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Relationships Among Selfie-Viewing on Social Media, Thin-Ideal Internalization, and Restrained Eating in Adolescents: The Buffering Role of Media Literacy

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Abstract

The aim of the present study was to test the relationship between selfie-viewing on social media and restrained eating as well as the mediating effect of thin-ideal internalization in this relationship. We also examined whether the links from selfie-viewing to thin-ideal internalization and restrained eating would be moderated by media literacy. Moreover, whether gender would moderate the mediation model was also examined. Results on a survey of 1,481 Chinese adolescents aged 12–19 years showed that selfie-viewing had a positive relationship with restrained eating and that thin-ideal internalization mediated this relationship. Furthermore, the association between selfie-viewing and thin-ideal internalization was moderated by media literacy. Specifically, the relationship was weaker for adolescents with higher media literacy. In other words, media literacy alleviated the negative effect of selfie-viewing on body image. Moreover, there were no gender differences in the mediation model. These findings add to the literature on the relationship between social media use and restrained eating. Educational programs aiming to improve media literacy may be beneficial for reducing the risk of restrained eating among adolescents.

Keywords: selfie-viewing; social media; restrained eating; thin-ideal internalization; media literacy

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Introduction

Social media use is becoming more and more prevalent in recent years, especially among young people. For example, the number of Chinese social media users in 2020 was 924 million and it is expected to exceed 1 billion by 2022, and users show an obvious trend of youth (iiMedia Research, 2021). Against this background, a wide range of research has examined the influence of social media use on adolescents' development (Schønning et al., 2020), and shows that social media use is associated with and predictive of body image and eating concerns among youth (Rounsefell et al., 2020; Saiphoo & Vahedi, 2019). As an unhealthy eating behavior (Hou et al., 2013), restrained eating refers to the intentional and sustained restriction of calorie intake with the aim of achieving

weight loss and maintaining body weight (Niu et al., 2020; Polivy & Herman, 1985). There is documented evidence that restrained eating serves as a risk factor for eating disorders (Polivy & Herman, 1985), and contributes to various health and functional issues (Pollert et al., 2016; Wang et al., 2020). Some research thus focused on restrained eating to examine the potential influence of social media use (e.g., Yao et al., 2021). Sharing selfies on social media has become a popular activity in recent years (Katz & Crocker, 2015; Senft & Baym, 2015), and the association between selfie activities and restrained eating might be worth investigating.

Selfies are defined as self-portrait pictures taken with a smartphone or digital camera and usually shared on social media (McLean et al., 2019). Some research shows a positive link from selfie activities, such as selfie-posting and self-photo manipulation, to eating behaviors (Cohen et al., 2018; McLean et al., 2015; Niu et al., 2020). Notably, in addition to engaging in selfie taking, posting, and editing, people can view and examine numerous selfies as well as the related likes and comments shared by others when using social media (i.e., selfie-viewing; Wang, Xie, et al., 2019). It has been documented that viewing others' selfies on social media is very common (Porch, 2015), and is related to body image concerns (Fardouly & Rapee, 2019; Wang, Fardouly, et al., 2019). Therefore, it would be worthwhile to examine the association between selfie-viewing and restrained eating.

Recently, restrained eating is becoming widespread among Chinese young people (Xiong et al., 2022; Yong et al., 2021). However, research focusing on social media use and restrained eating in the Chinese context is limited (Niu et al., 2020; Wang et al., 2023; Yao et al., 2021). Specific to selfie-related activities, only one study, to our knowledge, examined the association between selfie-posting and restrained eating among young adult women and revealed a positive relationship (Niu et al., 2020). Considering the popularity of China's selfie culture (J. Fan, 2018), the present study thus examined the potential relationship between selfie-viewing and restrained eating in the Chinese context. Notably, it would be particularly important to examine this relationship among adolescents because adolescence is accompanied by physical, psychological, and emotional changes (Patton & Viner, 2007). Adolescents tend to have heightened awareness of body and weight concerns due to these changes (Lawler & Nixon, 2011). Moreover, promoting healthy dietary habits among adolescents is crucial, as longitudinal research has demonstrated that restrained eating during adolescence could predict the onset of subsequent depression (Stice et al., 2000). Additionally, adolescents are more likely to engage in selfie-related behaviors (Dhir et al., 2016). Taken these into consideration, we focused on adolescents to investigate our research question. Collectively, the present study aimed to figure out whether selfie-viewing would be related to restrained eating among Chinese adolescents as well as the mechanisms underlying this relationship.

