

Refinement of the tripartite influence model for men: Dual body image pathways to body change behaviors

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ABSTRACT

Although muscularity and body fat concerns are central to conceptualizing men's body image, they have not been examined together within existing structural models. This study refined the tripartite influence model (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) by including dual body image pathways (muscularity and body fat dissatisfaction) to engagement in muscular enhancement and disordered eating behaviors, respectively, and added dating partners as a source of social influence. Latent variable structural equation modeling analyses supported this quadripartite model in 473 undergraduate men. Nonsignificant paths were trimmed and two unanticipated paths were added. Muscularity dissatisfaction and body fat dissatisfaction represented dual body image pathways to men's engagement in muscularity enhancement behaviors and disordered eating behaviors, respectively. Pressures to be mesomorphic from friends, family, media, and dating partners made unique contributions to the model. Internalization of the mesomorphic ideal, muscularity dissatisfaction, and body fat dissatisfaction played key meditational roles within the model.

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Introduction

Interest in men's body image has burgeoned in the last decade, which has fueled researchers' motivation to understand its major components (Grogan & Richards, 2002; Ridgeway & Tylka, 2005) and explore its sociocultural, psychological, and behavioral correlates (Cafri, van den Berg, & Thompson, 2006; Grieve, 2007; Ricciardelli & McCabe, 2004). From this literature, it is clear that components of men's body image mirror the mesomorphic body ideal promoted by Western media, characterized by visible – although not excessively large – musculature coupled with low body fat (Arbour & Martin Ginis, 2006; Grogan & Richards, 2002; Olivardia, Pope, Borowiecki, & Cohane, 2004; Ridgeway & Tylka, 2005). Increased pressure for men to fit this ideal is evident in the media (Frederick, Fessler, & Haselton, 2005; Leit, Gray, & Pope, 2002; Rolhinger, 2002) and during interpersonal encounters (Karazsia & Crowther, 2010). This pressure directs men to internalize the mesomorphic body type as ideal for themselves (Arbour & Martin Ginis, 2006; Grogan & Richards, 2002; Vartanian, 2009) and experience muscularity and body fat dissatisfaction if their body does not match this ideal (Tylka, Bergeron, & Schwartz, 2005).

Indeed, boys and men consistently identify muscularity and body fat as their two primary body image concerns (Grogan &

Richards, 2002; Jones & Crawford, 2005; Ridgeway & Tylka, 2005). About 90% of men indicated that they would like to be more muscular, and 38% of men disclosed that they would like to have lower body fat (Frederick et al., 2007). Another study revealed that 41% of heterosexual men believed they need to reduce their body fat (Frederick, Peplau, & Lever, 2006). On average, men's vision of their ideal body has approximately 25 more pounds of muscle and eight fewer pounds of body fat than their actual body (Olivardia et al., 2004).

Some scholars have contemplated how muscularity and body fat concerns are connected. Men may wish to lose body fat not to be thin or smaller but to highlight their muscle definition, as body fat can hide musculature (Hildebrandt, Langenbacher, & Schlundt, 2004). This process may reflect men's drive for leanness, or motivation to achieve and maintain a lean and toned body (Smolak & Murnen, 2008). Although body fat dissatisfaction and drive for leanness are similar, they are not the same construct. Body fat dissatisfaction assesses how individuals currently feel about their own body fat amount and distribution. Men who consistently work out and have a low percentage of body fat can be relatively satisfied with their current level of body fat but still have a high drive to maintain their lean and toned body. In a similar manner, muscularity dissatisfaction is distinct from drive for muscularity (Bergeron & Tylka, 2007). Although some researchers have proposed that muscularity dissatisfaction is more consistently related to men's mental health than body fat dissatisfaction (McCreary, 2007; Olivardia et al., 2004), others have found that both are

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independently and uniquely associated with well-being among heterosexual men (Bergeron & Tylka, 2007) and gay men (Blashill, 2010). Collectively, these research findings suggest that models of male body image should include men's muscularity and body fat dissatisfaction.

Yet, extant models of body image have not yet considered muscularity and body fat dissatisfaction as separate constructs within their design. For men, this is an important omission. The present study serves to fill this void by including both muscularity dissatisfaction and body fat dissatisfaction into one model. Previous research on men's body image was consulted to determine which model framework would best represent men's concerns. Meta-analyses have indicated that media pressures to be mesomorphic consistently predict men's body dissatisfaction (Barlett, Vowels, & Saucier, 2008). In addition, men's bodies do not escape scrutiny by important others in their lives (Martins, Tiggemann, & Kirkbride, 2007), and this appearance-related commentary contributes to their body dissatisfaction (Nowell & Ricciardelli, 2008). Therefore, a model which considers social influence variables from media and influential others would be appropriate to use as a framework to represent dual body image pathways to men's body change behaviors.

One social influence model that has been studied rather extensively is the tripartite influence model (Thompson, Covert, & Stormer, 1999; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). This model posits that three social influences (peers, parents, and media) have a direct impact on body dissatisfaction as well as an indirect impact through two variables: internalization of the social ideal body type and appearance comparison. Body dissatisfaction then is expected to predict restricted eating, which then contributes directly (and indirectly via body dissatisfaction) to bulimic symptomatology. Elements of this model have been supported for adolescent girls and women (e.g., Keery, van den Berg, & Thompson, 2004; van den Berg, Thompson, Brandon, & Covert, 2002), and studies have begun to modify it for men.

