

ORIGINAL ARTICLE

Appearance is power: How different types of social media use affect appearance anxiety

Jiaxi Chen¹, Manlin Wu¹, Han Zhang¹, Wenfeng Chen^{2,*}

¹Department of Psychology, Renmin University of China, Beijing 100872, China

²Faculty of Health and Wellness, City University of Macau, Macau 999078, China

ABSTRACT

Previous research on social media use has predominantly treated all users as homogeneous, potentially overemphasizing the severity of issues like appearance anxiety. This study conducted a survey of 461 college students, and adopted objective indicators such as the number of friends and use time to classify social media user groups into a high-frequency normal group, a low-frequency normal group, and an unusual group. The mediating role of objectification was used to explain the relationship between social media use and appearance anxiety. Results showed: (1) High-frequency social media use significantly influenced appearance anxiety, with stronger effects in the unusual group; (2) The unusual group showed significantly higher levels of appearance anxiety and objectification compared to the high- and low-frequency normal groups, with objectification partially mediating the impact of social media use on appearance anxiety in the unusual group. This study clarifies the negative effects of normal and unusual social media use patterns on appearance anxiety, offering new insights for future research.

Key words: social media use, appearance anxiety, objectification, typological analysis

INTRODUCTION

As of January 2020, China boasted 1.04 billion social media users, with a penetration rate of 72%, notably higher than the global average of 49% (Kemp, 2020). In the contemporary era, social media platforms have transcended the realm of simple communication and sharing, emerging as crucial channels for comprehending others' lives and establishing social connections. Nevertheless, while offering entertainment and a means of passing time, social media can also exert substantial negative effects on individuals. For example, the widespread body symbols and distorted beauty trends (such as the “white, young, and slim” ideal or the “ant waist” standard) frequently conflict with users' actual physical appearances, shattering their pre-existing

aesthetic concepts and giving rise to varying levels of appearance anxiety, which poses severe threats to both mental and physical well-being.

Previous researchers have often treated social media users as homogeneous, neglecting the differential effects of different use habits and patterns on appearance anxiety. While China's social media environment grows more complex and its user population expands, individuals vary in their susceptibility to the adverse psychological impacts—particularly those related to appearance anxiety. Earlier studies distinguished social media use into active and passive types, suggesting differing influences (Bessière et al., 2008), but failed to categorize different types of social media users. Therefore, there is a need for further exploration into social media use variations and user typology.

*Corresponding Author:

Wenfeng Chen, Faculty of Health and Wellness, City University of Macau, Rua de Tomás Pereira, Macau 999078, China. Email: wenfeng118@hotmail.com; <https://orcid.org/0000-0002-4271-8366>

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Measurement of objective and subjective indicators in social media use and typological classification

Most studies on social media neglect to distinguish between objective and subjective indicators of social media use. Objective indicators encompass measurable aspects, including use time, frequency, and specific behaviors. In contrast, subjective indicators relate to individuals' emotional attitudes towards social media, such as their sense of life integration and emotional dependence (Huang, 2021). In fact, these two types of indicators represent different dimensions of social media use and have distinct implications. On one hand, objective and subjective indicators are not entirely independent; they demonstrate strong associations. A survey of social media use among vocational college students found a significant moderate correlation between use time and sense of dependency (Mi & Zhang, 2018). This implies that objective indicators can, to some extent, predict subjective ones. Moreover, research has indicated that when only the objective measure of social media use time is employed as an indicator of social media involvement, it significantly and positively predicts individuals' subjective feelings of loneliness (Whaite et al., 2018). In other words, objective indicators can partially predict individuals' subjective experiences. On the other hand, there are disparities in the predictive effects of objective and subjective indicators on psychological factors like addiction. Some studies have revealed that social media use time alone cannot predict the existence of related psychological issues (Seabrook et al., 2016). Griffiths and colleagues found that adolescents with problematic subjective attitudes towards social media use showed higher levels of addiction compared to those who used social media frequently from an objective perspective (Griffiths et al., 2014). Therefore, when examining the impact of social media use on appearance anxiety, it is essential to distinguish between objective and subjective indicators.

The inconsistency in the predictive effects between use time as an objective indicator and subjective indicators may be ascribed to differing use needs, which result in different subjective meanings for the same objective measure. For example, the same use time or frequency of social media use can have diverse impacts on individuals depending on their specific situations. Research has shown that social media dependency among vocational college students is influenced not only by use time but also by the underlying needs (Mi & Zhang, 2018). The needs driving social media use can be classified into active and passive use according to the nature of the activities. Active use refers to direct communication activities on social media platforms, such as chatting or posting updates, while passive use involves observing others' lives without direct

participation, such as browsing profiles, images, videos, or updates (Burke et al., 2011; Verduyn et al., 2017). In this study, it is posited that social interaction needs are one of the most crucial needs and play a significant role in differentiating between active and passive use. For users engaged in active social media use, higher levels of social interaction needs are associated with longer time of active use, whereas lower levels lead to shorter time. However, for passive users, their use time is less affected by social interaction needs. An important objective factor reflecting social interaction needs is the number of social media friends, which leads us to introduce the second objective indicator in this study, *i.e.*, the number of friends.

