



Effects of self-concealment and self-esteem on Internet addiction in college students

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We investigated the relationships between self-concealment, self-esteem, and Internet addiction in college students. Participants ($N = 589$ undergraduates) completed the Self-Concealment Scale, the Rosenberg Self-Esteem Scale, and the Internet Addiction Diagnostic Questionnaire. Results show that self-esteem partially mediated the positive relationship between self-concealment and Internet addiction. Further, the bootstrapping analysis results reveal that self-concealment had a significant indirect effect via self-esteem on Internet addiction among college students. These findings extend previous studies and shed light on ways to reduce Internet addiction from a positive and meaningful perspective through the effects of self-concealment and self-esteem.

Keywords

Internet addiction; self-concealment; self-esteem; psychological maladaptation; college students

In recent years Internet addiction has become a major concern, and previous studies have reported that the incidence of this type of addiction ranges between 8.23% and 16.72% among Chinese college students (Tateno et al., 2016; Yang et al., 2016). *Internet addiction* refers to the excessive use of the Internet, which damages a person's social functioning and mental health (Vondráčková & Gabrhelík, 2016). It has been reported to be significantly correlated with anxiety, depression, and loneliness, and, in some cases, can even lead to criminal activity (Stavropoulos et al., 2017).

Internet addiction has also been found to be associated with negative life events, social support systems, human relations, satisfaction of psychological needs, and personality traits (Chou et al., 2005; Ko et al., 2006; Li et al., 2016). *Self-concealment* is a psychological disposition in which individuals conceal personal information that feels negative or painful, and it is considered an unchanging personality trait (Akdoğan & Çimşir, 2019; Hu et al., 2013). Studies imply that self-concealment leads to maladaptation in many aspects of people's lives (Hartman et al., 2015; Larson & Chastain, 1990; Masuda et al., 2011). For instance, self-concealment was reported to be associated with high levels of social anxiety, depression, and loneliness, and also low self-esteem, all of which may result in a person resorting to negative coping styles and having less social support (Constantine et al., 2004; Doğan & Çolak, 2016; Topkaya et al., 2012). Self-concealment has also been documented to be related to many problem behaviors. For example, Masuda et al. (2011) found that self-concealment was positively correlated with disordered eating symptoms, and Hartman et al. (2015) identified self-concealment as a major contributor to alcohol addiction.

To date, there has been relatively little research on the relationship between self-concealment and Internet addiction. The cognitive-behavioral model of Internet addiction holds that existing mental conditions (e.g.,

depression, social anxiety, loneliness) and nonadaptable perceptions (e.g., negative self-assessment) play key roles in the formation of Internet addiction (Davis, 2001; Dong & Potenza, 2014; King et al., 2012). Self-concealment has also been reported to be closely related to depression, social anxiety, and low self-efficacy (Hartman et al., 2015; Kawamura & Frost, 2004; Masuda et al., 2011). According to the cognitive-behavioral model, positive cognition about the Internet and negative cognition about reality are key contributors to Internet addiction (Davis, 2001; Dong & Potenza, 2014; King et al., 2012). Individuals with high levels of self-concealment mask and inhibit the negative experiences and suffering that they encounter in real life, and they can relax and release pressure on the Internet; this intensifies their negative perceptions about the real world and their dependence on the Internet, leading to Internet addiction (Gholamian et al., 2017; Yan et al., 2014). Therefore, we proposed the following hypothesis:

Hypothesis 1: Self-concealment will be positively correlated with Internet addiction.

To prevent Internet addiction, we must do more than simply discuss the correlation between self-concealment and Internet addiction: We must explore the underlying mechanisms of self-concealment. The self-perception model of self-concealment indicates that individuals internalize their self-concealed feelings of guilt and shame, which negatively affects their self-belief and results in low self-esteem (Hartman et al., 2015; Kahn & Hessling, 2001). Kahn and Hessling (2001) documented that self-concealment significantly predicted changes in self-esteem over a 2-month period. *Self-esteem* is generally defined as a person's respect for themselves, and it reflects the difference between the perceived real ego state and the expected ego state (Peng, Zhang, Zhao, et al., 2020). Billieux et al. (2015) found that low self-esteem was a high-risk factor for Internet addiction, and Senol-Durak and Durak (2011) posited that self-esteem was the strongest predictive factor of Internet addiction. In the face of life's pressures, those with high self-esteem tend to have fewer incidences of poor or maladjusted behavior; however, those with low self-esteem may struggle with handling human relationships, life events, and external pressures (Billieux et al., 2015; Gou et al., 2013; Senol-Durak & Durak, 2011; Wang & Peng, 2017). Hence, addiction to the Internet provides a way for individuals with low self-esteem to escape their various troubles and acquire feelings of success, belonging, approval, and understanding (Shi et al., 2017; Yücens & Üzer, 2018). The Internet provides a venue for individuals with low self-esteem to vent, release pressure, and acquire online psychological satisfaction (Lin et al., 2018). Therefore, we proposed the following hypothesis:

Hypothesis 2: Self-esteem will mediate the relationship between self-concealment and Internet addiction.