When studying men, Karazsia and Crowther (2009, 2010) conceptualized social influence as parental, sibling, and peer encouragement to exercise and diet in order to enhance appearance; sources were combined and measured as one overall social influence variable in their models. In their 2009 study, internalization of the mesomorphic ideal and appearance comparison mediated the relationship between social influence and men's muscularity dissatisfaction. In their 2010 study, social influence predicted men's internalization of the mesomorphic ideal and their engagement in appearance comparison. Internalization of the mesomorphic ideal, but not appearance comparison, predicted unique variance in muscularity dissatisfaction. Social influence, internalization of the mesomorphic ideal, and muscularity dissatisfaction each uniquely predicted muscularity-oriented behaviors, such as consuming muscle-building supplements and exercising despite injury. Among middle-school boys, Smolak, Murnen, and Thompson (2005) found that media influences and both peer and parent body-related comments each predicted muscle-building techniques directly as well as indirectly through appearance comparison (internalization was not examined in the model).

Based on the tenets of the tripartite influence model, previous research using this model with men, and the goal to represent dual body image pathways to men's body change behaviors, Fig. 1 was developed. As recommended when studying the tripartite influence model with men, constructs relevant to men were included (Karazsia & Crowther, 2010).

Social influences pressuring men to be mesomorphic were examined. Friends, family, and media were chosen as sources of pressure as they are similar to the social influence variables specified in the tripartite influence model. Also, romantic partners were integrated as another source of pressure, creating a quadripartite

influence model. Qualitative studies have suggested that partners' comments can influence men's body image. Ogden and Taylor (2000) concluded that young adult men use their dating partner as an information source from which to develop their body image. Pompper (2010) revealed that men of various ethnicities and ages reported anxiety and frustration with being unable to measure up to women's expectations of media-promoted male body ideals, which systematically affected their body image. McCabe and McGreevy (2010) found that middle age men, even though many received appearance-related compliments from their partners, reported appearance-related teasing (29%) and encouragement to lose weight (37%), build muscle (37%), and change their body shape (26%) from their partners. In Fig. 1, consistent with the tripartite influence model, each source of pressure to be mesomorphic was expected to predict men's internalization of the mesomorphic ideal as well as body dissatisfaction – represented in this model separately as muscularity dissatisfaction and body fat dissatisfaction.

According to the tripartite influence model (Thompson, Covert, & Stormer, 1999; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), internalization of societal appearance standards contributes to body dissatisfaction. Specific to men, those who are more likely to internalize the mesomorphic ideal report higher muscularity dissatisfaction (Karazsia & Crowther, 2009, 2010) and body fat dissatisfaction (Tylka et al., 2005). Therefore, internalization of the mesomorphic ideal was hypothesized to predict men's dissatisfaction with their muscularity and body fat and thus serve as a partial mediator between social influences and body dissatisfaction.

Appearance comparison was not integrated in Fig. 1 for three reasons. First, appearance comparison does not consistently contribute to boys' and men's body dissatisfaction after internalization of the mesomorphic ideal is considered (Jones, 2004; Karazsia & Crowther, 2010). Second, the measure of internalization of the mesomorphic ideal used in this study (i.e., the male version of the Sociocultural Attitudes Toward Appearance Questionnaire-Revised, SATAQ-R; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) contains a few items that reflect body comparison (e.g., "I often read magazines and compare my appearance to the male models," "I find myself comparing my physique to that of athletes pictured in magazines"). Separate model constructs should not have overlapping item content because the association between these constructs will be artificially inflated (Kline, 2005). Third, including two mediators between the four sources of social influence and two body dissatisfaction variables would crowd the model, as an additional seven paths (13 parameters) would need to be estimated. Indeed, several researchers have chosen to only examine one of these two mediators with males (e.g., Smolak et al., 2005; van den Berg, Paxton, Keery, Wall, Guo, & Neumark-Sztainer, 2007). For parsimony, then, only internalization of the mesomorphic ideal was considered as a mediator between social influences and body dissatisfaction.

The tripartite influence model suggests that body dissatisfaction promotes restricted eating behaviors (Thompson, Covert, & Stormer, 1999; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). However, men who are dissatisfied with their muscularity are more likely to report engaging in muscularity enhancement behaviors to increase musculature (Cafri, Thompson, Ricciardelli, McCabe, Smolak, & Yesalis, 2005; Goldfield, Blouin, & Woodside, 2006; Thompson & Cafri, 2007), and men who are dissatisfied with their body fat are more likely to report engaging in disordered eating to lower body fat (Tylka et al., 2005). Hence, muscularity dissatisfaction was hypothesized to predict muscularity enhancement behaviors, and body fat dissatisfaction was hypothesized to predict disordered eating behaviors. Also, per the tripartite influence model, body dissatisfaction should account for the relationships between internalization of the mesomorphic ideal and body change behaviors and the relationships between social influences and body

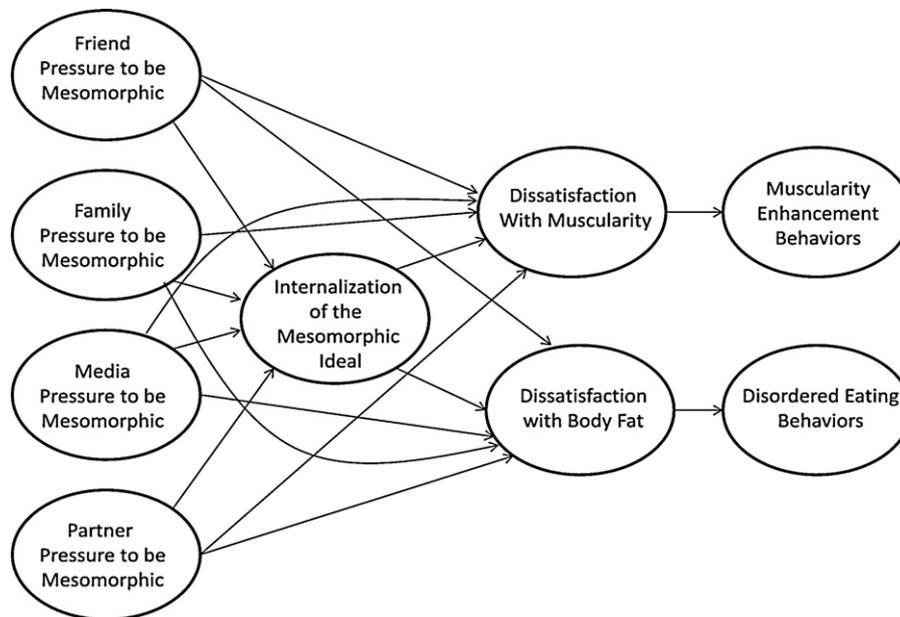


Fig. 1. The hypothesized modified tripartite (“quadripartite”) influence model illustrating dual body image pathways to men’s body change strategies.

change behaviors; thus, muscularity dissatisfaction and body fat dissatisfaction were hypothesized to be full mediators of these relationships.

