Muscle Mania: Development of a New Scale Examining the Drive for Muscul arity in Canadian Males

Todd G. Morrison
Red Deer College

Melanie A. Morrison
University of Saskatchewan

Christine Hopkins and E. Tyler Rowan
Red Deer College

Three studies (Ns = 412, 304, and 250) were conducted to create a psychometrically sound measure of the drive for muscularity, which is defined as the desire, typically found in males, to achieve a muscular mesomorphic body. The 8-item Drive for Muscularity Attitudes Questionnaire (DMAQ) possessed satisfactory reliability and a stable, unidimensional factor structure. As predicted, participants’ drive for muscularity correlated negatively with level of appearance self-esteem and positively with level of vanity. In addition, as participants’ drive for muscularity increased, so did the discrepancy between the body figures they selected to represent their current and ideal physiques. Finally, participants’ drive for muscularity correlated positively with various indexes of body image investment, including protein consumption and weight training.

Men’s concern about their physical appearance seems to be intensifying (Luciano, 2001). In the past, it was permissible for men to have a “spare tire” around their midsection, a double chin, and sagging buttocks. Today, however, considerable pressure is placed on men to become (and remain) muscular, taut, and lean.

Although there is limited research on male body image, available evidence suggests the ideal for men is a muscular mesomorphic build, one that is neither thin (i.e., ectomorphic) nor fat (i.e., endomorphic). The torso of an ideal mesomorph represents an inverted triangle, with well-developed pectoral muscles, arms, and shoulders, and a narrow waist (Grogan, 1999; Maisey, Vale, Cornuissen, & Tovee, 1999).

To date, two published scales have attempted to measure men’s desire for a muscular mesomorphic build: Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000) and the Swansea Muscularity Attitudes Questionnaire (SMAQ; Edwards & Launder, 2000).

Drive for Muscularity Scale

Using a variety of sources, such as surveys of weight-training enthusiasts, McCreary and Sasse (2000) developed a list of “attitudes and behaviours that reflect the degree of people’s preoccupation with increasing their muscularity” (p. 300). The final version of the DMS contains 15 items and uses a 6-point scale (1 = never, 6 = always). Cronbach’s alpha was .83 (males = .82, females = .78), which denotes satisfactory reliability. To determine the scale’s validity, McCreary and Sasse (2000) tested a series of hypotheses. For example, they predicted that boys would obtain higher scores on the DMS than girls. This prediction was confirmed, which the authors then used as evidence supporting the face validity of the scale. To evaluate its convergent validity, the authors hypothesized that scores on the DMS would correlate with psychological indicants of body image disorders, specifically higher levels of depression and lower levels of self-esteem. These hypotheses also were supported. Finally, as predicted, McCreary and Sasse (2000) found that correlations between these psychological vari-

1 It should be noted that the authors’ investigation of gender differences on the DMS does not provide any information about their scale’s face validity. Rather, their comparison of boys and girls represents the “known-groups technique,” which is an indicator of construct validity (Nachmias & Nachmias, 1976).
ables and the drive for muscularity were significant for boys but not for girls. In other words, the associations between these variables were differentially salient for boys and girls.

Despite the confirmation of these hypotheses, the psychometric soundness of the DMS may be questioned. First, it is possible that the differential salience reported by McCready and Sasse (2000), which is used as evidence for the scale’s validity, may be an artifact of restriction of range. For female participants, mean responses on 11 of the 15 DMS items fell between never and rarely. In contrast, males’ average responses fell between never and rarely on only 6 of the 15 items. Consequently, it is possible that the correlations between girls’ drive for muscularity and other measures such as depression and self-esteem may have been attenuated because of their minimal endorsement of items on the DMS.

Second, certain hypotheses generated to test the validity of the DMS were not confirmed. For example, it was proposed that individuals higher in the drive for muscularity would be less likely to report dieting to lose weight than those lower in the drive for muscularity. Results indicated a nonsignificant relationship between these variables. Further, as an indicator of discriminant validity, it was hypothesized that the drive for muscularity and the drive for thinness would be unrelated. However, contrary to this prediction, a sizable correlation ($r = .37, p < .01$) was obtained between male respondents’ scores on the DMS and the Eating Attitudes Test.

