Integrating Self-Concept Into the Relationship Between Drive for Muscularity, and Disordered Eating and Depression, Among Men

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Research on men’s health has increasingly recognized the importance of depression and eating disorders among men. The present study sought to extend extant work on self-concept and depression to men, incorporating muscularity-related attitudes and behaviors, and also incorporating risk for disordered eating. Two samples, one of 204 heterosexual college men and one of 197 gay and bisexual men sampled online, were recruited. Participants completed measures of drive for muscularity, self-concept, depression symptoms, and eating disorder symptoms. Data were analyzed using a structural equation model in which the relationships between drive for muscularity attitudes and behaviors, and depression and eating disorder symptoms, were mediated by physical self-concept, global physical self-concept, and self-esteem. The model was supported for the gay and bisexual men sample, but not for the college men sample. Implications for future research with men, and integration of body-related variables into therapy with men, are discussed.

Keywords: men’s health, depression, disordered eating, drive for muscularity

Researchers and clinicians have been giving increased attention to the etiology, assessment, and treatment of disorders such as depression and eating pathology among men (S. V. Cochran, 2005; Jones & Morgan, 2010). In particular, some work has investigated associations between such presenting concerns and behaviors and thoughts related to the body (Duggan & McCreaey, 2004; Oli- vardia, Pope, Borowiecki, & Cohane, 2004). College-aged men and gay and bisexual men are two groups of men posited to be at relatively higher risk for body image-related concerns (Parent, 2013a; Tiggemann, Martins, & Kirkbride, 2007). However, the association between men’s muscularity-related concerns and disorders such as depression and eating disorders has largely been examined as a direct relationship, rather than more complex mediational relationships. As well, extant work has generally not disentangled the potential differential relationships between muscularity-related attitudes (e.g., cognitive or emotional preoccupation or obsession with the body) versus muscularity-related behaviors (e.g., exercise, weightlifting, and other fitness-related behaviors) and depression or disordered eating. The present study sought to extend the model posited by Dishman, Hales, Pfeiffer, et al. (2006) in their examination of young women’s depression symptoms, which focused on self-concept as a mediator between exercise behaviors and depression, to men, using gender-relevant variables (i.e., muscularity-related attitudes and behaviors).

Dishman and Colleagues’ Mediation Model

Dishman, Hales, Pfeiffer, et al. (2006) found that, among their sample of adolescent girls, physical activity and sport participation were positively related to aspects of physical self-concept, which, in turn, were positively associated with self-esteem, which, in turn, was negatively associated with depression. Thus, the results suggested that physical activity and sport participation were positive influences on self-concept and psychological health among the sample in that study. Dishman et al.’s research focused on adolescent girls, though similar concerns (with a gender-moderated focus on muscularity) may also influence men’s experiences of depression or disordered eating.

There is utility in translating such a model to men’s drive for muscularity, depression, and disordered eating symptoms. The operationalization of the drive for muscularity as two constructs (muscularity-related behaviors, such as exercising and taking exercise supplements; and muscularity-related attitudes, such as aspiring to be much larger and more muscular) allows for the delineation of relationships of potentially differential valences. For example, physical activity and sport participation were found to enhance self-esteem in Dishman, Hales, Pfeiffer, et al.’s (2006) sample. It is possible that muscularity-related behaviors may be associated positively with physical self-concept and, through mediational relationships, negatively with depression and disordered eating. In contrast, intense focus on a desire to be muscular (i.e., muscularity-related attitudes) may be associated negatively with physical self-concept and, through mediational relationships, positively with depressive or disordered eating. As such, applying self-concept theories to men, by way of modifications to Dishman et al.’s model, represents an opportunity to disentangle mediation pathways between facets of the drive for muscularity and depression and eating disorder symptoms.
Depression, Eating Disorders, and Men

Although estimates of rates of depression vary by how the construct is operationalized, estimates place rates of depression for college men between 10% and 40% (Bayram & Bilgel, 2008; Kisch, Leino, & Silverman, 2005; Michael, Huebsmen, Gerard, Gilligan, & Gustafson, 2006). Rates of depression among gay and bisexual men have been consistently higher than among heterosexual men in comparisons studies (S. D. Cochran & Mays, 2000; S. D. Cochran, Sullivan, & Mays, 2003; Mills et al., 2004). Depressive symptoms and body image disturbances often co-occur among men; Olivardia et al. (2004) reported a significant relationship between “muscular belittlement” and depression among college men. Additionally, Brennan, Craig, and Thompson (2012) reported a significant relationship between the drive for muscularity and depressive symptoms among gay men.

Rates of disordered eating also vary by how the construct is operationalized. Rates have been estimated to range from about 2% to 25% among college men (Hoerr, Bokram, Lugo, Bivins, & Keast, 2002; Lavender, de Young, & Anderson, 2010; O’Dea & Abraham, 2002). In comparison studies, gay and bisexual men consistently report greater endorsement of eating disorder symptoms than heterosexual men (Feldman & Meyer, 2007a, 2007b, 2010; Strong, Williamson, Netemeyer, & Geer, 2000). Disordered eating symptoms also co-occur with body image disturbances among men; Olivardia et al. (2004) reported a significant correlation between muscular belittlement and disordered eating among college-aged men, and Brennan et al. (2012) reported a significant correlation between drive for muscularity and disordered eating among gay men.

