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Development and psychometric evaluation of the Male Body Attitudes Scale (MBAS)☆

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Abstract

A measure of men's attitudes toward their body (MBAS) was developed and evaluated via three independent samples of college men. In Studies 1 and 2, factor analyses determined and cross-validated the MBAS's underlying structure. Three factors emerged from the items: muscularity, low body fat, and height. Studies 1 and 2 provided construct (i.e., convergent, concurrent, and discriminant) validity evidence for the MBAS total scale and subscales; they were related or not related as expected to drive for muscularity, body esteem, internalization of the muscular ideal, pressures for muscularity, pressures for thinness, self-esteem, body comparison, eating disorder symptomatology, and impression management. Study 3 revealed that the MBAS total score and subscale scores were stable over a 2-week period. The internal consistency reliabilities for the total score and subscale scores were high across all three studies. The MBAS should prove useful for researchers and clinicians interested in men's body image assessment.

Keywords: Body image; College men; Assessment; Psychometrics; Muscularity; Low body fat; Height

Introduction

In the last three decades, body image has been discussed widely and consistently throughout the theoretical and empirical literature within several subfields of psychology, such as clinical, counseling, social, and developmental (Pruzinsky & Cash, 2002). Historically, literature on body image has focused mostly on women and their desire to become thinner (Pope, Phillips, & Olivardia, 2000). In recent years, however, many researchers (e.g., Andersen, Cohn, & Holbrook, 2000; Leit, Pope, & Gray, 2001; Stanford & McCabe, 2002) have argued that men also experience body image concerns and have spearheaded much investigation in this area.

Findings from this research suggest that men differ qualitatively from women in their perceptions of overall ideal body shape and the specific body areas of

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concern. Many researchers have documented that men commonly desire to become more muscular and have lower body fat, whereas women frequently want to become thinner and lose weight (Andersen et al., 2000; Cafri & Thompson, 2004; Vartanian, Giant, & Passino, 2001). In addition, men want to gain muscle in different areas than women want to lose fat (Andersen et al., 2000; McCabe & Ricciardelli, 2001). Specifically, men reported wanting to gain muscle from the waist-up (e.g., arms, chest); women, however, report concentrating on losing fat from the waist-down (e.g., hips, thighs, and buttocks).

Despite the upsurge of research attention in male body image, very few instruments measuring body image disturbance have been developed from the literature on men's body image or have been standardized and validated using samples of men. Instead, the majority of instruments solely reflect theoretical models of female body image in that their items were tailored to assess dissatisfaction with weight and body areas from the waist-down (Cohane & Pope, 2001). Because of the aforementioned gender differences in perceptions of ideal body shape, these instruments are not valid for men, and should not be used (Cafri & Thompson, 2004).

What measures, then, should researchers and clinicians use to assess men's body image? Prior to noting that new methods of assessing men's body image need to be developed and evaluated, Cafri and Thompson (2004) summarized and critiqued the current instruments grounded in theoretical models of male body image. They asserted that, in order to be considered appropriate to assess men's body image, (a) an instrument must contain several items that address men's attitudes towards their muscularity, (b) if an instrument contains items tapping features only indirectly related to body appearance (e.g., exercise), the items should be related to muscularity, and (c) if an instrument contains items exploring attitudes toward body regions, the upper torso should be included within these items. Overall, they concluded that only two measures, the Drive for Muscularity Scale (McCreary & Sasse, 2000) and the somatomorphic matrix (Gruber, Pope, Borowiecki, & Cohane, 1999), show some utility for evaluating men's body image. These two measures, as well as their limitations, are discussed next.

Items on the DMS assess men's motivation to become increasingly muscular; some of these items measure behavioral activities geared toward achieving or maintaining a muscular appearance (e.g., lifting weights, using protein supplements). Overall, this scale meets the aforementioned criteria specified by Cafri and Thompson (2004). However, because of its inclusion of behavioral items, the DMS is not purely an attitudinal measure of body image. Indeed, factor analyses have demonstrated that the DMS contains two factors: a drive for muscularity factor and a behavioral factor (McCreary, Sasse, Saucier, & Dorsch, 2004). Furthermore, drive for muscularity and body image attitudes perhaps should be considered somewhat conceptually different constructs for men. After all, among women, drive for thinness and body image attitudes are thought of as two distinct, albeit correlated, constructs, as each represents a different subscale on the Eating Disorder Inventory-2 (Garner, 1991). Support for the distinction between drive for muscularity and men's body image attitudes is further addressed by literature suggesting that men want to have low body fat in conjunction with increased muscle (Pope et al., 2000; Stanford & McCabe, 2002). Thus, both muscularity and body fat should be considered within men's body image instruments (Cohane & Pope, 2001). None of the DMS items measure men's desire to decrease body fat.

Unlike the DMS, the somatomorphic matrix assesses both muscularity and body fat, which is a clear strength of this measure (Cafri & Thompson, 2004). Specifically, this instrument is a computerized program that presents a matrix of 10×10 contour drawn silhouettes, ranging on axes of muscularity and body fat, and participants choose the image that best represents their own body, their ideal body, the average man, and the image most desired by the opposite sex. A limitation of the somatomorphic matrix is its inadequate stability over time. Cafri, Roehrig, and Thompson (2004) found that, for men, test–retest reliability estimates for the actual–ideal body difference scores (i.e., the indices of body dissatisfaction) on the muscularity dimension and the body fat dimension were clearly below the minimum value required for suggesting that a measure holds adequate reliability. These findings call into question its validity: as the reliability of a measure decreases, so will its validity (Nunnally & Bernstein, 1994).