As previously mentioned, subjective and objective indicators of social media use should not be confused, yet they are interconnected in varied aspects. Objective indicators of social media use-- such as use behavior, frequency, and number of friends--can, to some extent, reflect users' attitudes, goals, and personalities. For example, Gil de Zúñiga and colleagues (2017) found that the frequency of social media use was positively correlated with extraversion, agreeableness, and conscientiousness, while negatively correlated with emotional stability. Therefore, individuals belonging to different objective indicator categories may have distinct subjective experiences, motivations, and psychological processes during social media use. To clarify the differences among various social media user groups, this study uses two interrelated objective indicators—use time and number of friends—as classification criteria for identifying different social media use patterns, with the number of friends serving as an indicator reflecting social interaction needs (Dai et al., 2023). Thus, we propose the first hypothesis: Social media users can be categorized into three types based on the degree of match between their use time and number of friends [H1, Table 1].

Social media use and appearance anxiety

Appearance anxiety is defined as a socially evaluative anxiety (Dion et al., 1990), which is characterized by an individual's negative assessment of their overall physical appearance (Hart et al., 2008). A large amount of research has investigated the negative impacts of appearance anxiety on individuals. Individuals experiencing appearance anxiety often worry about whether their looks align with societal beauty standards and feel tense or anxious in anticipation of possible negative evaluations. This type of anxiety can also interfere with social interactions and may even contribute to the development of eating disorders (Fardouly et al., 2015; Rieger et al., 2010).

Previous studies that treated social media users

Table 1: Typology analysis of social media use

Number of friends	Low frequency	High frequency
Few friends	Low-frequency normal users (low-frequency group)	High-frequency unusual users (unusual group)
Many friends	Rare	High-frequency normal users (high-frequency group)

Note: Logically, there are few individuals who have many friends but relatively low social media use. Thus, this study neglected this rare type.

homogeneously have consistently concluded that a higher intensity of social media use is associated with higher levels of appearance anxiety and its related negative consequences. For example, the use of social networks has been associated with restrictive eating behaviors (Guo, 2019), which are significantly and positively correlated with appearance anxiety (Ma & Lan, 2022). Fardouly and colleagues (2015) found that the time and frequency of Facebook use were significantly and positively correlated with women’s self-objectification and body shame. Consistent with these findings, Lin (2019) reported that social media use results in increased body shame and anxiety among individuals in China. Moreover, Mi and Zhang (2018) suggested that prolonged exposure to aesthetic trends on social media can intensify perfectionism regarding appearance among college students, thus contributing to appearance anxiety.

However, these findings neglect the heterogeneity in the patterns of social media use across different groups. Social media activities can generally be classified into two types: active use and passive use (Burke *et al.*, 2010). Passive social media use refers to observing others’ lives without direct involvement (*e.g.*, browsing news feeds, viewing profiles, images, and status updates of other users), which has been shown to increase the risk of anxiety and depression (Burke *et al.*, 2011; Verduyn *et al.*, 2017). Verduyn and colleagues (2017) proposed that passive social media use triggers upward social comparisons. According to social comparison theory, comparing oneself with more attractive peers can lead to anxiety about one’s own appearance (Lewallen & Behm-Morawitz, 2016; Perloff, 2014). Therefore, individuals engaged in passive social media use show higher levels of appearance anxiety. In contrast, active social media use involves activities that facilitate direct interaction with others (*e.g.*, personal interaction, posting on Wechat moments). Active social media use has been demonstrated to have positive effects by cultivating a sense of social connectedness and improving well-being (Verduyn *et al.*, 2017). Consequently, active social media use may alleviate appearance anxiety to some extent.

As previously stated, social media users can be classified into low-frequency, high-frequency, and unusual groups based on differences in their patterns of use. The

question then arises: How does appearance anxiety vary among these distinct groups? This study hypothesizes that both the low-frequency and high-frequency groups mainly engage in active social media use, while the unusual group spends a significant amount of time on passive use. This implies that as the intensity of use increases, members of the unusual group may experience more frequent social comparisons, leading to heightened appearance anxiety. In contrast, for the low-frequency and high-frequency groups, increased social media use does not have such a pronounced impact. Although higher social media use is associated with greater appearance anxiety among all individuals, the predictive power of social media use intensity on appearance anxiety may differ between normal and unusual groups.