Examination of the scale itself reveals other limitations. First, none of the items on the DMS are reverse-scored. The use of items that are positively and negatively worded serves to control for response set bias and is a common practice in scale development (Neuman, 1997). Second, the DMS contains a mixture of attitudinal (e.g., I wish I were more muscular) and behavioral items (e.g., I lift weights to build muscle). Combining these distinct types of question content is problematic because it suggests a “lack of clarity about the research question and inadequate conceptualisation [of key constructs]” (de Vaus, 1990, p. 82). By combining attitudinal and behavioral items into a composite measure, the researcher fails to specify whether he or she is interested in measuring attitudes, attributes, beliefs, or behavior, constructs that are clearly dissimilar (e.g., Kraus, 1995).

Finally, de Vaus (1990) noted that, when creating composite measures, it is particularly important that item content be homogeneous because otherwise one is combining types of information that “tap quite different things” (p. 83).

Swansea Muscularity Attitudes Questionnaire

Edwards and Launder (2000) generated 33 items that measure various facets of muscularity, including bodybuilding behavior, the desirability of being muscular, attributes of muscularity, and perceived social benefits of muscularity. Two preliminary studies were conducted to refine this scale, and the resultant 32-item version was then distributed to 303 male participants. This version was factor analyzed using varimax rotation. A seven-factor solution emerged; however, only the first three were considered interpretable. The authors took the 10 highest loading items on Factor 1 and the 10 highest loading items on Factors 2 and 3 and factor analyzed them. A two-factor solution emerged with 10 items loading on Factor 1 (drive for muscularity [DFM]) and 10 loading on Factor 2 (positive attitudes toward muscularity [PAM]). Inspection of the factors revealed that the DFM measures desire for greater musculature and engagement in activities that promote muscularity, whereas the PAM measures the perceived benefits of being muscular. The reliability coefficients for the DFM and PAM were excellent: .94 and .91, respectively. Unfortunately, the authors did not discuss the validity of the SMAQ (or its subscales).

The SMAQ shares many of the limitations noted for the DMS. For example, all of the items on this scale are positively worded; thus, response set bias is a potential problem. As well, the SMAQ combines attitudinal and behavioral indicators of the drive for muscularity, which, as mentioned earlier, may be of concern from a measurement standpoint.

In addition, the SMAQ possesses other limitations that warrant discussion. First, one may question the authors’ decision to use varimax rotation when factor analyzing scale items. This type of rotation assumes that factors are orthogonal and minimizes their association (Stevens, 1992). However, because all items on the SMAQ appear to reflect the same construct (i.e., drive for muscularity), an oblique rotation, which allows for intercorrelations between factors, would have been preferable.

Inspection of the factor output suggests that double-loadings may be of concern. For example, “Being muscular gives me confidence” loaded at .46 and .68 on Factors 1 and 2, respectively. Edwards and Launder (2000) retained this item on Factor 2. However, according to Stevens (1992), factor loadings of .40 or greater possess “practical significance” and should be used for interpretative purposes. Because both loadings for this item exceed .40, the item is not a clear exemplar of either factor and should be deleted.
Several items on the SMAQ seem redundant (e.g., “I would like to be bigger in the future” and “I would like to be more muscular in the future”). Further, both of these statements are rather similar to the item “I want to be more muscular than I am now.”

Some of the items on the SMAQ appear to possess faulty logic (e.g., “I feel that when I have small muscles I do not look as good as when I have large muscles” and “I feel less of a man when I have small muscles than when I have large muscles”). As written, these items suggest that the muscularity of one’s body is a fluid state in which one’s physique can be more muscular today and less muscular tomorrow and vice versa. At the very least, these questions are applicable only to those who have occupied the corporeal states of both muscularity and nonmuscularity and, thus, are able to compare the two.

Given the limitations of the DMS and the SMAQ and in accordance with Kerr and Holden’s (1996) cogent point that multiple indicators of a given construct (in this case, the drive for muscularity) constitute a sound approach to attitude measurement, a new scale, Drive for Muscularity Attitudes Questionnaire (DMAQ), was developed. The three studies summarized herein detail the construction and validation of this measure.

Study 1

The purpose of this study was to examine the factor structure and reliability of the DMAQ. In addition, a simple test of the scale’s construct validity was conducted.