Recently, researchers have developed other drive for muscularity (Hildebrandt, Langenbucher, & Schlundt,

2004; Morrison, Morrison, Hopkins, & Rowan, 2004) and silhouette-based (e.g., Cafri & Thompson, 2004) measures; these measures have demonstrated initial psychometric support among men. There still remains, however, a need for instruments measuring both men's attitudes toward their muscularity and body fat that are more psychometrically sound than those that exist at the present time. This need is amplified due to the substantial practical relevance in effectively and accurately measuring men's body image, as it is associated with their psychological functioning (Cafri, Strauss, & Thompson, 2002; McCreary & Sasse, 2000; Olivardia, Pope, Borowiecki, & Cohane, 2004), and more reliable measures will produce more accurate and stronger correlations with psychological functioning. Therefore, the purpose of the present study was to develop a measure of men's body attitudes and determine whether it yields reliable and valid scores. In this series of three studies, we report the development and psychometric evaluation of this measure, the Male Body Attitudes Scale (MBAS).

Study 1

The purpose of Study 1 was to develop the MBAS items, to explore its factor structure, and to conduct a preliminary investigation of its internal consistency reliability and construct (i.e., convergent, concurrent, and discriminant) validity. Our hypotheses were consistent with previous theory and research on the correlates of body image among men (e.g., Andersen et al., 2000; Olivardia et al., 2004). Because body esteem and body attitudes are similar constructs, the MBAS total score, muscularity items, and low body fat items were expected to be related to certain aspects of body esteem (i.e., physical condition and upper body strength), providing convergent validity evidence. Similarly, convergent validity would be demonstrated by substantial relations between the MBAS total scale and muscularity items to drive for muscularity. As body image is related to well-being, the MBAS total score, muscularity items, low body fat items, and height items were expected to be related to self-esteem, providing concurrent validity evidence. Similarly, the MBAS total score, muscularity items, and low body fat items were expected to be related to eating disorder symptomatology; such relations would support the concurrent validity for these measures. Discriminant validity would be demonstrated by non-significant relations between (a) the MBAS and impression management, a biased form of responding that reflects the tendency to give inflated self-descriptions to an audience, (b) the MBAS height subscale and physical condition, upper body strength, drive for muscularity measures, and eating disorder symptomatology, and (c) the MBAS low body fat subscale and drive for muscularity.

Method

Participants

Undergraduate men ($N = 294$; mean age = 19.7 years, $SD = 3.0$; age range = 16–62) from a large Midwestern university participated in order to fulfill a requirement for their general psychology class. Most identified as Caucasian (81.3%), freshmen (55.1%), and either middle class (48.3%) or upper-middle (37.1%) class. The following ethnicities also were represented: African American (11.6%), Asian American (5.4%), multi-racial (0.9%), and Latino (0.7%).

Construction of the Male Body Attitudes Scale

The development of the MBAS was rational; we created 29 items to reflect the dimensions of men's body attitudes that have been repeatedly identified within the theoretical and empirical literature. These items are presented in Table 1. The number of MBAS items created for each dimension reflects the relative importance of the dimension as stated in the literature. Given that muscularity is a key dimension, and perhaps the central dimension, of men's body image (Cafri & Thompson, 2004), 12 items assessed men's attitudes toward with their muscularity. Because low body fat also is an important dimension of men's body satisfaction (Cohane & Pope, 2001), we included eight items that assessed men's attitudes toward their body fat. Two items were developed to reflect men's attitudes toward their height, as height has been noted as an important third dimension of men's body attitudes (Ridgeway & Tylka, in press). Last, seven general items were constructed to assess men's attitudes towards their overall body; these items were not specific to muscularity, leanness, or height. The

Table 1
Male Body Attitudes Scale (MBAS) items and factor loadings of the final factor solution obtained from the data of Study 1 ($N = 294$)

Item	Low body fat	Muscularity	Height
1. I think I have too little muscle on my body.	.20	**.79**	.00
2. I think my body should be leaner.	**.81**	.07	.10
3. I wish my arms were stronger.	.05	**.79**	.12
[a]4. I feel satisfied with the definition in my abs (i.e., stomach muscles).	**.86**	.08	.04
5. I think my legs are *not* muscular enough.	.06	**.64**	.01
6. I think my chest should be broader.	−.01	**.84**	.09
7. I think my shoulders are too narrow.	−.05	**.74**	.07
8. I am concerned that my stomach is too flabby.	**.87**	.03	.03
9. I think my arms should be larger (i.e., more muscular).	.01	**.83**	.09
10. I feel dissatisfied with my overall body build.	**.60**	**.55**	.01
11. I think my calves should be larger (i.e., more muscular).	.00	**.67**	−.04
12. I wish I were taller.	.09	.14	**.94**
13. I think I have too much fat on my body.	**.93**	−.01	.03
14. I think my abs are *not* thin enough.	**.77**	.06	.03
15. I think my back should be larger and more defined.	.23	**.64**	.08
16. I think my chest should be larger and more defined.	.24	**.70**	.15
[a]17. I feel satisfied with the definition in my arms.	.16	**.55**	−.09
[a]18. I feel satisfied with the size and shape of my body.	**.49**	**.46**	.01
[a]19. I am satisfied with my height.	.17	.04	**.91**
20. Have you felt that your own body size or shape compared unfavorably to other men?	–	–	–
21. Has eating sweets, cakes, or other high calorie food made you feel fat or weak?	**.68**	.06	.12
22. Have you felt like your muscle tone was way too low?	–	–	–
23. Have you felt excessively large and rounded (i.e., fat)?	**.86**	.08	.04
24. Have you felt ashamed of your body size or shape?	**.69**	**.41**	.00
25. Has seeing your reflection (e.g., in a mirror or window) made you feel badly about your size or shape?	**.72**	**.41**	.03
26. Has seeing muscular men made you feel badly about your own body size or shape?	–	–	–
27. Have you been so worried about your body size or shape that you have been feeling that you ought to diet?	**.82**	.02	.17
28. Have you ever felt that you were way too focused on your body size or shape?	–	–	–
29. Have you been particularly self-conscious about your body size or shape when in the company of other people?	–	–	–

Note: A bold factor loading reflects loading on the relevant factor. Factor loadings of the final factor solution were obtained after deleting (a) Items 22 and 26, which did not load on a particular factor, and (b) overall body Items 20, 28, and 29, which did not cross load on more than one factor in the initial factor analysis. Thus, the MBAS consists of the remaining 24 items.

