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Selfie-Posting and Young Adult Women's Restrained Eating: The Role of Commentary on Appearance and Self-Objectification

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Abstract

Considering the prevalence of social networking sites (SNSs) and restrained eating among young adult women, the present study aimed to investigate the association between selfie-posting on an SNS (WeChat Moments, the most widely used SNS in China) and self-objectification among Chinese young adult women as well as the mediating effects of commentary on appearance and self-objectification from the perspective of self-perception theory and objectification theory. A sample of 886 female undergraduate students who had an active WeChat Moments account were recruited voluntarily to complete questionnaires on selfie-posting on SNS, general SNS use, commentary on appearance on SNSs, self-objectification, and restrained eating. The results indicated that after controlling for general SNS use, age, and BMI, selfie-posting on a SNS was positively associated with restrained eating. Commentary on appearance and self-objectification mediated this association, which contained three mediating paths: the separate mediating effects of commentary on appearance and self-objectification and the serial mediating effect of commentary on appearance and self-objectification. These results indicate that selfie-posting and commentary on appearance on a SNS rather than general SNS use are risk factors accounting for restrained eating, which has theoretical and practical implications in terms of SNS use and restrained eating.

Keywords Social networking site · Selfie-posting · Self-objectification · Commentary on appearance · Restrained eating

Nowadays, restrained eating has been a common phenomenon among young women all over the world; nearly 50% of young adult women suffer from various restrained eating behaviors (Dong et al. 2016; Field et al. 2010; Forman and Butryn

2015). *Restrained eating* refers to the sustained and intentional restriction of caloric intake with the aim of losing and maintaining body weight or improving body image (Westenhoefer et al. 2013). However, empirical studies have revealed the opposite results: restrained eating is positively associated with weight gain and obesity (Dong et al. 2015; van Strien et al. 2014) as well as eating disorders (Stice et al. 2017). In addition, restrained eating is also detrimental to individuals' health and well-being; it can lead to low self-esteem, anxiety (Cardi et al. 2015), depression, and even suicide (Goldfield et al. 2010; Pollert et al. 2016).

Against this background, the factors influencing restrained eating have been the focus of multiple studies. Relevant studies found positive associations between social environmental factors (such as maternal weight concerns and the depictions of ideal body and appearance in the mass media) and restrained eating (Jonker et al. 2016; Mclean et al. 2016). As a popular form of media as well as an indispensable component in our daily lives (Meier and Gray 2014; Murray et al. 2016), the association between social networking sites (SNSs) use and young adult women's restrained eating needs further examination. Although studies have found that SNS use (time

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and frequency) is positively associated with body image concerns, restrained eating, and eating disorders (Hendrickse et al. 2017; Mabe et al. 2014; Murray et al. 2016), SNSs provide users with various applications and functions, which may have different effects on individuals' adaptation (Niu et al. 2018; Rosenthal et al. 2016). The general measure of SNS use in terms of time and frequency cannot clearly reveal this association; instead, specific behaviors on SNSs may be more predictive of body image and disordered eating (Holland and Tiggemann 2016; Walker et al. 2015). Therefore, it is of great significance to investigate the influence of specific activities on SNSs (such as posting photos of one's self) on restrained eating as well as its underlying mechanism.

At the same time, previous studies on SNSs have mainly been conducted in western culture with Facebook (Niu et al. 2018; Zheng et al. 2018). In China, there are some SNSs similar to Facebook in their interface and function: Users can post self-relevant information (mainly text and photos) on their personal homepage, which can be easily accessed and commented upon by friends. Among these SNSs, WeChat Moments stands out as the most widely used in China; the number of its users accounts for 87.3% of Chinese Internet users (China Internet Network Information Center 2018). Relevant studies in China also found a positive association between SNS use and both self-objectification and body image dissatisfaction (An 2017; Zheng et al. 2018), which are risk factors of restrained eating. Therefore, it is necessary to conduct additional studies in a Chinese sample. In particular, SNS use and selfie-posting are also more popular among young adult women (Sung et al. 2016; Zheng et al. 2018). On these basis, the present study aimed to investigate the association between specific activities on SNSs (such as posting photos of one's self) and restrained eating among Chinese young adult women.

