

Sociocultural and Psychological Links to Men's Engagement in Risky Body Change Behaviors

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Abstract The present theory-driven, empirical evaluation examined cross-sectional influences on men's engagement in risky body change behaviors. The study tested a slightly revised version of the Tripartite Influence Model (Thompson et al. 1999) with a sample of 156 male undergraduate students from the Midwestern Region of the United States. Participants completed measures pertaining to body image and health-risk behaviors. Consistent with the Tripartite Influence Model (Thompson et al. 1999), individual psychological variables mediated the association between sociocultural influences and muscularity-oriented body dissatisfaction. Body dissatisfaction mediated the relation between psychological variables and engagement in body change behaviors. Theoretical models developed to explain body change behaviors among women may be applicable to men when constructs are assessed in ways that are relevant to men.

Keywords Drive for muscularity · Internalization · Social comparison · Body change behaviors

Introduction

While there is considerable literature on female body image and maladaptive weight control strategies (e.g., Stice 2002), research suggests that many young men also experience

body dissatisfaction (BD). Frederick and colleagues (2007) reported that men's desire for increased muscularity exists across many cultures. According to Cafri et al. (2006), approximately 10% of adolescent males report using drugs to enhance muscularity. Body Change Behaviors (BCBs) that are more readily available, and thus more likely to be adopted widely (Smolak et al. 2005), include dietary restriction, performance-enhancing supplement use, and overtraining (e.g., to the point of injury). Given the frequency and severity of problems associated with maladaptive muscle-building strategies, it is important to understand factors related to their use. Research that elucidates risk factors is emerging (e.g., Smolak et al. 2005), and several conceptual models have been developed that encompass biological, sociocultural, and psychological influences on unhealthy BCBs for men (Cafri et al. 2005; Grieve 2007; Ricciardelli and McCabe 2004). Although differences among these models exist (Grieve 2007), they share many components with the Tripartite Influence Model (Thompson et al. 1999). Using cross-sectional, self-report methodology based on undergraduate males in the United States, the purpose of the present study was to examine the extent to which the Tripartite Influence Model (Thompson et al. 1999) can be used to explain potential influences on men's engagement in BCBs.

The Tripartite Influence Model

The Tripartite Influence Model was originally developed to explain risk factors associated with BD and bulimic symptomatology among females. This model posits that multiple sources of sociocultural influence (peers, parents, and media) affect BD through two mediating variables: internalization of an ideal body figure and social body comparisons. It should be noted that there is substantial variety across studies in the way social influences are

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operationalized (Shroff and Thompson 2006). In the present study, social influences are conceptualized as an individual's perceived encouragement to exercise and diet for the purpose of enhancing appearance from parents (mother and father), siblings, and peers. This conceptualization is based on previous work with the Tripartite Influence Model among females. Specifically, Thompson and colleagues (e.g., Keery et al. 2004) assessed multiple dimensions (media, parents, peers) of social influence in their studies with adolescent females. Within each dimension, Thompson and colleagues asked adolescents about perceived encouragement to change physical appearance from these sources and the extent to which physical appearance and body change behaviors are important to respective sources. In the present study, we emphasized the perceived encouragement aspect of social influence.

Internalization is the psychological process of adopting societal values as guiding principles (Thompson et al. 1999; Jones 2004). The inclusion of social body comparisons in the model stemmed from Festinger's Social Comparison Theory (1954), which suggests that individuals engage in social comparisons to process social information. In the context of the Tripartite Influence Model, individuals may engage in social comparisons to learn about and evaluate their own and others' bodies. In the original conceptualization of the Tripartite Influence Model, the construct of BD centered on thinness (Thompson et al. 1999), and maladaptive BCBs were conceptualized as eating pathology (Thompson et al. 1999). Empirical research with women of different ages and from many different cultures supports this theory (e.g., Keery et al. 2004; Yamamiya et al. 2008).

The societal ideal of the male figure has grown increasingly muscular (e.g., Pope et al. 1999), and as such, internalization of the mesomorphic ideal is associated with men's engagement in body comparisons (Karazsia and Crowther 2008), greater muscularity-oriented BD (Cahill and Mussap 2007; Jones 2004; Vartanian 2009) and risky BCBs (Smolak et al. 2005). Previous research also supports the role of internalization as a mediator between social influences and muscularity-oriented BD (e.g., Halliwell and Harvey 2006; Jones et al. 2004; Karazsia and Crowther 2009). In recent years, researchers extended the Tripartite Influence Model to explain factors related to BD among adolescent and young adult males, although mixed findings emerged (Chen et al. 2007; Karazsia and Crowther 2009; Smolak et al. 2005; van den Berg et al. 2007). These mixed findings may be explained, at least in part, by the fact that many previous studies with males did not include assessments of BD that are most relevant for men (e.g., muscularity-oriented BD; Tylka et al. 2005; Karazsia and Crowther 2009). Although our research with undergraduate men from the United States found that social body comparisons and internalization of a muscular ideal mediated a pathway between social influences and men's BD (Karazsia and Crowther 2009), research

that evaluates the contributions of both of these mediating variables simultaneously on body image and risky BCBs among men is lacking (Jones 2004).

Similarly, when men engage in social body comparisons, the emphasis is on muscle-related aspects of one's body (Gokey-LaRose et al. 2004). Some of the most common targets of social body comparisons among undergraduate males are friends, other males, and sports athletes (Karazsia and Crowther 2009). Engagement in social body comparisons is also correlated positively with internalization (Jones 2004), and both theoretical and empirical research suggests that social body comparisons mediate the relationship between social influences and internalization among both males (Karazsia and Crowther 2009) and females (e.g., Halliwell and Harvey 2006; Keery et al. 2004; Shroff and Thompson 2006).