[a] Reverse scored item.

MBAS was constructed to include items measuring two relevant types of body attitudes (i.e., body dissatisfaction and preoccupation; Mazzeo, 1999; Pruzinsky & Cash, 2002) that are often used in the assessment of body image disturbance. Ten items of the MBAS were modified from an extant measure of body preoccupation (the Body Shape Questionnaire-Revised-10; Mazzeo, 1999) to be consonant with the male body image literature.

We tailored many items to reflect empirical findings articulating certain body areas that men want to be more muscular and lower in fat. For instance, Ridgeway and Tylka (in press) revealed that college men desire large, defined, and strong arms; a broad chest and shoulders; a large and defined back; and large upper legs and calves. They found that men want to reduce body fat in the abdominal area. Overall, over half (7 out of 12) of the MBAS muscularity items

assessed attitudes with the upper body, a requirement of an adequate male body image instrument (Cafri & Thompson, 2004).

The 29 MBAS items are presented in Table 1. MBAS items were constructed to be rated along a six-point scale (*never* [1], *rarely* [2], *sometimes* [3], *often* [4], *usually* [5], *always* [6]). All 29 items can be averaged to obtain an overall score, and subscale (muscularity, low body fat, height) items can be averaged to obtain subscale scores. Higher scores reflect more negative body attitudes.

Measures

In addition to the MBAS, the following measures were used in Study 1:

The Body Esteem Scale (BES; Franzoi & Shields, 1984) is a 35-item measure of satisfaction with various aspects and areas of the body. Items are rated on a five-point scale ranging from *strongly dislike* to *strongly like*; higher scores reflect greater body esteem. For men, a 13-item physical condition (PC) subscale and nine-item upper body strength (UBS) subscale can be calculated by averaging the respective items. The 13-item Physical Attractiveness subscale was not used since it was not found to yield acceptable validity with men (Franzoi & Herzog, 1986). The PC and UBS scales demonstrate evidence of internal consistency reliability and convergent and discriminant validity among college men (Franzoi & Herzog, 1986; Franzoi & Shields, 1984). For the current sample, the internal consistency reliabilities (alphas) were .92 for PC and .90 for UBS.

The Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000) contains a seven-item muscularity-oriented body image (MBI) subscale and a seven-item muscularity behaviors (MB) subscale. Each item is scored on a six-point scale ranging from *never* to *always*. Subscale scores were created by averaging the respective items; higher scores indicate greater drive for muscularity. Previous studies have supported its internal consistency reliability and convergent, factorial, and discriminant validity (McCreary et al., 2004). For the current sample, the internal consistency reliabilities were .89 for MBI and .86 for MB.

The Swansea Muscularity Attitudes Questionnaire (SMAQ; Edwards & Launder, 2000) contains two 10-item subscales that measure men's drive for muscularity (DFM) and their endorsement of positive attributes of muscularity (PAM). Items are rated on a seven-point scale ranging from *definitely not* to *definitely*. Subscale items were averaged to form subscale scores; higher scores reflect greater drive for and endorsement of muscularity. Edwards and Launder (2000) found that SMAQ items loaded on their respective subscales, and alphas for both subscales were high. Alphas were .92 for DFM and .92 for PAM for the current sample.

The Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965) contains 10 items rated on a four-point scale ranging from *strongly disagree* to *strongly agree* and averaged. Higher scores indicate greater self-esteem. For samples of high school and college men, its internal consistency reliability, test–retest reliability, and construct validity are supported (McCreary & Sasse, 2000; Robinson & Shaver, 1973). Its alpha was .86 for the current sample.

The Eating Attitudes Test-26 (EAT-26; Garner & Garfinkel, 1979) assesses maladaptive eating attitudes and behaviors associated with clinical eating disorders. Participants indicate the extent to which they endorse each item along a six-point scale that ranges from *never* to *always*. Items were averaged; higher scores indicate greater eating disorder symptomatology. Among a sample of high school boys, its internal consistency reliability was adequate, and its construct validity was supported (McCreary & Sasse, 2000). For the current sample, its alpha was .85.

The Impression Management subscale of the Balanced Inventory of Desirable Responding (BIDR-IM; Paulhus, 1994) is a 20-item measure of the tendencies to consciously conceal socially undesirable behaviors (e.g., swearing, eavesdropping, littering). Items were rated along a five-point scale ranging from *not at all true* to *very true* and averaged. Higher scores reflect greater use of impression management. This subscale has demonstrated good internal consistency reliability, test–retest reliability over a 5-week period, and convergent validity (Paulhus, 1994). Its internal consistency reliability was .74 for the current sample.

Procedure

Participants were recruited from a description of the study listed on the psychology department website. After we ensured anonymity and obtained informed

consent, participants completed the measures in a classroom setting used as a research lab and received general psychology credit for their involvement. Measures were counterbalanced to control for order effects.

