



Media Internalized Pressure and Restrained Eating Behavior in College Students: The Multiple Mediating Effects of Body Esteem and Social Physique Anxiety

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Background: Restrained eating behavior has become the norm in college students' lives, and considering the harm it causes to college students, it is necessary to explore the factors associated with it. The aim of this study was to explore the association between media internalized pressure, body esteem, social physique anxiety, and restrained eating behavior.

Methods: The participants in this study were 1,032 Chinese college students (439 males and 593 females) and had a mean age of 20.22 years (SD = 1.277). They completed the Sociocultural Attitudes Toward Appearance Questionnaire-3, Body Esteem Scale (BES), Social Physique Anxiety Scale (SPAS), and Dutch Eating Behavior Questionnaire (DEBQ).

Results: The results showed that media internalized pressure was significantly and positively associated with college students' restrained eating behavior, that body esteem and social physique anxiety played a mediating role between media internalized pressure and restrained eating behavior, respectively, and that body esteem and social physique anxiety can also play a chained mediating role.

Conclusion: This study reveals the relationship between media internalized pressure and restrained eating behavior, and the important role played by body esteem and social physique anxiety. Future interventions targeting restrained eating should focus on the aspects of body esteem and social physique anxiety.

Keywords: media internalized pressure, restrained eating behavior, body esteem, college students, social physique anxiety

INTRODUCTION

Restrained eating behavior refers to individuals restricting their food intake for weight loss (Herman and Polivy, 1975; Westenhoefer et al., 2013), and is prevalent among college students (Han and Kahn, 2017). A Chinese app called Mint, which focuses on recording diets, reports that 7.65 million people are involved in restrained eating (Yang et al., 2021). In addition, restrained eating may lead to eating disorders (e.g., bulimia nervosa) and negative psychological emotions, such as anxiety and stress (Stice, 2002; Appleton and McGowan, 2006; Kalkan Ugurlu et al., 2021). Therefore, it is necessary to study the restrained eating behavior of college students and the factors influencing it.

Long-term exposure to the mass media can have a range of harmful effects on college students, such as feeling of isolation (Wright and Pritchard, 2009), anxiety (Garvin and Damson, 2008), and media internalized pressure (Ouyang et al., 2021). Media internalized pressure refers to the pressure that arises after an individual internalizes the ideal body shape which is promoted by the media and mentally compares it with his or her body shape (Stice et al., 2000; Thompson and Stice, 2001; Dittmar et al., 2009). It can relate to body dissatisfaction (Myers and Crowther, 2007), shame (Izydorczyk et al., 2020), stress (Sharp et al., 2014), and even bring about eating problems (Thompson and Heinberg, 1999; Morton et al., 2020). The tripartite influence model of sociocultural theory suggests that the media is one of the initial sources of influence that leads individuals to develop restrained eating behavior (Thompson et al., 1999; Thompson and Stice, 2001). Previous studies have demonstrated that images of slim bodies on television and idealized body size in software can affect individual eating behavior (Mills et al., 2002; Anschutz et al., 2008). This is particularly common among women (Fitzsimmons-Craft et al., 2016) and young adults (Wardle et al., 2006). Austin and Smith (2008) indicated that media internalized pressure can lead individuals to pay more attention to their body shape and create a desire for the ideal body shape, which may lead to restrained eating behavior.

Body esteem may mediate the relationship between media internalized stress and restrained eating behavior. Body esteem is a specific domain of overall self-esteem and refers to an individual's satisfaction with different aspects of the self-body or a positive or negative self-evaluation (Auslander et al., 2012; Lamb et al., 2021). On the one hand, some studies have confirmed that body esteem may relate to restrained eating behavior (Murray et al., 2016). The transdiagnostic theory of eating disorders proposed by Fairburn et al. (2003) suggests that when people are unable to meet the standards set for themselves, they develop negative evaluations of their bodies, which leads to lower body esteem and ultimately leads individuals to develop eating disorders. On the other hand, media internalized pressure may exert an influence on body esteem (Varnes et al., 2015). Flament et al. (2012) demonstrated that both appearance esteem and weight esteem play a mediating role between thin-ideal body shape and restricted eating behavior in female adolescents. When individuals perceive that their body figures are inconsistent with the toned and lean image advocated by the media, this lowers their body esteem and can easily trigger their restrained eating behavior to achieve the ideal figure (Karacan et al., 2014; Gattario et al., 2020).