Selfie-Viewing and Restrained Eating

According to sociocultural model, sociocultural factors (i.e., media, family, and peers) play a crucial role in the development of body dissatisfaction and the subsequent related behaviors (e.g., dieting and exercise) with aim of losing body weight and improve body image (Stice, 1994; Thompson et al., 1999). Selfies on social media can be seen as a source of appearance-related sociocultural pressure. Specifically, individuals typically choose images that they find attractive when sharing selfies (McLean et al., 2015). Additionally, the widespread availability of photo editing applications makes it convenient for people to enhance their selfies and post the most visually appealing ones (Fox & Vendemia, 2016; Stefanone et al., 2019). As a result, the selfies posted on social media often exhibit highly attractive physical appearances that are typically unattainable, imposing significant appearance-related sociocultural pressure on viewers. Consequently, viewers may experience dissatisfaction with their own appearance, leading them to engage in appearance-modification efforts. In fact, a review of multiple studies revealed that over two-thirds of the participants reported utilizing dieting as a weight loss strategy (Santos et al., 2017). Taken together, it would be reasonable to expect that selfie-viewing would be related to restrained eating.

Although there is little direct evidence for the influence of selfie-viewing on restrained eating, a wide range of research has documented the contributing role of selfie-viewing in negative body image. Cross-sectional studies have demonstrated the positive associations of selfie-viewing with appearance dissatisfaction among adolescents (Wang, Fardouly, et al., 2019). The predicting effect of selfie-viewing on negative body image is also identified by a longitudinal study focusing on adolescents (Wang, Xie, et al., 2019). Experimental research has also shown that exposure to others' selfies leads to lower body image among young women and adolescent girls (Fardouly & Rapee, 2019; Kleemans et al., 2018). Considering the link from body image dissatisfaction to restrained eating (Stice, 1994), we proposed that selfie-viewing on social media would have a positive association with restrained eating.

The Mediating Role of Thin-Ideal Internalization

An important mechanism that might underly the relationship between selfie-viewing and restrained eating is thin-ideal internalization. According to the sociocultural model of bulimia, the most obvious prerequisite for sociocultural pressures to have a negative impact on eating behavior is that these pressures are internalized. In other words, if an individual does not endorse the sociocultural pressures regarding thinness and attractiveness, it is unlikely that these pressures would affect their body image and eating behavior in a negative manner (Stice, 1994). In line with this theoretical viewpoint, the mediating role of thin-ideal internalization in the associations of media exposure with body image and eating concerns has been well documented (e.g., Bair et al., 2012; Tiggemann & Slater, 2014). Similarly, the relationship between selfie-viewing and restrained eating in the present study would be mediated by thin-ideal internalization.

As mentioned above, selfies posted on social media have been carefully selected and enhanced (McLean et al., 2015; Stefanone et al., 2019), and thus the appearance of the individuals in these selfies is usually slender and attractive, which is in line with the beauty norm described in the media. Accordingly, exposure to such selfies would cause the viewers to internalize the thin ideal. Furthermore, individuals would not only internalize the thin ideal simply through browsing images, but also through the feedback on selfies according to the social reinforcement theory. This theory suggests that individuals' attitudes and behaviors can be reinforced by the others' response (Tiggemann et al., 2018). Consistent with this perspective, exposure to comments and likes attached to appearance-related images lead to increased appearance comparison and lower body image among undergraduates (Tiggemann & Barbato, 2018; Tiggemann et al., 2018). Taken together, it would be plausible to expect that selfie-viewing would lead to thin-ideal internalization.

As suggested in the sociocultural model of bulimia, endorsement of the social norms of physical appearance described in the culture would contribute to body dissatisfaction if the ideals cannot be attained. In turn, people would take steps to lose body weight and improve body image, such as restrained eating (Stice, 1994). In simpler terms, thin-ideal internalization would be related to restrained eating. In fact, empirical research has consistently supported the positive association between thin-ideal internalization and restrained eating among college students and adolescent girls (e.g., McLean et al., 2015; Schaefer et al., 2017). Furthermore, prospective research has also demonstrated the predicting role of thin-ideal internalization in subsequent change in dieting among undergraduate women (Homan, 2010). Additionally, thin-ideal internalization has been found to mediate the association between Internet exposure and dieting behavior among adolescent girls (Tiggemann & Slater, 2014). Extrapolating from these findings, we expected that thin-ideal internalization would mediate the relationship between selfie-viewing and restrained eating.