Analyses

To evaluate the structure of the MBAS, we conducted a common factor analysis using principal axis factoring and varimax rotation. We chose varimax rotation because we did not expect one general factor or high correlations between the factors. As recommended by Tabachnick and Fidell (1996), the number of factors was determined by factor eigenvalues above 1.0 and a noticeable change in the slopes within the scree plot. We examined the rotated factor matrix to pinpoint items that loaded on these factors. Criteria for factor loadings included item values $\geq$.40 on the primary factor and values $\leq$.25 on other factors. Seven MBAS items (i.e., Items 10, 18, 20, 24, 25, 28, and 29) were designed to assess attitudes with overall body shape and consequently were not expected to load on only one factor. Also, to determine the internal consistency reliability of the MBAS total scale and subscales, we used Cronbach's alpha and examined item-total correlations. In order to be acceptable, alpha must be at or above .70, and item-total correlations should exceed the minimum acceptable value of .30 (Nunnally & Bernstein, 1994). Last, to explore the relations between the MBAS and the remaining measures, we used Pearson *r* correlations. Given the number of correlations, *p*-values were set at .004 to control for experiment-wise error (the Bonferroni adjustment was used, so an initial alpha of .05 was divided by the number of measures or .05/13). Following Cohen's (1992) recommendations, correlations of .20 were considered small, correlations of .40 were considered moderate, and correlations of .60 were considered large.

Results and discussion

Results from the factor analysis suggested that the best fit to the data appeared to be a three-factor solution. All three factors had eigenvalues exceeding 1.0 and were discernable within the scree plot. The scree plot demonstrated a very noticeable change in the degree of the slopes between subsequent factors. Upon examination of the factor loadings, all items that measured attitudes toward a lean body loaded only on a low body fat factor (eigenvalue = 10.4, 37.1% of the variance), all but two (i.e., Items 22 and 26) items that assessed attitudes toward muscularity loaded only on a muscularity factor (eigenvalue = 4.5, 16% of the variance), and both items that investigated men's attitudes toward height loaded only on a height factor (eigenvalue = 1.7, 6.2% of the variance). Of the seven items assessing attitudes toward overall body shape, four items loaded on both the low body fat and muscularity factors; three items (Items 20, 28, and 29) did not load at or above .40 on more than one factor. Thus, we excluded these three items as well as the two muscularity items that did not cross load on the muscularity factor and ran a second factor analysis on the remaining 24 items.

The second factor analysis suggested that all low body fat items loaded only on the low body fat factor, all muscularity items loaded only on the muscularity factor, all height items loaded only on the height factor, and all overall body shape items loaded on more than one factor (see Table 1 for the factors and factor loadings for this second analysis). The low body fat factor had an eigenvalue of 8.3 and accounted for 36.2% of the variance, the muscularity factor had an eigenvalue of 4.4 and accounted for 19.0% of the variance, and the height factor had an eigenvalue of 1.7 and accounted for 7.4% of the variance. The total amount of variance accounted for by these factors was 62.6%.

Alphas were .91 for the total 24-item MBAS scale, .93 for the 8-item body fat subscale, .90 for the 10-item muscularity subscale, and .88 for the 2-item height subscale. All item-total correlations exceeded the minimum acceptable value of .30 for the total 24-item scale (range = .31–.74, mean = .53) and the low body fat (range = .55–.89, mean = .75), muscularity (range = .45–.78, mean = .66), and height (value for both items = .79) subscales. These values support the internal consistency reliability for the MBAS total scale and subscales.

Correlations between the 24-item MBAS and the other measures are presented in Table 2. First, the MBAS's relations to body esteem and muscularity attitudes (i.e., drive for muscularity) were examined.

Table 2
Means, standard deviations, alphas, and correlations among the measures of Study 1 ($N = 294$)

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13
1. MBAS: total score	.91												
2. MBAS: muscularity	.69*	.90											
3. MBAS: low body fat	.79*	.17*	.93										
4. MBAS: height	.40*	.17*	.20*	.88									
5. BES: physical condition	−.65*	−.24*	−.67*	−.13	.92								
6. BES: upper body strength	−.55*	−.49*	−.31*	.05	.73*	.90							
7. DMS: MBI	.54*	.82*	.07	.19*	−.14	−.38*	.89						
8. DMS: MB	.10	.20*	.00	.12	−.26*	−.29*	.43*	.86					
9. SMAQ: DFM	.28*	.45*	.04	.16	.03	−.07	.55*	.22*	.92				
10. SMAQ: PAM	.34*	.42*	.13	.07	−.15	−.14	.52*	.14	.71*	.92			
11. RSE	−.40*	−.20*	−.33*	−.18*	.48*	.37*	.18*	−.05	.01	−.22*	.86		
12. EAT-26	.57*	.24*	.61*	−.21*	.40*	−.20*	.22*	.20*	.11	.16	.36*	.85	
13. BIDR-IM	−.14	−.09	−.11	−.14	.11	.00	−.09	.04	−.16*	−.15	.04	−.02	.74
M	3.18	3.23	2.75	3.13	3.59	3.50	3.40	2.20	5.04	4.27	3.28	2.01	2.81
SD	0.79	.94	1.19	1.56	.91	.80	1.13	1.08	.97	1.07	.43	.52	.49

Note: The alpha for each measure is presented along the diagonal. MBAS, Male Body Attitudes Scale; BES, Body Esteem Scale; DMS, Drive for Muscularity Scale (MBI, muscularity body image; MB, muscularity behaviors); SMAQ, Swansea Muscularity Attitudes Questionnaire (DFM, drive for muscularity; PAM, positive attributes of muscularity); RSE, Rosenberg Self-Esteem Scale; EAT-26, Eating Attitudes Test-26; BIDR-6, Balanced Inventory of Desirable Responding-6 (IM, Impression Management subscale).

* $p < .004$.

The MBAS total scale and muscularity and low body fat subscales were slightly-to-strongly related to body esteem (PC and UBS subscales of the BES). The MBAS total scale and muscularity subscale were moderately-to-strongly related to muscularity attitudes (MBI subscale of the DMS, SMAQ subscales). Only the muscularity subscale was related to muscularity behaviors (MB subscale of the DMS). These findings provide convergent validity evidence for the MBAS.

