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Muscularity teasing and its relations with muscularity bias internalization, muscularity-oriented body dissatisfaction, and muscularity-oriented disordered eating in Chinese adult men

Jinbo He [a,*,1], Wesley R. Barnhart [b,2], Yuchen Zhang [a,3], Jiayi Han [a,4], Ziyue Wang [c,5], Shuqi Cui [a,6], Jason M. Nagata [d,7]

[a] School of Humanities and Social Science, The Chinese University of Hong Kong, Shenzhen, China
[b] Department of Psychology, Bowling Green State University, Bowling Green, OH, USA
[c] School of Humanities and Social Sciences, Beijing Forestry University, Beijing, China
[d] Division of Adolescent & Young Adult Medicine, Department of Pediatrics, University of California, San Francisco, San Francisco, CA, USA

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ABSTRACT

Despite increasing research on weight teasing and other forms of appearance teasing, muscularity teasing, which occurs when an individual is victimized due to low muscularity, has not yet received research attention. Given the solid evidence of positive relations between weight teasing and thinness-oriented body dissatisfaction and disordered eating, we aimed to tap into muscularity teasing and examine its relations with muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating (e.g., rigid dietary rules for enhancing muscularity). A sample of 500 Chinese men, aged 18 – 62 years, were recruited online, and they competed questionnaires assessing muscularity teasing, muscularity bias internalization, muscularity-oriented body dissatisfaction, and muscularity-oriented disordered eating. Correlation analyses showed that muscularity teasing was significantly related to muscularity bias internalization ($r = 0.55$, $p < .001$), muscularity-oriented body dissatisfaction ($r = 0.50$, $p < .001$), and muscularity-oriented disordered eating ($r = 0.38$, $p < .001$). Structural equation modelling indicated that muscularity bias internalization and muscularity-oriented body dissatisfaction, as concurrent mediators, fully mediated the relationships between muscularity teasing and muscularity-oriented disordered eating. Findings extend existing knowledge in appearance teasing research to encompass muscularity teasing in order to better understand the etiology of muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating.

1. Introduction

Appearance teasing is negative appearance-related feedback on an individual's physical appearance from others (Thompson et al., 1999). To date, there has been ample, solid evidence showing positive relationships between appearance teasing and an array of adverse health consequences, especially body dissatisfaction and disordered eating (Dahill et al., 2021; Lie et al., 2019; Menzel et al., 2010). Appearance teasing is a broad construct pertaining to all appearance attributes which include not only body weight but also other body attributes, especially muscularity. However, most prior studies regarding appearance teasing focused on weight teasing (Menzel et al., 2010). Consequently, previous research about the links between appearance teasing and body dissatisfaction and/or disordered eating are mainly body weight-related. For instance, previous relevant research generally focused on weight teasing and its relationships with thinness-oriented body dissatisfaction and/or thinness-oriented disordered eating (e.g., Chen et al., 2022; Lopez-Guimera et al., 2012; Matthews et al., 2022). However, thinness-oriented body dissatisfaction, characterized by body weight/fat

* Correspondence to: School of Humanities and Social Science, The Chinese University of Hong Kong, Shenzhen 518172, Guangdong, China.
E-mail addresses: hejinbo@cuhk.edu.cn, anlfhe@gmail.com (J. He).
[1] orcid.org/0000–0002-2785-937
[2] orcid.org/0000-0002-9809-5225
[3] orcid.org/0000-0002-3535-0436
[4] orcid.org/0000-0002-1548-5245
[5] orcid.org/0000-0002-6088-0463
[6] orcid.org/0000-0002-4929-5167
[7] orcid.org/0000-0002-6541-0604

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concerns, is distinct from muscularity-oriented body dissatisfaction which is related to muscularity concerns. Furthermore, the manifestations of thinness-oriented disordered eating (e.g., dietary restraint and compensatory behaviors to lose weight or prevent weight gain) are also distinct from muscularity-oriented disordered eating (e.g., rigid dietary rules, rigid exercise routines, and use of supplements for enhancing muscularity; Lavender et al., 2017; Murray et al., 2017). Empirical evidence shows that muscularity-oriented disordered eating is related to worse functional impairment in adult men and women, above and beyond thinness-oriented disordered eating (He et al., 2023; Messer et al., 2022). Therefore, continued research is needed on the relationships between appearance teasing and muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating.