The Moderating Role of Media Literacy

The links from selfie-viewing to thin-ideal internalization and restrained eating might be moderated by some individual characteristics, such as media literacy. Generally, media literacy is defined as the ability to access, analyze, evaluate, and produce media information (Xie et al., 2019; Yates, 1999), and has been found to act as a protective factor against the negative influence of media across various outcomes, including body image (Paxton et al., 2022). In the context of media images, media literacy refers to the ability to critique images and to make an assessment about how realistic or otherwise images are (Irving et al., 1998). Specifically, a person with high media literacy could evaluate the images in media critically and recognize whether these images have been manipulated and enhanced. Based on the definition of media literacy, McLean et al. (2016b) proposed a media literacy-body and eating concerns model, which is extended from the tripartite influence model (Thompson et al., 1999). They posited that media literacy might interrupt the pathway from media pressure to internalization of media appearance-ideals by rendering appearance ideals in the media less desirable and less plausible and reducing the persuasive influence of media. Reduction in internalization would then decrease the distal factors, such as body dissatisfaction and disordered eating. Therefore, it is reasonable to expect that media literacy would moderate the links form selfie-viewing to thin-ideal internalization and restrained eating.

Previous research has identified media literacy as a protective factor of body image. For example, media literacy has been found to have positive relationships with low thin-ideal internalization and body dissatisfaction among adolescent girls (McLean et al., 2013), as well as high body appreciation among young women (Andrew et al., 2015). With the popularity of social media, the positive relationship between social media literacy, an extended concept of media literacy, and improved body image is also documented by empirical research focusing on adolescents

and young adults (Paxton et al., 2022). Intervention studies found that media literacy interventions can prevent negative body image outcomes (e.g., thin-ideal internalization and body dissatisfaction) from thin-ideal images for girls (Halliwell et al., 2011; Irving et al., 1998). Recently, a systematic review and meta-analysis revealed that media literacy interventions have the potential to improve media literacy and reduce body dissatisfaction (Kurz et al., 2022). There is also supporting evidence for social media literacy as a modifiable intervention target to improve body image (Paxton et al., 2022). Additionally, the buffering role of media literacy is also supported by experimental research (McLean et al., 2016a; Mingoia et al., 2020; Tamplin et al., 2018). For example, participants who have higher baseline media literacy report lower tanned ideal internalization than those with lower baseline media literacy (Mingoia et al., 2020). Specific to selfie-viewing, the more female viewers believed that the selfies of other women were digitally modified or altered, the less likely they were to internalize the thin ideal (Vendemia & DeAndrea, 2018). However, to our knowledge, the buffering role of media literacy in the links from selfie-viewing to body image and eating concerns is less examined.

The Role of Gender

It has been well documented that women report high rates of restrained eating and disordered eating than men (Y. O. Fan et al., 2010; Vartanian et al., 2018; Yong et al., 2021). It seems common sense that women would display a drive for a slim body while for men it is more important to look muscular. Recently, however, male ideal body has shifted from being purely muscular to being low in body fat and high in muscularity (McNeill & Firman, 2014; Wang et al., 2018). It thus might be possible that men also have somewhat thin-ideal internalization (McNeill & Firman, 2014). In terms of the associations between social media use and body image or disordered eating, the same relationship seems to hold in men as observed in women (see Saiphoo & Vahedi, 2019, for a review). Regarding the role of thin-ideal internalization, Vartanian et al. (2018) found that the link between thin-ideal internalization and restrained eating is significant for men and women. In the structural equation model, there were few gender differences in the paths (Vartanian et al., 2018). Another study found that thin-ideal internalization acted as a significant mediator between sociocultural influence and body image concerns for female participants but not males (H. Chen et al., 2007). To our knowledge, whether the direct and indirect effect of selfie-viewing on restrained eating would differ between boys and girls is largely unknown. Thus, the potential gender differences in the proposed mediation model would be explored in this study.

The Present Study

The present study aimed to examine the relationship between selfie-viewing and restrained eating among adolescents and whether this relationship would be mediated by thin-ideal internalization. Based on the literature review, we hypothesized that:

H1: Selfie-viewing would be positively related to restrained eating.

