that media internalization would instead mediate the relationship between sexual orientation and drive for muscularity. Media internalization was found to be an intervening variable that explains the influence that sexual orientation has on drive for muscularity. Previous research supports the notion that media internalization is an important factor in determining how one perceives oneself and that viewing more muscularized images of men can lead to increased dissatisfaction (Leit, Gray, & Pope, 2001), which could fuel one's drive to become more muscular. One study has indicated that gay men may be more negatively influenced by media images (Fawkner & McMurray, 2002). Another study has suggested that a gay male obsession with hyper-masculinity is related to pornography viewed by some gay men (Kendall, 2004). If gay men are more susceptible to media influences, then increased exposure of gay men to

media images of undressed muscular men could account for the increased drive in muscularity in gay men. Therefore, it is important to note that it is the consumption and subsequent internalization of muscularized images that accounts for drive for muscularity, rather than being gay in itself. Thus, it is important to emphasize these findings regarding the impact that the media may have, particularly in the gay community.

Media images may also be impacted by one's perception of the "ideal" body, as portrayed by different types of media. While straight men in this study slightly over-reported their perceived BMI, indicating that they see themselves as more bulky than they actually are, gay men tended to underreport their perceived BMI, suggesting that they see themselves as being leaner than they actually are. This finding supports previous research suggesting that straight and gay men aim for different ideals when working out in gyms (Atkins, 1998). While BMI has been implicated as a risk factor for body dissatisfaction (Stice, 2002), the relationship between BMI and cognitions related to pursuing more muscular body types has not been determined (Cafri, Thompson, Ricciardelli, McCabe, Smolak, & Yesalis, 2004). Although differences between measured and self-reported BMIs were not significant between groups, the current findings suggest that gay and straight men may be aiming for different body ideals and may view themselves according to these different ideals.

Comparing European American to African American men. Differences in ethnicity were found to be associated with both media internalization and drive for muscularity. Specifically, European American men were found to internalize media

images more and had a higher drive for muscularity than African American men. These relationships suggested that differences in images internalized might also better explain the relationship seen between ethnicity and drive for muscularity. European men's greater internalization of media images partly explained differences seen between black and white men concerning drive for muscularity. It has been suggested that media plays an important role in constructing representations of "masculinity" (Craig, 1992). However, media images are only part of the reason drive for muscularity is higher in white men. Differences may also be due in part to different types and amounts of media consumed by men of different ethnicities that may influence their perceptions of body appearance. One group of researchers who interviewed men of different ethnicities and their responses to idealized male body images in the media attributed different ethnic responses to differing cultural constructions of the male body (Gil, Henwood, & McLean, 2000). Therefore, different ideals for men of different ethnicities may also play a role in determining drive for muscularity.

The important role of media internalization. The finding of media internalization as an intervening variable that explained the relationship between sexual orientation and drive for muscularity and partially explained differences seen in black versus white men in relationship to drive for muscularity points to the important role that media images play in determining how men perceive their bodies and what they do to attain "ideal images." Most importantly, this study reveals that it is not just being straight or gay that may lead to an unhealthy drive for muscularity, nor is it simply one's ethnic identity. Rather, the influences that media has on each of these groups is what appears to explain

differences in their drive for muscularity. It is unclear whether gay men and European American men simply internalize these images more or whether the types of media aimed at these groups encourage more of an ideal and muscular figure in among these groups of men. Also, societal factors for each subculture may also emphasize or de-emphasize how media images are internalized. Therefore, it is important to research further why internalization of images differs among deferent ethnic groups and among those of different sexual orientations.

Limitations

While this study demonstrated that media internalization is an important mediating variable between sexual orientation and one's drive for muscularity, and between ethnicity and drive for muscularity, interpretation of these findings should be made with the knowledge of the limitations of this study. Although this study attempted to recruit a diverse group of men, recruitment required visiting gyms that may not be completely representative of the general population. While every attempt was made to control for possible differences in gym settings, the atmosphere of different gyms also may influence its clientele, and thus, these results may not be applicable to all men who work out in gyms. Additionally, the entire sample demonstrated relatively high levels of self-esteem that may not be representative of the general population of men who exercise. The majority of the men in this population were college educated and from relatively affluent areas; thus, this sample may not be as representative of those with lower educational levels or those from more rural settings.