Furthermore, previous research has demonstrated that social physique anxiety is associated with media internalized stress and restrained eating behavior (Frederick and Morrison, 1998; Ouyang et al., 2021). Social physique anxiety refers to the anxiety that arises from the fear that others will judge one's physique negatively (Hart et al., 1989). Hayes and Ross (1987) suggested that social physique anxiety may lead women to engage in unhealthy eating behaviors due to the pursuit of a thin-ideal body shape. In addition, Sharp et al. (2014) showed that excessive media internalized pressure is a cause of women's body dissatisfaction and social physique anxiety. Individuals

who discover a discrepancy between their body shape and the ideal body shape advertised by the media may experience dissatisfaction and anxiety (Christian et al., 2021), and they are prone to more body shape management, such as restrained eating behavior (Thompson et al., 1999).

In addition, body esteem may correlate with social physique anxiety (Gregus et al., 2014). People who are dissatisfied with their physical image may feel anxious when facing others' evaluation of their physical image (Frederick and Morrison, 1996). Miller and Fry (2018) found that body esteem is significantly and negatively associated with social physique anxiety. Atalay and Gençöz (2008) argued that people who have negative perceptions of their body image are more likely to experience higher levels of social physique anxiety. People with high media internalized pressure are more likely to develop lower body esteem (Cordero, 2011) and higher social physique anxiety (Martin, 1999), which can eventually make them avoid showing their body image in public. In the end, they tend to further restrict their eating behaviors and make their image meet social standards (Cox et al., 1997).

Our study can further deepen the investigation of factors influencing restrained eating behavior. This study aims to explore the multiple mediating roles of body esteem and social physique anxiety between media internalized pressure and restrained eating behavior among college students. We have proposed the following hypotheses: (1) media internalized pressure is positively associated with college students' restrained eating behavior; (2) the higher the media internalized pressure, the more likely college students are to have lower body esteem and these students' restrained eating behavior will be more frequent, i.e., body esteem plays a mediating role between media internalized pressure and restricted eating behavior; (3) when college students experience greater media internalized pressure, the higher the social physique anxiety they feel and the more frequently restrained eating behavior they experience, i.e., social physique anxiety plays a mediating role between media internalized pressure and restrained eating behavior; and (4) the greater the media internalized pressure on college students, the more likely they may feel lower body esteem and likely to experience higher social physique anxiety, which makes them more likely to engage in restrained eating behavior, i.e., body esteem and social physique anxiety play chained mediating roles between media internalized pressure and restrained eating behavior. The conceptual model is presented in **Figure 1**.

METHODS

Participants and Procedures

The participants were all Chinese college students in this study. We collected data from seven universities (i.e., two in North China, one in Central China, three in East China, and one in West China). We distributed the questionnaires through the Questionnaire Star platform (<http://www.wjx.cn>), which is a software that provides online questionnaire assessment services. We recruited participants in several ways as follows: (1) sent the link of the questionnaire to the class teachers *via* the Internet, who in turn distributed it to their students and

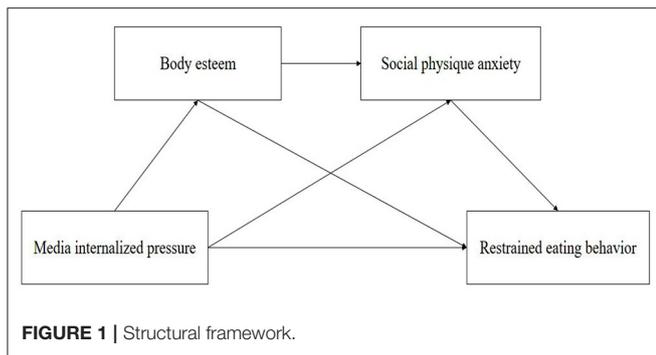


FIGURE 1 | Structural framework.