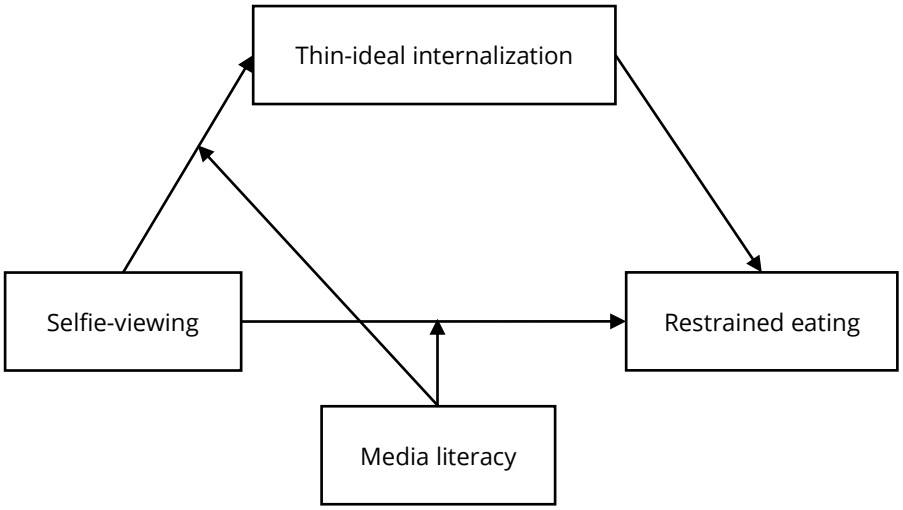
H2: The link from selfie-viewing to restrained eating would be mediated by thin-ideal internalization.

The buffering role of media literacy in the links from selfie-viewing to thin-ideal internalization and restrained eating was also investigated and we predicted that:

H3: The associations of selfie-viewing with thin-ideal internalization and restrained eating would be moderated by media literacy, such that these associations would be weaker for adolescents higher in media literacy than those for adolescents lower in media literacy.

The hypothesized conceptual model is shown in Figure 1. Finally, the potential gender differences in the mediation model were also examined largely for exploratory purposes.

Figure 1. *The Hypothesized Conceptual Model.*



Methods

Participants and Procedure

Participants were recruited through convenience sampling from two middle schools and two high schools in China. The researchers reached out to a teacher from each of these schools to collect data, and all of them agreed to participate. The final sample consisted of 1,481 adolescents aged 12–19 years (*M* = 15.49, *SD* = 1.84). There were 755 (51.2%) boys and 720 (48.8%) girls, with 6 participants not reporting the gender information. Body mass indices (BMI: kg/m^2) were calculated based on participants' self-reported heights and weights, with a mean BMI of 20.51 (*SD* = 3.62).

Data collection was conducted in March 2018. The Ethics Committee of the corresponding author's university granted approval for the study to proceed. The survey was administered in classrooms by trained graduate research assistants. Informed consent was obtained from all participants and one of their parents before data collection. Privacy and anonymity of the study were emphasized and participants were free to withdraw from the study at any time. Participants completed demographic questionnaire (e.g., age, gender, height, and weight), followed by the measures on selfie-viewing, thin-ideal internalization, media literacy, and restrained eating.

Measures

Selfie-Viewing

Referring to previous research (Wang, Fardouly, et al., 2019), selfie-viewing was assessed by three items. One item measured participants' frequencies of viewing others' selfies on social media, ranging from 1 = *very infrequently* to 6 = *several times a day* (Diefenbach & Christoforakos, 2017). The second and third items assessed the degree to which one observes others' selfies by asking *Do you carefully examine others' selfies?* and *Do you carefully examine the comments and number of "likes" on others' selfies?* The response option of these two items were ranging from 1 = *not at all* to 7 = *very much* (Lee & Sung, 2016). All items were standardized by using *z*-score before the mean scores were computed because they used different response ranges. For this measurement, higher scores indicated higher levels of selfie-viewing. In this study, the Cronbach's α was .65.

Thin-Ideal Internalization

Thin-ideal internalization was assessed through the Internalization: Thin/Low Body Fat subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-4-Revised (SATAQ-4R; Schaefer et al., 2017). This scale has been successfully used in Chinese sample (Wang et al., 2022). Participants were required to indicate their level of agreement of 4 statements through a 5-point scale with responses ranging from 1 = *definitely disagree* to 5 = *definitely agree*. An example item was *I want my body to look very lean*. Mean scores were computed with higher values indicating greater levels of thin-ideal internalization. In this study, the Cronbach's α was .80.