To our knowledge, there have been no evaluations of the Tripartite Influence Model that include risky BCBs with a sample of undergraduate men. This population is important to study for a variety of reasons. The transition from high school to college is a risk period for the development of other risky behaviors, including alcohol use, drug use, and sex with multiple partners (Fromme et al. 2008). Further, as many as 90% of undergraduate men in the United States express a desire to increase muscularity (Frederick et al. 2007). Therefore, this population may be at an increased risk for engagement in risky BCBs.

The Present Study

In this present study we used the framework of the Tripartite Influence Model to examine relations among sociocultural influences, the psychological processes of internalization and social body comparison, muscularity-oriented BD, and engagement in various risky BCBs. In our previous work examining the Tripartite Influence model, we found that the influence of sociocultural variables on men's BD was mediated by social body comparisons and internalization (Karazsia and Crowther 2009). While we continue to draw on the Tripartite Influence Model in this study, our goals were not only to replicate earlier findings with a new sample, but also to expand the previous findings to include risky BCBs. Consistent with previous research that indicated men are more preoccupied with an athletic, mesomorphic ideal (Smolak et al. 2001), the focus of the present study was muscularity-oriented BD (McCreary 2007), and risky BCBs were operationalized as potentially dangerous methods of enhancing muscle mass (e.g., lifting to the point of injury, positive attitudes toward substance and steroid use). Further, social influences were operationalized as perceived encouragement from various sources (parents, siblings, peers) to change one's body to attain an ideal body shape (Karazsia and Crowther 2009).

Consistent with the Tripartite Influence Model, we tested the following hypotheses (see Fig. 1): 1) individual psychological variables (internalization and social body comparisons) would mediate the relations between sociocultural influences and muscularity-oriented BD, 2) social body comparisons would mediate the relationship between social influences and internalization, and 3) muscularity-oriented BD would mediate the associations between individual psychological variables and undergraduate men's engagement in risky, appearance-oriented BCBs. We tested relationships among these constructs with structural equation modeling (SEM) procedures, which have several advantages over alternative approaches (Kline 2005). Most notably, SEM permits exploration of latent (unobserved) constructs that are assessed with multiple observed indicators, and it offers a more powerful method of testing mediation than Baron and Kenny's (1986) multiple regression approach (MacKinnon et al. 2002).

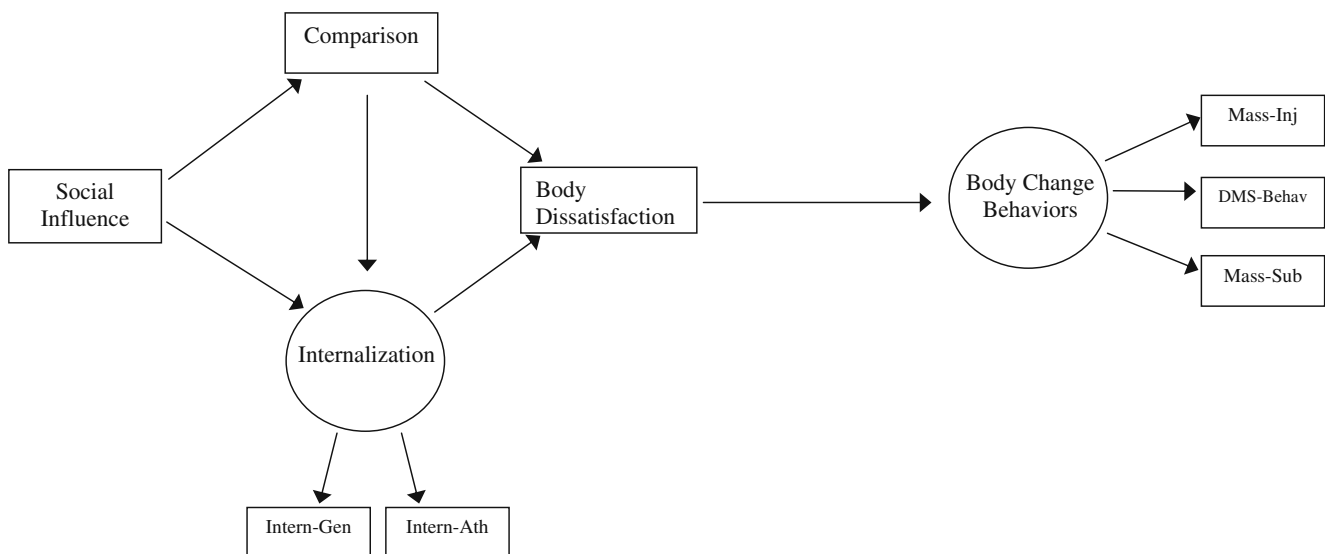
Method

Participants

Participants for this study were selected from a larger study that included 210 undergraduate male students enrolled in General Psychology at a large public Midwestern university

(see Karazsia and Crowther 2008). As described below, we assessed for social pressures from a variety of sources, including parents and siblings. In our previous research with a separate sample of 204 young men (Karazsia and Crowther 2009), we imputed for missing data when a respondent indicated that he did not have a mother, father, or sibling. In the present analyses, which are based on a separate sample, we were interested in the cumulative effect of respondent perceptions of influences from each of these sources, so we decided not to impute for missing data that resulted from not living with one of these family members. Thus, the 54 participants who reported that they did not have a mother, father, or sibling were excluded from the present analyses, resulting in a subsample of 156 students (Age: $M=19.34$ years, $SD=1.92$, Range: 18–25 years). It should be noted that in addition to results presented below, we also examined all models after imputing for missing data of the 54 participants deleted from the present study. Results based on the full sample with imputed data were very similar to results presented below. Conclusions from results based on the full sample were identical to those discussed in this paper.