Along with the increasing prevalence of eating disorders in China (Wu et al., 2022) and the call for more research on body dissatisfaction and disordered eating in Chinese men (He et al., 2021; Sun et al., 2020), in the present study, we argued that muscularity teasing needs more research attention, especially in Chinese men. Considering that masculinity is becoming more idealized for Chinese men in contemporary China (Song, 2022; Yu & Sui, 2022), and muscularity is a distinctive symbol of masculinity (Wacquant, 1995), muscularity teasing (e.g., the derogatory mocking nickname of '*Niangpao*'[8] of men with soft masculinity, and the derogatory mocking nickname of '*Xigou*'[9] of men with low muscularity) is increasingly pervasive in contemporary China and may be a significant contributor to muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating in Chinese men. For example, short videos with the hashtag '*Xigou*' for degrading men with low muscularity have become viral on Chinese mainstream social media, such as Bilibili and TikTok (e.g., see an online report at Tencent News; Tencent, 2022). Thus, in the present study, we aimed to provide preliminary empirical evidence on this topic in the Chinese context by tapping into muscularity teasing and its relations with muscularity bias internalization, muscularity-oriented body dissatisfaction, and muscularity-oriented disordered eating in Chinese adult men.

1.1. Muscularity teasing as an important yet under-researched form of appearance teasing

Physical appearance includes body weight and other body attributes (e.g., body size, height, hair, skin, eyes, and muscularity; Jacobi & Cash, 1994) that can be the targets of teasing (Christopher, 2012). Among the non-weight-focused body attributes, muscularity has been posited as a distinct and comparably important body attribute contrasted with thinness in shape and weight (e.g., Kelley et al., 2010; Murray et al., 2017). Muscularity is a major source of body image concerns for adolescents and adults, especially boys and men (Ganson & Rodgers, 2022; McCreary, 2011). However, surprisingly, there is very limited research specifically tapping into teasing due to one's low muscularity (i.e., muscularity teasing). Relevant studies either did not explore the direct associations between muscularity teasing and body dissatisfaction or disordered eating (Matera et al., 2018) or integrated muscularity teasing into a whole construct of appearance teasing to explore the associations between teasing and body dissatisfaction (Patel, 2004). Therefore, the direct associations between muscularity teasing and body dissatisfaction or disordered eating, especially muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating, remain unknown. Furthermore, the measures used in previous studies for assessing muscularity teasing only captured frequencies, missing the perceived impact (Matera et al., 2018; Patel, 2004); however, perceived impact of teasing is considered another important component of appearance teasing (see Duarte & Pinto-Gouveia, 2017).

1.2. Muscularity teasing and body dissatisfaction and disordered eating

As body ideals of boys and men are becoming increasingly muscular (Nagata et al., 2021; Pope et al. (1999)), muscularity concerns are pervasive among men from both Western and Eastern countries. For instance, a cross-cultural study reported considerable proportions of U.S. college men (i.e., 81∼84%) and Chinese college men (75% ∼ 77%) endorse muscularity concerns (Jung et al., 2010). Particularly, muscularity concerns can be problematic and are closely related to muscle dysmorphia and muscularity-oriented disordered eating in men (Griffiths et al., 2013; Murray et al., 2017; Thomas et al., 2014). Although, to our knowledge, no research has specifically explored the associations between muscularity teasing and muscularity-oriented body dissatisfaction or between muscularity teasing and muscularity-oriented disordered eating, there are a large number of relevant studies on the counterpart of muscularity teasing, namely weight teasing. Specifically, solid links have been revealed for weight teasing in relation to higher thinness-oriented body dissatisfaction and higher thinness-oriented disordered eating (e.g., Day et al., 2022; Menzel et al., 2010; Plumed et al., 2019). Therefore, muscularity teasing is likely to be related to muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating.

1.3. The role of muscularity bias internalization

Given that weight teasing is well-documented to foster weight bias internalization (e.g., Gmeiner & Warschburger, 2020; O'Brien et al., 2016; Zuba & Warschburger, 2017), muscularity teasing may also potentially contribute to muscularity bias internalization. Specifically, in light of the importance of muscularity in body image, muscularity bias internalization was coined as a counterpart of weight bias internalization (He et al., 2022). Muscularity bias internalization was defined as an individual's endorsement of muscularity-based stereotypes and subsequent negative self-evaluating applications due to muscularity (He et al., 2022). Furthermore, similar to weight bias internalization as a key correlate of thinness-oriented body dissatisfaction and thinness-oriented disordered eating (e.g., Durso et al., 2012; Hübner et al., 2016; Pullmer et al., 2021; Purton et al., 2019; Soulliard et al., 2021), muscularity bias internalization was also proposed as an important factor describing variance in muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating (He et al., 2022). Therefore, muscularity bias internalization could be an important mediator in the relationships between muscularity teasing and muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating.

In addition, given the well-documented evidence supporting muscularity-oriented body dissatisfaction as a risk factor or predictor of muscularity-oriented disordered eating (Lavender et al., 2017; Murray et al., 2017), it is also reasonable to assume that muscularity-oriented body dissatisfaction may mediate the relationship between muscularity teasing and muscularity-oriented disordered eating. Thus, along with the discussion above, muscularity bias internalization and muscularity-oriented body dissatisfaction may be concurrent mediators in the relationship between muscularity teasing and muscularity-oriented disordered eating.

