

# The Mediating Effect of Self-esteem on the Relationship between Internet Addiction and Academic Procrastination among Chinese College Students

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## Abstract

As information technology advances rapidly, the internet has become an essential resource in our everyday routines. However, the internet presents a risk of addiction and may adversely impact students' mental health, thus potentially leading to academic failure. Moreover, academic procrastination is also a common phenomenon in learning situations among college students. Although there have been studies on the relationship between Internet addiction and academic procrastination, there are fewer studies on the mechanisms by which Internet addiction affects academic procrastination, especially among Chinese college students. This study aims to investigate the role of self-esteem as a mediator in the relationship between Internet addiction and academic procrastination among college students. A survey was conducted using the Chinese Internet Addiction Scale Revised (CIAS-R), the Aitken's Procrastination Inventory, and the Self-esteem Scale on 446 college students at a Chinese university. The results revealed that Internet addiction was positively correlated with academic procrastination ( $r = 0.389, p < 0.01$ ). Both Internet addiction and procrastination were significantly and negatively correlated with self-esteem ( $r = -0.231, p < 0.01$ ;  $r = -0.277, p < 0.01$ ). Self-esteem partially mediated the effect between internet addiction and academic procrastination, and the mediating effect accounted for 11.79% of the total effect. These results highlight the importance of addressing academic procrastination by considering both the direct and psychological impacts of internet addiction.

**Keywords:** Internet Addiction, Academic Procrastination, Self-Esteem, Chinese College Students

**Introduction**

The swift advancement of information technology has propelled the internet to become an essential asset in daily life, exerting a profound influence across various aspects of society (Marsh & Rajaram, 2019; Xia, 2023). As internet usage continues to rise, with global users surging from 59.1 percent in 2021 to 64.4 percent in 2023 (Hootsuite (2022); Şirin & Ketrez (2023)), it is evident that internet access is becoming an increasingly prevalent phenomenon, shaping the behaviors and experiences of individuals worldwide. This ubiquity underscores the imperative to explore the multifaceted implications of internet usage, particularly concerning its impact on psychological well-being and academic performance.

The dual nature of the internet, offering both beneficial resources and potential hazards, necessitates a deeper understanding of its effects. While limited internet use can enhance productivity and connectivity, excessive and uncontrolled usage may bring out internet addiction, presenting a significant concern in contemporary society (Bagheri et al., 2023; Shek et al., 2013). This dichotomy underscores the importance of investigating the relationship between internet addiction and its adverse consequences, such as academic procrastination, which can impede educational attainment and personal development.

College students, in particular, represent a demographic greatly susceptible to the adverse effects of internet addiction (Salehi et al., 2014). With easy access to the internet and ample free time, college students are prone to overutilizing online platforms, compromising their academic engagement and performance (Moon & Illingworth, 2005; Srigriraju et al., 2014). This susceptibility is exacerbated by the prevalence of academic procrastination among college students, a pervasive phenomenon that undermines learning outcomes and contributes to educational disparities (Abdollahi et al., 2020; Fentaw et al., 2022).

Given the intertwined nature of internet addiction and academic procrastination, it is imperative to elucidate the mechanisms underlying their association. While previous research has established that internet addiction is positively associated with academic procrastination among Chinese college students (Gong et al., 2021; Hayat et al., 2020; Nadarajan et al., 2023), there remains a paucity of studies exploring the intricate pathways linking these constructs. Understanding the role of individual factors, such as self-esteem, in mediating this relationship is essential for devising targeted interventions and support strategies for college students (Mo et al., 2020; Steel, 2007).

Therefore, this study seeks to address this gap in the literature by examining the relationship between internet addiction, academic procrastination, and self-esteem among Chinese college students. By delineating the underlying mechanisms driving these associations, this research endeavors to offer practical insights and recommendations for promoting healthy internet usage habits and enhancing academic success among college students. Through a comprehensive exploration of these interconnected phenomena, this study aims to contribute to the development of evidence-based interventions tailored to the needs of college students in the digital age.

**Method****Participants**

Participants were selected by a simple random sampling method among college students in Shanxi Province, China. An anonymous self-report questionnaire was distributed through an online survey using “Wenjuanxing”, a reputable and widely used online survey platform in China (Lu et al., 2020; You et al., 2021). Self-reported questionnaires were then distributed to all college students at a university within a certain time, with the assistance of faculty

instructors, who shared an introduction to the survey and the online survey link through WeChat and QQ groups of their classes. During this process, students were informed that their participation was entirely voluntary and their responses would remain anonymous to protect their privacy. Additionally, participants were assured of their right to withdraw from the survey at any time without facing any penalties. Moreover, participants were informed through textual instructions to provide informed consent. Finally, 480 questionnaires were received, of which 446 were eligible participants, with an effective response rate of 92.9%.

