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Cyberbullying Victimization and Social Anxiety: Mediating Effects with Moderation

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Abstract: Cyberbullying experiences are considered an important factor contributing to social anxiety among college students. However, potential mediators of the relationship between cyberbullying and social anxiety, which may strengthen or weaken this relationship, are unclear. The present study examined the mediating role of self-esteem and appearance anxiety, as well as the moderating role of gender. A total of 269 college students participated in a questionnaire survey on cyberbullying victimization, appearance anxiety, self-esteem, and social anxiety, and 240 valid questionnaires were obtained, including 71 from males and 169 from females. The results show that cyberbullying victimization was significantly and positively correlated with appearance anxiety and social anxiety; appearance anxiety was significantly and positively correlated with social anxiety; and self-esteem was significantly and negatively correlated with social anxiety. Cyberbullying victimization mainly affects college students' social anxiety in two ways: the mediating role of appearance anxiety and the sequential mediating role of appearance anxiety and self-esteem. In addition, gender plays a moderating role between self-esteem and social anxiety. We discussed the practical implications of the current study and measures of behavioral interventions for college students.

Keywords: cyberbullying victimization; college students; appearance anxiety; self-esteem; social anxiety; gender differences

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1. Introduction

The rapid development of the internet has changed people's lifestyles, and according to the latest 49th Statistical Report on the Development Status of the Internet in China released by the China Internet Network Information Center in 2022, the number of Chinese internet users is 1.03 billion, of whom 17.30% are in the 20–29 age group, one of the three main groups of internet users [1]. Although the internet has brought convenience to people's lives, it has also increased the possibility of victimization [2], including via cyberbullying. Cyberbullying is any behavior in which an individual or group repeatedly transmits hostile or offensive messages through electronic or digital media with the intent to cause harm or discomfort to others [3]. A survey on adult cyberviolence research showed that the victimization and perpetration rates of cyberbullying were 2.38–90.86% and 0.56–54.30%, respectively [4], and a study with a sample of Chinese college students reported a 57.30% incidence rate of cyberbullying victimization [5]. Cyberbullying among college students has become a serious problem in society. Cyberbullying can negatively affect the health of the victim and trigger internalization and externalization difficulties [6]. Among them, social anxiety is one of the most common psychological problems [7,8], and social anxiety triggered by cyberbullying may hurt the victim's study, work, and social life [9], and even lead to increased suicidal ideation [10] or other serious physical and psychological problems.

The correlation between bullying victimization and social anxiety has been studied previously [8,11], but the impact on the victim has been largely explored in terms of the external environment and past encounters; few studies have focused on the self-examination of the victim's inner world, such as the mechanism underlying the association

between cyberbullying victimization and social anxiety from the perspective of appearance anxiety and self-esteem. The cognitive model of social anxiety suggests that an individual's negative appraisal of self is the primary cause of social anxiety [12]. Cyberbullying often includes teasing or mocking the appearance or body image of the bullied [13], which are likely to strengthen the victims' negative automatic thinking and negative body imagery, an important appearance cue in interpersonal interactions. This may be an important factor in the development of social anxiety [14]. Additionally, researchers have found that cyberbullying victimization can have a significant negative impact on victims' self-esteem [15], and negative self-evaluations generated by impaired self-esteem may further exacerbate a variety of psychological problems, such as social anxiety [16]. In addition, previous studies have revealed significant gender differences in self-esteem and social anxiety [16–18]. However, there are no consistent findings on whether there are gender differences in the relationship between self-esteem and social anxiety. Therefore, this study examines the relationship between cyberbullying victimization and social anxiety as a means to explore the mediating role of appearance anxiety and self-esteem, as well as the moderating role of gender.