Selfie-Posting on SNSs and Restrained Eating

The word *selfie* refers to a self-portrait taken using a smart phone for posting on SNSs (Qiu et al. 2015). With the popularity of smart phones and SNSs, selfie-posting has become one of the most popular activities on SNSs (Chua and Chang 2016; Ji and Chock 2017). Posting selfies is not only a photo-sharing behavior but it also is an important means of self-presentation (Barry et al. 2015; Meier and Gray 2014). SNSs provide users with a perfect platform for meticulous self-presentation in which individuals can present their ideal and most desirable traits and images (Seidman 2013). Therefore, selfies posted on SNSs are self-focused, with attempts to gain attention and positive feedback from others on their appearance, affiliations, or accomplishments (Chua and Chang 2016; Fox and Vendemia 2016; Vaate et al. 2018). At the same time, many users would edit or "photoshop" their selfies before

posting, which refers to digital enhancement of selfies using computer programs or smartphone applications (e.g., using filters, enlarging eyes, removing blemishes or slimming faces) for better online presentation of the self (Mcleanc et al. 2015).

With the popularity of selfie-posting, studies have investigated its influencing factors (e.g., personality and narcissism) (Qiu et al. 2015; Vaate et al. 2018; Weiser 2015), and more attention also has been paid to the influence of selfie-posting on individuals (Cohen et al. 2018; Zheng et al. 2018). Self-perception theory points out that, when engaging in self-presentation, one infers beliefs about themselves from an audience's perspective (Bem 1972). Namely, the characteristics or traits that are presented to others become more salient and are more likely to guide their future behaviors (Schlenker et al. 1994). This theory is also adopted to explain self-perception and behaviors on SNSs—for example, sexy self-presentations on SNSs increase willingness to engage in sexting (Oosten and Vandenbosch 2017) and photo- and selfie-related activity on SNSs has been positively associated with body image disturbance and eating disorders (Cohen et al. 2018; Mabe et al. 2014; Meier and Gray 2014). Based on these notions and subject to the perspective of self-perception theory, our study aimed to investigate the association between selfie-posting on an SNS and restrained eating as well as its underlying mechanisms. We hypothesized that selfie-posting on the SNS would be positively associated with restrained eating (Hypothesis 1).

Commentary on Appearance and Self-Objectification

Commentary on appearance is another important risk factor for restrained eating (Am and Perez 2013). This factor is expected to lead individuals to pay more attention to their appearance and body image and to further adopt restrained eating to maintain or improve their appearance and body image (Chang et al. 2014; Herbozo et al. 2017b). Because of the wide audience on SNSs, individuals can easily receive feedback and evaluation from others; in particular, appearance-related features on SNSs will receive much attention and comments (Fox and Vendemia 2016; Jong and Drummond 2016). At the same time, given the nature of selfies (i.e., they are self-focused with attempts to gain attention and feedback from others; Barry et al. 2015), selfie-posting increases the chance and frequency of obtaining commentary on one's appearance (Chua and Chang 2016; Vries et al. 2016). Based on objectification theory and relevant studies, we further hypothesized that commentary on appearance would mediate the influence of selfie-posting on restrained eating (Hypothesis 2a).

Self-objectification refers to the notion that women internalize an observer's perspective as a primary view of their own bodies or physical selves; that is, they look at and

evaluate themselves on the basis of their appearance (Fredrickson and Roberts 1997). Self-objectification is also a main predictor of body image disturbance and eating disorders (Tiggemann and Slater 2015); individuals with higher levels of self-objectification tend to control or manage their weight through indoor tanning behavior or restrained eating and are also more likely to suffer from eating disorders (Dakanalis et al. 2015; Muehlenkamp and Saris-Baglama 2002). In addition, objectification theory states that self-objectification is affected by many environmental factors, such as the depiction of the ideal body and appearance in media as well as experiences with sexual objectification (e.g., commentary on appearance) in daily life (Fredrickson and Roberts 2010; Tiggemann and Slater 2015). In the current information society, selfie-posting has been a common means of self-presentation on SNSs (Jong and Drummond 2016) and may also be an important factor associated with self-objectification, according to self-perception and objectification theories (Bem 1972; Schlenker et al. 1994). Studies have found that SNS use, especially selfie-posting on SNSs, increases the risk of self-objectification among women (Manago et al. 2015; Zheng et al. 2018). Thus, we hypothesize that selfie-posting can influence restrained eating through the mediating role of self-objectification (Hypothesis 2b).