[8] 娘炮 in Chinese is a derogatory term describing men with soft masculinity.
[9] 细狗 in Chinese refers to a kind of Chinese greyhound dog characterized by a very thin body and thin limbs.

1.4. The present study

Overall, we aimed to explore whether and to what extent muscularity teasing may be related to muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating. Moreover, mediation analyses with cross-sectional data are cost-effective approaches for probing potential mechanisms of the relationships between variables, even though these approaches are not able to demonstrate causal relationships (MacKinnon, 2012). Thus, given the limited research on this topic, we adopted a cross-sectional mediation analysis to examine the potential, concurrent mediating roles of muscularity bias internalization and muscularity-oriented body dissatisfaction in the relationship between muscularity teasing and muscularity-oriented disordered eating in Chinese adult men. Based on previous literature on appearance teasing, especially weight teasing (e.g., Day et al., 2022; Menzel et al., 2010; Plumed et al., 2019; Zuba & Warschburger, 2017), as well as existing literature on muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating (e.g., He et al., 2022; Lavender et al., 2017; Murray et al., 2016), we hypothesized that: 1) muscularity teasing would be positively related to muscularity bias internalization, muscularity-oriented body dissatisfaction, and muscularity-oriented disordered eating (Hypothesis 1); 2) muscularity bias internalization would be a significant mediator in the relationship between muscularity teasing and muscularity-oriented disordered eating after adjusting for potential covariates (e.g., age, BMI, and weight teasing; He et al., 2022; He et al., 2021; Menzel et al., 2010) (Hypothesis 2); and 3) muscularity-oriented body dissatisfaction would be a significant mediator in the relationship between muscularity teasing and muscularity-oriented disordered eating after adjusting for these same covariates (Hypothesis 3). The conceptual model is described in Fig. 1.

2. Methods

2.1. Participants

The present study included a sample 500 Chinese adult men. The participants were aged from 18 to 62 years old (M_{age} = 30.89 years, SD = 8.17), and their body mass index (BMI) ranged from 17.14 to 34.72 kg/m^2 (M_{BMI} = 22.97 kg/m^2, SD = 2.72). Furthermore, 97.8% had an ethnicity of Han and 2.2% were ethnicity minorities; 65.8% were married and 34.2% were unmarried or other (e.g., divorced); 4.0% had an education level of high school or lower and 96.0% had an education level of college or above; and 17.8% were college students and 82.2% were non-university students.

2.2. Procedure

The present study was approved by the Institutional Review Board of the Chinese University of Hong Kong, Shenzhen (No. EF20220906001). We recruited participants from Credamo (https://www.credamo.com) by setting a target sample size of 500 Chinese men. Credamo is a Chinese online survey platform which has been demonstrated to provide valid data (Wang et al., 2022). To recruit participants, random invitations were sent to Credamo participants who met our inclusion criteria (i.e., Chinese nationality, male gender, and aged over 18 years of age). In Credamo, users can set multiple types of response validity indicators to avoid common issues often observed in online surveys (Chmielewski & Kucker, 2020). Specifically, in the present study, we used a voice recording question to ask participants to record "I agree with the items on the informed consent and voluntarily participate in the survey" and upload the recording onto the platform. This voice recording question is easy for humans but extremely difficult, if not impossible, for bots or scripts, and each voice recording of the participants was screened by research assistants to ensure accuracy. We also used a "CAPTCHA" question provided by the platform, which is also easy for humans but extremely difficult for bots or scripts. Per the "CAPTCHA" question, the online surveys of participants who failed the question would be automatically terminated by the platform. Furthermore, we also set that each IP address could only have one access to the survey (i.e., participants with repeated accesses from the same IP address were automatically blocked from trying to complete the survey more than once). Moreover, to ensure response quality, we also embedded two attention checks which asked the participants to select certain responses for the attention check questions (e.g., "Please select strongly agree for this item"). Overall, 593 people accessed our online survey, and all participants provided informed consent. However, 93 were removed due to unclear voice records or failure of attention checks, leaving 500 participants in the present study. The 500 participants included in the analysis completed all