The ethnic composition of the subsample was 89.1% non-Hispanic White, 7.1% African American, and 3.8% other ethnicities (including Asian and Biracial). Most participants were in their first year of college (55.1%), with 35.9% in their second year, 5.8% in their third year, and 2.5% in their fourth year or above. Mean body mass



Note. Squares represent observed variables; circles represent latent constructs. Social Influence: Composite of Family Influences on Exercise Questionnaire; Comparison: Physical Appearance Comparison Scale; Intern-Gen: SATAQ-3 Internalization – General; Intern-Ath: SATAQ-3 Internalization – Athlete; Body Dissatisfaction: Drive for Muscularity Scale – Body Image; Mass-Inj: Muscle Appearance Satisfaction Scale – Injury; DMS-Behav: Drive for Muscularity – Behaviors Scale; Mass-Sub: Muscle Appearance Satisfaction Scale – Substance Abuse.

Fig. 1 Hypothesized model of relations among social influences, psychological processes, BD, and risky body change behaviors.

index was 25.03 (*SD*=3.63). Independent samples *t*-tests revealed no statistically significant differences on study variables between participants included versus excluded from present analyses.

Measures

Table 1 presents means, standard deviations, each scale’s internal consistency (Cronbach’s Alpha) in the present sample, and intercorrelations among measures. As part of a larger study that included additional assessments, participants completed the following questionnaires in respective order.

Demographic Questionnaire

Participants indicated their current age, year in school, and ethnicity.

Family and Peer Influences on Exercise

This scale is a 28-item self-report measure that assesses social influences on one’s exercising behaviors. For each potential source of influence (mother, father, sibling, peer), respondents were asked to indicate the extent to which the source encourages dieting and lifting weights to improve appearance. Participants were asked to respond to each item using a 5-point Likert scale ranging from 1 (Never) to 5 (Always). In the present analyses, 8 appearance items were summed to create a composite of family and peer influences. Four of these items assessed encouragement to diet to change appearance (one item per source; “How often

do/does your friends/mother/father/siblings encourage you to diet to lose or control your weight?”), and four items assessed encouragement to exercise to change appearance (one item per source; “How often do/does your friends/mother/father/siblings encourage you to lift weights to improve your appearance?”). Possible raw scores ranged from 8 to 40. Although not used in this study, 4 additional questions assess encouragement to enhance physical performance, and 16 questions ask about exercise behaviors of each source of influence. This scale was used in a previous examination of social influences on undergraduate men’s muscularity-oriented BD (Karazsia and Crowther 2009), and it has been adapted for use with females (Myers and Crowther 2007). The full version of the scale is available from the primary author upon request. In a previous examination in an independent sample of undergraduate males, various subscales of the full measure demonstrated adequate internal consistency and correlated positively with measures of appearance-oriented body comparisons, internalization, muscularity-oriented body dissatisfaction (Karazsia and Crowther 2009).

Physical Appearance Comparison Scale

(PACS; Thompson et al. 1991). The PACS is a 5-item inventory that assesses self-reported engagement in the comparison of one’s physical appearance to that of others. Participants were asked to report their frequency of engagement in each of five comparison behaviors (e.g., “In social situations, I sometimes compare my figure to the figures of other people.”) using a 5-point scale that ranged from 1 (Never) to 5 (Always). Consistent with the original

Table 1 Means, standard deviations, internal consistency, and intercorrelations of measures (*n*=156).

Variables	M	SD	Range for this sample		Alpha for this sample	1	1	2	3	4	5	6	7	
			Min	Max										
1. Social Influence	.00	2.84	−2.58	9.13	.83	–	–							
2. Comparison	13.31	3.63	6.00	24.00	.70	.25**	.25**	–						
3. Intern-Gen	22.71	8.04	8.00	40.00	.91	.27**	.27**	.55***	–					
4. Intern-Ath	15.37	4.92	5.00	25.00	.81	.27**	.27**	.44***	.77***	–				
5. DMS-Bod	20.20	8.32	7.00	42.00	.88	.22**	.22**	.35***	.50***	.48***	–			
6. DMS-Behav	30.87	8.22	7.00	42.00	.85	.17*	.17*	.20*	.32***	.33***	.35***	–		
7. MASS-Sub	6.53	3.13	4.00	20.00	.73	.40***	.40***	.30***	.29***	.31***	.37***	.57***	–	
8. MASS-Inj	6.85	3.09	3.00	15.00	.78	.31***	.31***	.34***	.34***	.40***	.36***	.57***	.54***	–

Social Influence: Family and Peer Influences on Exercise—Z-score composite of Parent, Peer, and Sibling Scales; Comparison: Physical Appearance Comparison Scale; Intern-Gen: Sociocultural Attitudes Towards Appearance Questionnaire 3—Internalization General Scale; Intern-Ath: Sociocultural Attitudes Towards Appearance Questionnaire 3—Internalization Athlete Scale; DMS-Bod: Drive for Muscularity Scale—Body Image Scale; DMS-Behav: Drive for Muscularity Scale—Behaviors Scale; MASS-Sub: Muscle Appearance Satisfaction Scale—Substance Use Scale; MASS-Inj: Muscle Appearance Satisfaction Scale—Injury Scale

p*<.05, *p*<.01, ****p*<.001

PACS scoring instructions, 1 item was recoded, and then all items were summed to create a total “PACS”. Possible scores range from 5 to 25; higher scores are indicative of greater body comparisons. This scale has been utilized in multiple previous investigations on men’s BD (e.g., Chen et al. 2007; Smolak and Stein 2006).