Discriminant validity was supported via the non-significant relations of the MBAS total scale and subscales to impression management. Additional discriminant validity evidence for the MBAS subscales was obtained by the non-significant relations between (a) the height subscale and physical condition and upper body strength, (b) the low body fat subscale and the muscularity attitudes and behaviors, and (c) the height subscale with the SMAQ subscales and muscularity behaviors. Although significant, the very small relations of the height subscale with muscularity body image and eating disorder symptomatology provide some support for its discriminant validity.

Concurrent validity of the MBAS was obtained through exploring its relations to self-esteem and eating disorder symptomatology. The MBAS total score and subscales were slightly-to-moderately related to self-esteem. The MBAS total score and low body fat subscale were moderately-to-strongly related to eating disorder symptomatology. The MBAS muscularity subscale was slightly related to eating disorder symptomatology. Furthermore, the finding that the MBAS muscularity subscale was slightly related to muscularity behaviors supports the concurrent validity of this subscale.

Study 2

The aims of Study 2 were to (a) determine whether the MBAS's factor structure as demonstrated in Study 1 would generalize to a different sample of men and (b) further explore its concurrent and discriminant validity. Given that internalization of the societal ideal appearance and the tendency to engage in physical appearance comparison are theorized to predict men's body attitudes (Andersen et al., 2000; Pope et al., 2000; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), relations of these constructs to the MBAS would provide incremental support for its concurrent validity. Also, perceived societal pressures for thinness should be related to men's attitudes toward their

body fat (i.e., low body fat subscale), and pressures to be muscular should be related to their attitudes toward their level of muscularity (muscularity subscale), lending support for the concurrent validity of these subscales. Furthermore, non-significant relations were expected between perceived pressure for thinness and the muscularity and height subscales, as pressures for thinness should not be associated with men's satisfaction with their level of muscularity or their height. Similarly, pressures to become more muscular should not be associated with the low body fat and height subscales. These non-significant relations would support the discriminant validity of these subscales.

Method

Participants

A total of 241 men (mean age = 18.9; *SD* = 1.89; age range, 17–39) from a large Midwestern university participated in Study 2. They received credit that was applied toward their general psychology class grades. Most men were Caucasian (80.9%), freshmen (74.3%), and identified as middle class (45.6%) or upper-middle class (44.4%). Other racial groups represented were Asian American (7.1%), African American (6.6%), Latino (4.1%), and multi-racial (1.2%).

Measures

The 24-item MBAS, previously discussed in detail, was administered. In addition, the following measures were given to the participants:

The Internalization subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-Revised: Male version (SATAQ-I: Male) is an 11-item subscale of the male version of the SATAQ-Revised (Thompson et al., 1999) that assesses men's tendency to internalize societal messages regarding appearance ideals (e.g., muscularity, physically fit). Items are rated on a five-point scale ranging from *completely disagree* to *completely agree* and averaged. Higher subscale scores indicate greater internalization of the muscular societal ideal. To our knowledge, no reliability or validity data have been reported on the SATAQ-I: Male; for the present study, its alpha was .87.

The Physical Appearance Comparison Scale (PACS; Thompson, Heinberg, & Tantleff, 1991) is a five-item scale that measures the tendency to compare one's appearance to the appearance of others. Its items are rated on a five-point scale ranging from *never* to *always* and averaged. Higher scores reflect greater comparison. Studies have shown that it is internally consistent ($\alpha = .78$), stable over time ($r = .72$), and related to body image dissatisfaction among women (Thompson et al., 1991). Its reliability and validity has not been investigated with men. Its alpha was .74 for the current sample.

The Perceived Sociocultural Pressures Scale (PSPS; Stice, Ziemba, Margolis, & Flick, 1996) is an eight-item scale assessing participants' perceived pressure for thinness from friends, family, dating partners, and the media. Participants rate each item along a five-point scale ranging from *never* to *always*. Items are averaged; higher scores indicate greater perceived pressure for thinness. For samples of women, its internal consistency reliability ($\alpha = .87$) and 2-week test–retest reliability ($r = .93$) are high, and it has been shown to predict body dissatisfaction and eating disorder symptomatology (Stice et al., 1996). Its reliability and validity has not been explored among men. Its internal consistency reliability was .90 for the current sample.

We also used a modified version of the PSPS to assess men's perceived pressures for muscularity. For this version, PSPS items were altered by substituting "to lose weight" and "thin" with "to be more muscular" and "muscular" (e.g., "I've felt pressure from my friends to be more muscular"). Items are rated on a five-point scale ranging from *never* to *always* and averaged; higher scores signify greater pressure to be muscular. Its alpha was .86 for the current sample.

Procedure

Participants read a description of the study and enrolled via the psychology department website. After participants signed the informed consent form and were guaranteed anonymity, they completed the measures, which were counterbalanced, in a classroom used as a research laboratory. They received general psychology course credit for their involvement.

Analyses

We used Mplus (Muthén & Muthén, 2001), a common confirmatory factor analysis program, to determine whether the MBAS conformed to its hypothesized structure. The maximum likelihood (ML) estimation was used to estimate the population covariance matrix. The adequacy of fit was determined by several indices provided by Mplus: the chi-square/degrees of freedom test, the comparative fit index (CFI), the Tucker–Lewis index (TLI; also known as the nonnormed fit index or NNFI), the standardized root-mean square residual (SRMR), and the root-mean square error of approximation (RMSEA). The goodness-of-fit index (GFI) and adjusted goodness-of-fit index (AGFI) are not computed as part of the Mplus program. A chi-square/degrees of freedom ratio below 3.0, CFI and TLI values greater than .90, a SRMR value less than .05, and a RMSEA value less than .08 represent an acceptable fit (Hu & Bentler, 1995; Kelloway, 1998; Muthén & Muthén, 2001).

