

The Impact of Perceived Discrimination on Mobile Phone Addiction Among Chinese Higher Vocational College Students: A Chain Mediating Role of Negative Emotions and Learning Burnout

Wenping Li¹, Ting Xu², Liuting Diao², Qishu Wu³

¹Prudence College, Zhejiang Business Technology Institute, Ningbo, People's Republic of China; ²Business School, Ningbo University, Ningbo, People's Republic of China; ³Zhejiang Business Technology Institute, Ningbo, People's Republic of China

Correspondence: Qishu Wu, Zhejiang Business Technology Institute, Airport Road, Haishu District, Ningbo, 1988, People's Republic of China, Email 10824010@zjbt.net.cn

Purpose: Perceived discrimination among higher vocational college students is a prevalent issue in China and is linked to various mental and behavioral problems, including mobile phone addiction. Yet, the mechanisms underlying the relationship between perceived discrimination and mobile phone addiction remain ambiguous.

Methods: To address this issue, we recruited 1253 higher vocational college students to elucidate the relationship between perceived discrimination and mobile phone addiction. Participants completed a series of self-report questionnaires assessing perceived discrimination, mobile phone addiction, negative emotions, and learning burnout.

Results: Our findings suggest that perceived discrimination positively influences mobile phone addiction. The negative emotions and learning burnout play mediating effects between perceived discrimination and mobile phone addiction, respectively. Notably, we observe a chain mediating role of negative emotions and learning burnout play between perceived discrimination and mobile phone addiction.

Conclusion: The results of our study demonstrate that higher vocational college students who perceived stronger discrimination are inclined to exhibit heightened emotional, cognitive, and learning challenges, such as increased negative emotions and learning burnout, which contribute to more serious excessive mobile phone use. These findings elucidate the mechanisms underlying the relationship between perceived discrimination and mobile phone addiction, enriching our understanding of the underlying emotional, cognitive, and learning dynamics in higher vocational college students.

Keywords: perceived discrimination, mobile phone addiction, negative emotions, learning burnout, structural equation model

Introduction

Mobile phone addiction is characterized by a psychological dependency on excessive use of mobile phones, leading to significant impairments in social and psychological functioning. This issue has garnered widespread attention from psychologists, educationalists, psychiatrists, and public policymakers.^{1,2} According to a report from an authoritative department in June 2022, there are over one billion mobile phone users in China, of which 34.9% are young adults aged 18–30 years.³ Furthermore, approximately 25% of young adults have experienced or are currently dealing with mobile phone addiction, highlighting its status as a significant social concern.⁴ Plenty of studies have demonstrated the potential detrimental effects of mobile phone addiction. These effects span physical domains, such as eye strain and headache.^{5–7} Psychological symptoms like depression, anxiety, and insomnia,^{6,8–10} and social repercussions, including social withdrawal and reduced academic performance.^{6,11} Thus, it is crucial to address the influential factors and implications of mobile phone addiction.

Perceived Discrimination and Mobile Phone Addiction in Chinese Vocational College Students

Perceived discrimination refers to an individual's belief that they have been targeted due to another's negative attitude, judgment, or unfair treatment.^{12,13} Several factors contribute to the perceived discrimination faced by Chinese vocational college students. Historically, Chinese higher education institutions operate within a distinct vertical hierarchical system and can be divided into three levels: the top universities (Project 98/5 and Project 21/1 universities), the general universities (neither Project 98/5 nor Project 21/1 universities), and vocational colleges.^{14,15} Compared to the top and general universities, vocational colleges in China have to recruit students with lower scores in the College Entrance Examination and receive less financial support from the government and fewer social donations, which weaken the quality of education they provide.¹⁶ This disparity in resources and academic reputation perpetuates a social stereotype questioning the capabilities of students among vocational colleges. Consequently, these students often face increased unfair treatment and mental stress, affecting both their daily lives and future career prospects.¹³

The psychological stress-coping theory posits that an individual's cognitive appraisal processes play a key role in how they manage stress.¹⁷ Experiencing discrimination is recognized as a stressful event with potential ramifications on various aspects of health. When confronted with stress, individuals evaluate the nature of the stressor and choose from a range of coping strategies, which can be broadly categorized as positive or negative.¹² Positive coping strategies aim for confrontation and resolution of stress, encompassing approaches like problem-solving, seeking social support, and rationalizing the situation. Conversely, negative strategies typically involve avoiding the issue and include behaviors such as denial, self-distraction, and resorting to substance use.^{18,19} Previous studies suggest that vocational college students may lean towards passive coping mechanisms, one of which includes mobile phone addiction.^{20,21} Yet, the relationship between perceived discrimination and behavioral challenges, such as mobile phone addiction, among vocational college students is not well-defined. Thus, in this current study, we explore the impact of perceived discrimination on mobile phone addiction among Chinese vocational college students, delving into the underlying mechanisms that drive this relationship.