While the bivariate associations between many of the variables included in Fig. 1 have been explored, it is unknown whether each path specified in Fig. 1 would add unique variance to the model. Likewise, unanticipated paths could emerge. Fig. 1 was tested with these issues in mind. To obtain the most parsimonious and accurate representation of the data, it was planned to trim paths that were not significant and add paths not originally specified but impact the fit of the model to the data.

Method

Participants

The final data set included responses from 473 undergraduate men ranging in age from 18 to 42 ($M = 20.1$, $SD = 3.8$) from a regional campus of a large Midwestern university. Most identified as White/Caucasian (82.7%), followed by multiracial (6.6%), Asian American (4.9%), African American (4.0%), Latino (1.7%), and Native American (0.2%). They represented first-year students (77.0%), sophomores (14.1%), juniors (4.7%), and seniors (4.3%). Most were heterosexual (96.0%). A total of 64.7% indicated that they were single but had previous relationships, while 30.8% were currently in a relationship, 1.7% were engaged, and 2.8% were married. In terms of socioeconomic identification, 21.0% reported working class, 52.0% endorsed middle class, 25.4% selected upper-middle class, and 1.5% indicated upper class. Men on average reported being 71.1 ($SD = 2.6$) inches tall and weighing 181.6 ($SD = 43.4$) pounds. This information was converted to metric units to calculate BMI (kg/m^2 ; $M = 25.2$, $SD = 5.7$).

Measures

Perceived pressure to be mesomorphic. A modified version of the Perceived Sociocultural Pressures Scale (PSPS; Stice, Ziemba, Margolis, & Flick, 1996) was used to assess men’s perceived pressure to be mesomorphic from four different sources in their lives: friends, family, dating partners, and the media. The original PSPS contains eight items that ask participants the extent to which they

feel pressure to lose weight and notice strong messages to have a thin body from these four sources (two items per source). In order to obtain a version appropriate for men’s body concerns, PSPS items were altered by substituting “be more muscular and/or lean” for “lose weight” and “have a muscular and/or lean body” for “have a thin body.” Similar to the original PSPS, items were rated on a scale ranging from 1 (*never*) to 5 (*always*) and averaged. Higher scores reflect greater pressure to be mesomorphic. A similar modified version was administered to a sample of college men, and its scores were internally consistent ($\alpha = .86$) and related to internalization of the mesomorphic ideal, yielding evidence of internal consistency reliability and construct validity (Tylka et al., 2005). In the current sample, Cronbach’s coefficient alphas were .95 for friend pressure, .92 for family pressure, .88 for media pressure, and .89 for partner pressure.

Internalization of the mesomorphic ideal. The Internalization subscale of the male version of the SATAQ-R (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) was used. This subscale contains 11 items that assess men’s tendency to internalize or adopt societal mesomorphic ideals (e.g., muscularity, being physically fit) as their own personal standard. Its items are rated on a scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). After specified items are reverse-coded, items are averaged. Higher scores, then, suggest greater internalization of the mesomorphic ideal. This subscale has yielded internally consistent scores ($\alpha = .87$) and is strongly related to appearance comparison, upholding the internal consistency reliability and construct validity of its scores (Tylka et al., 2005). In the current sample, alpha was .91 for this subscale.

Dissatisfaction with muscularity and body fat. The 10-item muscularity and 8-item body fat subscales of the Male Body Attitudes Scale (MBAS; Tylka et al., 2005) measured these constructs. Each MBAS item is rated on a scale ranging from 1 (*never*) to 6 (*always*). After the specified items are reverse-coded, subscale items are averaged; higher scores indicate greater muscularity and body fat dissatisfaction, respectively. Both subscales have yielded evidence of internal consistency reliability ($\alpha = .89$ for muscularity, $\alpha = .94$ for body fat), test–retest reliability over a 2-week period, discriminant validity via their nonsignificant associations with impression management, and incremental validity in their prediction of well-being above and beyond drive for muscularity with samples of college men (Bergeron & Tylka, 2007; Tylka et al., 2005).

Convergent validity is supported via the muscularity subscale's associations with upper body strength esteem and the body fat subscale's associations with physical condition esteem among college men. In the current study, alphas were .93 for the muscularity subscale and .94 for the body fat subscale.

Muscularity enhancement behaviors. The 8-item muscularity behaviors subscale of the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000) was used to assess men's engagement in body change behaviors designed to increase muscularity, such as utilization of protein and energy supplements, drinking weight gain or protein shakes, excessive weight lifting/weight training, and considering the use of anabolic steroids. Each item is rated on a scale ranging from 1 (*always*) to 6 (*never*). All items are reverse-coded and averaged so that higher scores indicate greater engagement in muscularity-related behaviors. Among college men, its scores are internally consistent ($\alpha = .86$), related to upper body strength esteem, and unrelated to impression management, yielding internal consistency reliability as well as construct and discriminant validity evidence (Tylka et al., 2005). In the current study, alpha was .87 for this subscale.