Media Literacy

Media literacy was measured using the Critical Consumption subscale of New Media Literacy Scale (NMLS; Koc & Barut, 2016). NMLS consists of four subscales: Functional Consumption, Critical Consumption, Functional Prosumption, and Critical Prosumption. Functional consuming literacy is characterized by consuming skills and understanding indicators, with an example item being *I know how to use searching tools to get information needed in the media*. Critical consuming literacy involves the analysis, synthesis, and evaluation of media messages, with an example item being *It's easy for me to make decision about the accuracy of media messages*. Functional prosuming literacy is measured through indicators such as prosuming skills, distribution, and production, and an example item for this subscale is *I am good at sharing digital media contents and messages on the Internet*. Critical prosuming literacy is represented by participation and creation indicators, with an example item for this subscale being *I am good at producing opposite or alternative media contents*. In the context of media images and body image, media literacy refers to the ability to critically assess images and evaluate their realism or lack thereof (Irving et al., 1998). Therefore, the Critical Consumption subscale of NMLS was used in the present study. Participants were asked to report their level of agreement of 10 statements through 5-point scale with responses ranging from 1 = *definitely disagree* to 5 = *definitely agree*. A mean score was calculated with higher scores meaning higher levels of media literacy. In this study, the Cronbach's α was .92.

Restrained Eating

Restrained eating was assessed with the Restrained Eating subscale of Dutch Eating Behavior Questionnaire (DEBQ; Van Strien et al., 1986). This scale has been widely used to measure restrained eating and has been validated in Chinese adolescents (Wu et al., 2017; Xiong et al., 2022). Participants responded to 10 items, using a 5-point scale ranging from 1 = *never* to 5 = *very often*. An example item was *Do you deliberately eat less in order not to become heavier?* A mean score was calculated and higher scores meant higher levels of restrained eating. In this study, the Cronbach's α was .89.

Data Analysis

Descriptive statistics were calculated first, followed by bivariate associations among the variables of interest. Second, the mediation effect of thin-ideal internalization in the relation between selfie-viewing and restrained eating was tested using Model 4 of the PROCESS macro (Hayes, 2013). This macro used the bootstrapping technique to test the significance of the direct and indirect effects by repeatedly sampling cases from the data and estimating the model in each resample. In the present study, we generated 95% bias-corrected confidence intervals (CIs) on the basis of 1,000 bootstrap samples to estimate the mediation effects. CIs that do not include zero indicate effects are statistically significant. Then, moderated mediation analysis was performed using Hayes's (2013) PROCESS macro for SPSS (Model 8) to test the role of media literacy in the mediation model. To further facilitate the interpretation of the interaction effect, simple slope tests were conducted for participants having high and low media literacy. Participants who scored more than one standard deviation above the mean were categorized as having high media literacy, whereas those who scored more than one standard deviation below the mean were categorized as having low media literacy. Finally, moderated mediation analysis was performed using Hayes's (2013) PROCESS macro for SPSS (Model 59) to test the moderating role of gender in the mediation model.

Results

Preliminary Analysis

Descriptive characteristics and bivariate correlations are displayed in Table 1. Selfie-viewing was positively and significantly related to thin-ideal internalization, media literacy, and restrained eating. Thin-ideal internalization and media literacy were related to restrained eating positively and significantly. The relationship between thin-ideal internalization and media literacy was not significant. Considering BMI had significant associations with thin-ideal internalization and restrained eating, it was controlled for in the following analyses.

Table 1. *Means, Standard Deviations, and Zero-Order Correlations for Main Study Variables.*

	Theoretical range	Actual range	*M (SD)*	1	2	3	4	5
1. BMI	/	11.02~37.04	20.51 (3.62)	1				
2. Selfie-viewing	/	−1.91~1.81	0 (0.75)	.03	1			
3. Thin-ideal internalization	1~5	1~5	3.15 (0.85)	.16**	.22**	1		
4. Media literacy	1~5	1~5	3.41 (0.72)	−.02	.08**	.05	1	
5. Restrained eating	1~5	1~5	2.38 (0.91)	.27**	.16**	.42**	.07**	1

Note. Mean for selfie-viewing was calculated by averaging *z*-scores of all items. BMI = body mass index. **$p < .01$.

Testing for the Mediating Effect

We then test the mediating effect of thin-ideal internalization in the association between selfie-viewing and restrained eating. As shown in Table 2, selfie-viewing positively and significantly predicted restrained eating, β = .15, $p < .001$. Additionally, selfie-viewing was significantly associated with thin-ideal internalization, β = .22, $p < .001$. Thin ideal internalization was positively associated with restrained eating significantly, β = .38, $p < .001$. The indirect effect of selfie-viewing on restrained eating through thin-ideal internalization was .08 and significant, *SE* = .01, 95% CI [.06, .10]. This finding indicated that thin-ideal internalization mediated the association between selfie-viewing and restrained eating. Hypothesis 2 thus was supported.