The Drive for Muscularity

Pursuit of the muscular ideal is often rewarded and reinforced in North American culture, with a more muscular build for heterosexual, gay, and bisexual men being associated with greater access to romantic and sexual partners and more positive judgments by others (Bartholome, Tewksbury, & Bruzzon, 2000; Frederick & Haselton, 2007; Lassek & Gaulin, 2009; Puts, 2010; Toledano, 2013). At the same time, research on muscularity has usually examined the drive for muscularity as a negative, pathological construct, and has explored its relationship with variables such as internalized homophobia, narcissism, sexism, objectification of women, and depression (Bergeron & Tylka, 2007; Brennan et al., 2012; J. Brown & Graham, 2008; Swami & Voracek, 2013). However, many investigators have not differentiated between muscularity-related attitudes and muscularity-related behaviors (e.g., many researchers use total scores on multidimensional measures of drive for muscularity that assess both muscularity-related attitudes and behaviors, thus making it unclear whether relations with other variables are driven by attitudes, behaviors, or both). Relatedly, to the extent that such paradigms pathologize muscularity- and fitness-enhancing behaviors, it is challenging to reconcile such lines of work with the consequences of not engaging in fitness-enhancing behaviors—e.g., with the high rates of obesity and sedentary lifestyles in the U.S. and abroad (Y. C. Wang & Beydoun, 2007; Y. C. Wang, McPherson, Marsh, Gottmacker, & Brown, 2011). Obesity and related conditions have been associated more reliably, and more strongly, with mental health concerns, physical health issues, and economic burden on health care systems, than has the drive for muscularity (Onyike, Crum, Lee, Lyketsos, & Eaton, 2003; Y. C. Wang et al., 2011). Separation of muscularity-related attitudes (which may exist independently of actually engaging in healthful exercise behaviors) from muscularity-enhancing behaviors, such as weightlifting, can help to elucidate the pathways through which some muscularity-enhancing behaviors might be adaptive and healthful, and useful to integrate into health research that aims to reduce obesity.

Muscularity may be particularly relevant to college men and gay and bisexual men. College men’s health has been said to be in crisis (Courtenay, 1998; Davies, Shen-Miller, & Isacco, 2010). This crisis is thought to be associated, at least in part, with health challenges resulting from rigid adherence to traditional masculinity ideologies, of which the drive for muscularity may be one manifestation (Daniel & Bridges, 2013; J. Martin & Govender, 2011). Indeed, traditionally-aged college men are in the modal age range for beginning use of anabolic steroids (Parkinson & Evans, 2006). As well, gay and bisexual men may share common experiences with regard to self-perceptions of the body (Moradi, Mohr, Worthington, & Fassinger, 2009; Wiseman & Moradi, 2010), to the extent that both groups may be involved in the gay community and both may seek to obtain bodies potentially appealing to other men, who sexually objectify potential partners to a greater degree than women or heterosexual men (Kozak, Frankenhaus, & Roberts, 2009; Strelan & Hargreaves, 2005). Although little research has been conducted directly comparing gay and bisexual men on body image variables, extant work does suggest that both groups experience similar levels of some body-related concerns, such as body image investment and eating disorder symptoms (Feldman & Meyer, 2007b; T. A. Ryan, Morrison, & McDermott, 2010). Research has indicated that gay and bisexual men report higher levels of the drive for muscularity than heterosexual men (Calzo, Corliss, Blood, Field, & Austin, 2013; Morrison, Morrison, & McCann, 2006). Social identity theory (R. Brown, 2000) suggests that muscular body composition may be sought by gay and bisexual men to enhance self-esteem and increase perceived mate value, given that muscularity is viewed as valued among many gay and bisexual men (Tiggemann et al., 2007; Varangis, Lanzieri, Hildebrandt, & Feldman, 2012). Thus, attainment of a muscular body represents one potential source of physical self-concept for gay and bisexual men. However, social identity theory can also be applied to heterosexual men in regard to the pursuit of the muscular ideal, given that they, too, have concerns about identity and reputation within the coconstructed dominant masculine culture (Galli & Reel, 2009). Unfortunately, limited work exists on cultural considerations in men’s body image beyond sexual orientation (Parent, 2013a).

Drive for Muscularity, Depression, and Disordered Eating

Research has indicated mixed findings related to engagement in exercise and men’s depression and disordered eating. Some researchers have posited that intense exercise (to the point of compulsion or addiction) may be unhealthful (Pope, Gruber, Choi, Olivardia, & Phillips, 1997). For example, among a sample of college men, intention related to exercise dependence (e.g., regularly exercising longer than one has planned) was associated with social physique anxiety (Hausenblas & Fallon, 2002). However,
regular casual or moderate exercise has been demonstrated to be protective against depression, and exercise alone has been demonstrated to reduce depression (Harris, Cronkite, & Moos, 2006). Several studies have found effects for moderate exercise of almost the same size as therapy and medication, with meta-analysis of “dose” effects (i.e., intensity of exercise, which included studies using interventions such as yoga, aerobic exercise, and weightlifting) indicating that more, or more intense, exercise was more beneficial than less, or less intense, exercise (Blumenthal et al., 2007; Cooney et al., 2013). Among a sample of college men, the product of time spent exercising and intensity of exercise was related positively with body satisfaction and negatively with social physique anxiety (Hauenblas & Fallon, 2002). Among a sample comparing experienced bodybuilders and regular weightlifters, bodybuilders demonstrated lower levels of physique anxiety than weightlifters (Hurst, Hale, Smith, & Collins, 2000).