We decided to form subgroups of items, or testlets, to use as indicators in the confirmatory factor analysis for the muscularity and low body fat subscales. We used testlets in lieu of individual items, as testlets offer a more accurate interpretation of the structure of a scale. Compared to individual items, testlets (a) are more likely to be normally distributed, (b) reduce the distortion of parameter estimates, (c) reduce the number of parameters to be estimated without compromising the loss of individual items or information that may contribute to the meaning of the latent variable, and (d) form indicators with greater reliability and more definitive rotational results (Hall, Snell, & Foust, 1999; Nasser & Wisenbaker, 2003). Furthermore, in confirmatory factor analysis, ML cannot provide a reliable inference when the number of variables (e.g., individual scale or subscale items) assessing a latent variable is large. Testlets, then, are more likely than individual items to meet the assumptions of ML estimation methods (Kishton & Widaman, 1994). For the present study, using individual items in place of testlets for the muscularity and low body fat subscales would result in misleading findings and invalid conclusions regarding the MBAS's factor structure. Provided that the set of testlets satisfies unidimensionality, it can replace items as indicators of the same latent construct (Hagtvet & Nasser, 2004). Therefore, we planned to examine the internal consistency reliability (via alpha) of the set of testlets representing both the muscularity and low body fat latent variables. Unidimensionality of the testlets also would be supported if their standardized residuals are less than 3.0 (Hagtvet & Nasser, 2004).

As recommended by Hall et al. (1999), testlets were formed rationally by analyzing item content and forming subgroups of items (i.e., by adding the items together) that appeared to tap similar constructs. The 10 items of the muscularity subscale were divided into four testlets: (a) arms (Items 3, 9, 17), (b) legs (Items 5 and 11), (c) chest (Items 6 and 16), and (d) shoulder/back area (Items 7 and 15). The remaining item on the muscularity subscale assessed attitudes toward the muscularity of the overall body, so it was analyzed separately and not included within a testlet. The eight items of the low body fat subscale were divided into three testlets: (a) abdominal area (Items 4, 8, and 14), (b) attitudes toward a lean body (Items 2 and 13), and (c) feelings of being fat (Items 21, 23, and 27). Because the height subscale only contained two items, testlets were not formed on this subscale, and these items were entered into the analysis separately. In sum, the four testlets comprised of muscularity items and Item 1 were specified to load on a muscularity factor, the three testlets comprised of low body fat items were specified to load on a low body fat factor, and Items 12 and 19 were specified to load on a height factor.

In addition, we used Cronbach's alpha to further determine the internal consistency reliability of the MBAS total scale and subscales and Pearson r correlations to evaluate the extent of the relationships between the MBAS total scale and subscale with the remaining measures. Criteria for these values (i.e., acceptable alpha levels, strengths of the correlations) were identical to the values specified in Study 1. However, because of the number of measures examined in this study, *p*-values were subjected to the Bonferroni adjustment, and therefore, set at .006 (i.e., .05/8).

Results and discussion

The unidimensionality of the set of muscularity testlets ($\alpha = .83$) and the set of low body fat testlets

($\alpha = .88$) was supported. Therefore, we ran the confirmatory factor analysis using these testlets, the muscularity Item 1, and the individual height Items 12 and 19 as indicators of their respective latent constructs. Results indicated that all Mplus fit statistics were acceptable ($\chi^2/df = 2.29$, CFI = .98, TLI = .97, SRMR = .04, RMSEA = .06) and confirmed the MBAS's factor structure. All indicators loaded significantly on their respective latent factors, indicating that the hypothesized latent factors are internally consistent and exist empirically. No standardized residual exceeded an absolute value of 3.0, further supporting the MBAS's adequacy and the testlets' unidimensionality. Fig. 1 displays the indicator loadings on their respective latent variables.

The relations of the MBAS to internalization of sociocultural attitudes of men's appearance, comparison of physical appearance, and perceived pressure for thinness and muscularity are presented in Table 3. The MBAS total score and the muscularity and low body fat subscales, but not the height subscale, were moderately-to-strongly related to internalization of sociocultural attitudes of men's attractiveness. The MBAS total scale and subscales were slightly-to-strongly related to the tendency to engage in physical appearance comparison. The MBAS total score and low body fat subscale related strongly to perceived pressures for thinness. The MBAS total score and muscularity subscale related moderately to perceived pressure for a muscular body. These relations support the concurrent validity of the MBAS.

Results also supported the discriminant validity of the MBAS subscales, as non-significant relations were found between perceived pressure for thinness and the muscularity and height subscales, and perceived pressure to be muscular was not related to the low body fat and height subscales.