Disordered eating behaviors. The 19 items comprising the dieting and bulimia/food preoccupation subscales of the Eating Attitudes Test (Garner, Olmsted, Bohr, & Garfinkel, 1982) were used to assess this construct. The 13-item dieting subscale gauges the extent to which individuals think about their level of fat and engage in dieting behaviors in an attempt to control weight. The 6-item bulimia/food preoccupation subscale assesses preoccupation with food and dieting and engagement in behaviors characteristic of bulimia. Items are rated along a scale ranging from 1 (*always*) to 6 (*never*). Although Garner et al. (1982) recommended that always, usually, and often are coded as 3, 2, and 1, respectively, and that sometimes, rarely, and never are each coded as 0, the full range of item responses were used to permit greater variance in the distribution of scores. Thus, all items were reverse-coded and averaged, so that higher scores indicated greater dieting behaviors, bulimia, or food preoccupation. Among college men, total EAT-26 scores (when scored continuously) yielded evidence of internal consistency reliability ($\alpha = .85$) and construct validity, as the EAT-26 was negatively related to self-esteem and body fat dissatisfaction (Tylka et al., 2005). In the current study, alpha was .91 for the 19 items comprising the dieting and bulimia/food preoccupation subscales. Although administered, the oral control subscale items demonstrated low internal consistency reliability with this sample ($\alpha = .52$), and therefore these items were excluded.

Procedure

All procedures were approved by the university's Institutional Review Board. Men were recruited from a description of the study listed on the psychology department's research management system website. The study was described as an investigation of the relationships between body experiences, attitudes, and behaviors. Interested participants could sign up for the study on the website and, when ready to complete, click a URL link to a Web page that hosted details needed for informed consent. After providing consent, men were directed to the survey Web page, where the measures and demographic information form were hosted. Two different orderings of the survey (containing opposite sequences of the measures) were administered to offset potential ordering effects. Several strategies were incorporated to detect duplicate and erroneous data. First, each participant received a respondent code at sign-up, and the data were screened for duplicate surveys (no duplicate surveys were detected). Second, three validity questions were embedded within the items of three measures, each of which instructed participants to choose certain responses (e.g., "To ensure that you are paying attention, please choose Always for this

item") in order to control for inattentiveness and random responding. Third, an outlier analysis detected seven cases with extremely large Mahalanobis distance values that far exceeded acceptable limits (Tabachnick & Fidell, 2007). Participants who failed any of the validity items, terminated early (respondents could exit at any point without penalty), or had unacceptable Mahalanobis distance values were not included in the data set. Men were given class credit in exchange for their participation.

Creation of Measured/Observed Variables

A latent variable was constructed for each source of pressure to be mesomorphic (friends, family, media, and partners) by allowing its two individual PSPS items to estimate it. For each latent variable representing internalization of the mesomorphic ideal, muscularity dissatisfaction, body fat dissatisfaction, muscularity enhancement behaviors, or disordered eating behaviors, three parcels (i.e., measured indicators) were constructed following the specifications by Russell, Kahn, Spoth, and Altmaier (1998). First, for each measure, an exploratory factor analysis was performed using the maximum likelihood (ML) method of extraction, and a single factor was extracted. Second, the factor loadings from this analysis were rank-ordered and successively assigned to one of three parcels; this process equalized the average loadings of each parcel on its respective latent factor. Third, items within each parcel were averaged to obtain a total parcel score. Fourth, the three total parcel scores were used to estimate their respective latent variable within the SEM analyses.

Results

Preliminary Analyses

Data were examined for normality of distribution. It has been suggested that researchers testing structural equation models should transform variables that have absolute values of skewness > 3 and kurtosis > 10 (Kline, 2005). Skewness and kurtosis values for the 15 parcels (which estimated the latent variables for internalization of the mesomorphic ideal, muscularity dissatisfaction, body fat dissatisfaction, muscularity enhancement behaviors, and disordered eating behaviors) and the eight individual PSPS items (which estimated the four latent variables representing sources of mesomorphic pressure) for were lower than these values (skewness range = -0.28 to 1.18 , kurtosis range = -0.93 to 1.96). Therefore, no variable was transformed. Variable means, standard deviations, and bivariate correlations are presented in Table 1.

Test of the Hypothesized Model in Fig. 1

The number of participants ($N = 473$) exceeded the minimum 5:1 cases-to-parameter ratio needed to confidently examine a model (Bentler, 1990). In this study, a total of 310 cases were needed as there were 62 parameters in the model. Mplus Version 4.1 (Muthén and Muthén, 2006) with ML estimation was used to analyze all models. Adequacy of model fit was determined via consensus among three indices recommended by Hu and Bentler (1999): the Comparative Fit Index (CFI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). Specifically, CFI values of .95 and higher, SRMR values of .08 or lower, and RMSEA values of .06 and lower indicate a good fit of the model to the data.

Examination of the measurement model. First, the measurement model was analyzed using confirmatory factor analysis. It provided a good fit to the data (CFI = .96, SRMR = .04, RMSEA = .06), $\chi^2(194, N = 473) = 548.53, p < .001$. For the latent variables representing sources of pressure, each item – factor loading was

Table 1
Means (standard deviations) and correlations among measures and BMI.