Sociocultural Attitudes Towards Appearance Questionnaire – 3

(SATAQ-3; Thompson et al. 2004). The SATAQ-3 is a 30-item self-report questionnaire that assesses multidimensional sociocultural influences on body image. In its entirety, the scale yields four subscales: Information, Pressures, Internalization-General, and Internalization-Athlete. Two scales were utilized in the present study: the 9-item Internalization-General (Intern-Gen) subscale, which assesses endorsement and acceptance of media messages that present unrealistic ideal images, and the 5-item Internalization-Athlete (Intern-Ath) scale, which assesses endorsement and acceptance of an athletic body ideal. The items are rated on a 5-point Likert Scale from 1 (Definitely Disagree) to 5 (Definitely Agree). The two internalization scales demonstrated adequate internal consistency and concurrent, incremental, and discriminant validity in a sample of undergraduate males (Karazsia and Crowther 2008). Responses to items were summed to create total scores for general (Intern-Gen; possible scores range from 9 to 45) and athletic (Intern-Ath; possible scores range from 5 to 25) internalization. Higher scores indicate greater self-reported internalization.

Drive for Muscularity Scale

(DMS; McCreary and Sasse 2000). The 15-item DMS assesses attitudes and behaviors related to preoccupation with and drive for muscularity. Items are scored on a 6-point scale from 1 (Always) to 6 (Never); scores are recoded so that higher scores represent a higher drive for muscularity. Previous psychometric analyses with undergraduate males yielded two factors, representing muscle-oriented BD (DMS-Bod) and behavioral (DMS-Behav) dimensions, both with demonstrated validity (McCreary et al. 2004). Examples of behaviors assessed on the DMS-Behav scale include the following: utilization of protein or energy supplements, consuming as many calories as possible in a day, drinking weight gain or protein shakes. We utilized a composite score of 7 DMS-Bod items as an estimate of men’s muscularity-oriented BD (possible range from 7 to 42); a composite score of 7 DMS-Behav items (possible range from 7 to 42) was used as an index of men’s risky BCBs (McCreary 2007).

Muscle Appearance Satisfaction Scale

(MASS; Mayville et al. 2002). The MASS was designed to assess symptoms specific to Muscle Dysmorphia, a variant of Body Dysmorphic Disorder initially proposed by Pope et al. (1997). Participants were asked to indicate the extent to which 19 statements apply to them using a 5-point Likert scale ranging from 1 (Almost Never) to 5 (Almost Always). In its entirety, the scale has 5 factor analytically derived subscales that assess different cognitive and behavioral dimensions of men’s muscularity. All scales demonstrated internal consistency and concurrent validity in a sample of undergraduate males (Mayville et al. 2002). In the present study, only the Injury (Mass-Inj), and Substance Use (Mass-Sub) scales were analyzed, both as indices of risky BCBs. These scales were computed by summing respective items. The 3-item Injury subscale assesses symptoms of overtraining (example items: “I often keep working out even when my muscles or joints are sore from previous workouts”). The 4-item Substance Use scale assesses individual reports of a willingness to use steroids and other risky means to obtain muscle mass (example items: “I often spend money on muscle building supplements”; “I must get bigger muscles by any means necessary”; and “I would try anything to get my muscles to group”). These scales were used as indices of risky BCBs.

Procedures

All procedures were approved by the associated University institutional review board. Details of the study were explained to participants in a written document. While participants read this form, a summary of the study was offered verbally. Prior to participation in this study, all participants were asked to sign an informed consent document. Following informed consent, participants completed the aforementioned battery of questionnaires. Anthropometric measures of weight and height were collected individually and privately using a wall height chart and scale. These measures were used to calculate Body Mass Index (BMI). All participants received credit toward their research participation requirement in General Psychology.

Results

Preliminary Screening

Preliminary examination of the dataset revealed that less than 1% of all data points were missing. Missing values were imputed using an expectation-maximization (EM) imputation algorithm available in EQS 6.1 (Bentler 2004) so that data from all participants could be utilized in the

analyses. When the amount of missing data is small, EM imputation yields more accurate standard errors than traditional methods for handling missing data (e.g., listwise and pairwise deletion; Bentler 2004).

All variables met standard criteria for univariate normality (Curran et al. 1996), with the exception of 4 items on the Family and Peer Influences on Exercise Scale (“How frequently do/does your (mother/father/siblings/friends) encourage you to diet to lose or control weight?”). These items were transformed using a log transformation (Tabachnick and Fidell 2007), and all items used to create the Encourage composite were then standardized. The resulting z-scores were then summed to create a total “Social Influence” score that was sufficiently normally distributed, with high scores being indicative of greater self-reported social influences. There was no evidence to suggest that the data did not meet the assumption of multivariate normality.

Evaluation of Model Fit

All SEM analyses were conducted with Maximum Likelihood estimation available in Mplus 5.0 (Muthén and Muthén 2007). In addition to the Chi-Square statistic, multiple fit indices were used to evaluate model fit (Hu and Bentler 1999; Kline 2005), including the Standardized Root Mean Square Residual (SRMR) and two other indices shown to be sensitive to model misspecification: the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA). A non-significant Chi-Square value, values greater than .95 for the CFI, and values less than .05 for the SRMR and RMSEA indicate a good fit, and values between .05 and .08 for the RMSEA indicate a reasonable fit (Hu and Bentler 1999).

Measurement Models

Prior to examining structural pathways among constructs and following the recommendations of Kline (2005), we examined measurement models for the two latent constructs in the hypothesized model: internalization and BCBs. Measurement models were analyzed with confirmatory factor analytic procedures. Internalization was comprised of two indicators (Intern-Gen and Intern-Ath), while the BCBs construct was comprised of three indicators (DMS-Behav, MASS-Sub, and MASS-Inj). These constructs demonstrated a good fit with the observed data, $\chi^2(4)=2.59$, $p=ns$, CFI=1.00, SRMR=.018; RMSEA=.01 (CI_{90%}=.00–.09).