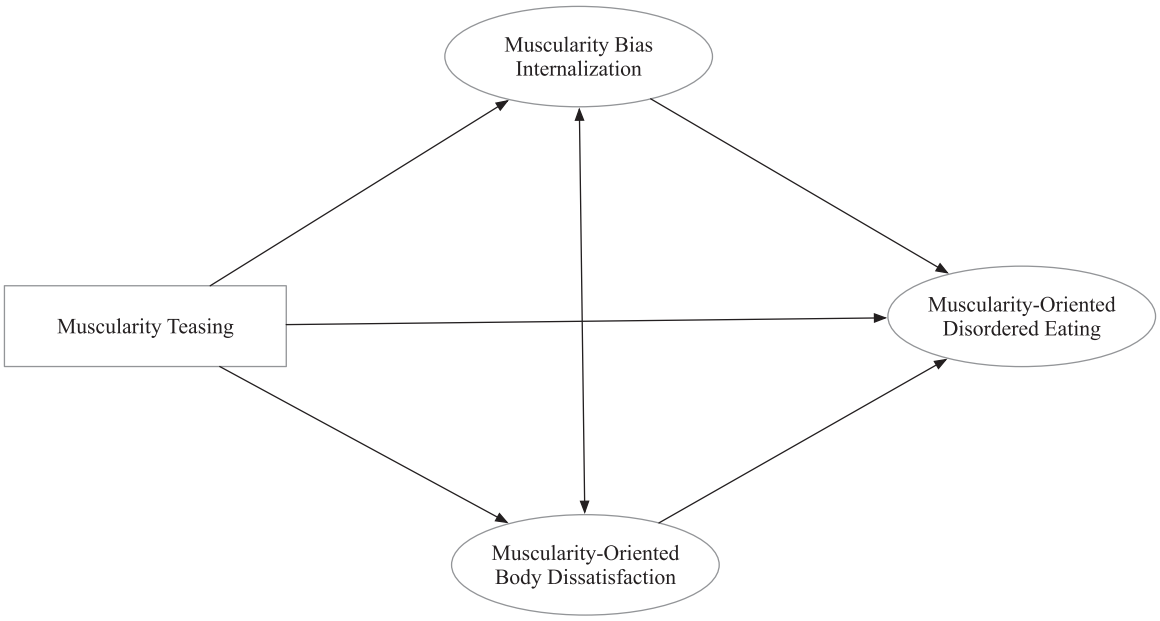

Fig. 1. Conceptual Model of the Mediation Analysis.

the survey items, passed the validity checks, and were paid 13 ¥ for compensation.

2.3. Measures

2.3.1. Muscularity teasing

To assess muscularity teasing, we adapted two questions for assessing weight teasing (see Rodgers et al., 2021) by modifying the wording from body weight to muscularity. Specifically, the first question used was "Have you ever been teased or made fun of by others because of low muscularity?" Response options were: (1) No and (2) Yes. Participants who responded with "Yes" on the first question were then asked the second question, "How much did this bother you?". Response options were from 1 (Not at all) to 5 (Very much). As there was no need for the participants who responded with "No" in the first question to respond the second question, there were missing responses for these participants on the second question. Thus, similar to Rodgers et al. (2021), the missing responses due to no prior teasing experience were coded as "0" scores in the second question such that recoded scores in the second question represented a combination of the occurrence of muscularity teasing and its perceived impact.

2.3.2. Weight teasing

To assess weight teasing, we used two questions reported in Rodgers et al. (2021). The first question was "Have you ever been teased or made fun of by others because of your weight?" Response options were: (1) No and (2) Yes. Participants who responded with "Yes" were then asked, "How much did this bother you?" Response options were from 1 (Not at all) to 5 (Very much). Participants who responded with "No" in the first question were coded to have "0" scores in the second question. The recoded scores in the second question therefore represented a combination of the occurrence of weight teasing and its perceived impact.

2.3.3. Muscularity bias internalization scale

Muscularity bias internalization was measured with the Muscularity Bias Internalization Scale (MBIS) which is a 14-item self-report measure (He et al., 2022). Example items are "I feel worthless when I think my muscles are not defined enough" and "I hate myself if my muscles are not big enough." The items of the MBIS are rated on a 7-point Likert-type scale from 1 (Strongly disagree) to 7 (Strongly agree). The average of the 14 items is the total score of the measure, and a higher total score represents higher muscularity bias internalization. The MBIS showed adequate internal consistency reliability, good test-retest reliability, and good construct validity in a sample of Chinese adult men (He et al., 2022). In the present study, the MBIS had a Cronbach's α of .94.

2.3.4. Drive for muscularity scale

As suggested in Bergeron and Tylka (2007), and in line with previous literature (e.g., Karazsia & Crowther, 2009; Tie et al., 2022), muscularity-oriented body dissatisfaction was assessed with the attitude subscale of the Drive for Muscularity Scale (DMS; McCreary et al., 2004). An example item of the attitude subscale is "I think that my arms are not muscular enough." Specifically, the attitude subscale of the DMS contains 7 items rated on a 6-point Likert-type scale ranging from 1 (Aways) to 6 (Never). The items were reverse-coded. The average of the reverse-coded items represents the total score of the attitude subscale, with higher total scores indicating higher muscularity-oriented body dissatisfaction. The DMS showed good psychometric properties (e.g., internal consistency reliability, test-retest reliability, and convergent validity) in Chinese adult men (He et al., 2021). In the present study, the attitude subscale of the DMS had a Cronbach's $\alpha$of.89.