Measure	M (SD)	Range	1	2	3	4	5	6	7	8	9
1. PSPS-Friend	2.17 (0.98)	1–5	–								
2. PSPS-Family	2.23 (0.97)	1–5	.51***	–							
3. PSPS-Media	2.98 (1.15)	1–5	.29***	.32***	–						
4. PSPS-Partner	2.15 (0.93)	1–5	.51***	.56***	.34***	–					
5. SATAQ-R-Internalization	3.05 (0.83)	1–5	.21***	.35***	.48***	.32***	–				
6. MBAS-Muscularity	3.26 (1.11)	1–6	.23***	.32***	.35***	.27***	.56***	–			
7. MBAS-Body Fat	2.90 (1.24)	1–6	.16**	.26***	.37***	.23**	.47***	.34***	–		
8. DMS-MBs	2.28 (0.96)	1–6	.13**	.17***	.08	.16**	.33***	.30***	.03	–	
9. EAT	1.96 (0.69)	1–6	.25***	.34***	.31***	.36***	.46***	.25***	.64***	.26***	–
10. Body Mass Index	25.17 (5.66)	n/a	.07	.04	.10	.05	.01	–.13**	.47***	–.07	.30***

Note. PSPS = Perceived Sociocultural Pressures Scale adapted to assess pressures to be mesomorphic; SATAQ-R = male version of the Sociocultural Attitudes Toward Appearance Questionnaire – Revised; MBAS-Muscularity = Muscularity dissatisfaction subscale of the Male Body Attitudes Scale (MBAS); MBAS-Body Fat = Body fat dissatisfaction subscale of the MBAS; DMS-MBs = Muscularity Behaviors subscale of the Drive for Muscularity Scale; EAT = Dieting and Bulimia/Food Preoccupation subscales composite of the Eating Attitudes Test-26.

** $p < .01$.

*** $p < .001$.

significant, all $ps < .001$. Loadings were .92 and .98 for friend pressure, .90 and .94 for family pressure, .97 and .82 for media pressure, and .90 and .88 for partner pressure. For the other latent variables, each parcel – factor loading was significant, all $ps < .001$. These loadings ranged from .88 to .92 for internalization of the mesomorphic ideal parcels, .87 to .92 for muscularity dissatisfaction parcels, .89 to .96 for body fat dissatisfaction parcels, .84 to .93 for muscularity enhancement parcels, and .90 to .91 for disordered eating parcels. Therefore, this measurement model was used to test the hypothesized structural model in Fig. 1.

Examination of the structural model. The structural model in Fig. 1 provided an acceptable-to-good fit to the data (CFI = .96, SRMR = .06, RMSEA = .07), $\chi^2(207, N = 473) = 627.73$, $p < .001$. The sources of pressure to be mesomorphic varied in their prediction of internalization of the mesomorphic ideal, muscularity dissatisfaction, and body fat dissatisfaction. Friend pressure to be mesomorphic did not predict internalization of the mesomorphic ideal, $\beta = -.09$, $t(472) = -1.68$, $p = .094$ or body fat dissatisfaction, $\beta = -.00$, $t(472) = -0.07$, $p = .944$. Family pressure to be mesomorphic did not predict muscularity dissatisfaction, $\beta = .07$, $t(472) = 1.29$, $p = .198$ or body fat dissatisfaction, $\beta = .07$, $t(472) = 1.16$, $p = .247$. Media pressure to be mesomorphic did not predict muscularity dissatisfaction, $\beta = .04$, $t(472) = 0.75$, $p = .454$. Finally, partner pressure to be mesomorphic did not predict internalization of the mesomorphic ideal, $\beta = .09$, $t(472) = 1.41$, $p = .159$, muscularity dissatisfaction, $\beta = .00$, $t(472) = -0.01$, $p = .992$, or body fat dissatisfaction, $\beta = .03$, $t(472) = 0.48$, $p = .631$. All other paths specified in Fig. 1 were significant, $p < .001$.

In order to obtain a more parsimonious model, these nonsignificant paths were deleted and the structural model was reexamined. The original model did not provide a better fit to the data than the trimmed model (CFI = .96, SRMR = .06, RMSEA = .07), $\chi^2(215, N = 473) = 637.62$, $p < .001$; $\chi^2_{\text{difference}}(8, N = 473) = 9.89$, $p = .273$. Thus, the trimmed model was retained.

Modification indices (MIs) were explored to determine whether data revealed paths which should be estimated within the model (Kline, 2005). Two paths with large MIs were noted in the trimmed model: the path from partner pressure to be mesomorphic to disordered eating behaviors (MI = 30.71) and the path from internalization of the mesomorphic ideal to muscularity enhancement behaviors (MI = 12.65). Therefore, these two paths were included in the trimmed model, and this revised model was examined. This revised model (CFI = .96, SRMR = .05, RMSEA = .06), $\chi^2(215, N = 473) = 592.00$, $p < .001$, provided a significantly better fit than the trimmed model without the two added paths, $\chi^2_{\text{difference}}(2, N = 473) = 45.62$, $p < .001$.

In a post hoc analysis, this revised model was evaluated against a model that included BMI. Because BMI was inversely related to muscularity dissatisfaction and positively associated with body fat dissatisfaction and disordered eating (Table 1), paths from BMI to muscularity dissatisfaction, body fat dissatisfaction, and disordered eating behaviors were added to the revised model. This expanded model including BMI, $\chi^2(229, N = 462) = 620.22$, $p < .001$, provided a significantly worse fit to the data than the revised model without the BMI paths, $\chi^2_{\text{difference}}(12, N = 462) = 28.22$, $p = .005$. Hence, the revised model without the BMI paths was interpreted because it provided the better fit while being more parsimonious. This model is presented in Fig. 2.

In the revised model, family pressure to be mesomorphic, $\beta = .24$, $t(472) = 5.41$, $p < .001$, and media pressure to be mesomorphic, $\beta = .47$, $t(472) = 9.46$, $p < .001$, accounted for 35.1% of the variance in internalization of the mesomorphic ideal. Friend pressure to be mesomorphic, $\beta = .11$, $t(472) = 2.72$, $p = .007$, and internalization of the mesomorphic ideal, $\beta = .59$, $t(472) = 13.09$, $p < .001$, predicted 39.5% of the variance in men's dissatisfaction with their muscularity. Media pressure to be mesomorphic, $\beta = .18$, $t(472) = 3.31$, $p = .001$, and internalization of the mesomorphic ideal, $\beta = .42$, $t(472) = 7.90$, $p < .001$, accounted for 28.4% of the variance in men's dissatisfaction with their body fat. Internalization of the mesomorphic ideal, $\beta = .22$, $t(472) = 3.72$, $p < .001$, and dissatisfaction with muscularity, $\beta = .20$, $t(472) = 3.38$, $p < .001$, contributed 14.6% of variance in men's muscularity enhancement behaviors. Last, partner pressure to be mesomorphic, $\beta = .22$, $t(472) = 5.93$, $p < .001$, and dissatisfaction with body fat, $\beta = .67$, $t(472) = 17.74$, $p < .001$, predicted 55.4% of the variance in men's disordered eating behaviors.