Such mixed findings point toward the need to disentangle effects. Differential relationships may exist between muscularity-related attitudes (e.g., wishing to be more muscular, which may range from motivation and goal-striving to preoccupation or obsession) and muscularity-related behaviors (e.g., actually engaging in exercise and related behaviors, which may range from regular engagement in healthful exercise to compulsion or addiction), and mood. Thus, separate assessment of muscularity-related attitudes and behaviors is vital to understanding the interrelationships in question. Further, such mixed findings point toward the possibility of mediating variables, rather than simple direct relationships between muscularity attitudes/behaviors and mood. The present study sought to disentangle some threads of research through separate assessment of muscularity-related attitudes and behaviors, and exercise, as well as examination of potential self-esteem- and self-concept-related mediators.

Physical Self-Concept, Global Physical Self-Concept, and Self-Esteem

Within theory on self-concept, Marsh (1996) defined three facets of self-concept: physical self-concept, global physical self-concept, and self-esteem. As described by Marsh, Martin, and Jackson (2010), early measures of self-concept tended to emphasize unidimensional conceptions of self-concept, such that measures developed to assess self-concept merged appraisals of characteristics such as body image, fitness, and appearance into single total scores. Marsh developed a multidimensional construction of physical self-concept encompassing characteristics such as appraisals of strength, flexibility, coordination, and endurance within a single measure and theoretical framework.

Marsh (1996) differentiated physical self-concept from global physical self-concept. Global physical self-concept is an overall appraisal of one’s body. That is, beyond appraisals of specific body forms and functions, individuals also have judgments of their bodies as a whole that is beyond the components. Finally, Marsh’s (1996) definition of self-concept also included self-esteem. Marsh’s definition of self-esteem centered on evaluations of the self that go beyond the body, components and whole, to reflect evaluations of the self in general.

Marsh (1996) posited that these three facets of self-concept interact. Specifically, appraisals of components of body forms and functions (physical self-concept) inform judgments of the body as a whole (global physical self-concept). Judgments of the body then influence, in part, individual self-esteem to the extent that self-esteem is dependent on body form and function. That is, individuals who have positive appraisals of their body in terms of factors such as strength and flexibility may then also have positive evaluations of their body in general, and having a positive evaluation of the body is associated with enhanced general self-esteem. In contrast, if individuals feel that their bodies do not look or function well, they may have poorer evaluations of their bodies in general, and may then experience decreased general self-esteem.

The posited relationships have been explored primarily among samples of women and girls, or mixed-gender samples without analysis by gender (Brewer & Olson, 2015; Dishman, Hales, Almeida, et al., 2006; A. J. Martin, Tipler, Marsh, Richards, & Williams, 2006). However, given growing attention to men’s experiences of body image dissatisfaction, it may be valuable to extend this research to men. Specifically, the posited mediational chain may link drive for muscularity attitudes and behaviors with depression and eating disorder symptoms. Muscularity-related attitudes may be associated with more negative appraisals of one’s body, and thus to the more negative side of the relationships posited by Marsh, and ultimately with higher levels of depression and eating disorder symptoms. Research on muscularity-related behaviors is less clear; indeed, the correlation between muscularity-related attitudes and behaviors is typically moderate (i.e., correlations in the .40s and .50s; Daniel & Bridges, 2013; McCreary, Sasse, Saucier, & Dorsch, 2004; Petrie, Galli, Greenleaf, Reel, & Carter, 2014), suggesting that there is only moderate overlap between attitudes about muscularity and actually engaging in muscle-building activities. It is possible that engaging in muscularity-related behaviors is associated with enhanced physical self-concept, as those activities will build strength and endurance, reduce body fat, enhance appearance, and so forth. Thus, muscularity-related behaviors may be associated with more positive appraisals of one’s body, and thus to the more positive side of the relationships posited by Marsh, and ultimately with lower levels of depression and eating disorder symptoms.

The Present Study

The present study tested self-concept as a mediator of the relationship between muscularity-related attitudes and behaviors, and depression and eating disorder symptoms, by using a modified version of Dishman, Hales, Pfeiffer, et al.’s (2006) model. In addition, we tested the model with two samples that have been frequently examined in men’s body image research; a sample of gay and bisexual men and a sample of heterosexual college men. We altered exogenous variables to be appropriate for use with samples of men (i.e., assessing variables with muscularity focus) and also sought to extend the model to eating disorder symptoms as well as depression symptoms. Our hypotheses were as follows:

Hypothesis 1: Drive for muscularity attitudes (H1a) would be associated negatively and drive for muscularity behaviors (H1b) would be associated positively with physical self-concept. This hypothesis reflects that drive for muscularity attitudes indicates concern with the body (similar to body preoccupation or dissatisfaction) and thus may relate negatively to appraisals of the body, while drive for muscularity
behaviors reflect engaging in behaviors to improve the body and thus are expected to be related positively to body self-concept.

**Hypothesis 2:** Drive for muscularity attitudes ($H_{2a}$) would be associated negatively and drive for muscularity behaviors ($H_{2b}$) would be associated positively, with global physical self-concept.