1.1. Cyberbullying Victimization and Social Anxiety

Social anxiety is a common negative psychological trait presented by people in real-world or virtual-space interaction situations, specifically referring to irrational fears that individuals have during social interaction due to fear of attention, observation, scrutiny, or evaluation by others [19]. Studies have shown that the 12-month prevalence of social anxiety in the U.S. adult population was nearly 6.80% [20]. Similarly, social anxiety is one of the more serious public health problems in the Chinese college student population [21]. Many empirical studies have shown that cyberbullying is a significant predictor of the occurrence of social anxiety [11,22]. A meta-analysis showed that cyberbullying encounters are associated with numerous negative outcomes for victims in terms of mental health, physical health, social functioning, and behavior [23]. Furthermore, Wells et al.'s [24] study exploring social-phobia-maintenance factors at the cognitive level also revealed that a negative egoistic focus is the underlying cause of social anxiety, and that cyberbullying experiences exacerbate college students' negative focus on self and produce negative self-evaluations, further contributing to the worsening of social anxiety. Therefore, this study proposes hypothesis H1:

Hypothesis H1. *Cyberbullying experiences will have a significant positive effect on the social anxiety of the bullied.*

1.2. The Mediating Effect of Appearance Anxiety

Appearance anxiety is a popular topic in contemporary society among the college student population, and it is defined as the fear that one will be judged negatively because of one's appearance [25], with key characteristics including excessive appearance concerns and destructive, time-consuming behaviors, such as repeated inspections and excessive grooming to cover up appearance flaws [26].

Few studies have examined the impact of cyberbullying on appearance anxiety in college student populations, but some relevant studies have reported the potential for adolescents to experience appearance-related cyberbullying. Specifically, Cassidy et al. [27] found that more than one-third of adolescents reported being cyberbullied because of their size or weight. One study by Mishna et al. [28] also found that one-tenth of adolescents reported being bullied online because of their appearance. Compared with adults of other ages, college students are more concerned about their appearance and others' evaluation of their appearance, and thus they are more likely to suffer from appearance anxiety caused by cyberbullying. Existing research confirms that cyberbullying victims exhibit higher appearance anxiety and more body dissatisfaction [29].

Additionally, body image serves as a significant determinant of social anxiety [30], and appearance anxiety is a better predictor of social anxiety compared to other body-image anxieties [25,31]. Studies related to the development of body dysmorphic disorder highlight the prominent role of teasing, victimization, and abuse in appearance anxiety and its clinical manifestations [32]. Cyberviolence, as a broader form of aggression via humiliation, teasing, and abuse, tends to deepen victims' negative perceptions of self-image and reinforce the focus on negative evaluations over time, forming false self-image judgments and leading to appearance anxiety.

Therefore, this study proposes hypothesis H2:

Hypothesis H2. *Appearance anxiety mediates the relationship between cyberbullying victimization and social anxiety.*

1.3. The Mediating Effect of Self-Esteem

Self-esteem refers to an individual's judgments and attitudes about their abilities and values and can be divided into trait self-esteem (long-term fluctuations) and state self-esteem (short-term fluctuations) [33]. State self-esteem is influenced by social evaluations [34], and trait self-esteem is influenced by social evaluations, which in turn influence social behavior [35], social decision making [36], and ultimately personal well-being [37]. It is widely believed that high trait self-esteem protects individuals from the harmful consequences of negative experiences such as failure [37], and that low trait self-esteem is more prone to negative emotions and mental health problems [38]. It has been demonstrated that cyberbullying victimization can negatively impact trait self-esteem [39]. According to the psychological mediator model, negative events affect individuals' psychology and behavior by influencing their internal states, such as attitudes and cognition [40]. The model consists of two processes. One is the distal stress process, which refers to exposure to negative life events, including bullying and rejection [41]. The other is the proximal stress process, which refers to the negative attitudes and cognitions that individuals develop when faced with negative life events. In the cognitive processing of negative external information, individuals subjectively believe that others will reject, discriminate against, and treat them unfairly [42]. In this sense, the experience of cyberbullying victimization may lead to low self-esteem in individuals and further increase the likelihood of social anxiety. Numerous studies have found that low self-esteem is one of the risk factors that predict social anxiety [43,44]. Cyberbullying victims are vulnerable to negative evaluations leading to low self-esteem, and those with low self-esteem are prone to further social anxiety through the anticipation of unfavorable evaluations from others. Therefore, the present study proposes hypothesis H3:

Hypothesis H3. *Self-esteem may also mediate the relationship between cyberbullying victimization and social anxiety.*

Notably, appearance anxiety resulting from cyberbullying victimization may also be related to trait self-esteem. Studies have shown that appearance ratings show some predictive effect on self-esteem levels [45]. Because self-esteem depends on how one perceives oneself, when victims have appearance anxiety, they tend to develop negative self-evaluations of themselves, which in turn undermine their sense of competence and worth, leading to low self-esteem. Therefore, victims with higher appearance anxiety are more sensitive to negative evaluations of others compared to victims with lower appearance anxiety, which may harm their self-esteem. Therefore, this study proposes hypothesis H4:

Hypothesis H4. *Cyberbullying victimization affects college students' social anxiety through the sequential mediating effects of appearance anxiety and self-esteem.*

1.4. The Moderating Effect of Gender

The effect of self-esteem on social anxiety may be moderated by gender. Gender is an important demographic factor influencing self-esteem. First, in terms of prevalence, numerous studies have shown that males generally have higher levels of self-esteem than females, both in adolescence and adulthood [46]. Second, there are also gender differences in social anxiety as an influencing factor for self-esteem. For example, a study based on data from the National Epidemiological Survey on Alcohol and Related Disorders found that women had a higher prevalence of social anxiety disorder compared to men in a study sample of 43,093 adults [47]. In addition, a review of 43 epidemiological studies from around the world [48] and a review of 21 epidemiological studies conducted in European countries [49] both came to the same conclusion that women are more likely to suffer from social anxiety compared to men. More direct evidence suggests that female students with high levels of social anxiety have relatively low self-esteem [50]. De Jong et al.'s [51] study of the relationship between self-esteem and social anxiety also suggests that lower self-esteem in females is associated with more symptoms of social anxiety, whereas data on males do not reflect this effect. Given these differences, this study proposes hypothesis H5:

Hypothesis H5. *Gender plays a moderating role between self-esteem and social anxiety.*

1.5. Purpose of the Study

In this study, we construct a moderated mediation model (Figure 1) to systematically examine the effects of cyberbullying victimization on appearance anxiety, self-esteem, and social anxiety among college students, as well as the different effects of cyberbullying victimization by gender. Based on previous research, we propose five hypotheses: H1: Cyberbullying experiences have a significant positive effect on social anxiety in those who are bullied; H2: Appearance anxiety mediates between cyberbullying victimization and social anxiety; H3: Self-esteem mediates between cyberbullying victimization and social anxiety; H4: Cyberbullying victimization predicts social anxiety in college students through the serial mediation of appearance anxiety and self-esteem; and H5: Gender plays a moderating role in the relationship between self-esteem and social anxiety.

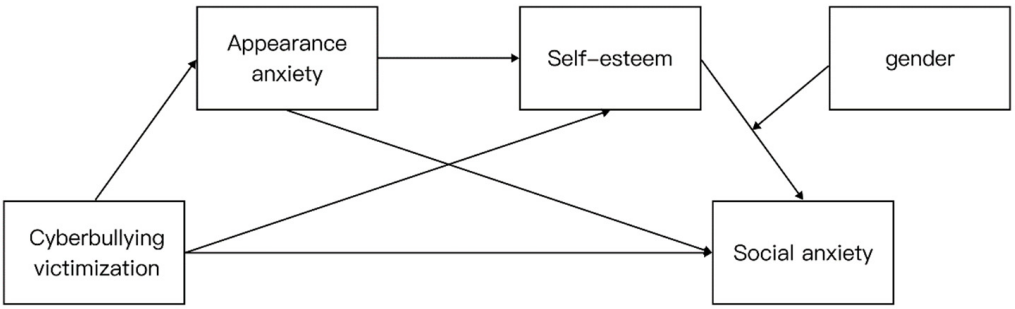


Figure 1. Theoretical framework.

2. Method

2.1. Participants and Procedure

A convenience sampling method was used to select the survey respondents from the Guangdong University of Technology. A total of 269 students participated in this questionnaire survey. In total, 29 invalid questionnaires (e.g., those with less than 5 min of answer time and those with the same or regular answer options) were excluded, leaving 240 valid questionnaires, with a valid recovery rate of 89.20%. There were 71 male students (29.60%) and 169 female students (70.40%), aged 18–25 years (mean age 21.23 years, standard deviation 1.75). This work was approved by the Departmental Ethics Committee and the Institutional Review Board of the Guangdong University of Technology (No. GDUTXS2023002). All the participants were provided informed consent before participation.