In addition, as we discussed, selfie-posting on SNSs can increase the frequency of obtaining commentary on appearance (Vries et al. 2016), which is a common sexual objectification experience. Thus, commentary on appearance will increase the risk of self-objectification and further lead to restrained eating (Calogero et al. 2010; Herbozo et al. 2013). Therefore, we further hypothesized that selfie-posting could influence restrained eating through a serial mediating effect of commentary on appearance and self-objectification (Hypothesis 2c).

Current Study

In summary, given the perspectives of self-perception and objectification theories, our study aimed to investigate the association between selfie-posting on a SNS (WeChat Moments) and restrained eating among Chinese young adult women as well as its underlying mechanisms. We hypothesized that selfie-posting on the SNS would be positively associated with restrained eating and that commentary on appearance and self-objectification would mediate this association. Finding these connections might uncover the main risk factors on SNSs that account for restrained eating, and this research may provide guidance for reasonable and healthy SNS use as well as inform interventions focused on restrained eating within contemporary information-based society.

Method

Participants

Participants were recruited from two universities in central China through convenience sampling. In total, 917 female undergraduate students who had an active WeChat Moments account voluntarily participated in our study. The study was approved by the Ethical Committee for Scientific Research at the university of the authors, and informed consent from participants was also obtained. Finally, 31 students withdrew from this study for personal reasons, and 886 students ($M_{age} = 20.14$, $SD = 1.09$, range = 18–23) completed the paper-and-pencil survey in which measures were presented to participants in the order listed in the following.

Measures

General SNS Use

One item used by Nesi et al. (2017) was adopted to assess the average time that participants spent on WeChat Moments per day, rated on a 7-point scale from 1 (*less than 10 min*) to 7 (*4 or more hours*). The value of Skewness (−.02) and kurtosis (.06) of this instrument were within acceptable limits for normality, and One-Sample Kolmogorov-Smirnov Test (K-S $Z = .44$, $p = .63$) was insignificant, which showed this variable was normally distributed.

Selfie-Posting on the SNS

We adopted an item used by Weiser (2015) to measure the selfie-posting frequency on WeChat Moments in our study. Participants responded to the item: "How often would you say that you share selfies on WeChat Moments?" Response options included: 0 (*less than once a year*), 1 (*once a year*), 2 (*several times per year but less than once a month*), 3 (*once a month*), 4 (*a few times a month but less than once a week*), 5 (*once a week*), 6 (*a few times per week*), 7 (*once a day*), and 8 (*more than once a day*). The value of Skewness (−.15) and kurtosis (−.04) of this instrument were within acceptable limits for normality, and One-Sample Kolmogorov-Smirnov Test (K-S $Z = .65$, $p = .92$) was insignificant, which showed this variable was normally distributed.

Commentary on Appearance on the SNS

We adopted the Verbal Commentary on Physical Appearance Scale (Herbozo and Thompson 2006) for our study; this scale contains 21 items on both negative and positive comments on appearance (e.g., "You're looking kind of skinny"; "You are in great shape"). Participants were asked to provide a frequency

rating by indicating how often they had been the recipient of each listed comment with 5-point Likert-type scale from 1 (*never*) to 5 (*always*). To ensure the participants endorsed items based on their experiences on the SNS, we specified that the items should be limited to the SNS (WeChat Moments), and participants were asked to respond according to their experiences on WeChat Moments. Higher averaged scores indicate higher frequency of appearance-related comments on SNS. In our study, a confirmatory factor analysis showed a good fit (χ^2/df = 3.39, RMSEA = .07, AGFI = .92, NFI = .94, GFI = .92, IFI = .94, CFI = .95). Cronbach's alpha for this scale was .89.

Self-Objectification

We used the Objectified Body Consciousness Scale (OBCS) in our study; this scale contains 24 items and can be divided into three dimensions with eight items each: body shame (e.g., "I feel ashamed of myself when I haven't made the effort to look my best"), body surveillance (e.g., "I often worry about whether the clothes I am wearing make me look good"), and appearance control beliefs (e.g., "I really don't think I have much control over how my body looks"). This scale has been used with Chinese samples and was found to have good internal consistency and construct-convergent validity among young adult women (Chen and Russo 2010; Jackson et al. 2016). Participants were asked to answer these items on a 7-point scale from 1, (*completely disagree*) to 7 (*completely agree*); higher averaged scores indicate higher levels of self-objectification. In our study, the Cronbach's alpha coefficients for the dimensions were .89 for body shame, .85 for body surveillance, and .83 for appearance control beliefs; the Cronbach's alpha for the whole scale, which we used in subsequent analyses, was .91.