**Hypothesis 3:** Global physical self-concept would be associated positively with self-esteem.

**Hypothesis 4:** Self-esteem would be associated negatively with depression ($H_{4a}$) and eating disorder ($H_{4b}$) symptoms.

**Hypothesis 5:** The indirect paths from drive for muscularity attitudes ($H_{5a}$), drive for muscularity behaviors ($H_{5b}$), though physical self-concept, global physical self-concept, and self-esteem, to depression and eating disorder symptoms, would be significant.

**Hypothesis 6:** Significant paths would be invariant between the samples of college men and gay and bisexual men.

### Method

#### Participants

Two samples were recruited: a sample of college men (the “C” sample) and a sample of gay and bisexual men (the “GB” sample). The C sample initially consisted of 215 men. Nonheterosexual participants ($n = 11$) were not included in the sample, leaving 204 men in the current analyses. The sample ranged in age from 17 to 46 ($M = 19.68$, $SD = 3.07$, $Mdn = 19.00$). Among the C sample, 114 (54%) identified as White, 34 (20%) identified as Hispanic, 25 (12%) identified as Black, 15 (7%) identified as Asian, 9 (5%) identified as multiracial, 3 (1%) identified as American Indian/Native American, 2 (1%) identified as “other,” and 2 (1%) declined to report their race/ethnicity. The GB sample consisted of 197 men. The sample ranged in age from 18 to 73 ($M = 35.33$, $SD = 16.11$, $Mdn = 28.00$). Among the GB sample, 149 (75%) identified as White, 21 (11%) as Hispanic/Latino, 14 (7%) as Asian, 8 (4%) as multiracial, 4 (2%) as Black, and 1 (1%) identified as “other.” Among the GB sample, 175 (89%) men identified as gay, and 22 (11%) identified as bisexual.

### Measures

#### Drive for muscularity—attitudes and behaviors.

The 14-item (a 15th item, on steroid use, is not included in the two-subscale version) Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000) was used to assess muscularity-related attitudes (DMS-Attitudes [DMS-A]; sample item: “I wish I were more muscular”) and behaviors (DMS-Behaviors [DMS-B]; sample item: “I lift weights to build more muscle”). Responses are made on a 6-point scale (1 = never, 6 = always). For the DMS-A, validity has been supported through positive correlations with body shame, social physique anxiety, and depression (Bergeron & Tylka, 2007; Michaels, Parent, & Moradi, 2013) among samples of college men and gay men. For the DMS-B, validity has been supported through correlations with bicep size (McCreary, Karvinen, & Davis, 2006) among college men, with eating to gain size among a sample of Scottish marathon competitor men (McPherson, McCarthy, McCreary, & McMillan, 2010), and involvement in the gay community among a sample of North American gay men (Tylka & Andorka, 2012). Among a sample of undergraduate men, the DMS-A and DMS-B have demonstrated test–retest reliability of 0.73 and 0.84, respectively (Litt & Dodge, 2008).

#### Physical self-concept.

Thirty-two items from the Physical Self-Description Questionnaire-40 (PSDQ-40; Marsh et al., 2010) corresponding to the nine physical self-description subscales of the measures (subsets listed in Table 1) were used to assess physical self-concept (sample item for PSDQ-40-strength: “I am a physically strong person”). Responses are made on a 6-point scale (1 = False, 6 = True). Validity of the PSDQ-40 has been supported through correlations with other measures of physical self-concept (e.g., PSDQ-40-Strength was associated with another strength measure, PSDQ-40-Endurance was associated with a measure of physical conditioning, PSDQ-40-Sport was associated with a measure of sport competence, and PSDQ-40-Appearance was associated with another measure of appearance self-concept; Marsh et al., 2010).

#### Global physical self-concept.

The PSDQ-40 Global Physical Self-Concept subscale is a three-item measure of satisfaction with one’s body in general (sample item: “Physically, I am happy with myself”). Responses are made on the same scale as the other PSDQ-40 items. Validity of the Global Physical Self-Concept scale has been supported through correlations with measures of physical self-worth (Marsh et al., 2010).

#### Self-esteem.

The Self-Esteem subscale of the PSDQ-40 is a five-item measure of self-esteem (sample item: “Overall, most things I do turn out well”). Responses are made on the same scale as the other PSDQ-40 items. Validity of the Self-Esteem subscale of the PSDQ-40 has been supported in research on undergraduate men and women that has found scores on this measure are negatively related to depression symptoms (M. P. Ryan, 2008).

#### Eating disorder symptoms.

The Eating Attitudes Test-26 (EAT-26; Garner & Garfinkel, 1979) is a 26-item measure of