Based on these observations, we propose the second and third hypotheses as following: The appearance anxiety of low-frequency and high-frequency groups is significantly lower than those of that unusual group (H2); Social media use positively predicts appearance anxiety among college students, and this predictive effect is stronger for the unusual group compared to the low-frequency and high-frequency groups (H3).

Mediating role of self-objectification

To further elucidate the disparities in appearance anxiety among different user groups, self-objectification is introduced as a mediating variable. Objectification is defined as the process through which individuals adopt an observer’s perspective toward their own body, focusing excessively on appearance over other aspects of self (McKinley & Hyde, 1996). High levels of objectification are frequently linked to anxiety, depression, and body shame (Guizzo & Cadinu, 2017). Research has indicated that during social media use, individuals internalize unrealistic beauty standards for self-evaluation. Individuals with stronger self-objectification tendencies are more prone to adopting others’ perspectives when evaluating themselves, thereby leading to higher body shame and appearance anxiety (Ching & Xu, 2019).

The objectification theory posits that exposure to objectifying environments heightens the probability of self-objectification (Fredrickson & Roberts, 1997).

Empirical research indicates that exposure to highly objectified images on social media may heighten self-objectification, which in turn is associated with reduced psychological well-being and increased depressive symptoms (Fardouly et al., 2015; Tang et al., 2024). For the “unusual” group, their prevalent passive social media behavior, which involves frequently browsing others’ profiles, pictures, and status updates, exposes them more often to objectifying environments. This exposure renders them more vulnerable to self-objectification and, consequently, more intense appearance anxiety. In contrast, both the high-frequency and low-frequency groups predominantly engage in active social media use, such as communicating and interacting with friends and family. This type of engagement exposes them less to objectifying content, thus reducing the likelihood of increased self-objectification.

In summary, we propose the fourth hypothesis as following: Compared to the unusual group, low-frequency and high-frequency users are less likely to experience increases in objectification levels through social media use, which in turn affects appearance anxiety. Conversely, the unusual group is more likely to experience heightened appearance anxiety *via* the mediating effect of objectification (H4).

METHODS

Participants

This study was in accordance with the Declaration of Helsinki and approved by the Ethical Committee of Department of Psychology, Renmin University of China (IRB number 23-010). Informed consent was gained from each participant before their participation.

We employed the SoJump platform to survey 474 college students. After excluding 13 subjects with invalid responses that failed the lie-detection questions, a total of 461 valid questionnaires were obtained, resulting in an effective response rate of 97.3%. The sample included 181 males (39.3%) and 280 females (60.7%). The participants were distributed across different academic years as follows: freshmen ($N = 92$, 20.0%), sophomores ($N = 182$, 39.5%), juniors ($N = 119$, 25.8%), and seniors ($N = 68$, 14.8%). The age of the participants ranged from 17 to 26 years, with a mean age of 19.80 ± 1.44 .

Measures

Social Media Use Questionnaire

The Social Media Use Questionnaire, adapted by Huang (2021) from the Facebook Use Intensity Scale to generalize it for overall social media use, was employed. This scale contains 16 items across three dimensions: one objective dimension (social media use information) and two subjective dimensions (life integration and

emotional involvement). Responses were measured on a 5-point Likert scale, with higher total scores indicating greater social media use intensity. The reliability (α) for the subjective dimension was 0.87.

Social Appearance Anxiety Scale (SAAS)

The SAAS, originally developed by Hart et al. (2008) and subsequently translated and revised by Kong and Yang (2009), was utilized in this study. This scale consists of 16 items and is commonly employed to assess individuals’ overall feelings toward their appearance. Respondents rated each item on a 5-point Likert scale, with higher scores indicating greater social appearance anxiety. The reliability (Cronbach’s α) for this scale in the current study was 0.95.

Objectified Body Consciousness Scale (OBCS)

The OBCS, developed by McKinley et al. (1996), contains 24 items and measures dimensions such as body surveillance, body shame, and beliefs about appearance control. Following the approach used by Chen (2022), we adapted the scale for Chinese university students by reducing it to 20 items, removing items 6, 8, 15, and 24. The scale was assessed using a 7-point Likert format, with higher total scores indicating greater objectification. In this study, the reliability (Cronbach’s α) for this scale was 0.92.

State-Trait Anxiety Inventory (STAI)

The Trait Anxiety Inventory (T-AI), part of the Chinese version of the STAI, was used to assess university students’ trait anxiety levels, following the adaptation by Dai (2015). The scale uses a 4-point Likert format (1-4), with scores ranging from 20 to 80. Higher scores indicate more pronounced anxiety symptoms. Several items were reverse-scored in the analysis, and the total score ranges from 20 to 80, with higher scores reflecting greater trait anxiety. In this study, the Cronbach’s α coefficient for the scale was 0.90.