Table 2. *Testing the Mediating Effect of Selfie-Viewing on Restrained Eating.*

Predictors	Model 1 (restrained eating)			Model 2 (thin-ideal internalization)			Model 3 (restrained eating)		
	β	*t*	*p*	β	*t*	*p*	β	*t*	*p*
BMI	.27	10.79	< .001	.15	6.07	< .001	.21	9.08	< .001
Selfie-viewing	.15	5.94	< .001	.22	8.46	< .001	.07	2.94	.003
Thin-ideal internalization							.38	15.20	< .001
R^2	.10			.07			.22		
F	77.81		< .001	55.81		< .001	137.11		< .001

Testing for the Moderating Role of Media Literacy

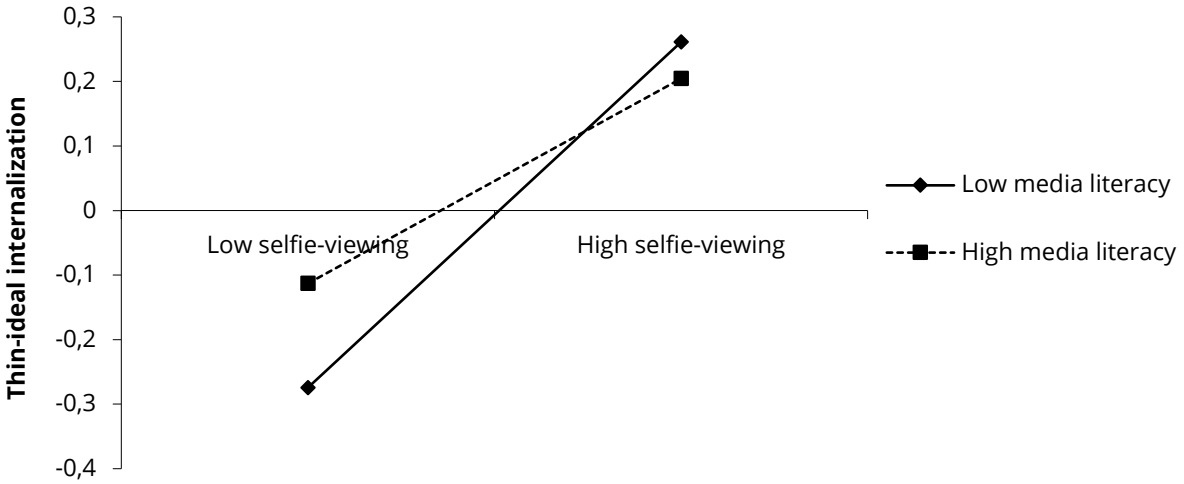
Table 3. *Testing the Moderating Role of Media Literacy.*

Predictors	Model 1 (thin-ideal internalization)			Model 2 (restrained eating)		
	β	*t*	*p*	β	*t*	*p*
BMI	.16	6.28	< .001	.21	8.94	< .001
Selfie-viewing	.21	8.36	< .001	.07	2.76	.006
Media literacy	.03	1.01	.314	.06	2.43	.015
Selfie-viewing × Media literacy	−.05	−2.39	.017	.04	1.93	.054
Thin-ideal internalization				.37	15.40	< .001
R^2	.08			.23		
F	29.61		< .001	85.46		< .001

The PROCESS macro (Model 8) in SPSS (Hayes, 2013) was used to test the moderating role of media literacy. To be specific, we estimated the moderating effects of media literacy on the links (1) from selfie-viewing to thin-ideal internalization and (2) from selfie-viewing to restrained eating. As table 3 displays, the association between selfie-viewing and thin-ideal internalization was moderated by medial literacy, β = −.05, $p = .017$. To facilitate the interpretation of this interaction effect, we plotted the predicted thin-ideal internalization by selfie-viewing separately for high and low media literacy (1 *SD* above the mean and 1 *SD* below the mean, respectively). Simple slope tests indicated that for individuals who had lower media literacy, higher selfie-viewing was associated with more thin-ideal internalization, $b_{simple} = .27$, $t = 7.73$, $p < .001$. For those with higher media literacy, the association

between selfie-viewing and thin-ideal internalization was also significant, but the magnitude was smaller, b_{simple} = .16, t = 4.58, p < .001 (Figure 2). The relationship between selfie-viewing and restrained eating was not moderated by media literacy, β = .04, p = .054. Thus, Hypothesis 3 was partially supported.