Although previous studies have provided considerable evidence of the relationships between self-concealment and Internet addiction, and between self-esteem and Internet addiction, few have analyzed the direct and indirect associations among these variables. Therefore, we explored the effect of self-concealment on Internet addiction among college students and examined the mediating effect of self-esteem in this relationship.

Method

Participants and Procedure

We recruited 612 college students from a comprehensive university in Henan Province, China, through convenience sampling. After elimination of invalid responses (e.g., more than 5% unanswered questions; answering in obvious rules, such as selecting "1" for all answers), 589 valid responses were received from 318 (54%) men and 271 (46%) women (response rate = 96%). Participants were majoring in Chinese Han language, history, management science, mathematics, and physics. The average age was 21.22 years ($SD = 1.77$, range = 19–24).

All the participants took part voluntarily in this study and were informed that the data would be used only for research purposes. The form of investigation was a paper-and-pencil survey that was administrated in the classroom environment after participants had signed an informed consent form. The Ethics Committee of Henan University approved this research, confirming the study adhered to relevant ethics provisions. Participants received RMB 10 (USD 1.50) for taking part in this study.

Measures

Self-Concealment Scale

The Self-Concealment Scale (Larson & Chastain, 1990) consists of 10 items, such as “When something bad happens to me, I tend to keep it to myself” and “I have negative thoughts about myself that I never share with anyone.” Responses are made on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), such that total scores range from 10 to 50, with higher scores indicating greater levels of self-concealment. Hu et al. (2013) translated this scale into Chinese and documented its excellent reliability and validity. Cronbach’s alpha in this study was .83.

Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem Scale consists of 10 items, such as “On the whole I am satisfied with myself” and “All in all, I am inclined to feel that I am a failure” (reverse coded). Responses are rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), and item scores are summed to form a total score after reverse coding of relevant items (Gray-Little et al., 1997). Shi et al. (2017) found that the Chinese version of this scale has good reliability and validity. Cronbach’s alpha in this study was .88.

Internet Addiction Diagnostic Questionnaire

Internet addiction was assessed by adopting Young’s Internet Addiction Diagnostic Questionnaire (Young, 1998), which consists of eight “yes” or “no” items. The total score corresponds to the number of “yes” responses, ranging from 0 to 8, and higher total scores indicate more severe Internet addiction (Sussman et al., 2011; Young, 1998). This scale was translated into Chinese by Li et al. (2016) and found to have good reliability and validity. Cronbach’s alpha in this study was .81.

Data Analysis

Data analysis was conducted using SPSS 20.0. First, we applied Harman’s single-factor test. Then, we calculated the correlations of self-concealment and self-esteem with Internet addiction using Pearson product-moment correlation analysis. Finally, we conducted a path analysis and tested the mediating effect via bootstrapping analysis (Peng, Zhang, Zheng, et al., 2020).

Results

Harman’s single-factor test was used to test for the presence of common method bias. All items were included in an exploratory factor analysis, the results of which show that five factors had an eigenvalue larger than 1, and the amount of variance explained by the first factor was 28.72%, which is below the critical value of 40%. Thus, common method bias was not a significant concern.

As shown in Table 1, self-concealment, self-esteem, and Internet addiction were significantly correlated with each other.

Table 1. *Intercorrelations Between Study Variables*

	<i>M</i>	<i>SD</i>	1	2
1. Self-concealment	27.51	6.18		
2. Self-esteem	31.20	4.11	-.24**	
3. Internet addiction	3.53	1.85	.33**	-.41**

Note. ** $p < .01$.

To control for inflated measurement errors occurring because multiple items were used to assess the latent variable, and to improve the reliability and normality of data distribution of the resulting measures, we created two item parcels for each of the variables of self-concealment, self-esteem, and Internet addiction, using the factorial algorithm proposed by Rogers and Schmitt (2004). The procedure for creating the item parcels was as follows: first, we conducted a factor analysis of the items in each variable; second, the factor loadings of each item were sorted in descending order; third, all the items were assigned to three parcels, in turn, according to their factor loadings. The method gives almost equal factor loadings in each parcel. The measurement model contained three latent constructs (self-concealment, self-esteem, and Internet addiction) and six observed variables (item parcels). The measurement model showed a good fit to the data, chi-square/degrees of freedom ratio (χ^2/df) = 2.64, root mean square error of approximation (RMSEA) = .05, standardized root mean square residual (SRMR) = .03, comparative fit index (CFI) = .98.

Next, we tested the structural model. The direct path coefficient from self-concealment to Internet addiction in the absence of a mediator was significant ($\beta = .45, p < .01$). A complete mediation model with self-esteem included as the mediator had a poor fit to the data, $\chi^2/df = 7.99$, RMSEA = .11, SRMR = .09, CFI = .93. Finally, we tested the partial mediation model (see Figure 1), which exhibited a good fit to the data, $\chi^2/df = 1.29$, RMSEA = .03, SRMR = .02, CFI = .99.