## **Measurements**

### ***Internet Addiction Scale***

The Chinese Internet Addiction Scale Revised (CIAS-R) was developed by Bai and Fan (2005) and revised based on the CIAS. The development and revision process were based on a sample of university students. This 19-item questionnaire utilizes a 4-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree), and encompasses four distinct dimensions: compulsive internet access and internet addiction withdrawal reactions, internet addiction tolerance symptoms, interpersonal and health problems, and time management problems. The internal consistency coefficient of this scale is 0.90.

### ***Academic Procrastination Scale***

The Aitken's Procrastination Inventory (API) was originally formulated by Aitken (1982) and subsequently translated by (Chen, 2008). They validated the idea that the scale could be used to measure academic procrastination among university students. This self-rating inventory, characterized by a single-dimensional structure, comprises 19 items and employs a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). A 5-point Likert scale was used, with the higher the score on the questionnaire, the greater the level of academic procrastination. The internal consistency coefficient of this scale is 0.85.

### ***Self-esteem Scale***

The self-esteem scale was developed by Rosenberg (1965). It consists of 10 items for the description of self-evaluation. A 4-point Likert scale was used: 1 refers to "strongly disagree", 2 refers to "disagree", 3 refers to "agree", and 4 refers to "strongly agree". The higher the score, the higher the level of self-esteem. Its internal consistency reliability coefficient is between 0.77- 0.88, with good validity, and it has been used for a long time and is widely available in China.

## **Statistical Analysis**

This study used SPSS 26.0 to process the data that was entered into a computer. Integrated use of common method biases test, descriptive statistics, Pearson correlation analysis, and linear regression analysis. Moreover, this study used process macro v4.1 model 4 for SPSS 26.0, and the bootstrap method was used to evaluate the mediation effects of self-esteem (Hayes, 2017).

## **Results**

### **Common Method Biases Test**

Owing to the utilization of self-report questionnaires, there may be common method biases (Podsakoff et al., 2003). Therefore, this study used the Harman single-factor to solve this issue. A total of 48 items on three scales were examined. The results revealed the

extraction of eight factors with eigenvalues exceeding 1, while the explained variance of the primary factor amounted to 24.43%, falling short of the critical threshold of 40% (Tang, 2020).

### Descriptive Statistics and Correlation Analysis

Among the 446 college students, the characteristics of the participants can be seen in Table 1. The gender of the majority of respondents was female (92.4%); 67 college students (15%) are in only one-child family, 379 college students (85%) are not; the year of study of the majority of respondents was first year (40.1%); and the place of residence of the majority was rural (48.2%). As depicted in Table 2, the outcomes of the bivariate correlations indicated a positive association between Internet addiction and procrastination ( $p < 0.01$ ). Moreover, both Internet addiction and academic procrastination exhibited significant negative correlations with self-esteem ( $p < 0.01$ ).

Table 1

*Frequencies and Percentage of Demographic Variables (N=446)*

Variables	Category	N	%
Gender	Female	412	92.4
	male	34	7.6
One-Child Family	Yes	67	15
	No	379	85
Year of Study	First	179	40.1
	Second	142	31.8
	Third	94	21.1
	Fourth	31	7
Place of residence	Rural	215	48.2
	Township	89	20
	Urban	142	31.8

Table 2

*Relationship between the Research Variables (N=446)*

Variables	M±SD	1	2	3
1 Internet addiction	43.47±9.92	1		
2 Academic procrastination	47.79±9.28	0.389**	1	
3 Self-esteem	26.10±2.34	-0.231**	-0.277**	1

Note: N = 446. SD = standard deviation. \*  $p < 0.5$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

### Testing for the Mediating Effect of Self-Esteem

Firstly, the mediation effect test procedure proposed by Wen Zhonglin (2005) was adopted to analyze the possible mediation effect of self-esteem between college students' Internet addiction and academic procrastination behaviors. In the first step, using college students' academic procrastination level as the dependent variable and Internet addiction as the predictor variable, regression analyses were conducted to obtain the path coefficient c.