2.3.5. Muscularity-oriented eating test

Muscularity-oriented disordered eating was assessed with the 15-item Muscularity-Oriented Eating Test (MOET; Murray et al., 2019) which captures the core symptoms of muscularity-oriented disordered eating (e.g., rigid dietary rules, rigid exercise routines, and use of supplements for enhancing muscularity). Example items are "I have continued eating, despite feeling full, in attempting to influence my muscularity" and "I have been deliberately trying to limit the overall volume of some foods so that my muscles look more defined." The MOET is rated on a 5-point Likert scale from 0 (Never true) to 4 (Always true). A total score can be calculated by summing the 15 items of the MOET. Higher total scores represent higher muscularity-oriented disordered eating. The MOET had been validated in Chinese adult men and showed good internal consistency reliability, good test-retest reliability, and good convergent validity (He et al., 2021). In the present study, the MOET had a Cronbach's α of .91.

2.4. Data analyses

Data analyses were conducted with the *psych* package (Revelle, 2021) and *lavaan* package (Rosseel, 2012) in R 4.2.0 (R Core Team, 2022). Since we could only download responses from the participants who completed the survey and got paid by the platform, there were no missing data. Descriptive analyses were conducted to present the descriptive statistics (i.e., mean, standard deviation, skewness, and kurtosis) of the variables involved in the present study. For Hypothesis 1, Pearson product moment correlations were conducted to evaluate the bivariate zero-order correlations of the variables. According to Cohen (1992), correlation coefficients of .10, .30, and .50 are considered small, medium, and large, respectively.

For Hypothesis 2 and Hypothesis 3, considering the strengths (e.g., explicit assessment of measurement error) of structural equation modeling (SEM), the proposed model was tested in the framework of SEM. Furthermore, we used a robust maximum likelihood (MLR) estimator since MLR provides more accurate parameter estimation than ML when data are non-normal (Lai, 2018). In addition, as described in Matsunaga (2008), item parceling provides several advantages (e.g., stabilization of parameter estimates) over SEM with all individual items; thus, we adopted the parceling strategy. Based on Wu and Wen (2011), we created three parcels for each latent variable (i.e., muscularity bias internalization, muscularity-oriented body dissatisfaction, and muscularity-oriented disordered eating). Specifically, by using exploratory factor analysis (EFA), we first sorted the factor loadings of items of the latent variables from the EFA and then sequentially assigned the items to the three parcels. Following the two-step approach in SEM (Anderson & Gerbing, 1988), the measurement model was first estimated, which is followed by the structural model. In the structural model, we further controlled for potential covariates (age, BMI, and weight teasing) that are likely related to the study variables (He et al., 2022; He et al., 2021; Menzel et al., 2010). Particularly, as weight teasing is a well-recognized factor contributing to body dissatisfaction and disordered eating (Menzel et al., 2010), controlling for weight teasing would help examine the unique connections between muscularity teasing and body dissatisfaction and disordered eating.

To evaluate the degree to which the proposed model fit the data, as recommended in Hu and Bentler (1999), we relied on the following model fit indexes: the Comparative Fit Index (CFI; close to or greater than .95 indicates good fit; greater than .90 indicates acceptable fit), Tucker–Lewis Index (TLI; close to or greater than 0.95 indicates good fit; greater than .90 indicates acceptable fit), Standardized Root Mean square Residual (SRMR; close to or less than .05 indicates good fit; and less than .10 indicates acceptable fit), and Root Mean Square Error of Approximation (RMSEA; close to or less than .06 indicates good fit; less than .10 indicates acceptable fit).

Table 1
Descriptive Statistics and Bivariate Correlations of the Study Variables and Covariates ($N = 500$).

	Mean	*SD*	*Skewness*	*Kurtosis*	1	2	3	4	5	6	7
1. Muscularity Teasing	1.52	1.84	0.53	-1.47	1.00						
2. Muscularity Bias Internalization	3.86	1.22	0.04	-0.46	0.55 ***	1.00					
3. Muscularity-Oriented Body Dissatisfaction	3.76	1.12	-0.27	-0.46	0.50 ***	0.66 ***	1.00				
4. Muscularity-Oriented Disordered Eating	1.44	0.76	0.32	-0.59	0.38 ***	0.53 ***	0.40 ***	1.00			
5. Weight Teasing	1.75	1.96	0.38	-1.61	0.61 ***	0.42 ***	.30 ***	0.43 ***	1.00		
6. Age	30.89	8.17	1.00	1.28	-0.02	0.03	-0.04	-0.14 **	0.05	1.00	
7. BMI	22.97	2.72	0.60	0.42	-0.08	-0.05	-0.25 ***	0.17 ***	0.18 ***	0.29 ***	1.00

Notes: BMI = body mass index; *SD* = standard deviation. * $p < .05$, ** $p < .01$, *** $p < .001$.

Finally, for estimating the indirect effects, we used 5000 bootstrapped 95% bias-corrected confidence intervals (i.e., 95% CIs). Indirect effects are statistically significant if the 95% CIs do not contain zero.