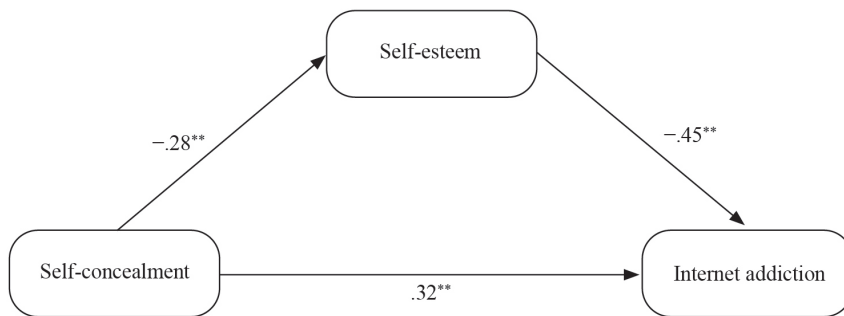


Figure 1. *The Structural Model*

We used bootstrapping analysis to test the significance of the mediating effect of self-esteem. The 95% confidence intervals of the direct and indirect effects are shown in Table 2; none of the intervals overlapped with zero. Thus, self-esteem partially mediated the relationship between self-concealment and Internet addiction.

Table 2. Direct and Indirect Effects and 95% Confidence Intervals for the Final Model

Model pathways	Estimated effect	95% CI	
		<i>LL</i>	<i>UL</i>
Direct effect			
Self-concealment → Self-esteem	-.28*	-0.17	-0.41
Self-concealment → Internet addiction	.32*	0.20	0.45
Self-esteem → Internet addiction	-.45*	-0.33	-0.58
Indirect effect			
Self-concealment → Self-esteem → Internet addiction	.13*	0.07	0.20

Note. * Empirical 95% confidence interval does not overlap with zero. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

Discussion

We found that self-concealment was significantly and positively correlated with Internet addiction among college students, supporting Hypothesis 1. The inhibition model holds that self-concealment creates long-term pressure on individuals (Uysal et al., 2010); thus, they require an appropriate space in which to release the stress caused by self-concealment (Jiang et al., 2019). Compared with face-to-face interpersonal interaction, the virtual space of the Internet is safer for individuals to release this pressure and express themselves (Jun & Choi, 2015; Peng, Cao, et al., 2019).

We also found that self-esteem partially mediated the effect of self-concealment on Internet addiction, partially supporting Hypothesis 2. People with high levels of self-concealment tend to be unwilling to tell others about their problems and troubles, which prevents them from getting help and support from others (Potoczniak et al., 2007). When individuals cannot cope with negative events or experiences, they will internalize their self-perceptions, which intensifies self-denial and may lead to low self-esteem (Alessandri et al., 2017; Auerbach et al., 2010; Marshall et al., 2015). Most people desire positive feedback, but individuals with low self-esteem cannot be satisfied by positive feedback that they receive in real life, so instead they seek it from the Internet (Ouyang et al., 2017; Peng, Feng, et al., 2019). Ouyang et al. (2017) found that adolescents and young adults with low self-esteem feel they can secure more positive feedback and online social support from the Internet than from real-life relationships; thus, they turn to the Internet to compensate for the perceived lack of positive feedback they receive in the real world. The Internet offers more benefits to individuals with low (vs. high) self-esteem, who depend more on the Internet and are more prone to Internet addiction (Niemz et al., 2005).

In terms of practical implications, we have several recommendations for effectively decreasing Internet addiction and its negative effects on college students. Our study demonstrates that individuals with high self-concealment are susceptible to Internet addiction, in that self-concealment directly predicted Internet addiction and decreased individuals' self-evaluation. Hence, individuals with high self-concealment need assistance with finding effective ways to release pressure and obtain enough social support, which should help them to reduce their Internet addiction. For example, college students should be encouraged to build close friendships, increase their social support networks, confide in close friends, and seek professional consultation to decrease stress. In these ways, individuals with high self-concealment can actively relieve their negative self-assessments and psychological pressures, and decrease their risk of Internet addiction. Low self-esteem is another contributor to Internet addiction. Thus, individuals with Internet addiction could undergo group guidance focused on building self-esteem to help them learn to face the real world and acquire active feedback in real-life contexts. The level and risk of Internet addiction can be lowered by raising individuals' self-esteem.

This study has some limitations. First, all variables were evaluated by self-reports. In subsequent research, other data collection methods could be employed, such as evaluations from teachers, parents, or classmates, to acquire more objective data. Second, self-esteem only partially mediated the effect of self-concealment on Internet addiction, indicating there may be other mediating variables in this relationship, such as social support and pressure. These other mediators could be explored in future studies.

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