The self-report measures used for this study have been shown to have good validity and reliability. However, the drive for muscularity scale is limited in that it does not contain distinct subscales that measure behaviors such as substance abuse, exercise frequency, and dieting behaviors (Cafri et al., 2004). Therefore, one is limited in the amount of information that can be obtained about potential pathology using this scale.

Finally, this study used a cross-sectional design, and is thus limited in its ability to draw conclusions about which factors truly represent risk factors for increasing one's drive for muscularity over time. Additionally, this study used a nonclinical sample of men, which may underrepresent the effects of media internalization and self-esteem on drive for muscularity.

Suggestions for Future Research

Future research should focus on understanding which factors are important in determining drive for muscularity and the degree to which this impacts disordered eating and impairment in other aspects of life. The current research study points to the need to further understand the great impact that the media has on the male community and how overly muscularized images may cause eating pathology and lead to body image problems. While this study shows that sexual orientation influences drive for muscularity through the amount of media internalized, more research should be conducted to understand why differences in internalization of media images exist between straight and gay men. Researchers should investigate whether it is difference in the sheer amount of media being viewed, or the types of images viewed by each group. It is also important to research how the gay culture versus straight culture may influence the types of messages

men view and how these images are perceived and subsequently internalized. With regard to ethnicity, it is also important to understand why media plays a role in predicting higher levels of drive for muscularity among Caucasian men. Again, it would be important to investigate whether the amount of images internalized or the types of images aimed at different ethnicities impacts their subsequent internalization. European American men and African American men do consume different types of media and different images are often portrayed to black and white men about their bodies. Also, it would be important to understand how each culture would impact the way media images are internalized. More research also should be conducted to determine whether images of normal healthier males would lead to less of a drive for muscularity among those who work out in gyms. It would also be interesting to examine whether an emphasis on more of a "healthy", less muscularized figure in gyms and media would decrease drive for muscularity in these groups of men.

Future research should also attempt to identify what types of media images are the most harmful to men. While this study showed significant contributions from TV and commercial media, as well as media portraying athletic images, more research should be conducted to understand which types of messages have the most impact for different groups.

Finally, this study reveals the importance of ethnicity in future research concerning drive for muscularity and muscle dysmorphia. While European American men demonstrate both greater media internalization and greater drive for muscularity than African American men, these relationships need to be further investigated to

understand why European American men are more affected by the media and what factors are contributing to their increased drive for muscularity over African American men. Additionally, other cultures should be studied to get a better picture of how ethnicity and different body types idealized by different groups may impact their tendency to develop or be buffered from developing muscle dysmorphia.

REFERENCES

Agliata, D., & Tantleff-Dunn, S. (2004). The impact of media exposure on males' body image. *Journal of Social & Clinical Psychology, 23*(1), 7-22.

Aiken, L.S., & West, S.G. (1991). *Multiple Regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.

Atkins, D. (Ed.) (1998). *Looking queer: Body image and identity in lesbian, bisexaul, gay, and transgender communities*. New York: Harrington Park Press.

Balsam, K.F., & Rothblum, E.D. (2001, November). Disordered eating and body dissatisfaction: A comparison of lesbian, gay, and bisexual adults and their heterosexual siblings. Paper presented at the 35th annual conference of the Association for the Advancement of Behavior Therapy, Philadelphia, PA.

Beren, S.E., Hayden, H.A., Wilfley, D.E., & Grilo, C.M. (1996). The influence of sexual orientation on body dissatisfaction in adult men and women. *International Journal of Eating Disorders, 20*(2), 135-141.

Berscheid, E., Walster, E., & Bohrnstedt, G. (1973). The happy American body: a survey report. *Psychology Today*, *7*, 119-131.

Botta, R. (2000). The mirror of television: A comparison of Black and White adolescents' body image. *Journal of Communication, 50*(3), 144-159.

Braun, D.L., Sunday, S.R., Huang, A., & Halmi, K.A. (1999). More males seek treatment of eating disorders. *International Journal of Eating Disorders, 25*, 415-424.