TABLE 1 | Demographic data ($N = 1,032$).

Variables	Category	<i>N</i>	%
Gender	Male	439	42.54
	Female	593	57.46
Area	Rural	521	50.48
	Town	439	42.52
Number of children	Only one child	521	50.48
	Non-only child	439	42.52
Grade	Freshman	316	30.62
	Sophomore	400	38.76
	Junior	202	19.57
	Senior	114	11.05
Major	Sciences	252	24.42
	Liberal arts	304	29.46
	Engineering	318	30.81
	Medicine	158	15.31

(2) recruited participants by posting advertisements on social networks. A total of 1,244 college students participated in the questionnaire, and data from 1,032 participants were eventually included in the data analysis. The survey was anonymous and participants could withdraw from the survey at any time. A total of 212 participants' questionnaires were eliminated, mainly based on invalid responses, such as contradictory responses, and excessive consecutive identical or regular responses. Our study was approved by the Ethics Committee of the School of Public Health at Cheeloo College of Medicine of Shandong University (20190912), and all participants who participated in the survey gave informed consent to the study.

Measures

Demographic Variables

Demographic variables included gender, age, grade, majors, place of residence, and whether the child is an only child. Grades were divided into freshmen, sophomores, juniors, and

seniors. Residence included urban and village areas. Majors were classified as science, liberal arts, engineering, and medicine.

Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ-3)

This study used the Chinese version (Liu, 2009) of the Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ-3) which was developed by Thompson et al. (2004) to measure media internalized pressure. This scale has 15 items, including a media attention subscale and an internalization subscale. The total score was obtained by adding the scores of the two subscales. This scale is compiled by the 5-point Likert-type scale, with scores of 1–5 meaning “totally disagree” to “totally agree.” Items 6, 10, 11, 12, and 13 reversed scoring questions. The higher the total score, the greater the media internalized pressure they received. The total Cronbach's α coefficient in this study for the scale was 0.864, of which 0.725 for the media attention subscale, and 0.834 for the internalization subscale.

Specific Body Esteem Scale (SBES)

The Body Esteem Scale (BES) was designed by Franzoi and Shields (1984). This scale has 35 items, requiring participants to assess various parts and functions of their bodies. In this study, we used the translated and modified Chinese version of BES by He and Zhang (2002), also known as the Specific BES (SBES). This scale includes satisfaction ratings of different body parts and has high reliability and validity. It is compiled by the 5-point Likert-type scale, with scores from 1 to 5 representing “fully unsatisfied” to “fully satisfied,” with higher scores showing higher body esteem. The scale we used showed a Cronbach's α coefficient of 0.969.

Social Physique Anxiety Scale (SPAS)

The Social Physique Anxiety Scale (SPAS) was designed by Hart et al. (1989), and we used the Chinese version (Xu, 2007) to gauge the social physique anxiety of college students in this study. This scale consists of 15 items and is compiled by the 5-point Likert-type scale, with scores of 1–5 meaning “not at all” to “complete.” The scores on items 1, 3, 7, 11, 13, and 14 reversed in this scale. The higher the total score, the higher the social physique anxiety. Previous studies have demonstrated the applicability of this scale among the Chinese University student population (Liu and Wang, 2019). The scale we used showed a Cronbach's α coefficient of 0.771.

Dutch Eating Behavior Questionnaire (DEBQ)

The restrained eating subscale of the Dutch Eating Behavior Questionnaire (DEBQ) developed by Van Strien et al. (1986) was used in this study. There are ten entries, which are primarily used to measure an individual's propensity to eat restrictively. This scale is compiled by the 5-point Likert-type scale and has 10 items. The scores 1, 2, 3, 4, and 5 represent the options “never,” “rarely,” “sometimes,” “often,” and “always,” respectively. There is a higher level of restrained eating behavior with higher scores. The reliability and validity of this scale were good in the Chinese University student population (Li et al., 2018; Ma and Lan, 2021). The Cronbach's α coefficient for this scale was 0.943.

TABLE 2 | Descriptive statistics and correlation analysis for each variable ($n = 1,032$).