3. Results

3.1. Descriptive and correlation analyses

Table 1 shows the descriptive statistics and bivariate correlations of the variables and covariates. All four study variables (i.e., muscularity teasing, muscularity bias internalization, muscularity-oriented body dissatisfaction, and muscularity-oriented disordered eating) were significantly inter-correlated (all $ps < 0.001$). Particularly, regarding Hypothesis 1, muscularity teasing had significant positive associations with muscularity bias internalization (a large effect size), muscularity-oriented body dissatisfaction (a large effect size), and muscularity-oriented disordered eating (a medium effect size). Furthermore, all three covariates (i.e., age, BMI, and weight teasing) were significantly related to one or more study variables; thus, these variables were controlled to exclude their influence on the proposed model.

3.2. Mediation analysis with structural equation modeling

3.2.1. Measurement model

The measurement model had an acceptable fit, with $\chi^2(24) = 122.23$ ($p < .001$), CFI = 0.97, TLI = 0.96, RMSEA = 0.09 (90% CI:.08 ∼.11), and SRMR = 0.04, suggesting the measurement model fitted these present data. Moreover, the factor loadings of the parcels ranged from .76 to .97.

3.2.2. Structural model

In the structural model, age, BMI, and weight teasing were covariates controlled in all paths. The structural model showed an acceptable model fit, with $\chi^2(48) = 264.69$ ($p < .001$), CFI = 0.95, TLI = 0.92, RMSEA = 0.10 (90% CI:.09 ∼.11), and SRMR = 0.04. Regarding the regression coefficients, as shown in Table 2 and Fig. 2, after controlling for covariates, higher muscularity teasing (β=.45, $p < .001$) was related to higher muscularity bias internalization. After controlling for covariates, higher muscularity teasing (β=.45, $p < .001$) was significantly related to higher muscularity-oriented body dissatisfaction. However, after controlling for covariates, muscularity bias internalization, and muscularity-oriented body dissatisfaction, muscularity teasing was not significantly related to muscularity-oriented disordered eating (β=.01, $p = .918$). These results indicated that the relationship between muscularity teasing and muscularity-oriented disordered eating was fully mediated by muscularity bias internalization and muscularity-oriented body dissatisfaction.

Table 3 shows the indirect effects of muscularity teasing on muscularity-oriented disordered eating via muscularity bias internalization and muscularity-oriented body dissatisfaction. The estimate of the total indirect effect of muscularity teasing on muscularity-oriented disordered eating was .09 (95% CI, 0.07 ∼.11). Both indirect pathways were significant: a single mediation pathway through muscle bias internalization (Hypothesis 2), with an indirect effect of .05 (95% CI, 0.03 ∼.08), and a single mediation pathway through muscularity-oriented body dissatisfaction (Hypothesis 3), with an indirect effect of .04 (95% CI, 0.01 ∼.06).

4. Discussion

The present study tapped into muscularity teasing, an important yet under-researched form of appearance teasing, which occurs when an individual is victimized due to their low muscularity. Our results supported our hypotheses and provided preliminary evidence that muscularity teasing is related to higher muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating in adult men, expanding the current knowledge of appearance teasing and its associations with muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating.

Our first hypothesis, that muscularity teasing would be associated with higher muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating in adult men, was supported. Even though such cross-sectional findings are preliminary, these findings correspond to the adverse health consequences of weight teasing on thinness-oriented body dissatisfaction and thinness-oriented disordered eating (Puhl & Lessard, 2020). Furthermore, mediation analyses revealed that the relationship between muscularity teasing and muscularity-oriented disordered eating was fully mediated by muscularity bias internalization and muscularity-oriented body dissatisfaction, which supported our second and third hypotheses. In other words, the link between muscularity teasing and muscularity-oriented disordered eating may be explained via higher muscularity bias internalization and higher muscularity-oriented body dissatisfaction. Indeed, such indirect pathways were well-supported in weight teasing, when weight bias internalization was the mediator while thinness-oriented body dissatisfaction and/or disordered eating were the outcome variables (Rosenbaum & Bernstein, 2022; Zuba & Warschburger, 2017). Thus, it is reasonable to conclude that higher muscularity teasing is associated with higher muscularity bias internalization (i.e., muscularity-related self-stigma) and higher muscularity-oriented body dissatisfaction which, in turn, may be associated with higher muscularity-oriented disordered eating.

Findings from the present study have three key implications. First, findings highlight the need to encompass muscularity teasing in future research on appearance teasing in adult men. In particular, the mechanisms of muscularity teasing (e.g., the potential perpetrators of peers and family members; Szwimer et al., 2020) should be further explored, which could contribute to the design of specific prevention programs targeting muscularity teasing to improve body image and eating behaviors in adult men. Second, the potential importance of addressing muscularity bias internalization in adult men reporting muscularity teasing and muscularity-oriented disordered eating should be noted. Specifically, interventions targeting muscularity bias internalization, which may include challenging or

Table 2
Standardized Regression Coefficients and Standard Errors from the Mediation Model.