The survey was sponsored by the well-known online survey website "Questionnaire Star" "https://www.wjx.cn/ (accessed on 1 October 2022)", and the link to the website was sent to students through forwarding by friends and group chats, which provides equal opportunity for the sample to access the population designation. Because the Questionnaire Star website sets all survey items as required questions, no data were omitted in this study. Before students filled out the questionnaire, participants were first informed about the voluntary and confidential nature of the survey, and if students felt uncomfortable in any way, they could promptly bring it to the operator's attention and discontinue answering the questions. In addition, the personal data of the participants involved will be kept strictly confidential and the data and information will be used only for scientific research and not for any journalistic or commercial purposes. The online questionnaire was released on 3 October 2022, and data collection was completed on 6 October 2022.

2.2. Power Analysis

The minimum required sample size was determined using Monte Carlo power analysis designed for indirect effects [52]. We assumed small to moderate correlations between variables in the model. We estimated the minimum sample size needed to achieve a power of 0.80, with a confidence level of 99% using 10,000 Monte Carlo replications with 20,000 draws. Power analysis indicated that the sample size for this research setting should be at least 196. The sample size of this study was reliable.

2.3. Measures

2.3.1. Cyberbullying Inventory

The cyberbullying inventory was developed by Erdur-Baker and Kavsut [53]. The focus of this study was the impact of cyberbullying victimization, so the scale was selected to describe a total of 18 cyberbullying victimization behaviors in the bullying section. The scale uses a 4-point scale (1 = never, 4 = more than 5 times) to indicate the number of times participants experienced cyberbullying victimization activities in the past year. The scale has also been applied several times in studies of Chinese university student populations, and the results have shown good reliability and validity [54,55]. Cronbach's alpha coefficient of the cyberbullying scale in this study was 0.86.

2.3.2. The Social Appearance Anxiety Scale

The Social Appearance Anxiety Scale, proposed by Hart et al. [25], was used to examine the overall level of appearance anxiety among college students. It consists of 16 items, such as "I feel anxious when others discuss my appearance" and "I worry that I miss many opportunities because of my appearance". The scale is scored on a 5-point scale (1 = strongly disagree, 5 = strongly agree), with higher scores indicating higher levels of appearance anxiety, and has good retest reliability, internal consistency, and construct validity [25]. Cronbach's alpha coefficient in this study was 0.94.

2.3.3. Self-Esteem Scale

The Rosenberg Self-Esteem Scale [56] was used as a measure of trait self-esteem [57]. The Self-Esteem Scale was developed by Rosenberg to measure an individual's overall level of self-esteem. This is a 4-point scale (1 = very nonconforming, 4 = very conforming) and contains a total of 10 items. The 3rd, 5th, 8th, 9th, and 10th items are reverse-scored, with higher scores representing higher levels of self-esteem. Cronbach's alpha coefficient for the self-esteem scale in this study was 0.81.

2.3.4. Social Anxiety Scale

The Social Anxiety Scale, revised by Chinese scholars Peng and Gong [58], is a more authoritative and mature instrument for measuring social anxiety among college students. The scale has 15 items and is scored on a 5-point scale (1 = not at all, 5 = fully), with

questions 3, 6, 10, and 15 being scored inversely, with higher scores representing higher levels of social anxiety. Cronbach's alpha coefficient for this scale in this study was 0.84.

2.4. Data Analysis

First, this study used SPSS 26.0 exploratory factor analysis to test for possible common method bias [59], and then AMOS 24.0 was used to measure questionnaire validity, including content validity and structural validity. Next, all variables were subjected to descriptive statistics and correlation analysis to explore the correlations among the variables. Finally, the bias-corrected nonparametric percentile Bootstrap method based on the mediating effects test was applied to the SPSS macro program PROCESS for model 6 for mediating effects and model 87 for moderating effects [60]. The independent, dependent, and mediating variables were also standardized, and then the sampling was repeated 5000 times to calculate 95% confidence intervals.

2.5. Common Method Bias Test and Validity Distinction

The results of the common method bias test revealed that a total of 21 factors had root eigenvalues greater than 1, and the first common factor could only explain 15.35% of the total variance, which was less than 40.00%, indicating that there was no serious common method bias in the self-reported data collected in this study.