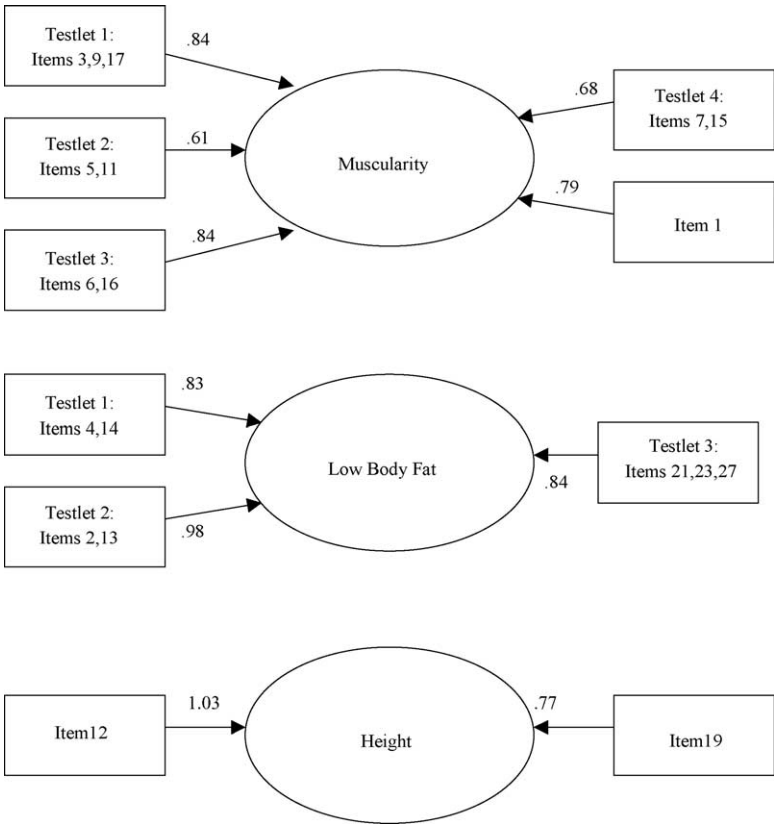

Fig. 1. Factor loadings of the Male Body Attitudes Scale (MBAS) garnered by confirmatory factor analysis of the data of Study 2 ($N = 241$).

Table 3
Means, standard deviations, alphas, and correlations among the measures of Study 2 ($N = 241$)

Measure	1	2	3	4	5	6	7	8
1. MBAS: total score	.91							
2. MBAS: muscularity	.74*	.89						
3. MBAS: low body fat	.82*	.24*	.94					
4. MBAS: height	.33*	.20*	.20*	.82				
5. SATAQ-I-Male	.48*	.44*	.34*	.12	.87			
6. PACS	.44*	.43*	.27*	.19*	.57*	.74		
7. PSPS: thinness	.59*	.14	.73*	.13	.26*	.16	.90	
8. PSPS: muscularity	.40*	.32*	.16	.13	.39*	.38*	.50*	.86
M	3.05	3.35	2.81	3.13	3.32	3.07	2.08	2.63
SD	.83	.94	1.20	1.76	.76	.72	.89	.81

Note: The alpha for each measure is presented along the diagonal. MBAS, Male Body Attitudes Scale; SATAQ-I-Male, Internalization subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-Male version; PACS, Physical Appearance Comparison Scale; PSPS, Perceived Sociocultural Pressures Scale.
* $p < .006$.

Alphas were .91 for the total MBAS scale, .89 for the muscularity subscale, .94 for the low body fat subscale, and .82 for the height subscale. Overall, Study 2 provided incremental evidence for the concurrent and discriminant validity of the MBAS and further supported its internal consistency reliability.

Study 3

An evaluation of the temporal stability of the MBAS is necessary. Therefore, Study 3 was undertaken to assess the test–retest reliability of this measure.

Method

Participants

A total of 107 men (mean age = 20.5 years, $SD = 5.5$; range, 17–60) enrolled in general psychology classes from two universities (one Midwestern, one Southern) participated in order to complete a class requirement. Similar to Studies 1 and 2, most men identified as Caucasian (81.3%), freshmen (69.2%), and middle (47.7%) or upper-middle (28.0%) class. The following ethnicities also were represented within this study: African American (9.3%), multiracial (4.6%), Latino (2.8), Asian American (0.9%), and Native American (0.9%).

Measure

The 24-item MBAS was used in Study 3.

Procedure

Participants were recruited through verbal announcements of the experiment given in their general psychology classes. For each administration, participants were instructed to write a code on their questionnaire (consisting of the first two letters of their mothers' maiden name and the last two digits of their phone number). This code allowed the researchers to match their initial and follow-up responses. After ensuring their confidentiality and obtaining informed consent, men completed the MBAS in a classroom setting used as a research lab. They completed the MBAS again 2 weeks later. For their involvement, participants received credit that was applied toward their grade.

Analyses

We used Pearson r correlations to determine the temporal stability of the MBAS total scale and subscales. A cutoff value of .70 was used as the criterion to establish acceptable test–retest reliability (Nunnally & Bernstein, 1994). Coefficient alpha (i.e., $\geq$.70) was used to provide additional evidence for the internal consistency reliability of its total scale and subscales.

Results and discussion

Results indicated that the total scale ($r = .91$), the muscularity subscale ($r = .88$), the low body fat subscale ($r = .94$), and the height subscale ($r = .81$) demonstrated adequate test–retest reliability. Hence, these findings support the stability of the MBAS over a 2-week period.

Similar to Studies 1 and 2, the results of Study 3 supported the internal consistency reliability of the MBAS. For the initial and second administration, respectively, alphas were each .94 for the total scale, .90 and .91 for the muscularity subscale, .93 and .95 for the low body fat subscale, and .81 and .80 for the height subscale.

General discussion

Due to the fact that body image disturbance is a central predictor of indices of psychological and physical health for men (Andersen et al., 2000; Cafri et al., 2002; McCreary & Sasse, 2000; Olivardia et al., 2004), it is imperative that men's body image is assessed accurately using psychometrically sound instruments. The present study developed a measure of men's body attitudes (MBAS), and examined its factor structure, reliability, and validity. Collectively, the results from three studies supported its hypothesized factor structure, internal consistency and test–retest reliability, and construct (i.e., convergent, concurrent, and discriminant) validity.

These findings are especially noteworthy, as quality measures of male body image are greatly needed (Cafri & Thompson, 2004). Although two extant measures, the DMS (McCreary & Sasse, 2000) and the somatomorphic matrix (Gruber et al., 1999), have been identified as useful for investigating men's body image, they are limited in certain ways. The DMS is functional for assessing men's drive for muscularity, but it does not assess other dimensions of body image important to men (e.g., low body fat) and it may be measuring a somewhat different construct than body attitudes. Whereas the somatomorphic matrix assesses dimensions of muscularity and body fat and has been shown to be very useful in determining perceptual body image, the actual–ideal body difference scores for these two dimensions have not been shown to have adequate temporal stability (Cafri et al., 2004). The MBAS was constructed to assess key dimensions of body image, and results from this study suggest that it has excellent psychometric support. Further, the MBAS meets the criteria set forth by Cafri and Thompson (2004) for adequate body image instruments.