Model Estimation

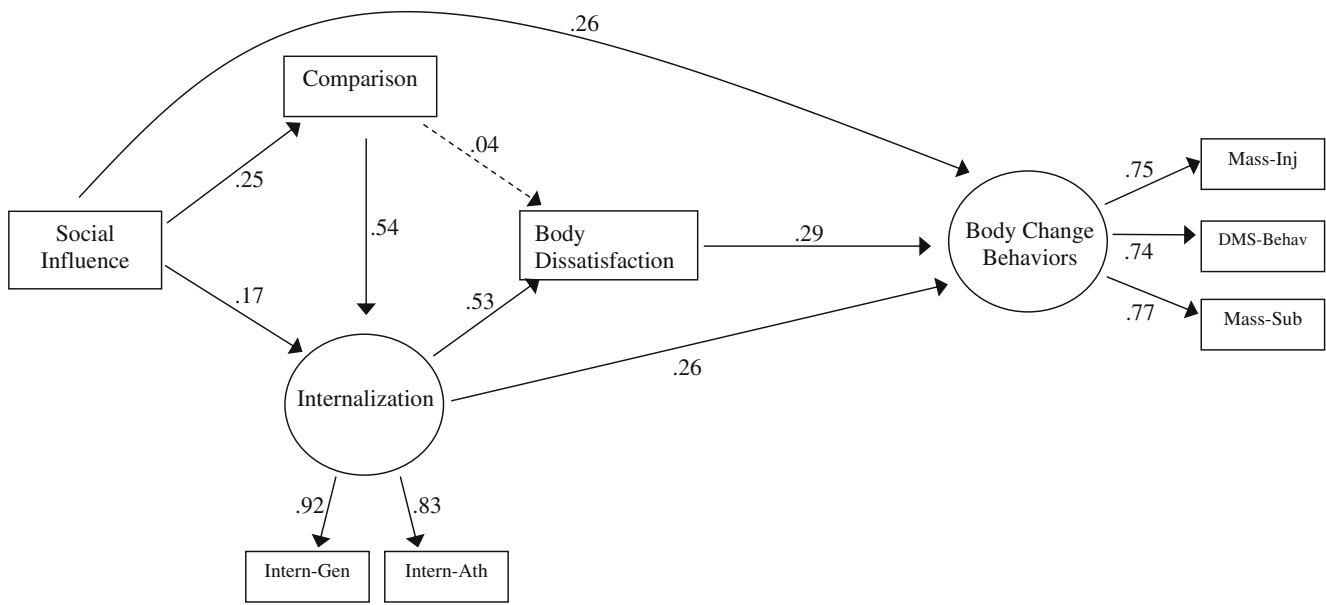
The hypothesized model is presented in Fig. 1. This model contains pathways that are consistent with the three main hypotheses of this study: 1) internalization and social body

comparisons mediate the relations between sociocultural influences and muscularity-oriented BD, 2) body comparisons mediate the relation between social influences and internalization, and 3) muscularity-oriented BD mediates the relations between the individual psychological variables and engagement in appearance-oriented BCBs. This model did not fit the data well, $\chi^2(17)=46.57$, $p<.001$, CFI=.94, SRMR=.10, RMSEA=.11 (CI_{90%}=.07–.14). Modifications to the hypothesized model were made on the basis of prior empirical evaluations of the Tripartite Influence Model. Consistent with Keery and colleagues (2004), direct paths from Social Influence and Internalization to BCBs were added. Results indicated that the revised model fit the data well, $\chi^2(15)=27.13$, $p<.05$, CFI=.97, SRMR=.038, RMSEA=.072 (CI_{90%}=.024–.12) and better than the hypothesized model, $\chi^2_{diff}(2)=19.44$, $p<.001$. This model accounted for 30.5% of the variance in muscularity-oriented BD and 36.3% of the variance in risky BCBs. Figure 2 presents the revised model with standardized estimates; all pathways are significant except for the direct pathway from comparison to BD ($p=.57$).

Mediation Analyses

We used a Monte Carlo method (MacKinnon et al. 2004) to evaluate the significance of several mediators. This Monte Carlo method was found to yield more accurate results than the Sobel test (Sobel 1982), and it can be adapted for use with latent constructs. In many respects, these analyses are similar to bootstrap techniques, and we used a web-based calculator created by Selig and Preacher (2008, June) to conduct these analyses. The method generates a very large number (20,000 in the present analysis) of estimates of an indirect effect by resampling from the distributions of each direct effect. This resampling procedure is then used to create confidence intervals of the hypothesized indirect effects. Evidence in support of an indirect effect exists when the confidence intervals do not contain zero.

Consistent with our hypotheses, we evaluated the following mediational pathways: 1) internalization and social body comparisons as mediators between social influence and muscularity BD, 2) social body comparisons as a mediator between social influence and internalization, and 3) muscularity BD as a mediator between internalization and BCBs. As noted above, a direct pathway from internalization to risky BCBs was added to the model. Therefore, we also examined the mediating role of internalization on the relationship between social influence and risky BCBs (Hypothesis 4 in Table 2). Results from the tests of indirect relationships are presented in Table 2. Indirect paths are significant when the lower bounds of the confidence intervals are greater than zero. All proposed mediational pathways were significant, with one exception.



Note. $\chi^2(15) = 27.13, p < .05, CFI = .97, SRMR = .038, RMSEA = .072 (CI_{90\%} = .024 - .12)$; Solid paths are significant at the .05 level.

Fig. 2 Final model of relations among social influences, psychological processes, BD, and risky body change behaviors.

While the indirect effect of social comparisons on the relationship between social influences and internalization was significant, social comparisons did not mediate the relationship between social influences and muscularity BD. Overall, these results support the roles of internalization, muscularity BD, and social body comparisons as mediators in this model.

Discussion

This study builds on our previous research on a circumscribed portion of the Tripartite Influence Model (Karazsia and Crowther 2009) by linking social influences and muscularity BD with risky BCBs. In doing so, the present results provided support for the extension of a slightly revised Tripartite Influence Model (Keery et al. 2004;

Thompson et al. 1999) to males. Specifically, the hypothesized model fit observed data well after two pathways were added: direct pathways from social influences to risky BCBs and from internalization to risky BCBs. Importantly, addition of these pathways is supported by previous empirical research on the Tripartite Influence Model. Thompson and colleagues (Keery et al. 2004; Shroff and Thompson 2006) used structural equation modeling to determine the extent to which the Tripartite Influence Model explained interrelations among variables in a sample of adolescent girls. In their analyses, they also proposed a slightly revised Tripartite Influence Model that incorporated two direct paths from social influences and internalization to food restriction, which can be conceptualized as a risky BCB.