The results of the validity tests are shown in Table 1. In terms of convergent validity, the average variance extracted (AVE) values of the variables were higher than 0.50, with composite reliability (CR) ranging from 0.81 to 0.92 and higher than 0.70, indicating that the convergent validity met the criteria. In terms of discriminant validity, the square roots of the AVE values of the variables were all greater than the correlation coefficients between the variables, indicating that the discriminant validity met the criteria.

Table 1. Mean, standard deviation, the correlation matrix of each variable, convergent validity, and discriminant validity (n = 240).

	M	SD	CR	AVE	1	2	3	4	5
1. Gender	-	-	-	-	-				
2. Cyberbullying victimization	1.28	0.32	0.81	0.52	0.04	0.72			
3. Appearance Anxiety	2.85	0.85	0.92	0.57	0.06	0.34 **	0.76		
4. Self-esteem	2.84	0.46	0.87	0.54	−0.08	−0.05	−0.26 **	0.74	
5. Social anxiety	3.36	0.55	0.85	0.53	0.09	0.14 *	0.43 **	−0.33 **	0.73

Note: * $p < 0.05$, ** $p < 0.01$, same below; gender: 0 = male, 1 = female. M: Mean. SD: Standard deviation. CR: Composite reliability. AVE: Average variance extracted.

3. Results

3.1. Descriptive Statistics and Correlation Analysis

Pearson correlation analysis was used to explore the potential relationships between cyberbullying victimization, appearance anxiety, self-esteem, social anxiety, and gender, and the descriptive statistics for each variable are shown in Table 1. Among them, cyberbullying victimization was significantly and positively correlated with appearance anxiety and social anxiety; appearance anxiety was significantly and negatively correlated with self-esteem and significantly and positively correlated with social anxiety; and self-esteem was significantly and negatively correlated with social anxiety.

3.2. Mediating Effect Test

Regression analysis revealed that cyberbullying victimization significantly and positively predicted appearance anxiety ($\beta = -0.92$, $p < 0.001$); appearance anxiety significantly and negatively predicted self-esteem ($\beta = -0.15$, $p < 0.001$); and when cyberbullying victimization, appearance anxiety, self-esteem, and social anxiety were included in the regression equation simultaneously, the direct predictive effect of cyberbullying victimization on social anxiety was not significant ($\beta = 0.03$, $p = 0.808$), appearance anxiety significantly and

positively predicted social anxiety (β = 0.24, $p < 0.001$), and self-esteem significantly and negatively predicted social anxiety (β = −0.28, $p < 0.001$).

Mediating effect analysis showed (Tables 2 and 3, Figure 2) that appearance anxiety and self-esteem mediated the effect between cyberbullying victimization and social anxiety, with a mediating effect of 0.23, accounting for 90.12% of the total effect of cyberbullying victimization on social anxiety (0.26). Specifically, the mediating effect consisted of indirect effects generated via two pathways: indirect effect 1 (0.22) through the pathway of cyberbullying victimization → appearance anxiety → social anxiety, and indirect effect 3 (0.04) through the pathway of cyberbullying victimization → appearance anxiety → self-esteem → social anxiety, while indirect effect 2 (−0.02) was not significant.

Table 2. Mediating effects of appearance anxiety and self-esteem on the relation between cyberbullying victimization and social anxiety.

	Appearance Anxiety			Self-Esteem			Social Anxiety		
	b	**SE**	**t**	**b**	**SE**	**t**	**b**	**SE**	**t**
constant	1.68	0.22	7.78 ***	3.17	0.13	23.87 ***	3.44	0.27	12.78 ***
Cyberbullying victimization	0.91	0.16	5.63 ***	0.97	0.08	0.87	0.03	0.10	0.24
Appearance anxiety				−0.15	−0.15	−4.27 ***	0.24	0.04	5.85 ***
Self-esteem							−0.28	0.07	−3.89 ***
R^2		0.12			0.07			0.24	
F		31.72			9.30			24.42	

Note: *** $p < 0.001$, same below; SE: Stand error.

Table 3. Bootstrap 95% confidence interval of mediating effect path.