Restrained Eating

The Restrained Eating (RE) subscale of the Dutch Eating Behavior Questionnaire (DEBQ; van Strien et al. 1986) was used in our study. This subscale contains ten items measuring an individual's restrained eating behaviors associated with the reduction and maintenance of body weight and image in daily life (e.g., "Do you think about your weight and its relationship with what you eat?"). Participants were asked to respond on a 7-point scale from 1 (*never*) to 5 (*always*); higher averaged scores indicate higher levels of restrained eating in daily life. This subscale has been used with Chinese samples and was found to have good reliability and validity among young adult women (Dong et al. 2015; Hou et al. 2013). In our study, the Cronbach's alpha for this scale was .86.

Statistical Analyses

All the data were input and analyzed with SPSS 18.0. First, descriptive statistics and correlation analysis were calculated with SPSS. Then, the PROCESS macro (http://www.afhayes.com) for SPSS (Model 6), suggested by Hayes (2013), was adopted to test the multiple mediating model with 5000 bias-corrected samples, which could test complex models using bootstrapping techniques to calculate confidence intervals (the effect is significant when 95% CI does not include zero). In addition, the general use of SNSs is a key factor affecting individuals' adaptation and their experiences on SNSs (Niu et al. 2018; Oh et al. 2014), and age and BMI are also important factors associated with restrained eating (Nguyen and Polivy 2014; Westenhoefer et al. 2013). To exclude the influence of those factors on the results of our study, we included these factors as control variables in our statistical analysis.

Results

Control and Test of Common Method Bias

Common method bias may exist in our study because all data were collected through questionnaires with self-reporting. Although some techniques (e.g., protecting respondents' anonymity) were used to control and reduce this bias, a confirmatory factor analysis was further conducted to test whether a single factor can account for all the variances in these data (Podsakoff et al. 2003). The result showed a poor model fit (χ^2/df = 32.47, RMSEA = .21, TLI = .54, CFI = .61), indicating that the current study had no significant issue with common method biases for estimates of the relationships among constructs.

Descriptive and Correlation Statistics

Table 1 shows the means, standard deviations, and Pearson's correlations among all study variables. In support of Hypothesis 1, significant positive correlations existed between selfie-posting with commentary on appearance, self-objectification, and restrained eating. Also, as we expected, general SNS use was also positively correlated with these three study variables of interest.

Mediating Model Analyses

Table 2 presented estimates of the direct, indirect, and total effect, as well as each specific indirect effect. First, as can be seen in Table 2, when restrained eating was regressed on selfie-posting and general SNS use, only selfie-posting was significantly associated with restrained eating ($B_{\text{selfie-posting}}$ = .18, 95% CI [.08, .31]; B_{SNS} = .05, 95% CI [−.04, .12]). Then

Table 1 Descriptive statistics and correlations among study variables

Variable	M (SD)	Correlations					
		1	2	3	4	5	6
1. General SNS use	5.12 (1.45)	–					
2. Age	20.14 (1.09)	.15**	–				
3. Body Mass Index (BMI)	20.26 (2.57)	.05	−.03	–			
4. Selfie-posting	4.11 (1.42)	.30***	.05	−.10**	–		
5. Commentary on appearance	2.37 (.58)	.19***	.09*	.22***	.37***	–	
6. Self-objectification	3.82 (.94)	.14**	.12**	.18***	.19***	.52***	–
7. Restrained eating	2.46 (.73)	.11**	.16***	.27***	.20***	.38***	.41***

*$p < .05$. **$p < .01$. ***$p < .001$

the mediating results further showed that commentary on appearance and self-objectification mediated the association between selfie-posting and restrained eating (total indirect effect = .15, 95% CI [.08, .24]). Furthermore, the indirect effect contained three significant mediating pathways: selfie-posting → commentary on appearance → restrained eating (indirect effect = .07, 95% CI [.03, .13]), supporting Hypothesis 2a; selfie-posting → self-objectification → restrained eating (indirect effect = .03, 95% CI [.01, .06]), supporting Hypothesis 2b; and selfie-posting → commentary on appearance → self-

objectification → restrained eating (indirect effect = .04, 95% CI [.02, .07]), supporting Hypothesis 2c (see Fig. 1).