Method

Participants

The sample consisted of 412 male undergraduate students enrolled in either a community college or a comprehensive university in Alberta, Canada. The mean age of the participants was 21.9 years (SD = 4.9, range = 17–51 years). Participants’ fields of study were varied and included areas such as psychology, kinesiology, welding, international relations, and commerce.

Instruments

Body Figure Questionnaire (BFQ; Lynch & Zellner, 1999). The BFQ consists of nine body drawings that depict successive increases in muscularity; the first denotes a body shape that is extremely thin with no muscle mass, and the ninth represents the type of hypertrophic muscularity characteristic of bodybuilders. In this study, participants were instructed to select their current body shape and their ideal body shape. Lynch and Zellner (1999) provide evidence attesting to the psychometric soundness of the BFQ.

DMAQ. The authors of the current study generated 41 items to assess individuals’ attitudes toward muscularity. The item-generation process was informed by a review of the available literature on male body image and inspection of the kinds of attitude statements used by the DMS and SMAQ. Fourteen items were negatively keyed to avoid response bias (e.g., “I do not think being muscular is all that important”). As well, all items were carefully reviewed to maximize the likelihood of content homogeneity. The response key for the DMAQ ranged from 1 (strongly disagree) to 5 (strongly agree); higher scores denote a stronger drive for muscularity. The procedure used to create the final version of the DMAQ is outlined in the Results section.

Procedure

A convenience sample was recruited whereby male students were approached by the researchers in classrooms and lounge/study areas. Ethical approval was obtained from the Human Research Ethics Committee affiliated with Todd G. Morrison’s institution. In accordance with these regulations, students were given an informed consent sheet, which indicated that involvement in the study was strictly voluntary and that all responses would be anonymous and confidential. Participants did not receive course credit for completing the survey.

Results

Item Reduction of the DMAQ

Two analytic procedures were used to reduce the number of items on the DMAQ. First, a principal-components analysis (PCA) with oblique rotation was performed. This class of rotation was selected because it allows for the possibility, should a multidimensional solution emerge, that components are intercorrelated (Stevens, 1992).

Before conducting the PCA, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett’s test of sphericity were conducted. In the current study, the KMO was .90 and Bartlett’s test was significant, both of which suggest that PCA is appropriate for use with these data (Stevens, 1992; Tabachnick & Fidell, 1996).
In accordance with Kaiser’s criterion, all components with an eigenvalue greater than 1 were retained. Nine components emerged, accounting for 57.4% of the total variance. However, to ensure that the final version of the DMAQ was unidimensional, only items that loaded on the first component were of interest. To select the best exemplars of the drive for muscularity, items had to load at .50 or higher on the first component but could not have loadings of .30 or higher on any other component. Thus, to be included in the final version of the scale, items had to share at least 25% of their variance with the construct being measured (namely, the drive for muscularity) and could not have complex (i.e., double) loadings. Thirteen of the original 41 items satisfied these criteria.

Reliability analysis was conducted on the remaining 13 items. Two items were deleted because they had low item-total correlations ($r_s < .30$), and 3 were deleted because they had item-total correlations greater than .70, which suggests item redundancy (Briggs & Cheek, 1986).

**Dimensionality of the DMAQ**

PCA was then performed on the remaining eight items. No rotation option was selected because it was assumed these items would load on a single component. A one-component solution was obtained (eigenvalue = 3.81), which accounted for 47.6% of the total variance.

**Reliability and Construct Validity of the DMAQ**

Cronbach’s alpha for the eight-item DMAQ was .84, which suggests good reliability. Scores on the DMAQ ranged from 8 to 40 ($M = 25.9, SD = 5.8$). The average score suggests that participants in this study possessed modest levels of the drive for muscularity.

To provide a preliminary assessment of the DMAQ’s construct validity, two hypotheses concerning the drive for muscularity and body image, as measured by the BFQ, were tested.

**Hypothesis 1.** As participants’ scores on the DMAQ increase, so will the muscularity of the figure they select on the BFQ to denote their ideal body. That is, the higher the drive for muscularity, the more muscular is one’s ideal body. This hypothesis was confirmed ($r = .46, p < .01$).

**Hypothesis 2.** As participants’ scores on the DMAQ increase, so will the absolute discrepancy between the body figures they select on the BFQ to represent their current physique and ideal physique. In other words, the higher the drive for muscularity, the greater is the perceived disjunction between actual and ideal appearance. This hypothesis was confirmed ($r = .49, p < .01$).