	Effect	**Boot SE**	**Boot LLCI**	**Boot ULCI**	**Relative Mediation Effect**
TOTAL	0.23	0.07	0.13	0.39	90.12%
Ind1: Cyberbullying victimization → appearance anxiety → social anxiety	0.22	0.06	0.13	0.34	84.12%
Ind2: Cyberbullying victimization → self-esteem → social anxiety	−0.02	0.03	−0.07	0.04	-
Ind3: Cyberbullying victimization → appearance anxiety → self-esteem → social anxiety	0.04	0.02	0.01	0.08	14.94%

Note: Boot SE: Bootstrap standard error. Boot LLCI: Bootstrap lower limit confidence interval. Boot ULCI: Bootstrap upper limit confidence interval.

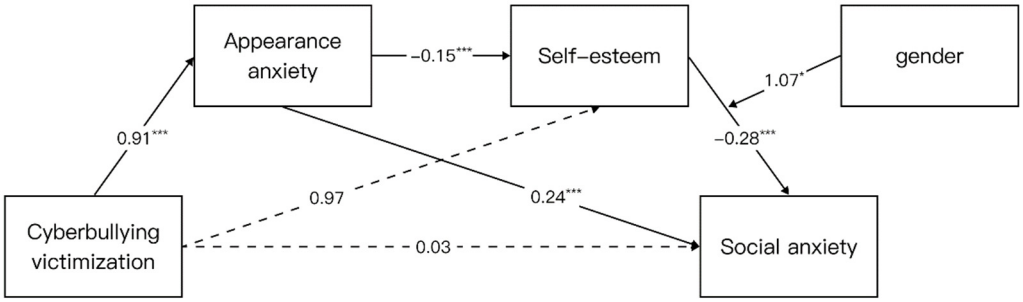


Figure 2. The mediating effect of cyberbullying victimization on social anxiety. Note: *** $p < 0.001$, * $p < 0.05$.

3.3. Moderated Mediation Test

We expected that gender would moderate the association between self-esteem and social anxiety. Model 87 of the PROCESS macro was used to examine this hypothesis. The results (Table 4) show that cyberbullying victimization significantly and positively

influenced appearance anxiety (b = 0.91, $p < 0.001$), but did not significantly predict self-esteem (b = 0.08, $p > 0.05$) or social anxiety (b = −0.01, $p > 0.05$). Further, appearance anxiety significantly and negatively influenced self-esteem (b = −0.15, $p < 0.001$) and significantly and positively influenced social anxiety (b = 0.23, $p < 0.001$). Additionally, gender moderated the association between self-esteem and social anxiety (95% CI [−0.6339, −0.0687], excluding 0), with a significant moderating effect.

Table 4. The mediating effect of gender on appearance anxiety and self-esteem.

	Appearance Anxiety			**Self-Esteem**			**Social Anxiety**		
	b	**SE**	**t**	**b**	**SE**	**t**	**b**	**SE**	**t**
constant	1.68	0.22	7.78 ***	3.17	0.13	23.87 ***	1.73	0.72	2.43 *
Cyberbullying victimization	0.91	0.16	5.63 ***	0.08	0.09	0.87	−0.01	0.10	−0.13
Appearance anxiety				−0.15	−0.15	−4.27 ***	0.23	0.04	5.81 ***
Self-esteem							0.30	0.24	1.22
Gender							1.07	0.41	2.58 *
Self-esteem X Gender							−0.35	0.14	−2.45 **
R^2		0.12			0.07			0.26	
F		31.72			9.30			16.34	

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Simple slope tests (Figure 3) showed that, for male participants, the effect of self-esteem on social anxiety was not significant, b = −0.05, $p = 0.641$. However, for female participants, the effect of self-esteem on social anxiety was significant, b = −0.40, $p < 0.001$. These results indicate that women experience a greater influence of self-esteem on social anxiety.



Figure 3. The effect of the interaction between self-esteem and gender on social anxiety.

Conditional indirect-effects analysis further suggested that gender moderated the indirect effect of cyberbullying victimization on social anxiety via appearance anxiety and self-esteem (95% CI [0.0022, 0.1075], excluding 0)—see Table 5. Specifically, for men, there was no significant indirect relationship between cyberbullying victimization and social anxiety (indirect effect = 0.01, SE = 0.02, 95% CI = [−0.0300, 0.0600]). For women, the indirect relationship between cyberbullying victimization and social anxiety (indirect effect = 0.06, SE = 0.02, 95% CI = [0.0200, 0.1100]) was significant. Therefore, hypothesis 3 is supported.

Table 5. Conditional effects of self-esteem at values of gender.