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<th>Measure</th>
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<tr>
<td>1. DMS-Attitudes</td>
<td>3.78</td>
<td>1.28</td>
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<td>2.02</td>
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<td>2.60</td>
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<td>.87</td>
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<td>3. PSDQ-Strength</td>
<td>3.33</td>
<td>1.27</td>
<td>.91</td>
<td>4.29</td>
<td>1.26</td>
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<td>4. PSDQ-Body Fat</td>
<td>3.54</td>
<td>1.80</td>
<td>.94</td>
<td>4.32</td>
<td>1.52</td>
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<td>5. PSDQ-Endurance</td>
<td>3.01</td>
<td>1.35</td>
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<td>6. PSDQ-Sport</td>
<td>2.70</td>
<td>1.41</td>
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<td>4.45</td>
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<td>7. PSDQ-Activity</td>
<td>3.31</td>
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<td>.93</td>
<td>4.24</td>
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<td>8. PSDQ-Coordination</td>
<td>3.80</td>
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<td>.93</td>
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<td>9. PSDQ-Health</td>
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<td>10. PSDQ-Appearance</td>
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<td>.84</td>
<td>4.31</td>
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<td>11. PSDQ-Flexibility</td>
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<td>.83</td>
<td>3.78</td>
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<td>12. Global physical self-concept</td>
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<td>.93</td>
<td>4.19</td>
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<td>13. Self-esteem</td>
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<td>15. Depression symptoms</td>
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<td>1.69</td>
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**Note.** DMS = Drive for Muscularity Scale; PSDQ = Physical Self-Description Questionnaire; GB = gay/bisexual men sample; C = college sample.
eating pathology (sample item: “I avoid eating when I am hungry”). Responses are made on a 6-point scale (1 = Never, 6 = Always), reversed if appropriate, and recoded (responses of 1, 2, or 3 are recoded as 0, 4s were recoded as 1s, 5s are recoded as 2s, and 6s are recoded as 3s). Validity of the EAT-26 has been supported in prior studies of college men via correlations with rigid dietary control (Timko & Perone, 2005) and dissatisfaction with one’s upper body (McFarland & Petrie, 2012). Among samples of gay men, the EAT-26 has been correlated positively with internalized homophobia, and body shame, and correlated negatively with self-esteem (Reilly & Rudd, 2006; Wiseman & Moradi, 2010).

**Depression symptoms.** The Center for Epidemiological Studies—Depression Scale (CES-D; Radloff, 1977) is a 20-item measure that assesses symptoms of depression over the past week (sample item: “I was bothered by things that usually don’t bother me”). Responses are made on a 4-point scale [1 = Rarely or none of the time (less than 1 day), 4 = All of the time (5–7 days)]. Scores on the CES-D have been correlated positively with suicidality and hostility among college men (Langhinrichsen-Rohling, Arata, Bowers, O’Brien, & Morgan, 2004), and suicidality among non-heterosexual persons (Mills et al., 2004; Russell & Joyner, 2001).

**Procedure**

The present study was approved by the institutional review board at the authors’ institution. Two samples were recruited. The C sample was collected from the participant pool at a large public university in the Southern U.S. Participants were given the opportunity to sign up for the study from a list of available studies (de-identified and numbered, such that participants did not know the general purpose of the study until they signed up and viewed the informed consent). Participants completed the study online, and were compensated for their participation with credit toward their required research participation. The GB sample was collected online from social networking groups aimed toward gay and bisexual men. Groups were chosen for sampling that were specific to large U.S. cities (e.g., groups for gay and bisexual men in Boston, Houston, etc.). The groups had a wide variety of purposes and most were hosted on Facebook or Yahoo web pages (e.g., local lesbian, gay, bisexual, and transgender sport groups, local activity or club pages, local singles’ pages; sites specifically for the purpose of sexual contacts were not sampled). Emails were sent to group moderators for permission to post a link to the study, if possible, and notices about the study were posted to the groups. Participants completed the survey measures online. Participants were entered into random drawings for one of four $25 gift cards as compensation for participation.

**Results**

Participants missing more than 25% of any measure were removed from the data set prior to analysis. Fifteen participants total were removed from the data set prior to analyses, the majority of these being from the GB group and completing no items—presumably, they only entered the drawing and did not provide data. For participants who were missing less than 25% of data on a given measure, available item analysis (Parent, 2013b) was used to calculate Cronbach’s alphas and mean scores on the measures, presented for both groups in Table 1. Items for the DMS-A, DMS-B, CES-D, and EAT were parceled with three parcels for each construct. Parceling was accomplished by entering individual measures into principal axis factor analyses and assigning items to parcels in countervailing order, as per recommended practice (Little, Cunningham, Shahar, & Widaman, 2002). The measures were entered into separate factor analyses for the two samples and the results of item parceling were compared; order of magnitudes of factor loadings were generally similar and discrepancies were resolved with randomly assigning conflicted items in cases where the two samples had slightly different parcel structures. For Self-Esteem, because the measure had five items, items were parceled into two parcels of two items and one parcel of one item. For Global Physical Self-Concept, because the measure had three items, all three items were used as indicators of the latent variable.

Data were transferred to Mplus (Muthén & Muthén, 2010) for structural equation modeling (SEM) and invariance testing. SEM was run using maximum likelihood estimation. Parcels were used to represent intended latent constructs for the DMS-A, DMS-B, CES-D, and EAT scales. Subscales of the PSDQ, except for Self-Esteem, were used as latent indicators of the Physical Self-Concept scale. Data in the models were not multivariate normal according to the macro developed by DeCarlo (1997; Mardia’s normalized test coefficient $z = -2.08, p = .04$). Although several multivariate outliers were identified, removing them had no impact on the results and running the model using maximum likelihood estimation with robust standard errors did not impact the results; thus, all participants were retained in analyses. Models were assessed using guidelines for model evaluation suggested by Weston and Gore (2006) and others (Hu & Bentler, 1999; Martens, 2005) of acceptable fit indicated by a comparative fit index (CFI) of over .90, a root mean square error of approximation (RMSEA) under .10 (including the upper bound of the 90% confidence interval), and a standardized root mean square residual (SRMR) of under .10. To test the hypotheses, we examined correlations among the constructs in the hypotheses, and used analysis of indirect paths to assess for indirect relationships using 5,000 bootstrapped samples.