Button, E.J., Sonuga-Barke, E.J.S., Davies, J., & Thompson, M. (1996). A prospective study of self-esteem in the prediction of eating problems in adolescent

schoolgirls: Questionnaire findings. *British Journal of Clinical Psychlogy, 35(2),* 193-203.

Cafri, G., Strauss, J., & Thompson, K. (2004). Male body image: Satisfaction and its relationship to well-being using the somatomorphic matrix. *International Journal of Men's Health, 1*, 215-231.

Cafri, G., & Thompson, K. (2004). Measuring male body image: A review of the current methodology. *Psychology of Men and Masculinity*, *1(5), 1*524-9220.

Cafri, G, Thompson, K., Ricciardelli, L., McCabe, M., Smolak, L., & Yesalis, C. (2004). Pursuit of the muscular ideal: Physical and psychological consequences and putative risk factors. *Clinical Psychology Review 25*, 215-239.

Carlat, D. J., & Camargo, C. A. (1991). A review of bulimia nervosa in males. *American Journal of Psychiatry, 148*(7), 831-843.

Cash, T.F. (1997). *The body image workbook: An 8-step guide for learning to like your looks.* Oakland, CA: New Harbinger

Cash, T.F., Winstead, B.A., & Janda, L.H. (1986). The great American shape-up: body image report. *Psychology Today, 20*, 30-37.

Cohane, G.H., & Pope, H.G., Jr. (2001). Body image in boys: A review of the literature. *International Journal of Eating Disorders*, *29*, 373-379.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155-159.

Cole, J.C., Smith, R., Halford, J.C.G., & Wagstaff, G. F. (2003). A preliminary investigation into the relationship between anabolic-androgenic steroid use and

the symptoms of reverse anorexia in both current and ex-users. *Psychopharmacology*, *166*(4), 424-4430.

Craig, S. (1992). *Men, masculinity, and the media*. Thousand Oaks, CA. Sage Publications, Inc.

Duggan, S. J., McCreary, D. R. (2004). Eclectic Views on Gay Male Pornography: Pornucopia. *Journal of Homosexuality, 47*(3-4), 45-58.

Espel, E.S., Sapnakos, A., Kasl-Godley, J., & Brownell, K.D. (1996). Body shape ideals across gender, sexual orientation, socioeconomic status, race, and age in personal advertisements. *International Journal of Eating Disorders, 19* (3), 265-273.

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program. *Behavior Research Methods, Instruments, & Computers*, *28*, 1-11.

Esteban, C.M. (2003). The effects of media images on women's body esteem across ethnicity. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 63* (8-B), 3911.

Fawkner, H. J.; McMurray, N. E. (2002). Body Image in Men: Self-Reported Thoughts, Feelings, and Behaviors in Response to Media Images. *International Journal of Men's Health, 1*(2), 137-161.

Franzoi, S.L., & Herzog, M.E. (1987). Judging Physical attractiveness: What body aspects do we use? *Personality and Social Psychology Bulletin*, *13*, 19-33.

Garner, D. M. (1997). The 1997 Body Image Survey Results. *Psychology Today*, *30*(1),

30-84.

Gil, R., Henwood, K., & McLean, C. (2000). The tyranny of the 'six-pack'? Understanding men's responses to representations of the male body in popular culture. In Squire, C. (ed). *Culture in Psychology* (pp. 100-117). New York: Routledge.

Gray, J.J., Ford, K., & Kelly, L.M. (1987). The prevalence of bulimia a black college population. *International Journal of Eating Disorders, 6*, 733-740.

Gray-Little, B., Williams, V.S.L., & Hancock, T.D. (1997). An item response theory analysis of the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 23*, 443-451.

Grilo, C. M.; Masheb, R. M.; Brody, M. (2005). Binge Eating and Self-Esteem Predict Body Image Dissatisfaction among Obese Men and Women Seeking Bariatric Surgery. *International Journal of Eating Disorders, 37*(4), 347-351.