Gender	Boot Indirect Effect	Boot SE	95% CI	
			Lower	Upper
Male	0.0074	0.0205	−0.0261	0.0537
Female	0.0562	0.0217	0.0211	0.1063

Note: Number of Bootstrap samples: 5000. SE: Stand error. CI: confidence intervals.

4. Discussion

In this study, we examined the effects of cyberbullying victimization on social anxiety among college students. This study found that the effect of cyberbullying victimization on social anxiety was mediated exclusively through appearance anxiety and self-esteem, and this mediating effect arose through two indirect pathways: first, through the independent effect of appearance anxiety; and second, through the joint effects of appearance anxiety and self-esteem, with the process moderated by gender. The results of this study help us to investigate the mechanisms of action of cyberbullying victimization on college students' behavior and provide guiding suggestions for the safeguarding of college students' physical and mental health and safety, as well as to prevent them from developing social anxiety.

4.1. The Influence of Cyberbullying on College Students' Social Anxiety

The present study found that cyberbullying victimization was significantly and positively related to social anxiety among college students, and the total effect between cyberbullying victimization and social anxiety was significant. These results confirm the impact of cyberbullying victimization on social anxiety, with bullied students feeling less socially effective and having greater difficulty with interpersonal interactions [22]. However, in the present study, the direct predictive effect of cyberbullying victimization on social anxiety was not significant. A possible reason for this is that self-perception is thought to be an important sustaining factor in social anxiety disorder [24,61] and because negative self-perceptions play a central role in developing and maintaining social anxiety disorder [62]. This implies that cyberbullying as a negative stressful event does not directly affect social anxiety, but indirectly affects an individual's social behavior and triggers social anxiety by influencing their self-perception, including forming negative self-evaluations of appearance or self-competence and worth.

4.2. The Mediating Role of Appearance Anxiety

The present study found that appearance anxiety mediated the relationship between cyberbullying victimization and social anxiety among college students, and that cyberbullying victimization increased the likelihood of social anxiety by increasing individuals' appearance anxiety, which is consistent with previous research on cyberbullying victimization causing appearance anxiety [63] and appearance anxiety causing social anxiety [25]. The inclusion of all three variables simultaneously in this study demonstrates that appearance anxiety plays an important mediating role in the way cyberbullying victimization affects social anxiety. Self-objectification theory posits that the female and male body are socially constructed as an object of observation and evaluation, primarily based on appearance [64,65]. When individuals experience online violence, especially attacks that target appearance image, they tend to internalize their perception of their appearance. This implies that they begin to see themselves as an object to be observed and evaluated based on their appearance, a process known as self-objectification. Self-objectification is a form of self-awareness characterized by the habitual and constant surveillance of physical appearance. Research has shown that this constant body surveillance leads to increased anxiety about appearance, which in turn leads to many mental health problems, including social anxiety [64].

4.3. The Mediating Role of Self-Esteem

The present study found that trait self-esteem did not mediate the relationship between cyberbullying victimization and social anxiety, a result that is contradictory to our assumptions. However, a similar conclusion has been reached by studies that did not find a relationship between cyberbullying victimization and self-esteem in college student populations [66,67]. Possible reasons for this are that college students, as adults, have plateaued in their trait self-esteem levels and are not easily influenced by external circumstances. Robins et al. [46] showed that self-esteem declines during adolescence and then steadily increases until late adulthood. A longitudinal study by Trzesniewski et al. [68] also showed that adulthood typically indicates higher, more stable levels of self-esteem and levels are consistently higher than levels in adolescence. Furthermore, few subjects in this study reported extremely high rates of cyberbullying victimization, and most victims could be categorized as mildly involved. Thus, this finding suggests that infrequent or moderate cyberbullying may not produce as significant a change in self-esteem as severe cyberbullying in the adult college population.