The model was first assessed as a measurement model in both groups. Among the GB sample, the PSDQ health subscale did not load significantly onto the intended latent variable ($B = 0.02, SE = 0.09, \hat{\beta} = 0.01, p = .78$), and among the C sample this variable had a weaker loading than any other PSDQ variable ($B = 0.26, SE = 0.08, \hat{\beta} = 0.22, p < .01$). Because of the problematic loading, we removed this variable from the models. We also allowed several related PSDQ variables to covary, using modification indices suggested by both groups (body fat with strength and activity, coordination with flexibility and sports, and endurance with activity).

Among the C sample, the measurement model fell just below recommendations for determining acceptable fit to the data for CFI, $\chi^2(351) = 838.29, p < .001$, CFI = .89, RMSEA = .08 (90% CI = 0.07, 0.09), SRMR = 0.07. All indicators loaded onto their latent factors at $p < .001$. Among the GB group, the measurement model was also an acceptable fit to the data, $\chi^2(351) = 755.84, p < .001$, CFI = .91, RMSEA = .08 (90% CI = 0.07, 0.08), SRMR = 0.08. Again, all indicators loaded onto their intended latent variables at $p < .001$. Measurement model correlations among the variables are presented in Table 2 for both groups.
Using the measurement model, we examined $H_1$–$H_4$ in both groups by examining correlations among latent constructs. Among the GB and C groups, $H_{1a}$ was not supported; muscularity-related attitudes were unrelated to physical self-concept. $H_{1b}$ was supported; muscularity-related behaviors were associated negatively with physical self-concept, with a medium-sized effect in both groups. Among both groups, both hypotheses $H_{2a}$ and $H_{2b}$ were supported; muscularity-related attitudes were associated negatively, and muscularity-related behaviors were associated positively, with global physical self-concept in both groups, with all effects in the small effect size range.

Among both groups, $H_3$ was supported; global physical self-concept and self-esteem were positively associated with medium-sized effects. Finally, $H_4$ was also supported in both groups, with self-esteem being associated negatively with eating disorder symptoms and depression symptoms with both small effect sizes for eating disorder symptoms and medium (in the C group) and large (in the GB group) effects for depression.

The measurement model fit acceptably in the GB group and was marginally poorly fitting in the C group, and so we examined the structural model in both groups in order to test indirect paths posited in $H_5$. Results from the C group indicated that the model fell below recommended cutoffs for CFI and SRMR: $\chi^2(361) = 901.41, p < .001, \text{CFI} = .88, \text{RMSEA} = 0.08 (90\% \text{ CI} = 0.07, 0.09), \text{SRMR} = 0.10$. In the GB sample, however, model fit was acceptable, $\chi^2(361) = 785.20, p < .001, \text{CFI} = .90, \text{RMSEA} = 0.08 (90\% \text{ CI} = 0.07, 0.09), \text{SRMR} = 0.08$. Path coefficients for both models are presented in Figure 1.

Because the model was not a good fit among the C sample, we examined indirect relationships only among the GB sample. Results of indirect effects testing are presented in Table 3. Overall, total indirect relationships indicated that drive for muscularity attitudes were associated positively with depression and eating disorder symptoms, while drive for muscularity behaviors were associated negatively with depression and eating disorder symptoms. Because model fit was poor in the C group, it was not possible to conduct invariance testing to compare the models between groups (i.e., fit indices indicated that the baseline models were not invariant).

Consistent with recommendations to test theoretically possible alternative models, we tested an alternative model in both groups. The alternative model identified was a simpler mediation model in which drive for muscularity attitudes and behaviors predicted physical self-concept, global physical self-concept, and self-esteem, and those three variables predicted depression and eating disorder symptoms. This alternative model is more parsimonious than the hypothesized model in that it does not delineate specific hypothesized mediation relationships. This model fit the GB data poorly, $\chi^2(358) = 945.04, p < .001, \text{CFI} = .86, \text{RMSEA} = 0.09 (90\% \text{ CI} = 0.08, 0.11), \text{SRMR} = 0.10$, and also fit the C data poorly, $\chi^2(358) = 1209.30, p < .001, \text{CFI} = .81, \text{RMSEA} = 0.11$.