Discussion

From the perspectives of self-perception theory and objectification theory, we investigated the influence of selfie-posting on self-objectification among Chinese young adult women, as well as the underlying mechanisms. We found not only that

Table 2 Testing the pathways of the multiple mediation model

Path	Standardized Path coefficient	95% CI	
		Lower	Upper
a. Total effect model			
General SNS use	.05	−.04	.12
Age	.09	−.01	.15
Body Mass Index (BMI)	.14*	.04	.25
Selfie-posting → Restrained eating	.18**	.08	.31
b. Multiple mediation mode			
Direct effects			
General SNS use	.03	−.08	.09
Age	.06	−.02	.12
Body Mass Index (BMI)	.10*	.02	.16
Selfie-posting → Restrained eating	.05	−.05	.16
Selfie-posting → Commentary on appearance	.29***	.20	.40
Commentary on appearance → Restrained eating	.27***	.10	.48
Selfie-posting → Self-objectification	.10*	.04	.17
Self-objectification → Restrained eating	.33***	.15	.55
Commentary on appearance → Self-objectification	.40***	.23	.55
Indirect effects			
Total indirect effect	.15	.08	.24
Selfie-posting → Commentary on appearance → Restrained eating	.07	.03	.13
Selfie-posting → Commentary → Self-objectification → Restrained eating	.04	.02	.07
Selfie-posting → Self-objectification → Restrained eating	.03	.01	.06

*$p < .05$. **$p < .01$. ***$p < .001$
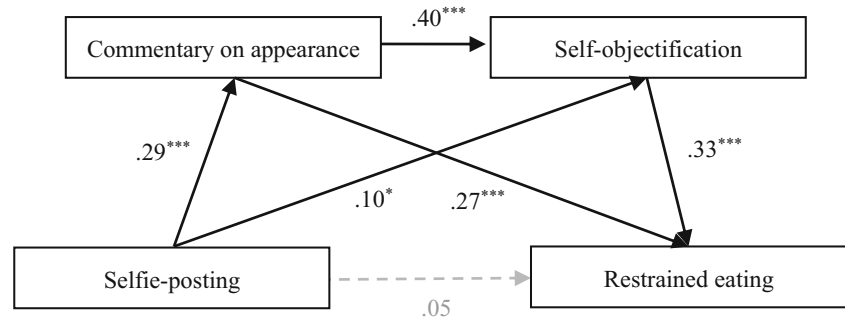
selfie-posting on social networking sites was positively associated with restrained eating but also that commentary on appearance and self-objectification mediate the association between selfie-posting and restrained eating.

Consistent with relevant studies investigating the influences of self-presentation on SNSs on individuals (Oosten and Vandenbosch 2017), our study further found a positive association between selfie-posting on a SNS and restrained eating. According to self-perception theory, when engaging in self-presentation, one will infer beliefs about oneself and one's behavior from an audience perspective; thus, the characteristics or traits presented to others would influence an individual's self-perceptions and future behaviors (Bem 1972; Schlenker et al. 1994). As an important manner of self-presentation on SNS, selfies are always self-focused, with attempts to highlight their sexy and attractive appearance characteristics (Barry et al. 2015; Chua and Chang 2016). In particular, some women also expect to be evaluated based on their appearance when they portray themselves to a large audience online (Zheng et al. 2018). Thus, selfie-posting on SNSs would cause women to pay more attention to their appearance and body image and further engage in behaviors aiming to improve appearance and body image, such as restrained eating.

Our results further uncovered some mechanisms underlying the association between selfie-posting and restrained eating by revealing the mediating roles of commentary on appearance and self-objectification. Individuals receive feedback and evaluations from SNSs' audiences, in particular, focusing on appearance-related features (Barry et al. 2015; Jong and Drummond 2016; Vaate et al. 2018). Therefore, selfie-posting increases chances for and frequency of obtaining commentary on one's appearance on the SNS (Chua and Chang 2016; Vries et al. 2016).