**Discussion**

The results of Study 1 suggest that the DMAQ is psychometrically promising. First, PCA indicates that all scale items load on a single component. This is important because we concur with McCreary and Sasse’s (2000) position that the drive for muscularity is a unidimensional construct and that, as a result, appropriate measurement of this drive demands use of an instrument that is itself unidimensional.

Preliminary evidence attesting to the reliability and validity of the DMAQ also was obtained in this study. Cronbach’s alpha was .84, which indicates good internal consistency. As well, confirmation of two hypotheses examining the relationship between the drive for muscularity and body image suggests that the scale possesses construct validity.

Although encouraging, these findings are insufficient to justify use of the DMAQ to measure individuals’ drive for muscularity. Scale validation requires multiple strands of evidence using a variety of measures and samples.

**Study 2**

The purpose of Study 2 was to replicate key results from Study 1 (namely, to corroborate the DMAQ’s unidimensionality and reliability) and to provide complementary evidence attesting to the measure’s validity.

**Method**

**Participants**

The sample consisted of 304 male students from a community college in Alberta, Canada. The mean age of participants was 23 years ($SD = 5.7$, range = 17–50 years). Because of the length of the questionnaire, no additional demographic information was collected.

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2Research suggests that similar proportions of men select an ideal that is heavier/thinner than their current shape (e.g., Cohn & Adler, 1992). Because these ideals are in opposite directions, mean current/ideal discrepancies tend to approximate zero. Thus, absolute discrepancies are recommended.
Instruments

The questionnaire used in Study 2 contained a variety of measures. Those pertinent to the goal of validating the DMAQ are described next.

Body Image Investment (BII). Eight items, developed specifically for this study, were used to assess potential behavioral correlates of the drive for muscularity. Three items measured consumption of protein and supplements to increase muscle mass (e.g., “I consume protein bars”). These items used a 5-point Likert-type response format (1 = never, 3 = sometimes, 5 = very often) and were summed to create a composite score; higher scores denoted greater consumption of products designed to increase muscularity. Three items measured weight lifting (i.e., frequency of weight training per week, number of sets per exercise, and number of repetitions per set). These items used an open-ended response format. Finally, two items measured frequency and duration of cardiovascular exercise, again using an open-ended response format. Multiplicative total scores were computed for weight training and cardiovascular exercise (i.e., a total cardiovascular score was computed by multiplying frequency of cardiovascular exercise per week by length of the typical cardiovascular workout). For both measures, higher scores denote more intense participation in weight training and cardiovascular exercise. Similar multiplicative indicators of body image investment have been used by Davis, Fox, Cowles, Hastings, and Schwass (1990).

DMAQ. The eight-item version created in Study 1 was used to measure the drive for muscularity.

Steroid contemplation. One item, developed specifically for this study, was used to measure contemplation of steroid use. The statement “I think about using steroids to build muscle mass” was responded to on a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). Buckley et al. (1988) provided evidence attesting to the validity of single-item measures of steroid use.

Procedure

The recruitment and ethics procedure used by the researchers in this study were identical to those described in Study 1.

Results

Dimensionality of the DMAQ

A PCA was conducted to determine the replicability of the component solution obtained in Study 1. No rotation option was selected because it was expected that all items on the DMAQ would load on a single component. The KMO statistic was .87, and Bartlett’s test of sphericity was significant; thus, the data were component analyzable. As in Study 1, Kaiser’s criterion was used to determine the number of components that should be retained.

The PCA produced a single-component solution (eigenvalue = 3.65), which accounted for 45.6% of the total variance. Component loadings ranged from .44 to .74 (M = .67), with a majority exceeding .60. Stevens (1992) reported that “components with four or more loadings above .60 in absolute value are reliable, regardless of sample size” (p. 384). Thus, one may conclude that the DMAQ is reliably unidimensional.

Scale Reliabilities

Cronbach’s alpha for the DMAQ was .82. This value is similar to that reported in Study 1 and, again, suggests that the DMAQ possesses good reliability. The alpha coefficient for the three-item scale measuring protein/supplement consumption was .79, which suggests satisfactory reliability. The three weight-training items did not use a uniform response format; thus, a standardized alpha coefficient was computed. The level of reliability for this measure also was adequate (α = .72). Finally, because the cardiovascular measure consisted of two items, an alpha coefficient was not computed. Instead, the correlation between these items was inspected to determine whether the authors were justified in multiplying these items. The correlation between frequency and duration of cardiovascular exercise was significant (r = .45, p < .01); consequently, it was deemed reasonable to combine the two items.