Mediation

Shrout and Bolger's (2002) bootstrap procedures were used to estimate the significance of the indirect effects. Mplus was specified to create 10,000 bootstrap samples from the data set by random sampling with replacement and generate indirect effects and bias-corrected confidence intervals (CIs) around the indirect effects when analyzing the final structural model. Indirect effects are significant if the 95% CIs do not include zero. Indirect effects examined were for the hypotheses generated from tenets specified in the tripartite influence model. Two additional indirect paths were tested based on the added path from internalization of the mesomorphic ideal to muscularity enhancement behaviors (family pressure to be mesomorphic → internalization of the mesomorphic ideal → muscularity enhancement behaviors; media

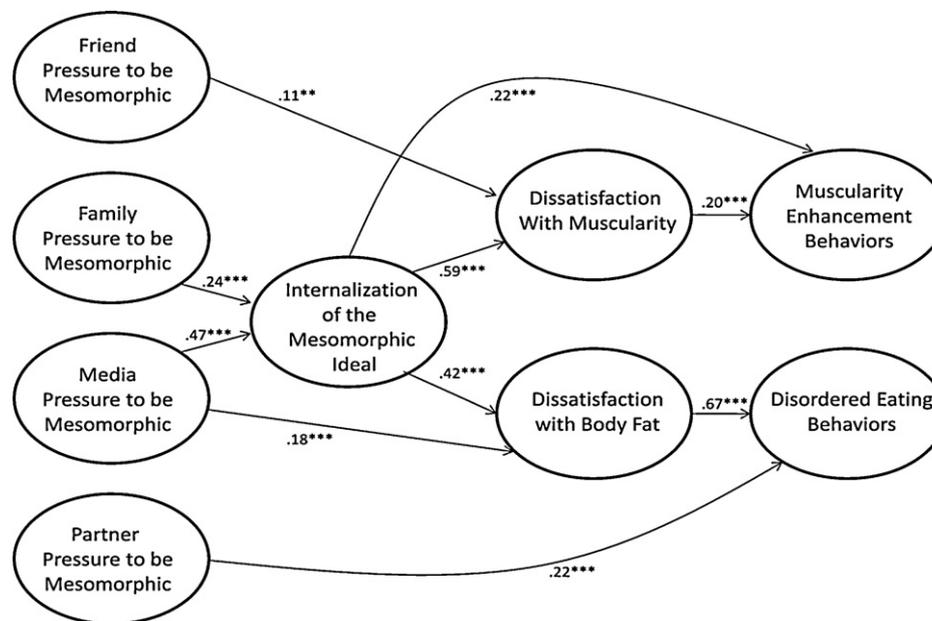


Fig. 2. Revised dual body image pathway model with nonsignificant paths trimmed and significant paths added. Path coefficients are presented. The model assumed bidirectional relationships between the four sources of pressure. * $p < .05$, ** $p < .01$, and *** $p < .001$.

pressure to be mesomorphic → internalization of the mesomorphic ideal → muscularity enhancement behaviors).

All indirect effects examined were significant, suggesting mediation for all examined indirect paths. Partial or full mediation was determined by whether there was a significant direct path in the model; if so, then it would indicate partial mediation and if not, then it would indicate full mediation. For each test of mediation, Table 2 includes the standardized indirect effect, bias-corrected 95% CI, and whether it represents full or partial mediation.

Discussion

This study contributes to the scant yet growing literature on models of men's body image which include variables relevant for men (Karazsia & Crowther, 2009, 2010). Specifically, this study extended this literature by integrating two important components of men's body image (muscularity dissatisfaction and body fat dissatisfaction), two body change behaviors (muscularity enhancement behaviors and disordered eating behaviors), and partner pressure to be mesomorphic within the tripartite influence model (Thompson, Covert, & Stormer, 1999; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). This "quadripartite" model provided a good fit to the data. Overall, results suggest that there are dual body image pathways to men's engagement in muscularity enhancement and disordered eating behaviors. Internalization of the mesomorphic ideal, muscularity dissatisfaction, and body fat dissatisfaction played key mediational roles in the model, connecting three sources of pressure to be mesomorphic (friend, family, and media) with men's body change behaviors.

Most hypothesized paths were significant in the quadripartite model. However, each source of pressure incrementally contributed to one or two model variables, but was not uniquely associated with all three of the anticipated variables (internalization of the mesomorphic ideal, muscularity dissatisfaction, and body fat dissatisfaction). Also, two paths not originally hypothesized were added to the model, one of which has been supported empirically with men. Karazsia and Crowther (2010) also found a direct path from internalization of the mesomorphic ideal to muscularity enhancement behaviors in their test of the tripartite influence model. The other unexpected path was from partner pres-

sure to be mesomorphic to disordered eating behaviors. If men are exposed to pressure to be muscular and/or lean from their romantic partners, then this pressure may directly shape their engagement in disordered eating behaviors. Men likely eat often with their romantic partners. Perhaps men restrict their eating if they are eating next to a partner who is critical of their appearance. Although some researchers have explored partner pressures to be mesomorphic (McCabe & McGreevy, 2010; Ogden & Taylor, 2000; Pompper, 2010), they have investigated this variable within the context of men's body image and not as a predictor of their disordered eating behaviors.