Data analyses

We utilized IBM SPSS Statistics 26.0 (descriptive analysis, correlation analysis, t-test and mediation analysis) and Stata 17.0 (OLS regressions and SUEST test) for the statistical analyses in our study. CFA and ULMC for common method bias test were run by Mplus 7.8. Statistical significance levels are indicated in the subsequent tables and figures as follows: * $P < 0.05$, ** $P < 0.01$, and *** $P < 0.001$.

RESULTS

Common method bias test

To investigate common method bias, we utilized three approaches: Harman’s single-factor test, factor model comparison, and control of unmeasured potential

method factors (ULMC) (Tang & Wen, 2020; Xiong *et al.*, 2012). First, through exploratory factor analysis using Harman's single-factor test, it was found that the unrotated solution yielded 10 eigenvalues greater than 1. The largest factor accounted for 26.96% of the variance, which is below the 40% threshold. Second, a comparison was carried out between the single-factor model (method factor) and a four-factor model (social media use, objectification, appearance anxiety, trait anxiety). The four-factor model significantly outperformed the single-factor model ($\Delta\chi^2/\Delta df = 681.01$, $P < 0.001$, $\Delta CFI = 0.23$, $\Delta TLI = 0.24$, $\Delta RMSEA = 0.03$). Finally, a ULMC test was performed by adding all items as indicators of a global method factor in addition to the four trait factors (social media use, objectification, appearance anxiety, trait anxiety) and comparing this model with one containing only the trait factors. The two models did not differ significantly ($\Delta\chi^2/\Delta df = 0.63$, $P = 0.531$, $\Delta CFI < 0.001$, $\Delta TLI = 0.001$, $\Delta RMSEA < 0.001$). Collectively, these results indicate that there is no severe common method bias among the variables.

Typological analysis of social media use

As previously proposed, our aim was to use objective indicators of social media use (number of friends and time spent) to predict subjective indicators and classify participants into different groups: low-frequency, high-frequency, and unusual groups. The crucial question is whether distinct groups can truly be identified. We initially conducted a K-means cluster analysis with social media use time and number of friends as observational indicators. The results indicated that the sample could be divided into three categories, as presented in Table 2.

The first category corresponds to the low-frequency group. This group is characterized by the number of friends mainly ranging from 101-500, relatively lower active social media use needs, and correspondingly shorter use time, mostly less than three hours. This group consisted of 214 participants, accounting for 46.4% of the sample.

The second category represents the high-frequency group. The number of friends in this group predominantly exceeds 500, indicating the highest level of active social media use needs and corresponding use time, which primarily range from three to seven hours. This group included 132 participants, making up 28.6% of the sample.

The third category corresponds to the unusual group. Although their number of friends was lower than those in the high-frequency group, mostly within 500, their social media use time was significantly higher than that of the other two groups, with most exceeding seven hours. This suggests that a substantial portion of their

time is devoted to passive social media use. The unusual group comprised 115 participants, accounting for 24.9% of the sample.

Overall, the cluster analysis results supported the typological analysis hypothesis H1 regarding social media use patterns.

Descriptive statistics of typological groups

Descriptive statistics were conducted on the three groups, revealing comparable proportions of female participants across all groups: 59.8%, 57.4%, and 65.2% respectively. The distribution of education years was also similar among the groups, with sophomores representing the largest proportion (average 38.4%), followed by juniors and freshmen (average 27.2% and 18.5% respectively), and seniors the smallest (average 15.8%). Professional distributions were largely consistent across groups, with a combined total of 90% of participants in liberal arts and science programs, with balanced representation between the two. Body mass index (BMI) indices showed similar compositions across all groups, with most participants having normal BMI levels (average 65.9%), while underweight and overweight participants each accounted for approximately 18.5% and 15.6% respectively.

The descriptive statistics for key variables in this study—subjective social media use, appearance anxiety, objectification, and the control variable trait anxiety—are presented in Table 3. It is evident that the unusual group showed higher levels on all three measures compared to the two normal user groups (see Section 3.5 for detailed comparisons).

Correlation analysis

The correlation analysis of different measurement indicators across the three groups is presented in Table 4. It showed that appearance anxiety was significantly correlated with subjective social media use, objectification and trait anxiety, and the correlations were higher in the unusual group; the correlation of subjective social media use and objectification is only significant in the unusual group.