By relying on a dominant conceptual model and assessment measures designed specifically for men, this study contributes to the growing literature on muscularity-oriented

Table 2 Monte Carlo method for testing indirect effects of the final model ($n=156$).

Proposed mediating pathway	IV	DV	Confidence intervals (95%)		
			Lower	Upper	
Hypothesis #	Mediator				
1	Internalization	Social Influence	Muscularity BD	.025	.30
	Social Comparisons	Social Influence	Muscularity BD	-.056	.096
2	Social Comparisons	Social Influence	Internalization	.070	.34
3	Muscularity BD	Internalization	BCBs	.016	.092
4	Internalization	Social Influence	BCBs	.001	.051

BD and men's utilization of BCBs. The importance of assessing constructs in a manner that has relevance to men cannot be understated (e.g., Cafri and Thompson 2004). For example, several previous examinations suggested that internalization and social comparison may not play important roles in men's BD (e.g., Chen et al. 2007; van den Berg et al. 2007). Importantly, these studies conceptualized constructs with respect to a societal ideal that is centered on thinness and thus more relevant to females (e.g., Grossbard et al. 2009). While adiposity may be an important construct for men (Tylka et al. 2005), this construct clearly operates differently among men than women (e.g., Presnell et al. 2004; Richards et al. 1990). Specifically, men may express dissatisfaction with their bodies when they are either under or over weight (e.g., Richards et al. 1990). In the present study, the constructs were assessed with measures designed specifically for men. In this methodological context, the Tripartite Influence Model was a useful heuristic for understanding relations among sociocultural influences, psychological processes, and men's engagement in unhealthy BCBs.

Consistent with this conceptual model, these results partially replicate our earlier findings regarding the roles of social body comparisons and internalization as mediators of the influence of social influences on men's BD (Karazsia and Crowther 2009). Specifically, it appears that at least two pathways explain the influence of social influences and muscularity-oriented BD: 1) encouragement to obtain the mesomorphic ideal influences internalization of the ideal, which in turn predicts muscularity BD, and 2) the pathway between social influences and internalization is partially mediated by social appearance comparisons.

One interesting finding that emerged in the present study was the nonsignificant direct pathway between appearance comparisons and muscularity-oriented BD. Previous conceptual (Thompson et al. 1999) and empirical (Karazsia and Crowther 2009) research suggested that social body comparisons influence BD directly and indirectly through internalization. However, in the present study, a direct pathway from appearance comparison to muscularity-oriented BD was not supported, suggesting that the influence of appearance comparison on muscularity-oriented BD was explained fully through a mediating variable, internalization. It should be noted that the role of internalization as a mediator between appearance comparison and muscularity-oriented BD is consistent with both the Tripartite Influence Model and Social Comparison Theory. The rationale is that individuals rely on evaluative comparisons of others to obtain information about various dimensions of the self, including body image (Festinger 1954). In the context of the Tripartite Influence Model, it may be that men engage in body comparisons to learn about the ideal body figure and perhaps to estimate how their body compares. This process may result in an

increased likelihood of setting the ideal figure as one's personal goal or standard (i.e., internalizing the ideal image). Previous empirical research supported the role of social comparison as a partial mediator between social influences and internalization of the ideal figure in adolescent females (e.g., Keery et al. 2004; Shroff and Thompson 2006) and undergraduate males (Karazsia and Crowther 2009). Research that examines the roles of social body comparisons and internalization on muscularity-oriented BD simultaneously is lacking (e.g., Jones 2004), so future research is necessary to examine the mediating roles of both constructs on the relationship between social influences and muscularity-oriented BD.

The unique contributions of this paper need to be interpreted with respect to the study's limitations. Although the proposed directionality among variables was consistent with relevant theory, all data in this study were cross-sectional and measures were not counterbalanced, so directionality cannot be inferred and relations among variables may be inflated due to order effects. Future research is needed to evaluate the Tripartite Influence Model among males with a longitudinal design. A second limitation was that the present sample lacked ethnic diversity, so the extent to which the revised Tripartite Influence Model applies to undergraduate males with different ethnic backgrounds could not be tested explicitly. A third limitation concerns the assessment of constructs examined in this study. Previous research suggests that male BD (Bergeron and Tylka 2007), sociocultural influences (e.g., Jones and Crawford 2005; Shroff and Thompson 2006), and social comparisons (e.g., Wood 1989) are multidimensional constructs, so future research is necessary to examine the relationships among different dimensions of these constructs. Further, although the assessment of social influences was based on a measure used in previous research, the validity of this scale has yet to be evaluated formally.

Although this study had several limitations, it does offer important insights for future research and intervention efforts. This study added to the growing body of literature that suggests men gain information about body ideals through their evaluative comparisons with others (e.g., Karazsia and Crowther 2009). Even though young men associate the muscular ideal with health and fitness (Grogan and Richards 2002), the processes of appearance comparisons and internalization are associated with muscularity-oriented BD and risky BCBs (e.g., Cafri et al. 2005; Smolak et al. 2005). Therefore, psychological processes of appearance comparison and internalization may be fruitful targets of future prevention and intervention strategies. Specifically, increasing young men's awareness of the extent to which social comparisons and internalization impact their risk of muscularity-oriented BD and risky BCBs may help them separate evaluative body comparisons

of themselves and others from attributions of health and fitness. Young men that utilize risky BCBs that have detrimental effects on health and well-being (Cafri et al. 2005) may benefit from learning about BCBs that contribute to healthy lifestyles (e.g., Winnett 1995).