In the second step, using self-esteem as the dependent variable and Internet addiction as the predictor variable, regression analyses were conducted to obtain the path coefficient  $a$ . In the third step, using college students' academic procrastination level as the dependent variable and Internet addiction and self-esteem as the predictor variables at the same time, regression analyses were conducted to obtain the path coefficient  $b$  and  $c'$ , as shown in Table 3.

As shown in Table 3, in the first step, Internet addiction positively predicts academic procrastination. Subsequently, in the second step, self-esteem negatively predicts academic procrastination. Notably, in the third step, even after accounting for the influence of self-esteem on academic procrastination, Internet addiction continues to exhibit a negative prediction of academic procrastination. This discernible pattern signifies that the magnitude of the regression coefficient pertaining to the relationship between Internet addiction and academic procrastination diminishes subsequent to the introduction of the mediating variable, self-esteem, into the framework connecting the dependent variable (academic procrastination) and the independent variable (Internet addiction). Consequently, it is evident that self-esteem functions as a partial mediator in the relationship between Internet addiction and academic procrastination.

Table 3

*Testing the pathways of the mediation model (N=446)*

Path	Dependent Variables	Predictors	$\beta$	$F$	$t$
1 (path c)	Academic procrastination	Internet addiction	0.364	79.048	8.891***
2 (path a)	Self-esteem	Internet addiction	-0.055	25.010	-5.001***
3 (path b)	Academic procrastination	Self-esteem	-0.782	51.311	-4.490***
(path c')		Internet addiction	0.321		7.798***

Subsequently, the PROCESS v.4.2 macro (Simple Mediation Model) developed by Hayes (2012) in SPSS 26.0 software was employed, and the Bootstrap method was utilized to examine the mediating effects in the model. The percentile Bootstrap method with bias correction was applied, with a selection of 5000 resampling iterations to compute the model's effect size and its 95% confidence interval (as shown in Table 4). The direct effect size of Internet addiction and the mediating effect size of self-esteem were determined to be 0.321 and 0.043, respectively, with 95% confidence intervals that do not encompass zero. Consequently, both the direct and mediating effects exhibit statistical significance. This indicates that self-esteem plays a partial mediating role between internet addiction and academic procrastination, as suggested by Fang Jie (2012), with the mediating effect accounting for 11.79% of the total effect. Based on these data results, a mediation model can be constructed (see Figure 1).

Table 4

*Results of Mediation Test (N=446)*

	Effect	SE	Bootstrap 95% CI		Percentage of Total Effect
			Lower	Upper	
Total effect	0.364	0.041	0.283	0.444	
Direct effect	0.321	0.041	0.240	0.402	
Indirect effect	0.043	0.017	0.017	0.082	11.79%

Note: 5000 bootstrap samples; standardization of all variables; SE= Std, Error.

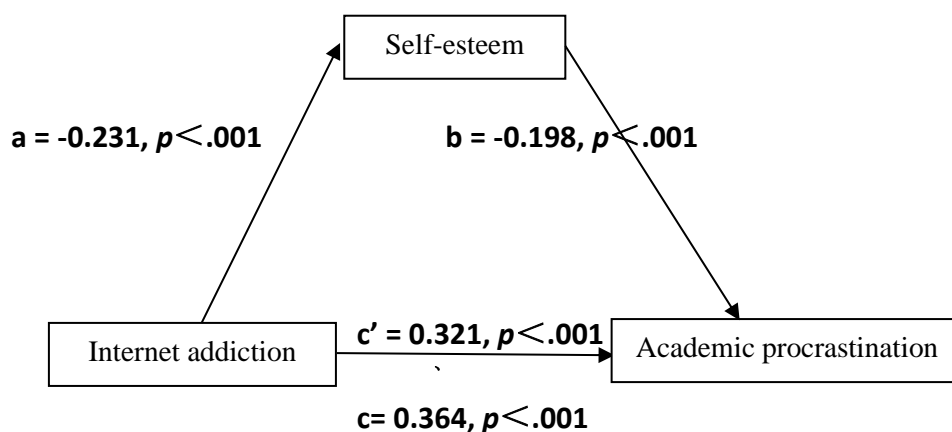


Figure 1 Self-esteem Mediation model

## Discussion

This study seeks to investigate the mediating role of self-esteem in the relationship between internet addiction and academic procrastination among Chinese college students. The research has produced noteworthy findings. Firstly, a positive correlation was identified between internet addiction and academic procrastination ( $r = 0.389$ ,  $p < 0.01$ ), consistent with the previous studies (Geng et al., 2018; Hayat et al., 2020; Karakaya Özyer & Altinsoy, 2023). This finding aligns with the conceptual model of procrastination, classifying factors influencing procrastination into task-related, personality traits, and state factors (Procee et al., 2013). Among these factors, external temptations on the internet, particularly attention-distracting learning tasks that do not contribute to task completion, have been established as pivotal influencers of academic procrastination (Gustavson & Miyake, 2017). The highly advanced internet landscape significantly amplifies the impact of external temptations on individuals (Firth et al., 2019).