Differences between groups

An analysis of variance (ANOVA) was conducted for trait anxiety, revealing no significant differences among the three groups ($F [2,458] = 0.321$, $P = 0.725$). To further verify the differences between the unusual group and the normal user groups (low-frequency and high-frequency), pairwise t-tests were performed.

Generally, the difference effect sizes between the unusual group and the two normal groups were moderate to small.

Low-frequency group vs. unusual group

The unusual group showed significantly higher social media use intensity compared to low-frequency normal users ($t [327] = 2.357, P = 0.019, d = 0.27$), indicating that objective indicators predict subjective experiences effectively; the unusual group identified through clustering indeed reported stronger subjective experiences.

Appearance anxiety was significantly higher in the unusual group compared to low-frequency normal users ($t [327] = 3.464, P = 0.001, d = 0.40$), supporting our hypothesis that the unusual group shows higher appearance anxiety levels.

Objectification scores were significantly higher in the unusual group than low-frequency normal users ($t [327] = 1.980, P = 0.049, d = 0.23$), indicating elevated objectification levels among unusual group individuals.

High-frequency group vs. unusual group

Significant differences were observed in appearance anxiety between the two groups ($t [245] = 3.097, P = 0.002, d = 0.40$). Objectification differences approached significance ($t [245] = 1.940, P = 0.054, d = 0.25$). Subjective social media use scores were higher in the unusual group but did not reach significance ($t [245] = 0.743, P = 0.458$).

Compared to differences with the low-frequency group, the similarities between the high-frequency and unusual groups in terms of objectification and social media use score differences diminished, aligning with previous findings based on ungrouped total samples.

These analyses for difference comparison further confirmed the results of the typological analysis, indicating that clustering based on objective indicators can reflect individuals' subjective feelings towards social media use. Additionally, the level of appearance anxiety among the unusual group was significantly higher than both the low- and high-frequency groups, thereby validating Hypothesis H2. The study also found that objectification levels were notably higher in the unusual group compared to other groups, but whether it plays a mediating role requires further investigation.

Influence of social media use on appearance anxiety

A linear regression analysis based on ordinary least squares (OLS) was conducted for all three groups of participants. As shown in Table 5, after controlling for trait anxiety, subjective social media use positively predicted appearance anxiety across all three groups. Notably, the beta coefficients and R^2 values for the unusual group were higher than those of the low-

frequency and high-frequency groups.

If we assume that the error terms between models are uncorrelated ($\text{corr}[\epsilon_1, \epsilon_2] = 0$), we can directly compare the OLS estimates across different groups. However, given that the social and environmental contexts of the two groups share many similarities, their error terms may be correlated ($\text{corr}[\epsilon_1, \epsilon_2] \neq 0$). To further test the differences in regression coefficients across groupings, this study employed a Seemingly Unrelated Estimation (SUE) approach based on the seemingly unrelated regression (SUR) model as suggested by Lian and Liao (2017). This method combines samples from both equations and performs generalized least squares (GLS) estimation for SUR. The null hypothesis of the SUEST test assumes that coefficients are correlated, implying that OLS regressions cannot be used to directly compare across groups.

First, the difference in regression coefficients between the low-frequency group and the unusual group was statistically tested, leading to the rejection of the null hypothesis ($P = 0.017$). This indicates that the beta coefficient for the unusual group is significantly higher than that for the low-frequency group. A similar test was then conducted between the high-frequency group and the unusual group; however, the null hypothesis could not be rejected ($P = 0.923$), suggesting no significant difference in beta coefficients between these two groups. These findings provide partial support for Hypothesis H3, further highlighting that excessive social media use is more likely to lead to problematic outcomes.

Despite the absence of significant differences in regression coefficients between the high-frequency group and the unusual group in terms of the direct effect on appearance anxiety through social media use, it remains intriguing why the high-frequency group showed lower levels of appearance anxiety. This discrepancy suggests the possibility of additional underlying mechanisms specific to the unusual group. To explore this further, we employed PROCESS Model 4 (SPSS macro) to investigate the mediating role of objectification in the relationship between social media use and appearance anxiety, while controlling for trait anxiety [Table 6]. The significance of all regression coefficients was evaluated using a bias-corrected percentile bootstrap method with 5,000 resamples, generating confidence intervals to assess the theoretical models.