Variables	<i>M</i>	<i>SD</i>	1	2	3	4
1 Media Internalized Pressure	45.18	10.382	1.000	–	–	–
2 Body Esteem	117.05	26.713	–0.142**	1.000	–	–
3 Social Physique Anxiety	44.49	8.796	0.377**	–0.333**	1.000	–
4 Restrained Eating Behavior	27.18	9.609	0.289**	0.083**	0.295**	1.000

M, Mean; *SD*, Standard Deviation; ** $p < 0.01$.

TABLE 3 | The results of the regression estimate of the chained mediation model.

Outcome variables	Predictors	Goodness-of-fit indices			Regression coefficient and significance	
		<i>R</i>	<i>R</i> ²	<i>F</i>	β	<i>t</i>
BE	MIP	0.263	0.069	7.575***	–0.116	–3.751***
SPA	MIP	0.477	0.227	27.249***	0.339	11.932***
	BE				–0.283	–9.904***
REB	MIP	0.413	0.171	17.477***	0.206	6.551***
	BE				0.195	6.311***
	SPA				0.288	8.876***

*** $p < 0.001$. MIP, Media Internalized Pressure; BE, Body Esteem; SPA, Social Physique Anxiety; REB, Restrained Eating Behavior.

Statistical Analysis

The SPSS version 24.0 software and its macro program PROCESS version 3.3 (Hayes, 2017) were used to analyze the data. Descriptive statistics, such as frequencies, means, and standard deviations, were used to illustrate the distribution of the variables. Pearson correlation analysis was used to test the relationship between each pair of variables. Model 6 of PROCESS was used for the mediation analysis and to test our hypothesis. The significance levels for the variables were 0.05. The significance of the mediation effect was tested using the Bootstrap method. A Bootstrap sample of 2,000 was set to be drawn in PROCESS, and 95% confidence intervals (CIs) were constructed. The parameter estimates were significant if the 95% CI did not contain 0 (Wen et al., 2004).

RESULTS

Common Method Bias Analysis

We used factor analysis to perform the tests of common method bias. The chi-square statistic of Bartlett's test of sphericity was significant ($KMO = 0.959$, $p < 0.001$). Through the principal component analysis, we extracted a total of nine components with eigenvalues > 1 . It was found that 24.95% of the variance was explained for the first factor, which was lower than the required standard of 40%. This proves that the questionnaire used in this study has no common method bias (Podsakoff et al., 2003).

Demographic Variables

We finally analyzed data from 1,032 participants. The mean age of the participants was 20.22 years ($SD = 1.277$), with an age range of 18–27 years. The final sample contained 439 (42.54%) male students and 593 (57.46%) female students. **Table 1** shows the information on demographic variables.

Correlation Analysis

Table 2 shows the descriptive statistics and correlations between media internalized pressure, body esteem, social physique anxiety, and restrained eating behavior. The bivariate correlation analysis revealed a significant positive relationship between media internalized pressure, social physique anxiety, and restrained eating behavior. In addition, there was a significant negative correlation between body esteem, media internalized pressure, and social physique anxiety.

Regression Analysis

We performed the regression analysis after standardizing the variables. **Table 3** shows the mediated regression coefficients between media internalized pressure, body esteem, social physique anxiety, and restrained eating behavior. The results showed that there was a significant negative correlation between media internalized pressure and body esteem and a significant positive correlation with social physique anxiety. Moreover, there was a significant negative correlation between body esteem and social physique anxiety. Furthermore, media internalized pressure, body esteem, and social physique anxiety can all significantly and positively relate to restrained eating behavior.