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References

- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–1182. doi:10.1037/0022-3514.51.6.1173.
- Bentler, P. M. (2004). *EQS 6 structural equations program manual*. Encino: Multivariate Software, Inc.
- Bergeron, D., & Tylka, T. L. (2007). Support for the uniqueness of BD from drive for muscularity among men. *Body Image: An International Journal of Research, 4*, 288–295. doi:10.1016/j.bodyim.2007.05.002.
- Cafri, G., & Thompson, J. K. (2004). Measuring male body image: A review of the current methodology. *Psychology of Men and Masculinity, 5*, 18–29. doi:10.1037/1524-9220.5.1.18.
- Cafri, G., Thompson, J. K., Ricciardelli, L., McCabe, M., Smolak, L., & Yesalis, C. (2005). Pursuit of the muscular ideal: Physical and psychological consequences and putative risk factors. *Clinical Psychology Review, 25*, 215–239. doi:10.1016/j.cpr.2004.09.003.
- Cafri, G., van den Berg, P., & Thompson, J. K. (2006). Pursuit of muscularity in adolescent boys: Relations among biopsychosocial variables and clinical outcomes. *Journal of Clinical Child and Adolescent Psychology, 35*, 283–291. doi:10.1207/s15374424jccp3502_12.
- Cahill, S., & Mussap, A. (2007). Emotional reactions following exposure to idealized bodies predict unhealthy body change attitudes and behaviors in women and men. *Journal of Psychosomatic Research, 62*, 631–639. doi:10.1016/j.jpsychores.2006.11.001.
- Chen, H., Gao, X., & Jackson, T. (2007). Predictive models for understanding body dissatisfaction among young males and females in China. *Behaviour Research & Therapy, 45*, 1345–1356. doi:10.1016/j.brat.2006.09.015.
- Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods, 1*, 16–29. doi:10.1037/1082-989X.1.1.16.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*, 117–140. doi:10.1177/001872675400700202.
- Frederick, D. A., Buchanan, G. M., Sadehgi-Azar, L., Peplau, L. A., Haselton, M. G., Berezovskaya, A., et al. (2007). Desiring the muscular ideal: Men's body satisfaction in the United States, Ukraine, and Ghana. *Psychology of Men & Masculinity, 8*, 103–117. doi:10.1037/1524-9220.8.2.103.
- Fromme, K., Corbin, W. R., & Kruse, M. I. (2008). Behavioral risks during the transition from high school to college. *Developmental Psychology, 44*, 1497–1504. doi:10.1037/a0012614.
- Gokee-LaRose, J., Dunn, M. E., & Tantleff-Dunn, S. (2004). An investigation of the cognitive organization of body comparison sites in relation to physical appearance related anxiety and drive for thinness. *Eating Behaviors, 5*, 133–145. doi:10.1016/j.eatbeh.2004.01.003.
- Grieve, F. G. (2007). A conceptual model of factors contributing to the development of muscle dysmorphia. *Eating Disorders, 15*, 63–80. doi:10.1080/10640260601044535.
- Grogan, S., & Richards, H. (2002). Body image: Focus groups with boys and men. *Men and Masculinities, 4*, 219–232. doi:10.1177/1097184X02004003001.
- Grossbard, J. R., Lee, C. M., Neighbors, C., & Larimer, M. E. (2009). Body image concerns and contingent self-esteem in male and female college students. *Sex Roles, 60*, 198–207. doi:10.1007/s11199-008-9535-y.
- Halliwel, E., & Harvey, M. (2006). Examination of a sociocultural model of disordered eating among male and female adolescents. *British Journal of Health Psychology, 11*, 235–248. doi:10.1348/135910705X39214.
- Hu, L., & Bentler, M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55. doi:10.1080/10705519909540118.
- Jones, D. C. (2004). Body image among adolescent girls and boys: A longitudinal study. *Developmental Psychology, 40*, 823–835. doi:10.1037/0012-1649.40.5.823.
- Jones, D. C., & Crawford, J. K. (2005). Adolescent boys and body image: Weight and muscularity concerns as dual pathways to BD. *Journal of Youth and Adolescence, 34*, 629–636. doi:10.1007/s10964-005-8951-3.
- Jones, D. C., Vigfusdottir, T. H., & Lee, Y. (2004). Body image and the appearance culture among adolescent girls and boys: An examination of friend conversations, peer criticism, appearance magazines, and the internalization of appearance ideals. *Journal of Adolescent Research, 19*, 323–339. doi:10.1177/0743558403258847.
- Karazsia, B. T., & Crowther, J. H. (2008). Psychological and behavioral correlates of the SATAQ-3 with males. *Body Image: An International Journal of Research, 5*, 109–115.
- Karazsia, B. T., & Crowther, J. H. (2009). Social body comparison and internalization: Mediators of social influences on men's muscularity-oriented body dissatisfaction. *Body Image: An International Journal of Research, 6*, 106–112.
- Keery, H., van den Berg, P., & Thompson, J. K. (2004). An evaluation of the Tripartite Influence Model of BD and eating disturbance with adolescent girls. *Body Image: An International Journal of Research, 1*, 237–251. doi:10.1016/s0022-3999(02)00499-3.
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford.
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7*, 83–104. doi:10.1037/1082-989X.7.1.83.
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*, 99–128. doi:10.1207/s15327906mbr3901_4.
- Mayville, S. B., Williamson, D. A., White, M. A., Netemeyer, R. G., & Drab, D. L. (2002). Development of the muscle appearance satisfaction scale. *Assessment, 9*, 351–360. doi:10.1177/1073191102238156.
- McCreary, D. R. (2007). The drive for muscularity scale: Description, psychometrics, and research findings. In J. K. Thompson & G. Cafri (Eds.), *The muscular ideal: Psychological, social, and medical perspectives* (pp. 87–106). Washington: American Psychological Association.
- McCreary, D. R., & Sasse, D. K. (2000). An exploration of the drive for muscularity in adolescent boys and girls. *Journal of American College Health, 48*, 297–304. doi:10.1080/07448460009596271.
- McCreary, D. R., Sasse, D. K., Saucier, D. M., & Dorsch, K. D. (2004). Measuring the drive for muscularity: Factorial validity of