For the low-frequency group, after controlling for trait anxiety, the direct effect of social media use on appearance anxiety was significant: $\beta = 0.25, SE = 0.55, P < 0.001$. When both social media use and objectification were included in the regression model, social media use remained a significant predictor of appearance

Table 2: The clustering analysis results (N = 461)

Group	Low-frequency group (N = 214)	High-frequency group (N = 132)	Unusual group (N = 115)
Number of friends in social media			
≤100	76 (16.5)	0	13 (2.8)
101-500	138 (29.9)	63 (13.7)	82 (17.8)
> 500	0	69 (15)	20 (4.3)
Time spent on social media			
≤3 h	138 (29.9)	53 (11.5)	0
3-7 h	76 (16.5)	79 (17.1)	40 (8.7)
> 7 h	0	0	75 (16.3)

The data were presented as N (%)

Table 3: Subgroup descriptive analysis

Measures	Low-frequency group	High-frequency group	Unusual group
Subjective social media use	19.7±5.8	20.8±4.6	21.3±5.9
Appearance anxiety	47.9±14.5	47.9±14.8	53.8±15.3
Objectification	65.1±13.5	64.8±13.8	68.4±15.3
Trait anxiety	47.1±7.9	46.6±8.6	47.4±8.4

Table 4: The variable correlations within each group

Group		Appearance anxiety	Subjective social media use	Objectification
Low-frequency group	Subjective social media use	0.301*		
	Objectification	0.362*	0.009	
	Trait anxiety	0.346*	0.096	0.258*
High-frequency group	Subjective social media use	0.447*		
	Objectification	0.543*	0.108	
	Trait anxiety	0.511*	0.096	0.511*
Unusual group	Subjective social media use	0.568*		
	Objectification	0.613*	0.297*	
	Trait anxiety	0.451*	0.160	0.479**

* $P < 0.01$

Table 5: The regression analysis of social media use on appearance anxiety (controlling for trait anxiety)

Group	Regression coefficient	Intercept	R ²
Low-frequency group	0.673 [#]	6.83	0.192
High-frequency group	1.291 [#]	-16.73	0.421
Unusual group	1.321 [#]	-6.32	0.456

[#] $P < 0.001$

anxiety: $c = 0.25$, $SE = 0.57$, $P < 0.001$. The bias-corrected percentile Bootstrap test indicated that the mediating effect of objectification was not significant: $ab = -0.004$, $Boot\ SE = 0.02$, 95% CI [-0.04, 0.04]. The proportion of mediation in the total effect was $ab / (ab + c) = 1.6\%$ [Figure 1].

For the high-frequency group, after controlling for trait

anxiety, the direct effect of social media use on appearance anxiety was significant: $c = 0.45$, $SE = 0.07$, $P < 0.001$. When both social media use and objectification were included in the regression model, social media use remained a significant predictor of appearance anxiety: $c = 0.48$, $SE = 0.08$, $P < 0.001$. The bias-corrected percentile Bootstrap test indicated that the mediating effect of objectification was not significant: ab

Table 6: Analysis of mediation effect (subjective social media use → objectification → appearance anxiety).

Group	Path type	Effect value	Boot se	95% confidence interval	
				Lower Limit	Upper Limit
Low-frequency group	Total effect	0.24	0.06	0.14	0.36
	Direct effect	0.25	0.05	0.15	0.36
	Indirect effect	-0.004	0.02	-0.04	0.04
High-frequency group	Total effect	0.48	0.08	0.32	0.64
	Direct effect	0.45	0.07	0.31	0.60
	Indirect effect	0.03	0.03	-0.03	0.10
Unusual Group	Total effect	0.49	0.07	<0.01	0.36
	Direct effect	0.40	0.06	<0.01	0.28
	Indirect effect	0.09	0.03	0.03	0.16

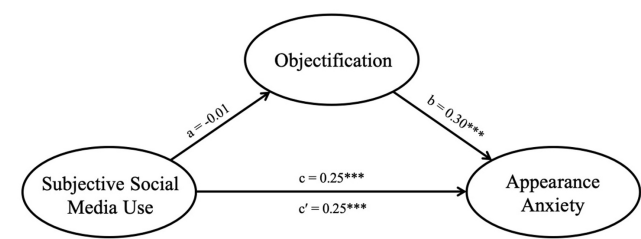


Figure 1. The mediating effect analysis for low-frequency normal users.

= 0.03, Boot *SE* = 0.03, 95% CI [-0.03, 0.10]. The proportion of mediation in the total effect was $ab / (ab + c') = 6.25\%$ [Figure 2].

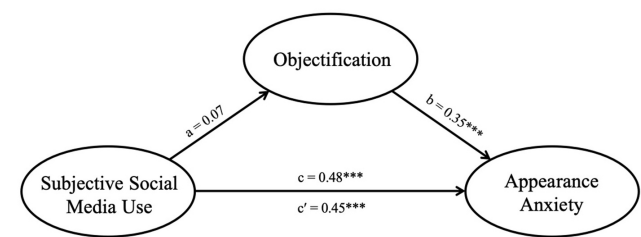


Figure 2. The mediating effect analysis for high-frequency normal users.