Antecedent variables	Consequent variables											
	Muscularity Bias Internalization				Muscularity-Oriented Body Dissatisfaction				Muscularity-Oriented Disordered Eating			
	B (95% *CI*)	*SE*	*β*	*Z*	*B* (95% *CI*)	*SE*	*β*	*Z*	*B* (95% *CI*)	*SE*	*β*	*Z*
Age	0.004 (−0.01,0.01)	0.01	0.04	0.88	0.003 (−0.01,0.01)	0.01	0.03	0.71	0.01 (0.001,0.01)	0.004	0.09	2.06*
BMI	-0.02 (−0.05, 02)	0.02	-0.05	-1.01	-0.08 (−0.12, −0.04)	0.02	-0.21	-4.20***	.05 (0.03,0.07)	0.01	0.19	4.23***
Weight Teasing	0.06 (0.02,0.11)	0.03	0.13	2.55*	.05 (−0.004,0.10)	0.03	0.09	1.76	0.08 (0.04,0.11)	0.02	0.22	4.16***
Muscularity Teasing	0.23 (0.18,0.28)	0.03	0.45	9.01***	.25 (0.19,0.30)	0.03	0.45	8.37***	.002 (−0.04,0.04)	0.02	0.01	0.10
Muscularity Bias Internalization									0.22 (0.11,0.34)	0.06	0.30	3.71***
Muscularity-Oriented Body Dissatisfaction									0.15 (0.05,0.25)	0.05	0.22	2.92**
R^2	.30						0.31					0.41

Notes: Covariates were age, BMI, and weight teasing. *B* = unstandardized regression coefficient, *CI* = confidence interval, *SE* = standard error, *β* = standardized regression coefficient, *Z* = *Z* score. * $p < .05$, ** $p < .01$, *** $p < .001$.

restructuring one's stereotypical beliefs about muscularity and decreasing self-stigmatizing evaluations about their muscularity, may be efficacious in reducing muscularity-oriented disordered eating among adult men experiencing muscularity teasing. For example, the body gratitude journaling intervention (also referred to as *Expand Your Horizon*) was found to be effective in reducing weight bias internalization in adult women (Davies et al., 2022). Thus, it may be promising to tailor the body gratitude journaling intervention to reduce muscularity bias internalization in adult men. Third, our findings also underscore the role of muscularity-oriented body dissatisfaction in adult men reporting muscularity teasing and muscularity-oriented disordered eating. Specifically, findings from the present study speak to the potential usefulness of helping men who experience muscularity teasing to develop more balanced attitudes and behaviors about their muscularity as means to potentially reduce muscularity-oriented disordered eating.

The present study represents a novel contribution to the body image literature by tapping into muscularity teasing and its relationships with muscularity bias internalization, muscularity-oriented dissatisfaction, and muscularity-oriented disordered eating in Chinese adult men, a highly underrepresented population in body image research. However, several limitations and future research directions must be considered. First, the cross-sectional nature of the present study prevents attributions of temporal and causal relationships of the study variables, a limitation that should be considered when interpreting mediation findings based on a cross-sectional design. Future replication research using experimental and longitudinal designs are necessary to verify the presented mediation pathways from muscularity teasing to muscularity-oriented disordered eating via muscularity bias internalization and muscularity-oriented body dissatisfaction.

Second, the present study was conducted in a sample of adult Chinese men from the general population, and participants' clinical status (e.g., current eating disorder(s) diagnosis or not) was not collected. Thus, the present findings are confined to adult Chinese men from the general population, and future studies are needed to replicate the study in Chinese men from clinical settings and from different demographic (e.g., women; see He et al., 2023, for validated MOET in Chinese adult women) and age (e.g., Chinese boys and girls) dimensions. Third and relatedly, the present study did not collect information on participants' specific gender identities (e.g., cisgender or transgender), a limitation that should be considered in future research given that Chinese transgender individuals may be at high risk of eating disorders (Barnhart et al., 2023). Fourth, as culture is recognized as a significant contributing factor in the development of eating disorders (Miller & Pumariega, 2001; Pike et al., 2014), cultural differences should be considered in interpreting the present findings which speaks to the need for research to test such relationships in the U.S. and other geographic locations. Fifth, given the powerful role of sexual orientation(s) on body image disturbances (He et al., 2020), including muscularity-oriented body dissatisfaction (e.g., Eik-Nes et al., 2018), future research testing such questions in sexual minority populations is needed to explore the unique experiences of these populations under the umbrella of muscularity-oriented eating and body image disturbances.