**Table 2**

**Construct Intercorrelations**

<table>
<thead>
<tr>
<th>Construct</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. DMS-Attitudes</td>
<td>.41**</td>
<td>-.02</td>
<td>-.30**</td>
<td>-.15</td>
<td>.28**</td>
<td>.15**</td>
<td></td>
</tr>
<tr>
<td>2. DMS-Behaviors</td>
<td>.36**</td>
<td>.53**</td>
<td>.28**</td>
<td>.07</td>
<td>.06</td>
<td>-.03</td>
<td></td>
</tr>
<tr>
<td>3. Physical self-concept</td>
<td>-.02</td>
<td>.52**</td>
<td>.81**</td>
<td>.51**</td>
<td>-.27**</td>
<td>-.31**</td>
<td></td>
</tr>
<tr>
<td>4. Global physical self-concept</td>
<td>-.15**</td>
<td>.36**</td>
<td>.89**</td>
<td>-.59**</td>
<td>-.37**</td>
<td>-.44**</td>
<td></td>
</tr>
<tr>
<td>5. Self-esteem</td>
<td>-.02</td>
<td>.19**</td>
<td>.77**</td>
<td>.69**</td>
<td>-.33**</td>
<td>-.82**</td>
<td></td>
</tr>
<tr>
<td>6. Eating disorder symptoms</td>
<td>.21</td>
<td>.33**</td>
<td>-.17**</td>
<td>-.17**</td>
<td>-.23**</td>
<td>.29**</td>
<td></td>
</tr>
<tr>
<td>7. Depression symptoms</td>
<td>.10</td>
<td>.11</td>
<td>-.34**</td>
<td>-.35**</td>
<td>-.52**</td>
<td>.50**</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Data for GB sample are above the diagonal, for C, below. DMS = Drive for Muscularity Scale.

*p < .05. **p < .001.

![Figure 1](image-url)  
Figure 1. Structural model. Values for the GB group are on the top lines, values for the C group are on the lower lines. *p < .05. **p < .001.
Results Among Gay and Bisexual Men

Results indicated that the model fit acceptably among the gay and bisexual men sampled. Consistent with the hypotheses, among the GB sample, muscularity-related attitudes were associated negatively with global physical self-concept, though muscularity-related attitudes were not significantly associated with physical self-concept. Also consistent with the hypotheses, muscularity-related behaviors were associated positively with physical self-concept and global physical self-concept. Thus, among this sample, greater levels of attitudinal preoccupation with muscularity were associated with more negative appraisals of overall body function, while higher levels of behaviors related to muscularity (e.g., exercise) were associated with more positive overall and specific appraisals of body function. This finding of countervailing relationships supports the notion that preoccupation with muscularity, not engagement in muscularity-related behaviors, is associated with mental health issues. Although muscularity-related attitudes and behaviors were positively related to each other in this sample, they shared only 17% of their variance. Thus, it does not appear that high levels of preoccupation with muscularity are a prerequisite for engaging in muscularity-enhancing behaviors, and that many gay and bisexual men may engage in mental health-enhancing fitness behaviors without experiencing pathological preoccupation with muscularity.

Further, consistent with hypotheses, global physical self-concept, or overall appraisals of body function, were associated positively with self-esteem, and self-esteem was associated negatively with eating disorder symptoms. In particular, significant indirect relationships emerged for the relationship between drive for muscularity and eating disorder symptoms. In particular, significant indirect relationships emerged for the relationship between drive for muscularity and eating disorder symptoms. The present study sought to explore a model similar to that posited by Dishman, Hales, Pfeiffer, et al. (2006). This model posited that physical self-concept, global physical self-concept, and self-esteem would mediate the relationships among muscularity-related attitudes and behaviors, and depression and eating disorder symptoms. We applied this model to two samples: one sample of heterosexual college men, and one sample of gay and bisexual men recruited from online community groups.

Discussion

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Further exploration of the model among gay men indicated the presence of indirect relationships suggesting that muscularity-related attitudes were indirectly associated with greater levels of depression and eating disorder symptoms, and muscularity-related behaviors were indirectly associated with lower levels of depression and eating disorder symptoms. In particular, significant indirect relationships emerged for the relationship between drive for muscularity and eating disorder symptoms. This finding supports literature and research pointing toward the need to continue to disentangle the constructs of muscularity-related attitudes and muscularity-related behaviors, and to the potential benefits of exercise and fitness to self-esteem and mental health.
Results Among College Men

Results indicated that the model fit poorly among the college men. Because the model did not fit well among the sample of college men, we were unable to conduct invariance testing as we had planned. However, examination of the college men’s data may be useful to understand the patterns of relationships for future research. In particular, several hypothesized binary relationships were present. As with the gay and bisexual men sample, muscularity-related behaviors were associated positively with physical self-concept, global self-concept, and self-esteem, while muscularity-related attitudes were associated negatively with global physical self-concept. However, associations with eating disorder symptoms and depression were less clear, with muscularity-related attitudes and behaviors both being associated positively with eating disorder symptoms, but not depression symptoms. It is likely that among heterosexual college men, many other factors not examined in this model play into the onset of eating disorder and depression symptoms.

In particular, the results of the SEM analysis suggested that, after accounting for other relationships, global physical self-concept did not have a significant unique relationship with self-esteem. This is in contrast to the results with gay and bisexual men, which indicated a more substantial relationship, and despite the similar magnitudes for the relationship between physical self-concept and global physical self-concept in both groups. In contrast, there was a significant association between physical self-concept and self-esteem for college men where this relationship was not significant for the gay and bisexual men. This suggests that, at least within these two samples, there may be a difference in the role and importance of global physical self-concept (i.e., an appraisal of the body that goes beyond the form and function of the body’s components) between these two groups. It is not clear from the present data why this might be. Importantly, this difference is not reflected in the simple bivariate correlations among these variables, for which both groups demonstrate medium-sized correlations between global physical self-concept and self-esteem; this difference emerges only when other aspects of the model are included. Further research is needed on why this difference might have emerged. Although no significant binary correlations with age were observed for any of the variables in the two samples in a post hoc test (see the Limitations and Implications section), the two samples were of different average ages and there may be an age-related moderation of these relationships that goes beyond a simple effect of age; for example, age may moderate only some of the links in this model, age may be a proxy of identity development statuses, or age may have nonlinear relationships with some of the variables in the model.