At the same time, appearance-related commentary is a main risk factor for restrained eating (Calogero et al. 2010; Chang et al. 2014; Herbozo et al. 2013) because it can shape individuals' self-perceptions about their body image and further influence their appearance-related behaviors. Specifically, negative commentary may induce low physical self-evaluation (i.e., reduced body self–esteem and increased body shame), causing individuals to engage in more body

surveillance and behaviors aimed at improving performance, such as cosmetic surgery and restrained eating. In contrast, positive commentary may reinforce positive body image and appearance control beliefs, also leading to behaviors associated with maintaining or improving appearance, such as applying makeup, indoor tanning, and restrained eating (Choukas-Bradley et al. 2018; Herbozo et al. 2013, 2017a, b). Thus, selfie-posting influences restrained eating through its mediating effect on commentary on appearance.

In addition, according to self-objectification theory and relevant empirical results, self-objectification is another main risk factor for restrained eating and eating disorders (Dakanalis et al. 2015; Fredrickson and Roberts 1997; Tiggemann and Slater 2015). At the same time, self-objectification tends to induce negative emotions and more evaluation of appearance (such as body shame), as well as the pursuit of a sexy and attractive appearance, so that individuals with higher levels of self-objectification are more likely to engaged in behaviors such as restrained eating to maintain or improve appearance (Fredrickson et al. 1998; Herbozo et al. 2013; Manago et al. 2015). At the same time, the essence of self-objectification is that women internalize an observer's perspective as a primary view of their own bodies or physical selves (Fredrickson and Roberts 1997), and self-perception theory points out that one infers beliefs about oneself from an audience's perspective (Bem 1972). Thus, as an important manner of self-presentation, the self-focused selfies lead to self-objectification and further increase the risk for restrained eating. That is, selfie-posting influences restrained eating through the mediating effect of self-objectification.

Self-objectification theory also states that self-objectification is affected by many environmental factors, especially sexual objectification experiences, such as commentary on appearance (Tiggemann and Slater 2015). In addition, relevant studies have found that selfie-posting on SNSs increases the frequency of obtaining commentary on appearance (Chua and Chang 2016; Vries et al. 2016), which may increase the risk for self-objectification and further lead to restrained eating (Herbozo et al. 2013; Tiggemann and Slater 2015). Thus, selfie-posting might also influence restrained eating through the serial mediating effects of commentary on appearance and self-objectification.

In sum, the current study extends previous research by revealing that selfie-posting and commentary on appearance, rather than general SNS use, are risk factors explaining the association between SNSs and restrained eating. Based on relevant studies (Oosten and Vandenbosch 2017), our result further indicates that self-perception theory can also explain the influences of self-presentation on SNS: Sexual objectification experiences (such as commentary on appearance) were also present on SNS, which also increase the risk for self-objectification and restrained eating.

Practice Implications

Our results also have some practical implications. It is important for us to note that creating and posting appearance-related information on SNSs puts users at risk for sexual objectification and restrained eating. It is important then to inform individuals about the potentially negative effects of selfie-posting and appearance-related commentary on SNSs. Educators and policymakers should take actions to educate individuals to use SNSs knowledgeably and to prevent users from being too involved in body-focused activities such as selfie-posting.

Limitations and Future Research Directions

The current findings should be considered in the light of multiple limitations. First, causal hypotheses cannot be tested through cross-sectional survey research such as our study. Future work should include longitudinal or experimental research to strictly confirm the causal nature of the relationships we explored. Second, although selfie-posting, self-objectification, and restrained eating are more common among young women (Barry et al. 2015; Tiggemann and Slater 2015), they are also exhibited by men and significant gender differences are also shown in their influences on individuals (Choma et al. 2010; Manago et al. 2015; Sorokowski et al. 2016). Third, the limited generalizability of our findings should be acknowledged. Thus, diverse participants (e.g., different genders and cultural backgrounds) are required in future studies. Finally, considering the specific influence of appearance-related commentary on individuals (Calogero et al. 2010), the attributes (positive or negative) of commentary on appearance should also be considered in future studies.

Conclusions

The present study revealed the positive association between selfie-posting on a SNS and young adult women's restrained eating as well as its underlying mechanism—the mediating effects of commentary on appearance and self-objection. Our study not only indicates that selfie-posting and commentary on appearance on a SNS, rather than general SNS use, are risk factors accounting for Chinese young adult women's

restrained eating, but also highlights that selfie-posting and commentary on appearance on SNSs may be risk factor for sexual objectification and restrained eating.

Compliance with Ethical Standards All ethical guidelines for human subjects' research were followed.

Conflict of Interest All authors declare they have no conflicts of interest.

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