Figure 2. *The Interaction Between Selfie-Viewing and Media Literacy on Thin-Ideal Internalization.*



Testing for the Role of Gender

Results of independent samples *t*-tests examining gender differences are presented in Table 4. Girls scored higher on selfie-viewing, thin-ideal internalization, and restrained eating than boys did. No significant difference was found in media literacy between boys and girls. Regarding the moderating effect of gender in the mediation model, gender did not moderate the direct or indirect relationships between selfie-viewing and restrained eating (Table 5), which means no gender difference was found in the mediation model.

Table 4. *Means, Standard Deviations, and Independent Samples t-tests Comparisons Between Boys and Girls.*

Variables	*M (SD)*		*t*	*p*	*d*
	Boys	Girls			
Selfie-viewing	−0.07 (0.77)	0.09 (0.72)	4.04	< .001	0.21
Thin-ideal internalization	2.92 (0.84)	3.39 (0.79)	10.81	< .001	0.59
Media literacy	3.44 (0.75)	3.38 (0.69)	1.52	.128	0.08
Restrained eating	2.23 (0.88)	2.52 (0.91)	6.23	< .001	0.32

Note. Mean for selfie-viewing was calculated by averaging *z*-scores of all items.

Table 5. *Testing the Moderating Role of Gender in the Mediation Model.*

Predictors	Model 1 (thin-ideal internalization)			Model 2 (restrained eating)		
	β	*t*	*p*	β	*t*	*p*
BMI	.19	7.29	< .001	.22	9.39	< .001
Selfie-viewing	.21	5.63	< .001	.12	3.31	.001
Gender	.53	−10.89	< .001	−.14	−2.98	.003
Selfie-viewing × Gender	−.04	−0.82	.414	−.09	−1.80	.073
Thin-ideal internalization				.35	9.65	< .001
Thin-ideal internalization × Gender				−.01	−0.25	
R^2	.14			.23		
F	59.49		< .001	71.84		< .001

Discussion

Our finding revealed that selfie-viewing had a positive relationship with restrained eating among adolescents. Restrained eating has been found to be related to negative psychological and physical health outcomes, such as disordered eating, depression, and suicidal ideation (Polivy & Herman, 1985; Pollert et al., 2016; Wang et al., 2020). In recent years, restrained eating has become increasingly common among Chinese young people (Xiong et al., 2022; Yong et al., 2021). However, research examining the antecedents of restrained eating in the Chinese context is little. Previous research that has shown that selfie-viewing is a risk factor of body image concerns (Fardouly & Rapee, 2019; Kleemans et al., 2018; Wang, Fardouly, et al., 2019; Wang, Xie, et al., 2019). Building upon these studies and considering the popularity of selfie activities in China (J. Fan, 2018), the current study thus explored the possible link from selfie-viewing to restrained eating among Chinese adolescents. Our finding suggests that viewing selfies on social media may have a negative influence on adolescents' eating behaviors, which is consistent with sociocultural model (Stice, 1994; Thompson et al., 1999). In particular, selfies on social media exert appearance-related pressures on viewers due to their attractiveness and unattainability, which ultimately lead to negative effects on viewers' eating behaviors. Additionally, by focusing on selfie-viewing on social media, our research provides a fresh perspective to explore the influence of social media use on eating disorders, thereby enriching the existing literature in this field (Rodgers & Melioli, 2016).

Consistent with the hypothesis, thin-ideal internalization mediated the relationship between selfie-viewing and restrained eating. This result is congruent with the sociocultural model (Stice, 1994; Thompson et al., 1999) and extends previous findings that appearance-ideal internalization mediated the association between sociocultural factors (e.g., media consumption and Internet exposure) and body image and eating concerns among adolescent boys and girls (Tiggemann & Slater, 2014; Vandenbosch & Eggermont, 2012, 2013). As mentioned before, selfies shared on social media are usually modified to confirm to the standard of beauty described in the culture (Fox & Vendemia, 2016; Stefanone et al., 2019). Therefore, viewers would internalize the thin-ideal when exposure to slim bodies in selfies. Furthermore, others' feedback on these selfies could intensify this effect (Tiggemann & Barbato, 2018; Tiggemann et al., 2018). In turn, thin-ideal internalization would relate to restrained eating (McLean et al., 2015; Schaefer et al., 2017).