4.4. The Serial Mediating Effect of Appearance Anxiety and Self-Esteem

The present study also found that appearance anxiety and trait self-esteem play a sequential mediating role between cyberbullying victimization and social anxiety among college students, a result that reflects the strong link between appearance anxiety and self-esteem and supports previous research [69]. The results suggest that cyberbullying victimization increases the risk of social anxiety and that this effect is mediated through the combined effects of appearance anxiety and self-esteem. This finding not only sheds greater light on the mechanisms of action by which cyberbullying victimization affects social anxiety in college students, but also provides empirical support for the psychological mediator model [40] that cyberbullying, as a negatively stimulating event, is prone to increase social anxiety through teasing, ridicule, and abuse, which cause the bullied to develop appearance anxiety by creating a false perception of their self-image. Appearance anxiety further induces a psychological disorder of low self-esteem in the victim, which is also reflected in social behavior, where the victim develops social avoidance behavior due to the fear of being bullied again in interpersonal interactions.

4.5. Gender Moderation

The present study found that gender significantly moderates the effect of self-esteem on social anxiety. Specifically, females exhibited an increased negative effect of self-esteem on social anxiety, while no such effect was found for males. This is consistent with previous research findings [51]. Leary and Baumeister [70] believed that self-esteem is an intrinsic response to an individual's interpersonal relationships with others, reflecting the importance of relationships in the individual's eyes and the degree to which the individual pays attention to others' evaluations. In contrast, numerous studies have shown that women generally have lower self-esteem than men due to society's biased negative evaluations of female roles and the high expectations of female appearance [71]. Several studies have used self-esteem as a multidimensional self-evaluation tool that includes cognitive, social, and appearance aspects. When women are exposed to more multidimensional sources of stress, they also tend to negatively regulate their self-esteem and further influence their social behavior, triggering social anxiety.

In addition, a study on neurology showed that men can secrete a protein associated with counteracting stress, providing an anxiolytic effect not seen in women [72]. This physiological signaling difference may underlie the gender differences in self-esteem in predicting social anxiety.

4.6. Research Suggestions and Limitations

This study is important to the prevention of and intervention in the negative effects caused by cyberbullying, correctly guiding college students' social concepts and promoting

their physical and mental health development. On the one hand, attention should be paid to the general effects of cyberbullying and appearance anxiety on college students' mental health and social behaviors. Parents should pay more attention to the online behavior of college students. When students show sadness and abnormal appearance-grooming behaviors, they should help resolve negative emotions in time and to face up to and accept their self-image, and positive emotional support from families can protect them from cyberbullying [73]. Schools and related educational institutions should help college students to establish correct self-perception and aesthetic values and give timely psychological counseling to students who have anxiety, low self-esteem, and other emotions that are difficult to regulate; on the other hand, this study found that women show the moderating effect of self-esteem predicting social anxiety. This requires us to consider the relationship between self-esteem and social anxiety when developing interventions for females to develop a process-oriented package, to provide more encouraging education, and to help females overcome social psychological barriers by organizing social activities in a planned manner.

In addition, some limitations of this study require addressing. First, this study used a cross-sectional research method; the predictive effects of the main variables are based on existing theoretical assumptions, and we did not verify the causal relationships over time. Second, this study is based entirely on students' self-reports, an approach that has several weaknesses: they may be susceptible to self-presentation strategies or fear of reprisals [74], or they may be influenced by social expectations and memory biases. Third, there was a large difference between the two gender samples in this study, with the female sample being higher than the male sample, which is similar to the sample data from the study by Kim and Duval [75] and may have some impact on the effect of gender-regulated self-esteem on social anxiety. It is recommended that future studies conduct gender ANOVA on the proposed model by considering equal approximations of the sample sizes of both genders. Finally, the small variability in self-reporting in this study regarding the cyberbullying victimization component and the insignificant effects felt by participants in terms of cyberbullying victimization may make some impact on the correlation of cyberbullying victimization with other variables, and further focus on the vulnerable population of cyberbullying victimization is needed in follow-up studies.

5. Conclusions

The results of this study showed that cyberbullying victimization positively predicted appearance anxiety and social anxiety among college students; appearance anxiety negatively predicted self-esteem levels and positively predicted social anxiety; and college students' self-esteem levels negatively predicted social anxiety. This implies that college students victimized by cyberbullying are more likely to have anxiety about their appearance, develop low self-esteem, and feel uncomfortable with social interactions. Specifically, cyberbullying victimization affects social anxiety by affecting college students' appearance anxiety; it also affects social anxiety through college students' appearance anxiety and self-esteem levels in turn. Finally, the findings also revealed that self-esteem had different effects on social anxiety levels according to gender, with females increasing the negative effect of self-esteem on social anxiety and males not.

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