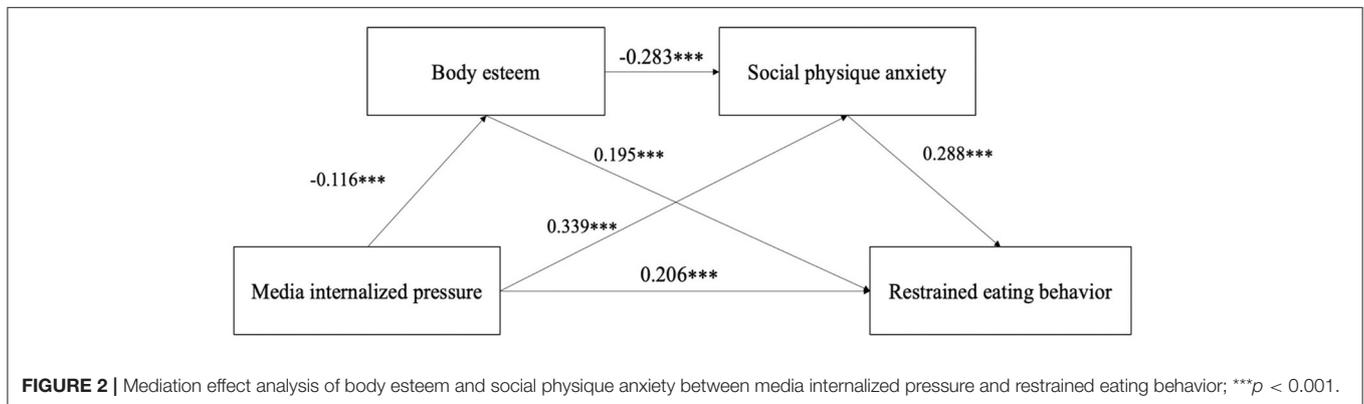
Mediation Analysis

The bias-corrected percentile Bootstrap method was used to test all the above-mediated paths, and the selected Bootstrap self-sampling size was 2,000, with 95% CIs calculated. Findings from the mediation analysis are shown in **Table 4** and **Figure 2**. Both the direct and indirect pathways between media internalized pressure and restrained eating behavior were significant. In addition, the separate mediating and chaining effects of body esteem and social physique anxiety between media internalized pressure and restrained eating behavior were also significant.

TABLE 4 | Bootstrap analysis of the test for mediating effects ($n = 1,032$).

Effect types	Path	Effect	SE	Bootstrap 95% CI
Direct effect	MIP → REB	0.206	0.031	0.144–0.268
Indirect effect	MIP → BE → REB	−0.023	0.008	−0.039 to −0.009
	MIP → SPA → REB	0.098	0.016	0.067–0.131
	MIP → BE → SPA → REB	0.010	0.003	0.004–0.016
Total indirect effect		0.085	0.0162	0.054–0.118
Total effect		0.291	0.031	0.231–0.350

MIP, Media Internalized Pressure; BE, Body Esteem; SPA, Social Physique Anxiety; REB, Restrained Eating Behavior.



DISCUSSION

This study investigated the association between media internalized pressure and restrained eating behavior, and the multiple mediating roles of body esteem and social physique anxiety in the relationship between media internalized pressure and restrained eating behavior among college students. We found that (1) there was a significant and positive association between media internalized pressure and restrained eating behavior; (2) body esteem mediated the effect of media internalized pressure on restricted eating behavior; (3) social physique anxiety mediated the effect of media internalized pressure on restricted eating behavior; and (4) body esteem and social physique anxiety play chained mediating roles between media internalized pressure and restrained eating behavior.

Our study found that media internalized pressure was positively related to restrained eating behavior in our college student sample. Similar to our previous studies, Chang et al. (2013) showed that the ideal body shape communicated by mass media leads to media internalized pressure in individuals, which can make them more prone to self-objectification (Slater and Tiggemann, 2015) and thus increase restrained eating behavior (Ashikali and Dittmar, 2010). It highlights the relationship between visual exposure to the media's thin-ideal body shape and restrained eating behavior. This is perhaps because media internalized pressure increases the likelihood of perceived body dissatisfaction, and this appearance pressure, in turn, contributes to restrained eating behavior (Myers and Crowther, 2007; Fuller-Tyszkiewicz et al., 2018).