Construct Validity of the DMAQ

If the DMAQ measures the drive for muscularity, then scores on this instrument should correlate positively with behaviors designed to attain a muscular body. In the current study, the behaviors measured were protein/supplement consumption and weight lifting. As well, it is reasonable to propose that contemplation of steroid use should correlate positively with the drive for muscularity. That is, individuals more committed to becoming muscular also may be more likely to think about using steroids for the express purpose of increasing muscle mass.

These hypotheses were supported. Scores on the DMAQ (M = 25.9, SD = 5.8) correlated positively with the protein/supplement consumption index (r =
.40, \( p < .01 \)) and with the multiplicative index of weight training \((r = .25, \ p < .05)\). As well, participants’ scores on the DMAQ correlated positively with their self-reported contemplation of steroid use \((r = .25, \ p < .01)\). Globally, these results suggest that participants with a higher drive for muscularity evidenced behaviors and cognitions congruent with achieving a muscular body.

To further determine the construct validity of the DMAQ, the relationships between the drive for muscularity and weight lifting and cardiovascular activity were investigated. We contend that these forms of exercise are differentially salient to an individual’s desire to become more muscular (i.e., of the two, the former would appear to be more salient than the latter). Thus, if the DMAQ possesses construct validity, one would anticipate a stronger relationship between scores on the DMAQ and weight lifting than between scores on the DMAQ and cardiovascular exercise.

The weight lifting and cardiovascular multiplicative indexes correlated significantly with scores on the DMAQ \((r_s = .25 \text{ and } .13, \text{ respectively, } p < .01)\). However, Fisher’s \( r \)-to-\( z \) transformation revealed that, as hypothesised, the relationship between weight lifting and the drive for muscularity was significantly stronger \((z = 2.02, \ p < .05)\).

**Discussion**

The results of this study suggest that the DMAQ is a psychometrically robust measure of the desire for a more muscular body type. The single-component solution observed in Study 1 was replicated in this study. Moreover, because seven of the eight components loaded above .60, one may be fairly confident in the reliability of this solution (Stevens, 1992). However, it should be noted that both Studies 1 and 2 used PCA to examine the dimensionality of the DMAQ. This technique has been criticized on the grounds that criteria used to make decisions about component retention such as Kaiser’s criterion and scree plots may provide inaccurate estimates of the number of true components (Stevens, 1992). A more rigorous assessment of the scale’s dimensionality would be afforded by conducting a confirmatory factor analysis (CFA), which provides indicators of model fit.

The reliability of the DMAQ appears to be quite good. Ideally, one would like alpha coefficients to be at or above .90. However, when evaluating the reliability of this scale, one must consider its brevity and use of items that are reverse-scored (i.e., both of these factors are known to attenuate internal consistency; see Batson & Schoenrade, 1991; Carmines & Zeller, 1979).

Results from Study 2 provide additional evidence attesting to the validity of the DMAQ. As hypothesized, positive correlations were obtained between scores on this scale and variables that link logically with the drive for muscularity (e.g., protein/supplement consumption, weight training, and steroid contemplation). Also, it was found that weight lifting was more strongly associated with the drive for muscularity than was cardiovascular exercise. It should be noted, however, that the correlation observed between weight lifting and scores on the DMAQ was more modest than anticipated. Inspection of the data for the three items comprising the weight lifting index revealed that restriction of range for one item might have contributed to the low correlation. Specifically, when instructed to list how many sets respondents performed for each weight-training exercise, approximately 81% answered between zero and three sets. Thus, it might have been better to focus on a single indicator of weight-lifting activity, one that would permit more varied responding. Indeed, when examining the relationship between simple frequency of weight lifting and scores on the DMAQ, a stronger correlation emerged \((r = .35, \ p < .01)\).