Comparisons Among Groups

Important similarities and differences emerged between the groups in the correlations between muscularity-related attitudes and behaviors, and depression and eating disorder symptoms. As anticipated, muscularity-related attitudes were associated with depression symptoms among both groups, and eating disorder symptoms among gay men. This finding suggests that muscularity-related attitudes, which may reflect preoccupation with obtaining the muscular ideal, are associated with some negative psychological variables. This supports work that posits that internalization of the pursuit of the muscular ideal can have negative consequences for men (Parent, 2013a; Parent, Schwartz, & Bradstreet, 2015). Further exploration of the manifestations of these psychological issues is warranted, as is further investigations of mediators and moderators of the relationship between muscularity-related attitudes and such issues, especially among college men for whom the present model did not adequately explain the relationship.

Muscularity-related behaviors were unrelated to depression symptoms in both groups, but were positively associated with eating disorder symptoms among men. Thus, building on work that demonstrated the effectiveness of exercise in the treatment of depression, more work is needed both on how muscularity-related behaviors might be best harnessed and used in the treatment of psychological challenges, and what aspects of muscularity-related behaviors may be hindrances or barriers to psychological health.

Another important finding is the differences between the groups in the bivariate and indirect relationships between muscularity-related attitudes and muscularity-related behaviors, and depression and eating disorder symptoms. Among the gay and bisexual men, as hypothesized, muscularity-related attitudes were associated with greater depression and eating disorder symptoms. This was also true among the college men for eating disorder symptoms, but not depression symptoms. Among gay and bisexual men, muscularity-related behaviors were not associated with either depression or eating disorder symptoms, whereas among the college men muscularity-related attitudes were associated positively with eating disorder symptoms. Yet, in examining more complex indirect relationships among the gay and bisexual men, muscularity-related attitudes were associated negatively with depression and eating disorder symptoms. This suggests that there may be complex, mediated, and moderated relationships among these variables in these groups. It is important to tease apart these mediators and moderators to understand why and for whom muscularity-related attitudes may be detrimental, and why and for whom muscularity-related behaviors may be used to promote physical and mental health. Further, though total indirect associations were significant between muscularity-related attitudes and behaviors to eating disorder symptoms among the gay and bisexual men sampled, the specific indirect associations were not significant. Thus, more research is needed on the manifestations of specific indirect relationships among these variables.
Finally, the present results suggest that self-concept, and, in particular, physical self-concept, mediates the relations among muscularity-related attitudes and behaviors, and psychological health, among gay and bisexual men. The fact that the overall model was supported among gay and bisexual men, but not among heterosexual college men, suggests that body-related attitudes may be more salient among gay and bisexual men than heterosexual college men; this is consistent with research indicating that body-related variables may be more salient to gay and bisexual men, who may spend much time in body-objectifying contexts (Parent et al., 2015; Tylka & Andorka, 2012).

Limitations and Implications

Our results have implications for research and for clinical work. Research may continue to explore how attitudes and behaviors related to muscularity may have differing or even opposing relationships with other important variables. Such work would improve the integration of men’s body image research into health psychology and obesity research. Also, research may explore ways to enhance fitness behaviors without increasing muscularity-related overly obsessive attitudes, or ways to reduce obsessive attitudes while maintaining healthful fitness behaviors. Our results also did not support for the model for disordered eating symptoms; alternative models may be explored to understand how men’s body self-concept is related to health behaviors and disordered eating. With clients, the present work speaks to the importance of assessing physical self-concept among men who may present for therapy with depressive symptoms, regardless of sexual orientation. For example, therapists might explore body-related self-talk with men clients. Therapists might also encourage clients to explore opportunities for integrating fitness into a mental health and wellness plan, ideally within an integrated care system and including the therapist, a physician, a personal trainer, or a nutritionist.

The results of the present study must be interpreted in light of its limitations. The present study was cross-sectional and causality cannot be inferred from the findings. Reciprocal temporal relationships likely exist among the constructs (e.g., depression increases feelings of lethargy which may inhibit exercise, which may promote physical inactivity, which may increase depression, and so on). Although we used two samples of men, there are many other personal, social, and demographic characteristics that may influence the model. For example, research on global physical self-concept and depression might be extended to aging populations of men, or men who have acquired physical disabilities. Also, though the college sample was relatively diverse with regard to race/ethnicity, the gay and bisexual men sample was mostly White; limited research exists on how race and related constructs, such as acculturation, may influence body image among men (Parent, 2013a). Finally, use of the two different samples meant that there was a notable age difference among the groups, though age was not reliably associated with the variables in the model in either group; for college men, it was related significantly only to Endurance ($r = -.16$) and Body Fat ($r = .22$), and for the gay/bisexual men it was not significantly related to any of the variables). Other age differences may emerge were samples to include persons in older age groups.

Despite these limitations, this research adds to existing work by disentangling pathological versus protective aspects of the drive for muscularity and exercise, offering a theory-driven integration of body self-concept and physical self-description into men’s body image research, and suggesting multiple future avenues of inquiry.

References


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SELF-CONCEPT DRIVE FOR MUSCULARITY