As a result, we argue that the MBAS would be useful for both researchers assessing male body image and clinicians who work with men in a variety of venues, such as eating disorder programs, college counseling centers, elementary and high schools, and private practice. The MBAS could be used in concurrent and prospective studies to investigate correlates, risk factors, and protective factors of men's body dissatisfaction. Adequate reliability and validity of measures are needed to meet the assumptions of many statistical designs (e.g., structural equation modeling, hierarchical multiple regression, longitudinal analyses), and the psychometric evidence for MBAS obtained in this study would support the use of these analyses with this measure. Also, the MBAS is easy to administer and score, and requires only a few minutes to complete. These features would facilitate its incorporation within questionnaire packets and its use as a screening instrument to identify male clientele with severe body dissatisfaction who may be at risk for, or even engaging in, behaviors such as disordered eating and steroid abuse. Further, professionals have the choice of using the total MBAS score to get an estimate of overall body attitudes, or the individual subscales to assess specific dimensions of these attitudes. Given the recommendations to use multiple measures of body image (Thompson, 2004), researchers and clinicians could administer the behavior questions on the DMS and the MBAS, or the MBAS low body fat and height subscales with the full DMS in order to obtain a more comprehensive description of men's body image.

We set out to investigate two types of men's attitudes toward their bodies (i.e., satisfaction and preoccupation) and constructed MBAS items to reflect these dimensions. Interestingly, these dimensions have been documented as distinct within the literature on women's body image (e.g., Mazzeo, 1999; Pruzinsky & Cash, 2002), whereas they were not found to be distinct for men in this study. Gender role socialization may be one explanation of this apparent difference.

Specifically, women are both permitted and encouraged to experience discontent with their weight and appearance when their bodies are not similar to the thin-ideal stereotype portrayed in the media (Maine, 2000); as a result, body dissatisfaction has become acceptable and normative for women to acknowledge (Striegel-Moore, Silberstein, & Rodin, 1986; Tylka, 2004). However, only some of these women become substantially preoccupied with their bodies (Mazzeo, 1999), leading to the distinctiveness of body dissatisfaction and preoccupation. It has been argued (e.g., Pope et al., 2000) that body dissatisfaction is less acceptable for men to acknowledge, as they often receive societal messages that body dissatisfaction is a concern that only women experience (Andersen et al., 2000). Acknowledging body dissatisfaction, then, may be harder for men, as they fear being labeled as feminine (Pope et al., 2000). It may be that only those men who are preoccupied with their body shape and composition concurrently acknowledge body dissatisfaction. Therefore, among men, these constructs are more likely to be intertwined.

Limitations and future research

This study contains limitations that are important to acknowledge. Only samples of college men were used to investigate the psychometrics of the MBAS. Most of the college men were young-adult, Caucasian, freshmen, and middle to upper-middle class. It is important to determine whether this measure is reliable and valid with other samples of men, such as pre-adolescent and adolescent boys, community men not in college, men of color, male athletes, competitive male body-builders, and men in outpatient and inpatient eating disorder programs.

Another limitation of the MBAS is the height subscale. Although men reported wishing they were taller, it is likely that a small but significant minority of very tall men may wish to be shorter. Therefore, they may report being dissatisfied with their height but never wishing they were taller. Researchers and clinicians assessing men's attitudes toward height may wish to consider only Item 19 for this reason. Because of findings from qualitative analyses that men reported a desire to be taller (i.e., Ridgeway & Tylka, in press), and the high correlation between Items 12 and 19 ($r = .79$), we retained both items to maintain the subscale in these three studies. Nevertheless, we explored the relations of Item 19 with the other study measures and found that this item was correlated with the other study measures to a similar degree as the overall height subscale. Further, Item 19 was stable over a 2-week period ($r = .82$). This preliminary psychometric evidence suggests that Item 19 can be used in lieu of the two-item height subscale.

Evidence of the reliability and validity of the MBAS should be considered tentative, as additional psychometric investigation is imperative. Specifically, future research endeavors could be aimed at demonstrating whether its total scale and subscales predict self-esteem to a larger degree than measures of body attitudes originally developed to test female-focused concerns. Also, to further support the validity of the muscularity subscale, researchers could give this measure to women to demonstrate that men have greater preoccupation with muscularity than do women. Significant correlations between (a) actual weight and the low body fat subscale and (b) actual height and the height subscale would provide additional evidence for these subscales' validity. Determining whether the MBAS is stable over a period of time that exceeds 2 weeks also seems necessary.

Some men may desire greater muscularity and tone, but not much increase in size. For instance, men who are obese may desire a smaller back and chest and smaller arms and legs but want these areas to be more muscular. Researchers, then, may want to revise Items 9, 11, 15, and 16 by excluding the term "larger" in each item and evaluate the reliability and validity of this revised scale. Yet, findings from Cafri et al. (2002) suggest that other men may want more body fat than they currently have, perhaps due to the salience of having a large body size. For these men, it may be necessary to retain the term "larger" within these items.

Future studies might also examine the MBAS in terms of its sensitivity to treatment change and its influence on pathological eating, harmful behaviors to change body shape (e.g., use of steroids) or exercise related behaviors (e.g., excessive weight-lifting). Prospective designs using the MBAS could determine whether initial levels of internalization of sociocultural attitudes towards men's appearance and sociocultural pressures to change body shape predict future levels of body dissatisfaction, and whether

initial levels of body dissatisfaction predict future levels of eating disorder symptomatology, steroid abuse, and excessive exercise. Researchers also may wish use the MBAS muscularity subscale to identify women who are dissatisfied with their degree of muscularity, as much less is known about women's desire to become increasingly muscular than is known about their desire to become thinner (McCreary & Sasse, 2000).

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