Finally, given the preliminary nature of the topic of muscularity teasing, there is no validated measure of muscularity teasing that includes both frequency and perceived impact of teasing due to muscularity. We therefore developed a two-item measure in the present study by adapting a measure previously used for probing weight teasing (Rodgers et al., 2021). However, the validity of the measure should be specifically evaluated. In addition, considering that multiple-item measures may have better psychometric properties than measures with one or two items (Sarstedt & Wilczynski, 2009), future studies may also develop and validate a multiple-item

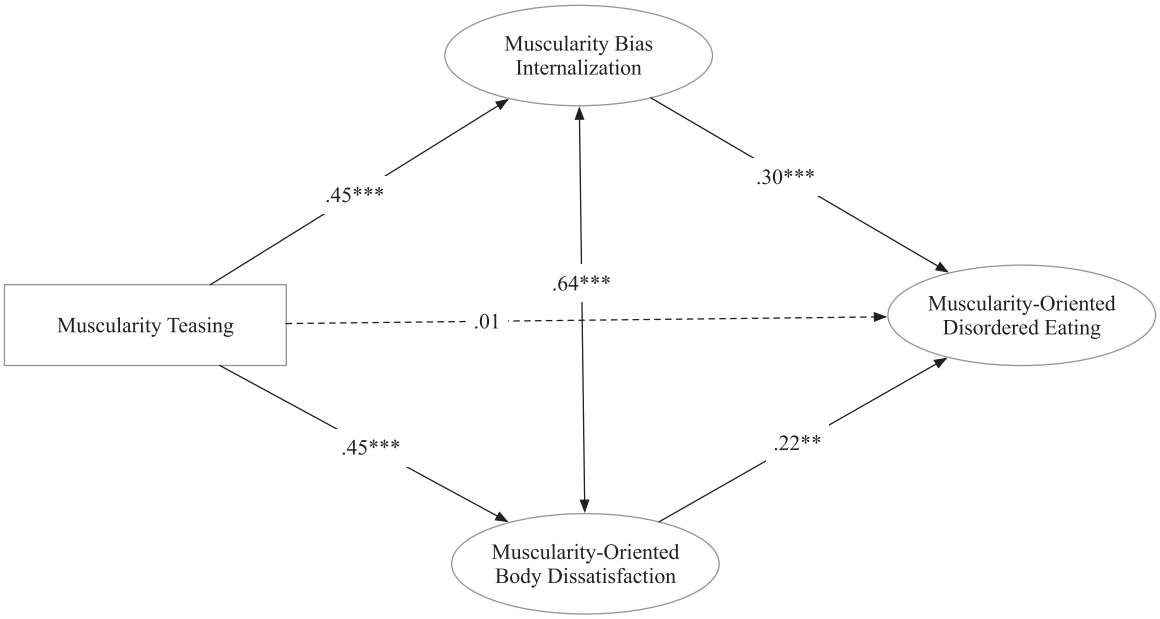

Fig. 2. Statistical Model of the Mediation Analysis (*Note*: age, BMI, and weight teasing were controlled as covariates in all paths; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$).

Table 3
Estimation of Indirect Effects.

Indirect effects	Point estimate	95% *CI*	*SE*
Total	0.09	0.07 –0.11	0.01
Path 1: MT→MBI→MODE	0.05	0.03 –0.08	0.01
Path 2: MT→MOBD→MODE	0.04	0.01 –0.06	0.01

Notes: CI = confidence interval, *SE* = standard error, MT = muscularity teasing; MBI = muscularity bias internalization, MOBD = muscularity-oriented body dissatisfaction, MODE = muscularity-oriented disordered eating.

measure of muscularity teasing to fully capture and represent associations with muscularity teasing.

In sum, the present study provided preliminary empirical evidence on muscularity teasing and its relations with muscularity bias internalization, muscularity-oriented body dissatisfaction, and muscularity-oriented disordered eating in Chinese adult men. The findings extend existing knowledge on appearance teasing and highlight the potential value of encompassing muscularity teasing for the prevention of muscularity-oriented body dissatisfaction and muscularity-oriented disordered eating.

Ethical approval

The ethical approval was obtained from the Institutional Review Board of the Chinese University of Hong Kong, Shenzhen (No. EF20220906001).

Informed consent

Informed consent was obtained from all the surveyed participants.

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CRediT authorship contribution statement

Jinbo He: Conceptualization, Investigation, Funding acquisition, Formal analysis, Writing – original draft, Writing – review & editing. **Wesley R. Barnhart:** Writing – original draft, Writing – review & editing. **Yuchen Zhang:** Writing – review & editing. **Jiayi Han:** Writing – review & editing. **Ziyue Wang:** Investigation, Writing – review & editing. **Shuqi Cui:** Writing – review & editing. **Jason M. Nagata:** Writing – review & editing. All authors approved the manuscript for submission.

Data Availability

Data will be made available on request.

Declaration of Competing Interest

All authors declare that they have no conflict(s) of interest.

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