- the Drive for Muscularity Scale in men and women. *Psychology of Men and Masculinity*, 5, 49–58.
- Muthén, L. K., & Muthén, B. O. (2007). *Mplus user's guide* (5th ed.). Los Angeles: Muthén & Muthén.
- Myers, T. A., & Crowther, J. H. (2007). Sociocultural pressures, thin-ideal internalization, self-objectification, and body dissatisfaction: Could feminist beliefs be a moderating factor? *Body Image: An International Journal of Research*, 4, 296–308. doi:10.1016/j.bodyim.2007.04.001.
- Pope, H. G., Gruber, A. J., Choi, P., Olivardia, R., & Phillips, K. A. (1997). Muscle dysmorphia: An underrecognized form of body dysmorphic disorder. *Psychosomatics*, 38, 548–557.
- Pope, H. G., Olivardia, R., Gruber, A., & Borowiecki, J. (1999). Evolving ideals of male body image as seen through action toys. *International Journal of Eating Disorders*, 26, 65–72. DOI: 10.1002/(SICI)1098-108X(199907)26:1<65::AID-EAT8>3.0.CO;2-D.
- Presnell, K., Bearman, S. K., & Stice, E. (2004). Risk factors for body dissatisfaction in adolescent boys and girls: A prospective study. *International Journal of Eating Disorders*, 36, 389–401. doi:10.1002/eat.20045.
- Ricciardelli, L. A., & McCabe, M. P. (2004). A biopsychosocial model of disordered eating and the pursuit of muscularity in adolescent boys. *Psychological Bulletin*, 130, 179–205. doi:10.1037/0033-2909.130.2.179.
- Richards, M. H., Boxer, A. W., Petersen, A. C., & Albrecht, R. (1990). Relation of weight to body image in pubertal girls and boys from two communities. *Developmental Psychology*, 26, 313–321. doi:10.1037/0012-1649.26.2.313.
- Selig, J. P., & Preacher, K. J. (2008, June). Monte Carlo method for assessing mediation: An interactive tool for creating confidence intervals for indirect effects [Software]. Retrieved from <http://www.people.ku.edu/~preacher/medmc/medmc.htm>
- Shroff, H., & Thompson, J. K. (2006). The tripartite influence model of body image and eating disturbance: A replication with adolescent girls. *Body Image: An International Journal of Research*, 3, 17–23. doi:10.1016/j.bodyim.2005.10.004.
- Smolak, L., & Stein, J. A. (2006). The relationship of drive for muscularity to sociocultural factors, self-esteem, physical attributes gender role, and social comparison in middle school boys. *Body Image: An International Journal of Research*, 3, 121–129. doi:10.1016/j.bodyim.2006.03.002.
- Smolak, L., Levine, M. P., & Thompson, J. K. (2001). The use of the sociocultural attitudes towards appearance questionnaire with middle school boys and girls. *International Journal of Eating Disorders*, 29, 216–223. doi:10.1002/1098-108X(200103)29.
- Smolak, L., Murnen, S. K., & Thompson, J. K. (2005). Sociocultural influences and muscle building in adolescent boys. *Psychology of Men & Masculinity*, 6, 227–239. doi:10.1037/1524-9220.6.4.227.
- Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In S. Leinhardt (Ed.), *Sociological methodology 1982* (pp. 290–312). San Francisco: Jossey-Bass.
- Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin*, 128, 825–848. doi:10.1016/S0022-3999(02)00488-9.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Allyn and Bacon.
- Thompson, J. K., Heinberg, L., & Tantleff, S. (1991). The Physical Comparison Scale (PACS). *The Behavior Therapist*, 14, 174.
- Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: theory, assessment, and treatment of body image disturbance*. Washington: American Psychological Association.
- Thompson, J. K., van den Berg, P., Roehrig, A. S., Guarda, A. S., & Heinberg, L. J. (2004). The sociocultural attitudes towards appearance scale-3: Development and validation. *International Journal of Eating Disorders*, 35, 293–304. doi:10.1002/eat.10257.
- Tylka, T. L., Bergeron, D., & Schwartz, J. P. (2005). Development and psychometric evaluation of the Male Body Attitudes Scale (MBAS). *Body Image: An International Journal of Research*, 2, 161–175. doi:10.1016/j.bodyim.2005.03.001.
- van den Berg, P., Paxton, S. J., Keery, H., Wall, M., Guo, J., & Neumark-Sztainer, D. (2007). Body dissatisfaction and body comparison with media images in males and females. *Body Image: An International Journal of Research*, 4, 257–268. doi:10.1016/j.bodyim.2007.04.003.
- Vartanian, L. R. (2009). When the body defines the self: Self-concept clarity, internalization, and body image. *Journal of Social and Clinical Psychology*, 28, 94–126. doi:10.1521/jscp.2009.28.1.94.
- Winnett, R. A. (1995). A framework for health promotion and disease prevention programs. *American Psychologist*, 50, 341–350. doi:10.1037/0003-066X.50.5.341.
- Wood, J. V. (1989). Theory and research concerning social comparisons of personal attributes. *Psychological Bulletin*, 106, 231–248. doi:10.1037/0033-2909.106.2.231.
- Yamamiya, Y., Shroff, H., & Thompson, J. K. (2008). The tripartite influence model of body image and eating disturbance: A replication with a Japanese sample. *International Journal of Eating Disorders*, 41, 88–91. doi:10.1002/eat.20444.