**Study 3**

Given that previous tests of the DMAQ’s unidimensionality have been conducted using exploratory component analysis, one purpose of Study 3 was to assess the scale’s dimensionality using CFA. In addition, although Studies 1 and 2 examined the drive for muscularity vis-à-vis behavioral and cognitive variables such as weight lifting and steroid contemplation, respectively, the relationship between this drive and psychological factors had yet to be investigated. To address this omission, two psychological variables, appearance self-esteem and vanity, were assessed in Study 3. Appearance self-esteem was selected because it appeared to be a logical extension of research conducted by McCreary and Sasse (2000) detailing the negative association between global self-esteem and the drive for muscularity. The second variable was selected not for any compelling theoretical rationale but simply because it was of interest to the authors. Finally, using the technique of known-groups validity (Nachmias & Nachmias, 1976), athletes (i.e., varsity team members) and nonathletes’ drive for muscularity was compared.
Method

Participants

The sample was 250 male undergraduate students from a comprehensive university in Ontario, Canada (mean age = 22.3 years, SD = 4.7 years). Their majors included biology, computer science, engineering, and economics. In response to an item assessing varsity team membership, 58 participants reported being on a varsity team.

Instruments

DMAQ. A description of this scale is provided in Study 1.

Physical Appearance Self-Esteem Scale (PASS; Pliner, Chaiken, & Flett, 1990). This six-item measure examines individuals’ satisfaction with their physical appearance and uses a 5-point Likert-type scale (1 = never, 3 = sometimes, 5 = very often). In the current study, items were modified to read as statements rather than questions (e.g., “How often are you dissatisfied with the way you look?” became “I am dissatisfied with the way I look”). This modification was made because items from the PASS were interspersed with other questions, all of which read as statements. Scores on the PASS can range from 6 to 30; higher scores represent greater levels of physical appearance self-esteem. Morrison, Kalin, and Morrison (in press) provide evidence attesting to the psychometric soundness of this modified version of the PASS.

Revised Narcissistic Personality Inventory–Vanity Subscale (VS; O’Shea, Tech, & Gustafson, 2000). The VS may be seen as measuring excessive pride in one’s physical appearance. It contains three items (e.g., “I like to show off my body”) and, in the current study, uses a 5-point Likert-type scale (1 = never, 3 = sometimes, 5 = very often). Scores on the VS can range from 3 to 15; higher scores suggest greater levels of vanity. O’Shea et al. (2000) offer evidence suggesting that the VS possesses adequate psychometric properties.

Procedure

Melanie A. Morrison recruited a convenience sample of male students from various locations throughout a large, comprehensive university. Further, because varsity team involvement was of interest in the current study, members of a football varsity team were recruited. Similar to the protocol used in Studies 1 and 2, an informed consent sheet was attached to each questionnaire indicating that participants’ responses were anonymous and confidential and that they could terminate their involvement at any time. Respondents were not remunerated in any manner for their participation. Finally, it should be noted that ethical approval was granted from the Ethics Review Board at Melanie A. Morrison’s institution.

Results

A CFA was conducted to determine whether a unidimensional model best represents the DMAQ. The sample size used in this study did not exceed 250; thus, the robust estimation procedure was used (Hu & Bentler, 1999).

To gauge the fit of the proposed unidimensional model, four goodness-of-fit statistics were used: goodness-of-fit index (GFI; Jöreskog & Sörbom, 1989), root mean square error of approximation (RMSEA; Browne & Cudeck, 1993), robust comparative fit index (*CFI; Bentler, 1990), and standardized root mean squared residual (SRMR; Sörbom & Jöreskog, 1982). For the GFI and *CFI, values exceeding .9 indicate good fit (Armitage & Conner, 2000; Byrne, 1994). According to Thompson, Coovet, Richards, Johnson, and Cattarin (1995), RMSEA values of .08 or less denote reasonably good fit (values of .05 or less represent good fit). Finally, for the SRMR, values of .05 or less characterize good fit.

Dimensionality of the DMAQ

CFA results of the DMAQ items supported a unidimensional fit to the data, Satorra-Bentler χ²(20, N = 250) = 42.47, p < .01, *CFI = .95, GFI = .95, RMSEA = .07, SRMR = .05. Standardized factor loadings are given in Table 1.

Scale Descriptives and Reliabilities

Means, standard deviations, and minimum/maximum scores were (in order): DMAQ (M = 26.28, SD = 5.61, range = 9–38); PASS (M = 20.39, SD = 3.66, range = 8–30); and VS (M = 8.08, SD = 2.4, range = 3–15). Alpha coefficients for the scales were satisfactory (i.e., DMAQ = .80; PASS = .65; VS = .74).