We found that media internalized pressure can relate to restrained eating behavior through body esteem and social physique anxiety, respectively, which supports our hypotheses 2 and 3. According to the cognitive behavioral model of eating disorders, the thin-ideal body shape promoted by the media increases individuals' misperceptions of their bodies during self-evaluation, which may cause low body esteem and anxiety, and even lead individuals to adopt unhealthy eating behaviors, such as restrained eating behavior (Fairburn, 1997). Previous studies have also indicated that the internalization pressure of ideal-thin body shape from the media may increase personal body dissatisfaction and decrease body esteem (Hawkins et al., 2004; Vartanian and Dey, 2013). In addition, we found a mediating role for social physique anxiety between media internalized pressure and restricted eating behavior. The mass media's promotion of the ideal body shape can lead individuals to pursue an unrealistically thin-ideal body shape, generating media internalized pressure and dissatisfaction with their body shape, which can lead to social physique anxiety and eventually adopt some restrained eating behavior to reduce this anxiety (Martins et al., 2007; Kertechian and Swami, 2016; Kalyva et al., 2021).

Finally, we found body esteem and social physique anxiety play a chained mediating role between media internalized pressure and restricted eating behavior. This result supports our hypothesis 4. Although the tripartite influence model of the sociocultural theory states that media internalized pressure is one of the causes of restrained eating behavior in individuals (Thompson et al., 1999), this study introduces body esteem

and social physique anxiety into this model for the first time and examines the mechanisms by which all three play a role in restrained eating behavior in college students. The media promotion of a thin-ideal body shape leads individuals to evaluate their body shape from the perspective of others, and this inappropriate evaluation tends to lower body esteem and develop social physique anxiety in dissatisfaction with their bodies (Gregus et al., 2014), which leads to thoughts of changing their body shape and eventually results in restrained eating behavior.

This study has important implications. In theoretical aspects, first, we confirmed the relationship between media internalized pressure and restrained eating behavior among college students, extending the tripartite influence model of the sociocultural theory. Second, we applied body esteem and social physique anxiety to explain their association, which helps to understand the underlying mechanisms between these two variables. In practice, we can develop some strategies to avoid restrained eating and other unhealthy behaviors based on these influencing factors. First, social media should stop promoting a single strict aesthetic standard, and instead, should promote healthy beauty and lead people to a healthy lifestyle. Second, we can promote the physical and mental health of college students by promoting correct aesthetic concepts, so that they can be guided to correctly view the ideal body shape and discover their own beauty as disseminated by the media, and thus form correct body perceptions and self-evaluations. Third, we can intervene in mediating variables to reduce restrained eating behavior. Physical activity and restrained eating behavior are the two most commonly used methods of body management, but physical activity rarely produces negative effects (Boutelle et al., 2009; Schur et al., 2010). Encouraging college students to participate in physical activity can also help individuals improve self-confidence and self-esteem, which may reduce restrained eating behavior (Duncan et al., 2009). In addition, mindfulness, a self-regulation mental training method with Buddhist origins, has been shown to be effective in reducing anxiety and depression, and enhancing well-being, which may also help reduce restrained eating behavior (Kristeller and Wolever, 2010).

Despite these positive results, this study also has some limitations. First, this study is a cross-sectional study, so it does not draw a causal relationship between the variables. Future studies could examine the causal relationship between mediating variables and restrained eating behavior or design intervention experiments for mediating variables to test whether restrained eating behavior can be reduced. Second, our survey participants are all college students, and we hope that future research will be extended to include more samples (e.g., adolescents or working adults). Finally, this study adopted an online method of distributing questionnaires; the measurement environment cannot be guaranteed to be consistent and, therefore, may introduce bias. Future studies may consider distributing and collecting questionnaires on-site.

CONCLUSION

This study confirms the relationship between media internalized pressure, body esteem, social physique anxiety, and restrained eating behavior. There is a significant and positive association between media internalized pressure and restrained eating behavior among college students. Moreover, media internalized pressure can also increase the risk of restrained eating behavior through the parallel mediating effects of body esteem and social physique anxiety, as well as through the sequential mediating effects of body esteem and social physique anxiety.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethics Committee of the School of Public Health at Cheeloo College of Medicine of Shandong University (20190912). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

TF and SX completed the writing of the introduction and discussion. JY completed the writing of the methods. TF completed the writing of results, data coding, cleaning, and the first draft of the manuscript. JW and GS completed the writing review and editing. All authors contributed to the article and approved the submitted version.

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