Dissatisfaction with muscularity slightly predicted men's muscularity enhancement behaviors, and dissatisfaction with body fat strongly predicted their disordered eating behaviors. Findings from Karazsia and Crowther (2010) also supported the muscularity dissatisfaction – muscularity enhancement link within a test of their modified tripartite influence model, but research to date has not investigated the body fat dissatisfaction – disordered eating behaviors link within models of men's body image. The presence of unwanted body fat is a very important appearance concern for many men, perhaps because it masks muscle tone (Frederick et al., 2007; Hildebrandt et al., 2004; Ridgeway & Tylka, 2005; Tylka et al., 2005). These findings underscore the importance of including body fat dissatisfaction in models of men's body image. Exclusion of this variable may explain why social influences and muscularity dissatisfaction have not reliably predicted men's disordered eating behaviors.

Family and media pressures to be mesomorphic each predicted internalization of the mesomorphic ideal. Families and the media are two influential early socialization agents for values regarding attractiveness (Gillen & Lefkowitz, 2009). Thus, families that regularly expose boys and men to media images of mesomorphic men and regularly reinforce this ideal as the only attractive body type for men may encourage boys' adoption of the mesomorphic image as ideal for themselves. Internalization of the mesomorphic ideal served a central mediator in the relationships from family pressure to be mesomorphic to muscularity dissatisfaction, body fat dissatisfaction, and muscularity enhancement behaviors. Specifically, family pressure to be mesomorphic seems to only contribute to men's body image and muscularity enhancement

Table 2

Tests of mediation: examination of indirect effects, bias-corrected 95% confidence intervals (CIs), and significance of direct paths.

Indirect path	Indirect effect (β)	95% CI	Direct path significant?	Full or partial mediation
Family Pressure → Internalization → Muscularity Dissatisfaction	.14 [*]	.100 to .260	No	Full
Family Pressure → Internalization → Body Fat Dissatisfaction	.10 [*]	.071 to .226	No	Full
Media Pressure → Internalization → Muscularity Dissatisfaction	.28 [*]	.192 to .342	No	Full
Media Pressure → Internalization → Body Fat Dissatisfaction	.20 [*]	.145 to .286	Yes	Partial
Family Pressure → Internalization → Muscularity Enhancement	.05 [*]	.025 to .121	No	Full
Media Pressure → Internalization → Muscularity Enhancement	.11 [*]	.043 to .155	No	Full
Internalization → Muscularity Dissatisfaction → Muscularity Enhancement	.12 [*]	.043 to .256	Yes	Partial
Friend Pressure → Muscularity Dissatisfaction → Muscularity Enhancement	.02 [*]	.005 to .060	No	Full
Internalization → Body Fat Dissatisfaction → Disordered Eating	.28 [*]	.150 to .291	No	Full
Media Pressure → Body Fat Dissatisfaction → Disordered Eating	.12 [*]	.025 to .124	No	Full

Note. The indirect effect estimate is standardized.

^{*} $p < .05$.

behaviors through internalization of this ideal. Internalization of the mesomorphic ideal also served as a key mediator from media pressure to be mesomorphic to body fat dissatisfaction, muscularity dissatisfaction, and muscularity enhancement behaviors. Men who perceive pressure from the media to be mesomorphic were only dissatisfied with their muscularity and engaged in muscularity enhancement behaviors to the extent they internalized the mesomorphic ideal. However, media pressure to be mesomorphic appears to be directly associated with men's body fat dissatisfaction, regardless if they internalize the mesomorphic ideal or not.

Muscularity and body fat dissatisfaction also served as central mediators in the model. Perceiving pressure from friends to be mesomorphic seems to be directly associated with increased muscularity dissatisfaction for men. Muscularity dissatisfaction, in turn, connects this pressure source with muscularity enhancement behaviors. Muscularity dissatisfaction only partially accounted for the relationship between internalization of the mesomorphic ideal and muscularity enhancement behaviors. This finding suggests that simply internalizing the mesomorphic ideal may promote muscularity enhancement behaviors, even if men are not dissatisfied with their current level of muscularity. Body fat dissatisfaction, however, fully accounted for the relationship between internalization of the mesomorphic ideal and disordered eating behaviors, indicating that internalization of the mesomorphic ideal only contributes to disordered eating behaviors to the extent that men are dissatisfied with their body fat. Body fat dissatisfaction also connected media pressure to be mesomorphic to men's disordered eating behaviors, suggesting that men who perceive media pressure to be mesomorphic only engage in disordered eating behaviors to the extent that they are dissatisfied with their body fat.

Although BMI was positively associated with body fat dissatisfaction and disordered eating behaviors and negatively associated with muscularity dissatisfaction, when it was added as a variable to the model, it adversely affected the model's fit to the data. Men do not desire to be thin or scrawny, characterized by the lack of muscularity and body fat (Ridgeway & Tylka, 2005). The goal of adhering to the mesomorphic ideal is not to weigh less (or have lower BMI), but to have muscular definition coupled with low body fat. Because a mesomorphic man can weigh more than a man with little musculature but high body fat, the association between BMI and men's body image is not straightforward. For women, who tend to be pressured to lose weight and internalize the thin ideal, BMI and body image are closely linked and should be considered in models of women's body image (Moradi, Dirks, & Matteson, 2005).

Limitations and Directions for Future Research

Several limitations should be considered when interpreting this study's findings. One meditational variable in the tripartite

influence model, appearance comparison, was not integrated. The decision to exclude this variable was based on its content overlap with internalization of the mesomorphic ideal, previous research suggesting that it is not as influential in predicting men's muscularity dissatisfaction and muscularity enhancement behaviors (Karazsia & Crowther, 2010), and the increase in paths/parameters that would need to be included to accommodate its meditational role. However, it is uncertain whether the four sources of pressure to be mesomorphic would contribute unique variance in men's appearance comparison, and in turn, whether their appearance comparison would add incremental variance to the prediction of their body fat dissatisfaction and disordered eating behaviors. In the future, researchers could add appearance comparison to the trimmed model, which contains fewer paths and parameters than the original estimated model, to determine its unique contribution to the model variables. Researchers, however, would need to ensure that their measures of internalization of the mesomorphic ideal and appearance comparison do not have items with overlapping content.