Construct Validity of the DMAQ

To date, no published studies have examined the relationships between the drive for muscularity and...
Table 1

<table>
<thead>
<tr>
<th>Item</th>
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<tr>
<td>I do not want to become more muscular.</td>
<td>−.66</td>
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<tr>
<td>I wish my legs were more muscular.</td>
<td>.57</td>
</tr>
<tr>
<td>When I see a guy who is really muscular, it inspires me to get bigger.</td>
<td>.61</td>
</tr>
<tr>
<td>Muscularity is important to me.</td>
<td>.64</td>
</tr>
<tr>
<td>I think I need to gain a few pounds of “bulk” (muscle mass).</td>
<td>.58</td>
</tr>
<tr>
<td>I do not wish my arms were more muscular.</td>
<td>−.38</td>
</tr>
<tr>
<td>I should work out more to increase muscle mass.</td>
<td>.58</td>
</tr>
<tr>
<td>I would feel more confident if my lats (back muscles) were bigger.</td>
<td>.49</td>
</tr>
</tbody>
</table>

Note. Response key: 1 = strongly disagree; 2 = disagree; 3 = don’t know; 4 = agree; 5 = strongly agree. *Item is reverse keyed.

appearance self-esteem and vanity. Thus, the findings presented herein are exploratory in nature.

It seemed logical to hypothesize that males striving to achieve the muscular ideal extolled in Western culture should be less satisfied with their physical appearance than those who do not wish to become muscular (i.e., those evidencing a low drive for muscularity). This hypothesis was confirmed (r = −.23, p < .01). Specifically, as the drive for muscularity intensified, physical appearance self-esteem decreased.

With respect to vanity, multiple hypotheses appear to be plausible. First, it is possible that the drive for muscularity is most pronounced in individuals possessing nonmuscular physiques. If so, such individuals may be highly uncomfortable objectifying their bodies or having them objectified by others. In this scenario, an inverse relationship between vanity and the drive for muscularity would be anticipated. Second, the drive for muscularity may be independent of one’s actual body shape; that is, certain males, irrespective of their musculature, may be higher than other males in this drive. McCreary and Sasse (2000) provided tentative evidence in support of this assertion: Specifically, they found that participants’ body mass index did not correlate with their scores on the DMS. If this drive is only minimally associated with one’s real physical appearance, then vanity and the drive for muscularity may be unrelated. Third, individuals higher in the drive for muscularity may be more likely to engage in various behaviors designed to improve the body. Indeed, results from Study 2 suggest this is the case (i.e., positive correlations were observed between scores on the DMAQ and various indicators of body image investment). Because these individuals actively work to better themselves physically, they may, on average, possess superior bodies (i.e., bodies more congruent with current aesthetic standards of male attractiveness). Consequently, these individuals may be more comfortable objectifying themselves and being objectified by others. If so, one would anticipate a positive correlation between vanity and the drive for muscularity.

In the current study, scores on the DMAQ and the VS were positively correlated (r = .31, p < .01). Thus, as participants’ drive for muscularity increased, so did their level of vanity.

Finally, in accordance with known-groups validity, it was proposed that the drive for muscularity would be more salient to those heavily involved in sports activities (i.e., varsity team members). An independent samples t test confirmed this hypothesis. Varsity participants had significantly higher scores on the DMAQ (M = 28.8, SD = 3.9) than nonvarsity participants (M = 25.5, SD = 5.7), t(140.10) = 5.16, p < .01, d = .87.

Discussion

Findings from Study 3 provide additional evidence attesting to the psychometric soundness of the DMAQ. First, results from the CFA performed in this study complement those obtained in Studies 1 and 2 using PCA. The PCA and CFA output indicate clearly that the DMAQ is a unidimensional measure of the drive for muscularity. As mentioned, the issue of dimensionality is important. Constructs that are perceived to be unidimensional, such as the drive for muscularity, should be measured by instruments that are themselves unidimensional. Disjunctions between construct and measure in terms of dimensionality are problematic.