Harter, S. (1990). Causes, correlates, and the functional role of global self-worth: a life-span perspective. In R.J. Sternberg & J. Kolligan, Jr. (eds.), *Competence Considered*. New Haven, CT, Yale University Press.

Heinberg, L.J., Thompson, J.K., & Stromer, S. (1995). Development and validation of the sociocultural attitudes towards appearance questionnaire, *17*(1), 81-89.

Herzog, D.B., Newman, K.L., & Warshaw, M. (1991). Body image dissatisfaction in homosexual and heterosexual males. *Journal of Nervous and Mental Disorders, 179*, 356-359.

Hitzeroth, V., Wessels, C., Zungu-Dirwayi, N., Oosthuizen, P., & Stein, D. J. (2001). Muscle dysmorphia: a South-African sample. *Psychiatry and Clinical Neurosciences, 55*(5), 521-523.

Holland, A. & Andre, T. (1994). Athletic participation and the social status of adolescent males and females. *Youth and Society, 25*, 388-407.

Keel, P.K., Leon, G.R., & Fulkerson, J.A. (2001). Vulnerability to eating disorders in childhood and adolescence. In Ingram, R.E. and Price, J.M. (eds.). *Vulnerability to Psychopathology: Risk across the Lifespan* (pp.389-411). New York: Guilford Press.

Kendall, C.N. (2004). Educating gay male youth: Since when is pornography a path towards self-respect? *Journal of Homosexuality, 37*, 3-4.

Kouri, E.M., Pope, H.G., Katz, D.L., & Olivardia, R. (1995). Fat-free mass index in users and non-users of anabolic-androngergic steroids. *Clinical Journal of Sports Medicine*, *5*, 223-228.

Lakkis, J., Ricciardelli, L.A., & Williams, R.J. (1999). Role of sexual orientation and gender-related traits in disordered eating. *Sex Roles, 41,* 1-16.

Leit, A.R., Gray, J.J., & Pope, H.G., Jr. (2001). The media's representation of the ideal male body: A cause for muscle dysmorphia? *International Journal of Eating Disorders*, *31*, 334-338.

Leit, A.R., Pope, H.G., Jr., & Gray, J.J. (2001). Cultural expectations of muscularity in men: The evolution of Playgirl centerfolds. *International Journal of Eating Disorders, 29*(1), 90-93.

McCabe, M.P. & Riciardelli, L.A. (2003). A longitudinal study of body change strategies among adolescent males. *Journal of Youth and Adolescence, 32*, 105-113.

McCreary, D.R., & Sasse, D.K. (2000). An exploration of the drive for muscularity in adolescent boys and girls. *Journal of American College Health*, *48* (6), 297-304.

Miller, K.J., Gleaves, D.H., Hirsch, T.G., Green B.A., Snow, A.C., & Corbett, C.C. (2000). Comparisons of body image dimensions by race/ethnicity and gender in a university population. *International Journal of Eating Disorders*, 27(3), 310-316.

Morrison, T.G., Hopkins, C., Rowan, E.T., & Morrison, M.A. (2004). Muscle Mania: Development of a New Scale Examining the Drive for Muscularity in Canadian Males. *Psychology of Men and Masculinity*, *1*(5), 1524-9220.

Noles, S. W., Cash, T. F. & Winstead, B. A. (1985). Body image, physical attractiveness, and depression. *Journal of Consulting and Clinical Psychology*, 53, 88-94.

O'Dea, J.A., & Abraham, S. (2002). Eating and exercise disorders in young college men. *Journal of American College Health*, 50(6), 273-278.

Olivardia, R. (2001) Mirror, mirror on the wall, who's the largest of them all? The features and phenomenology of muscle dysmorphia. *Harvard Review of Psychiatry*, *9*, 254-259.

Olivardia, R., Pope, H.G., Jr., Borowiecki, J.J., & Cohane, G.H. (2004). Biceps and body image: the relationship between muscularity and self-esteem, depression, and eating disorder symptoms. *Psychology of Men and Masculinity*, *5*(2), 112-120.

Olivardia, R., Pope, H. G., & Hudson, J.I. (2000). Muscle dysmorphia in male weightlifters: a case control study. *American Journal of Psychiatry*, *157*(8), 1291-1296.