For the unusual group, after controlling for trait anxiety, social media use had a significant direct effect on appearance anxiety, $c' = 0.40$, $SE = 0.06$, $P < 0.001$. When both social media use and objectification were entered into the regression equation, social media use significantly predicted appearance anxiety, $c = 0.49$, $SE = 0.07$, $P < 0.001$. The bias-corrected percentile Bootstrap method revealed that objectification played a significant mediating role between social media use and appearance anxiety, $ab = 0.09$, Boot $SE = 0.03$, with a 95% confidence interval of [0.03, 0.16]. The proportion of the mediated effect to the total effect was $ab / (ab + c') = 18.37\%$ [Figure 3]. These findings indicate that objectification partially mediates the relationship

between social media use and appearance anxiety.

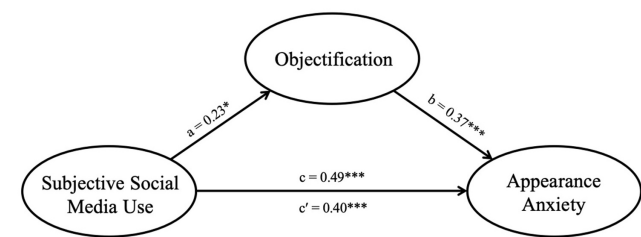


Figure 3. Mediation analysis of unusual users.

Based on these results, it can be concluded that the mediating role of objectification is only present in the unusual group, thereby validating Hypothesis H4.

DISCUSSION

This study differentiated between subjective and objective indicators when measuring social media use to uncover the disparities in the intensity of appearance anxiety and the influence pathways among different user groups. On one hand, the study confirmed that individuals show diverse patterns of social media use. It carried out a typological analysis of users, classifying them into three categories: the low-frequency group, the high-frequency group, and the unusual group. On the other hand, by introducing objectification as a mediating variable, it explained the different impact pathways of appearance anxiety among these groups, accounting for why deviant high-frequency use results in higher appearance anxiety. The findings of this study hold theoretical significance for comprehending the relationship between social media use and appearance anxiety and possess important practical value in preventing and reducing individuals' appearance anxiety.

Subjective vs. objective indicators of social media use

Building upon the distinction drawn by Burke *et al.*

(2011) and Verduyn *et al.* (2017) between active and passive modes of social media use, this study employed objective indicators to typologically categorize individuals into different social media user types according to their subjective metrics. Based on the definitions of active and passive social media use, an individual can engage in both active and passive use. Nevertheless, this study hypothesizes that an individual's social media use style remains stable, as it is influenced by personal traits and experiences, leading to consistent tendencies in use. Existing research has demonstrated that extroverted adolescents show a lower frequency of social media use (Goby, 2006), whereas lonely adolescents tend to use it more frequently (Valkenburg & Peter, 2008). Therefore, based on the matching degree of two objective indicators—the number of friends and use time—individuals were classified into three groups: the low-frequency group, the high-frequency group, and the unusual group.

This partially accounts for the instability in previous studies concerning the relationship between social media use and appearance anxiety. Some researchers have discovered that social media use can intensify appearance anxiety through objectification and self-body monitoring by heightening external appearance perfectionism, body shame, and anxiety (Fardouly *et al.*, 2015; Lin, 2019; Mi & Zhang, 2018). In contrast, others have reported that using social media for communication alleviates anxiety and elicits positive emotions (McGinnity *et al.*, 2005; Rice & Markey, 2009). The instability in these findings may stem from the failure to distinguish between subjective and objective indicators of social media use. Previous studies measured social media use intensity by combining both objective metrics (*e.g.*, frequency, use time, number of friends) and subjective attitudes (*e.g.*, integration into daily life and perceived identification with the platform). However, whether social media use increases appearance anxiety through objectification primarily hinges on the individual's subjective use style. Therefore, this study examined the relationship between objective and subjective indicators of social media use. First, users were clustered based on objective metrics to identify three distinct use styles. Then, the impact of social media use on appearance anxiety within each group was investigated. This approach avoids unstable results caused by the mixing of objective and subjective indicators.

Typological analysis of social media use patterns

Based on the potentially complex relationships between objective and subjective dimensions, this study aimed to elucidate the relationship between social media use and appearance anxiety across these two dimensions. To achieve this aim, cluster analysis was utilized to

categorize social media users into three groups: the low-frequency, high-frequency, and unusual groups. The study hypothesized that individuals in the unusual group would show significantly higher levels of appearance anxiety compared to those in the low-frequency and high-frequency groups.