In terms of the moderating effects, media literacy moderated the link from selfie-viewing to thin-ideal internalization, such that for individuals higher in media literacy, the association between selfie-viewing and thin-ideal internalization was weaker than that for those lower in media literacy. This finding is in accordance with previous findings that media literacy buffers the effect of exposure to appearance ideal on internalization of this ideal (Irving et al., 1998; Mingoia et al., 2020). These results can be explained by the proposed media literacy-body and eating concerns model (McLean et al., 2016b). In the case of the present study, when exposed to thin-ideal selfies, individuals with high media literacy may be more likely to evaluate these images as unrealistic, and therefore not internalize such appearance standard to evaluate themselves.

Unexpectedly, the link from selfie-viewing to restrained eating was not moderated by media literacy. This result suggests that the protecting role of media literacy in eating disorders might be indirect through mediating processes of body image variables. In other words, media literacy could buffer the negative effects of media on body image, such as thin-ideal internalization in the current study, which in turn is associated with less eating disorders. In line with this speculation, previous research showed that media literacy-based interventions reveal improvements in media literacy constructs and body-related variables, but not disordered eating (McLean et al., 2016b). Additionally, in the present study media literacy was measured using the Critical Consumption subscale of NMLS (Koc & Barut, 2016). Although this measure was developed to target new media, including social media examined in the current study, it might lack specificity to capture the unique aspects of social media. Recently, measurement approaches have been designed to focus on specific features of social media literacy. For instance, commercial social media literacy and peer social media literacy were separately assessed to capture individuals' capacities to deconstruct social media content (Tamplin et al., 2018). Notably, although some progress has been made in assessing social media literacy, further exploration is needed to validate the existing measures and explore innovative measurement approaches, as suggested by Paxton et al. (2022).

No gender differences were found in the mediation model, which is consistent with the finding that little evidence of gender differences in the indirect effects from risk factors to body dissatisfaction and eating concerns through internalization and comparison (Vartanian et al., 2018). However, this result is somehow inconsistent with previous finding that thin-ideal internalization mediated the association between sociocultural influence and body

dissatisfaction for Chinese women, but not men (H. Chen et al., 2007). This inconsistence of findings among male group might be explained by the idol worship in China today. Specifically, many popular male celebrities in recent China usually have some androgynous features in appearance, which propagandizes an ideal body for men that is similar to the thin ideal (L. Chen, 2018). As a result, after exposure to media, such as selfies on social media, men would also internalize the thin-ideal, which in turn would contribute to restrained eating. Notably, more future research is necessary to figure out this issue given the lack of research on Chinese males' body image.

Several limitations should be addressed. First, participants in this study focused on Chinese adolescents. Samples from other cultural backgrounds and age groups might worth investigating in the future. Additionally, the present study used a community sample which might limit the generalization of the results to subclinical and clinical samples. Second, the design of this study was cross-sectional, which made the results not valid enough to reach casual conclusion. Future research could test the model through longitudinal designs. Third, data collection was based on self-report measures, which might have influence on the results to some extent. Future research could conduct other methods to enhance the measurement and analysis of selfie behaviors. One such method is content analysis, which could be employed to code selfies posted online (Qiu et al., 2015), along with the accompanying feedback. This approach would further enable researchers to investigate potential connections between these selfie behaviors and other variables. Furthermore, the selfie-viewing measure in the current study exhibited a low alpha value due to its inclusion of items that assessed a range of behaviors (i.e., viewing and examining the selfies and the related comments/likes). Future research could further differentiate between casual browsing and attentive observation of selfies to examine their possible distinct effects on viewers' body image and eating behaviors.

Despite these limitations, the current study has some implications. From the theoretical perspective, our study explored the association between selfie-viewing and restrained eating as well as the mediating role of thin-ideal internalization, which enriches sociocultural theory and research on eating concerns in the context of social media and more specifically in relation to selfie activities. In addition, the examination of the moderating effect of media literacy also confirms the proposed media literacy-body and eating concerns model. From the practical perspective, our study indicated that media literacy buffered the negative effect of selfie-viewing on thin-ideal internalization, which suggests that educational program aiming to improve media literacy (including social media literacy) would be beneficial for the development of positive body image and thus reducing the risk of restrained eating among adolescents.

Conflict of Interest

The authors have no conflicts of interest to declare.

Authors' Contribution

Yuhui Wang: conceptualization, writing—original draft, funding acquisition. **Xiao Gu**: methodology, formal analysis. **Jingyu Geng**: writing—review & editing. **Xinyi Wei**: investigation, visualization. **Li Lei**: supervision, conceptualization.

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