Second, variables that are psychological in nature were examined to strengthen the DMAQ’s construct validity. Results indicated that participants’ drive for muscularity appears to be negatively related to their level of appearance self-esteem and positively related to their level of vanity. At this time, the precise nature of these relationships is unclear. For example, does the drive for muscularity lower individuals’ appearance self-esteem, or is the drive a consequence of individuals attempting to redress negative feelings about their appearance by actively pursuing a better

The nonsignificance of this correlation may be a function of both thin and overweight individuals (i.e., those with low and high body mass indices, respectively) being fairly high in the drive for muscularity.
(i.e., more muscular) body? Alternatively, does a reciprocal relationship exist between the two?

Finally, it was found that members of varsity teams had higher scores on the DMAQ than did nonmembers. Additional research is needed to replicate this finding and identify other subpopulations of men who may evidence high levels of the drive for muscularity (e.g., gay men, bodybuilders). As well, the psychological and behavioral correlates of this drive in such vulnerable groups warrant investigation. It is possible that men who possess a heightened drive for muscularity, as a function of category membership, also may be more likely to engage in practices potentially injurious to their well-being (e.g., steroid use).

General Discussion

These studies suggest that the DMAQ is psychometrically robust. It is unidimensional and possesses a good level of reliability (i.e., mean \( \alpha = .82 \)). Further, multiple strands of evidence using a variety of attitudinal and behavioral indicators have been forwarded in support of the scale’s validity.

Despite its strengths, a number of limitations warrant discussion. All measures used to validate the DMAQ were self-report. Because men may consider it socially unacceptable to admit to being dissatisfied with their bodies, the integrity of respondents’ data may be questioned.

The correlational nature of the research is another limitation. Because causal inferences cannot be made, it is unclear whether the drive for muscularity leads to the behavioral outcomes assessed in this study or whether the converse occurs. The possibility that a reciprocal relationship exists between these constructs was not explored. That is, the drive for muscularity may motivate individuals to engage in specific behaviors that, in turn, intensify the drive.

In addition, the study relied exclusively on college/university students. Although the samples used in Studies 1 and 2 were fairly heterogeneous (i.e., participants were not restricted to university-level programs—a significant proportion were enrolled in trades and adult education courses), researchers should examine the drive for muscularity in samples outside an academic environment. In addition, research with preadolescent and adolescent samples may provide insight into the genesis of this drive.

The reader may assume that the omission of female participants is another limitation of this research. However, it must be noted that the DMAQ is designed for use with men rather than women. It is our opinion that a single scale cannot address the drive for muscularity in both groups because the drive manifests itself differentially as a function of gender. Anecdotally, it appears that women are driven to be toned rather than muscular. The ideal of gaining mass (i.e., having big arms and big legs), although evidently quite appealing to men, seems less so to women.

McCreary and Sasse’s (2000) research underscores the difficulty associated with developing a measure of the drive for muscularity that is appropriate for both men and women. Inspection of mean item responses to their DMS reveals that female respondents seemed to reject a majority of its items (i.e., their overall mean rate of endorsement was between never and rarely). Such rejection is not surprising because the DMS contains items such as “I think I would look better if I gained 10 pounds in bulk” and “I try to consume as many calories as I can in a day,” items that contravene aesthetic standards for physical attractiveness in Western women (Grogan, 1999; Morrison et al., in press).

In conclusion, this research indicates that a majority of male participants appear to be dissatisfied with their physical appearance. For example, in Study 1, participants wanted an ideal body shape 1.2 figures larger (i.e., more muscular) than their current shape. With respect to muscularity, rates of endorsement for items comprising the DMAQ indicate high levels of dissatisfaction. For instance, in Study 3, 70.3% either strongly agreed or agreed with the statement “I should work out more to increase muscle mass.” Such findings contradict the pervasive assumptions that most men are satisfied with their bodies and do not think of themselves in aesthetic terms. These results also suggest that using the term muscle mania in this article’s title should not be dismissed as hyperbole. The fixation on musculature and the ceaseless determination to be “buff” are no longer restricted to the world of bodybuilding but, rather, appear to be widespread. Indeed, men who are satisfied with their appearance and do not subscribe to the cult of bigness have become atypical (e.g., Furnham & Calnan, 1998; Raudenbush & Zellner, 1997). Given that research on the drive for muscularity is in its infancy, the determinants and possible sequelae of this drive warrant greater empirical attention.

References


Received August 22, 2001
Revision received January 29, 2003
Accepted March 20, 2003