It should be noted that a few muscularity enhancement behaviors assessed in this study do not pose a high risk for men. Whereas some of the items assessed by the muscularity behaviors subscale of the DMS are dangerous (e.g., intended steroid use) and characteristic of muscle dysmorphia (e.g., experiencing guilt if a weight-training session is missed), two of the eight items are not risky unless done in excess: lifting weights and drinking weight-gain or protein shakes. Another item (i.e., using protein or energy supplements) could be harmful depending on the supplement: testosterone, human growth hormone, insulinlike growth factor, and beta-2 agonists are dangerous for men (Bahrke, 2007), whereas other supplements could be relatively harmless, such as B vitamins.

Self-reports of pressure to achieve media appearance ideals can be influenced by memory recall and subjective interpretation of others' statements and media messages. Nevertheless, these self-reports are important to assess and have been a focus of prior research. It could be easily argued that individuals' perceptions of events shape their attitudes and behaviors more than what actually happened (Moradi et al., 2005). Also, items in the version of the PSPS used in this study did not differentiate between pressures to be muscular and pressures to be lean. The rationale for combining muscular and lean within each PSPS item was that it may be hard for men to differentiate if significant others and the media are pressuring them to be muscular, lean, or both. For example, if their partners pressure them to work out or if they look at images of mesomorphic men, then it would be hard to discern which type of pressure they are faced with. Unfortunately, then, it was not possible to determine whether pressure to be muscular, pressure to be lean, or both are driving the relationships found in this model.

Another limitation of this study is its cross-sectional design. Given the limited available research on models of men's body image, correlational data can provide useful groundwork for additional research. Yet, no causal interpretations can be made about the sequence of model variables. Alternative models of the data could exist; for instance, internalization of the mesomorphic ideal could prime men to interpret others' statements as pressure to be mesomorphic. Unfortunately, SEM cannot differentiate among models that provide alternative explanations for the pattern of relationships. Longitudinal designs are needed to examine the temporal relations suggested by the present study's findings. These designs could also test the effectiveness of interventions that target the model's variables and help clarify the links proposed in the model. Given internalization of the mesomorphic ideal's pivotal role in the model, cognitive dissonance programs may be helpful. Cognitive dissonance programs have individuals behave in ways inconsistent with societal appearance ideals (see Stice, Shaw, Becker, & Rohde, 2008 for review of cognitive dissonance programs and their empirical support). These programs could encourage men to behave in ways inconsistent with the mesomorphic ideal and help challenge their attitude that achieving this ideal is important to their self worth and body attitudes. In fact, scholars have posited that these programs may be very useful for reducing the mesomorphic ideal, drive for muscularity, and body dissatisfaction in men (Yager & O'Dea, 2008), which then may, in turn, reduce their use of body change behaviors.

The sample was rather homogenous. Most men identified as Caucasian and heterosexual and were in emerging adulthood (between ages 18 and 25). Future studies need to examine the applicability of the model to men of different ethnicities, gay and bisexual men, and older men. Men involved with the gay male subculture, in which physical appearance is accentuated (Blashill, 2010), may receive greater pressure to achieve the mesomorphic ideal, and therefore may be more likely to internalize this ideal. Researchers need to examine associations between men's involvement in the gay community and the model variables, as well as whether sexual orientation moderates the relationships between the model variables. Further, both ethnicity and age can impact how men construe body image (Pompper, 2010). Non-Caucasian men and older men tend to criticize depictions of masculinity in U.S. culture, as these depictions are based on adherence to an "unattainable" and "overdone" mesomorphic ideal (Pompper, 2010, p. 689). However, even when ethnically diverse and older men challenged the mesomorphic ideal, they expressed concern and anxiety that women would use these images as benchmarks for what men should look like. Researchers need to determine the extent to which critiquing the mesomorphic ideal and the lack of identification with this ideal preserves men's body image.

Relatedly, it is important to determine the extent to which gaining significant body fat and growing up fat has on the model variables. Indeed, more U.S. men are becoming overweight and obese in a culture that devalues fat (Centers for Disease Control and Prevention, 2011). Men tend to gain body fat and lose muscle mass as they age, positioning them farther away from the mesomorphic ideal. Age, then, may moderate the paths between the model variables.

Last, although the examined model variables contributed a large percentage of variance in disordered eating (55.4%), they only accounted for 14.6% of the variance in muscularity enhancement behaviors. Neuroticism and self-prescribed perfectionism, given their connection to muscle dysmorphia (Petrie & Greenleaf, 2007), may accompany muscularity dissatisfaction and internalization of the mesomorphic ideal in the prediction of muscularity enhancement behaviors. These variables and associations are in need of exploration within models of men's body image and body change behaviors.

Conclusion

The present study extended the tripartite influence model's applicability to men in two main ways. First, dual body image pathways were explored and found to be evident in the model: muscularity dissatisfaction predicted muscularity enhancement behaviors, and body fat dissatisfaction predicted disordered eating behaviors. Second, another source of social influence – pressure to be mesomorphic from dating partners – was added to create a quadripartite model. Key tenets posited in the tripartite influence model were supported in this study. Namely, internalization of the mesomorphic ideal, muscularity dissatisfaction, and body fat dissatisfaction played central mediating roles, accounting for many paths from family, media, and friend pressures to body change behaviors. On the contrary, partner pressure to be mesomorphic directly predicted disordered eating behaviors; this association was not mediated by other model variables. Overall, results indicate that both muscularity and body fat dissatisfaction should be studied within models of men's body image, as they are predicted by different sources of mesomorphic pressure and they predict different body change behaviors. Researchers also are urged to include partner pressures to be mesomorphic in models investigating men's disordered eating behaviors.

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