Secondly, our findings revealed a substantial negative correlation between internet addiction and self-esteem ( $r = -0.231$ ,  $p < 0.01$ ). This result aligns with previous research (Mo et al., 2020; Yildirim et al., 2018), indicating that individuals at high risk of internet addiction exhibit notably lower self-esteem scores. Self-esteem, as defined by Rosenberg (1965), is an individual's attitude towards themselves, distinguishing between positive and negative evaluations. Individuals with low self-esteem may demonstrate maladaptive cognition due to negative self-evaluations, rendering it more challenging for them to cope with life demands and environmental challenges (Mei et al., 2016). Moreover, individuals with lower self-esteem may seek refuge online and on social media platforms to attain a sense of importance and recognition (Andreassen et al., 2017). According to Young (2009), a considerable proportion of internet addicts have a history of low self-esteem. Further research on internet

addiction indicates that individual self-esteem levels serve as a determining factor. Some studies posit that self-esteem is a crucial predictor of internet addiction, especially for introverted individuals who employ the internet to compensate for social deficits.

Thirdly, our study results indicate that self-esteem plays a partially mediating role in the relationship between internet addiction and academic procrastination. Therefore, internet addiction not only directly influences academic procrastination but also exerts an indirect effect through its impact on individual self-esteem. According to Steel (2007) integrated theory, procrastination primarily arises from the gap between intention and action. Individuals with low self-esteem often lack a sense of task performance efficacy (Yerdelen et al., 2016) and are more susceptible to distraction, leading to reduced willingness to complete tasks and a prolonged delay between intention and action, resulting in an increased frequency of procrastination. Higher levels of self-efficacy and self-esteem are linked to reduced tendencies towards procrastination. Additionally, individuals with low self-esteem may tether their self-worth to external performance. Profound fear of self-denial in the face of failure and intense apprehension of negative evaluations from others are common manifestations (Burka & Yuen, 2008). Due to the fear of potential academic performance failure, students frequently choose to procrastinate to avoid potential impacts on their self-esteem, attributing potential academic performance failures to external factors. In summary, the decline in self-esteem caused by internet addiction renders individuals more susceptible to delaying academic tasks. This study reveals the significant mediating role of self-esteem in the relationship between internet addiction and academic procrastination.

While this research provides valuable insights, it is crucial to recognize its limitations, which present chances for improvement in future studies. First, the sample is predominantly Chinese university students, Consequently, prudence is warranted in extrapolating and contemplating variables in diverse cultural and educational contexts when applying the findings of the research. Second, given the limitations of the cross-sectional design, future research is recommended to employ a more rigorous longitudinal approach for a comprehensive understanding of the mediating role of self-esteem in the relationship between internet addiction and academic procrastination. Additionally, reliance on participant self-reports may introduce subjective bias, especially on sensitive topics such as internet addiction and academic procrastination. Participants may be influenced by social expectations, predisposing them to provide responses that align with societal norms. Future studies should explore objective measurement methods, like physiological indicators or behavioral observations, to improve objectivity and reliability. Despite these constraints, it is important to acknowledge that research is a continuously developing process. This study provides a basis for future investigations to expand upon and address these limitations.

## **Conclusion**

In summary, this study concludes that self-esteem partially mediates the link between internet addiction and academic procrastination in college students. While internet addiction has a direct impact on academic procrastination, its more significant influence is indirect through its effect on individual self-esteem. To address academic procrastination effectively, future research should not only focus on the direct effects of internet addiction but also consider its potential psychological impacts. Exploring additional mediating variables could enhance our understanding of this complex relationship, informing targeted intervention strategies. Recognizing the pivotal roles of educational institutions and families in shaping

students' self-esteem, collaborative efforts among students, parents, and educators are essential for promoting students' psychological well-being and academic success.

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