Previous research has not explored appearance anxiety from the perspective of normal and unusual social media use. Nevertheless, previous studies have differentiated between active and passive social media use. This differentiation is consistent with the classification employed in this study. The low-frequency and high-frequency groups mainly participated in active social interactions on social media, such as chatting with friends and sharing life experiences. Conversely, individuals in the unusual group were more inclined to engage in passive social media activities, spending more time browsing others' profiles, pictures, videos, and other content. This typological analysis of social media use was carried out by classifying users according to the "number of friends" and "use time." Subsequently, comparisons were made between groups regarding their demographic and psychological data. This approach enabled a more detailed understanding of the specific social media use patterns and unique psychological processes within each group.

Influence of social media use on appearance anxiety and the mediation of objectification

The findings indicated significant disparities in appearance anxiety levels across the three groups, with the unusual group showing significantly higher levels compared to the low-frequency group. Although the difference between the unusual and high-frequency groups decreased, individuals in the unusual group still presented higher levels of appearance anxiety than those in the high-frequency group. The underlying causes of these differences may reside in the primary social media use patterns of each group. Low-frequency and high-frequency users predominantly engaged in active social interactions online, which partially offset offline communication obstacles caused by time limitations or spatial distances. This compensation was associated with higher levels of subjective well-being, life satisfaction, and perceived social support (Chen *et al.*, 2021; Liu, 2021; Wu, 2022), thus alleviating negative emotions such as appearance anxiety. In contrast, unusual users primarily engaged in passive social media use, which might have restricted their opportunities for positive emotional and attitudinal experiences through active interactions with friends. Additionally, the high accessibility of appearance-related information on social media could have triggered more upward social comparisons among passive users, leading to heightened levels of appearance anxiety. Social comparisons are pervasive in everyday

social media use (Li, 2022), and excessive upward comparisons have been associated with increased social media anxiety and other negative emotions (Chen, 2022).

To further explain the differences in appearance anxiety between the unusual group and the low-frequency/high-frequency groups, this study introduced objectification as a mediating variable in the relationship between social media use and appearance anxiety. Unusual users more frequently engaged in passive social media behaviors, such as browsing others' updates, which exposed them to a greater amount of objectifying content on social media. This exposure likely contributed to higher levels of objectification among unusual users, which in turn was related to increased appearance anxiety (Guizzo & Cadinu, 2017). In contrast, the low-frequency and high-frequency groups engaged less in passive behaviors, reducing their exposure to objectifying environments and thereby decreasing the likelihood of elevated objectification and subsequent increases in appearance anxiety. The study confirmed the partial mediating role of objectification among unusual users but found no significant mediating effects in the other two groups. By integrating objectification theory and building on existing research regarding active and passive social media use, this study provided a theoretical explanation for why individuals in the unusual group showed higher levels of appearance anxiety.

By distinguishing between different user groups and exploring the diverse pathways through which social media use influences appearance anxiety, this study contributed to a more comprehensive understanding of the mechanisms underlying the relationship between social media use and appearance anxiety. This approach represents an advancement in the path analysis of how social media use impacts appearance anxiety.

Limitations and future directions

This study also presents the following limitations: Firstly, although the model construction in this study was grounded in a certain theoretical basis, the use of a cross-sectional design still precludes the establishment of clear causal relationships among variables. Future research is recommended to adopt longitudinal methods for further validation. Secondly, this study relied on participants' subjective reports. This approach may give rise to social desirability effects and potential data biases. Thirdly, the research on social media use was based on the overall use across multiple platforms, such as WeChat, Weibo, QQ, and Xiaohongshu (RedNote). However, different platforms might have distinct use patterns and motivations. Therefore, future studies could focus on specific platforms for more in-depth investigations. Lastly, the typological analysis in this study employed two objective indicators, namely "use

time" and "number of friends", for classification. There might be other objective indicators that can better capture social media use patterns, and future research could explore these to achieve more precise and accurate classifications.

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None.

Author contributions

Chen JX: Conceptualization, Methodology, Investigation, Formal analysis, Writing—original draft, Writing—review & editing; Wu ML and Zhang H: Conceptualization, Methodology, Investigation, Writing—original draft; Chen WF: Conceptualization, Methodology, Data interpretation, Writing—review & editing, Supervision, Project administration, Funding acquisition. All authors have read and approved the final version of the manuscript.

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Ethical approval

This study was in accordance with the Declaration of Helsinki and approved by the Ethical Committee of Department of Psychology, Renmin University of China (IRB number 23-010).

Informed consent

Informed consent was gained from each participant before their participation.

Conflict of interest

The authors declare no competing interest.

Use of large language models, AI and machine learning tools

The Tongyi large language model (Qwen) was employed to assist with translation and stylistic polishing of the English language in this manuscript. All content remains the responsibility of the author.

Data availability statement

The data used and/or analysed during the current study are available from the corresponding author on reasonable request.

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