Olivardia, R., Pope, H. G., & Mangweth, B. (1995). Eating disorders in college men. *American Journal of Psychiatry*, *152*(9), 1279-1285.

Pope, H.G., Jr. & Brower, K.J. (In press). Psychiatric effects of anabolic-adronergic steroid use in H.I. Kaplan & B.J. Sadock (eds.) *Comprehensive Textbook of Psychiatry*, *7th ed.* Baltimore: Williams & Wilkins.

Pope, H.G., Gruber, A.J., Choi, P., Olivardia, R., & Phillips. K.A. (1997). Muscle dysmorphia: An underrecognized form of body dysmorphic disorder. *Psychosomatics: Journal of Consultation Liaison Psychiatry, 38*(6), 548-557.

Pope, H.G., Jr., Katz D.L., & Hudson, J.I. (1993). Anorexia Nervosa and "reverse anorexia" among 108 male bodybuilders. *Comprehensive Psychiatry*, *34*, 406-409.

Pope, H.G., Olivardia, R., Gruber, A.J., & Boroweicki, J. (1999). Evolving ideals of male body image as seen through action toys. *International Journal of Eating Disorders*, *26*, 65-72.

Pope, H.G., Phillips, K.A., & Olivardia, R. (2000). *The Adonis Complex*. The Free Press, New York.

Preacher, K.J. & Leonardelli, G.J. (2001). Calculation for the Sobel test: An interactive calculation tool for mediation tests [Computer software]. Available from http://www.quantpsy.org.

Riciardelli, L.A., & McCabe, M.P. (2001). Moderators of sociocultural influences on body dissatisfaction, strategies to decrease weight, and strategies to increase muscle tone among adolescent boys and girls. *Sex Roles, 44*, 189-207.

Riciardelli, L.A., & McCabe, M.P. (2003). A longitudinal analysis of the role of psychological factors in predicting body change strategies among adolescent boys. *Sex Roles*, 48, 349-360.

Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton, NJ: Princeton University Press.

Russell, C.J., & Keel, P.K. (2002). Homosexuality as a specific risk factor for eating disorders in men. *International Journal of Eating Disorders, 31,* 300-306.

Siever, M. (1994). Sexual orientation and gender as factors in socioculturally acquired vulnerability to body dissatisfaction and eating disorders. *Journal of Consulting and Clinical Psychology, 62,* 252-260.

Silberstein, L.R., Mishkind, M.E., Striegel-Moore, R.H., Timko, C., & Rodin, J. (1989). Men and their bodies: A comparison of homosexual and heterosexual men. *Psychosomatic Medicine, 51,* 337-346.

Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In S. Leinhart (Ed.), *Sociological methodology 1982* (pp.290-312). San Francisco: Jossey-Bass.

Spitzer, B.A., Henderson, K.A., & Zivian, A.T. (1999). Gender differences in population versus media body sizes: A comparison over four decades. *Sex Roles, 40*, 545-565.

Stein, D. J., Hitzeroth, V., Wessels, C., Zungu-Dirwayi, N, & Oosthuizen, P. (2001). Muscle dysmorphia: a South African Sample. *Psychiatry & Clinical Neurosciences*, *55*(5), 521-523.

Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin*, *128*, 825-848.

Stice, E. & Shaw, H. (2004). Eating disorder prevention programs: a meta-analytic review. *Psychological Bulletin*, *130*(2), 206-227.

Thompson, J.K., van den Berg, P., Roehrig, M., Guarda, A.S., & Heinberg, L.S. (2004). The Sociocultural Attitudes Towards Appearance Scale-3 (SATAQ-3): Development and Validation. *International Journal of Eating Disorders*, *35*(3), 293-304.

Wildes, J.E., & Emery, R.E. (2001). The roles of ethnicity and culture in the development of eating disturbance and body dissatisfaction: A meta-analytic review. *Clinical Psychology Review, 21*(4), 521-551.

Yelland, C., & Tiggeman, M. (2003). Muscularity and the gay ideal: body dissatisfaction and disordered eating in homosexual men. *Eating Behaviors*, *4,* 107-116.