The Mediating Effect of Negative Emotions Between Perceived Discrimination and Mobile Phone Addiction

The theory of relative deprivation posits that individuals, upon comparing their circumstances to a reference group and perceiving a disadvantage, experience a sense of deprivation.²² This feeling often manifests as anger, resentment, depression, and other negative emotions, which can be detrimental to their psychological and behavioral development.²³ Influenced by social stereotypes, Chinese vocational college students tend to experience heightened relative deprivation.^{24,25} Consequently, they often grapple with intensified negative emotions, including anxiety, depression, and stress.²⁶ Based on the above evidence, negative emotion might mediate the relationship between perceived discrimination and mobile phone addiction, particularly when considering the emotional processing experiences of Chinese vocational college students.

Numerous studies indicate a connection between mobile phone addiction and negative emotions, notably depression and anxiety.^{7,27} On the one hand, individuals with mobile phone addiction tend to exhibit heightened sensitivity to negative stimuli, such as sad facial expressions, and often experience more intense negative emotions compared to non-addicts.^{28,29} On the other hand, previous research demonstrates that individuals with pronounced anxiety or depression tendencies often prefer online communication via mobile phones over direct face-to-face interactions. This suggests a propensity for those with intense negative emotions to develop mobile phone addiction.^{30,31} Collectively, these findings hint at intrinsic links between perceived discrimination, negative emotions, and mobile phone addiction in Chinese vocational college students. Yet, the specific mechanisms driving these associations remain elusive.

The Mediating Effect of Learning Burnout Between Perceived Discrimination and Mobile Phone Addiction

Previous studies show that individuals exposed to discrimination often exhibit heightened psychological and behavioral issues. One explanation posits that the experience of discrimination influences individuals' responses to daily stressors

stemming from such discrimination, subsequently impacting their psychological and behavioral outcomes.^{32,33} Several lines of evidence suggest that negative responses to daily stressors frequently lead to academic burnout among students.^{34,35} Learning burnout describes students' feelings of exhaustion in their academic journey, characterized by physical and mental fatigue, diminished motivation to learn, and a sense of reduced personal achievement.³⁶ According to the compensatory internet use theory, individuals in negative life situations (eg, learning burnout) tend to use the internet to compensate for their negative emotions.³⁷ Specifically, individuals' response to negative life situations is the reason for compensatory internet use, and the response can compensate for negative emotions by using the internet to generate positive feelings.³⁸ Higher vocational college students often experience negative feelings in learning, such as feelings of exhaustion and burnout, resulting in a decline in academic performance, so they tend to use mobile phones excessively to alleviate the burnout, resulting in mobile phone addiction.

The Chain Mediating Effect of Negative Emotion and Learning Burnout Between Perceived Discrimination and Mobile Phone Addiction

The Interaction of Person-Affect-Cognition-Execution (I-PACE) model posits that interactions among its core components (Person, Affect, Cognition, and Execution) underpins the emergence and perpetuation of addictive behaviors, such as internet, mobile phone, and game addictions. The model underscores how an individual's psychological state, intertwined with emotional and cognitive processes, facilitates addiction. In the context of this study, the perceived discrimination experienced by Chinese vocational college students represents the Person component or the individual psychological state. Subsequently, this perceived discrimination simultaneously evokes negative emotions and learning burnout, embodying the emotional and cognitive processes. Negative emotions and learning burnout serve as catalysts, prompting individuals to seek coping mechanisms in response to sustained stress. As a result, we propose that excessive mobile phone use, representing the execution component, emerges as a primary coping tool for individuals seeking respite from these adverse feelings and experiences.

Main Purpose and Hypothesis

Despite extensive research on the links between perceived discrimination, negative emotions, learning burnout, and mobile phone addiction, there remains a gap in understanding how the latter is influenced by perceived discrimination via the mediating effects of negative emotions and learning burnout. Based on the stress-coping theory and the I-PACE model, we conducted an empirical investigation to address the existing gaps. Specifically, we aimed to test the following hypotheses:

Hypothesis 1: Perceived discrimination significantly predicts mobile phone addiction among higher vocational students.

Hypothesis 2: Negative emotions mediate the relationship between perceived discrimination and mobile phone addiction.

Hypothesis 3: Learning burnout mediates the relationship between perceived discrimination and mobile phone addiction.

Hypothesis 4: Negative emotions and learning burnout together have a chain-mediating effect on the relationship between perceived discrimination and mobile phone addiction.

Materials and MethodsParticipants

This research recruited participants from two vocational colleges in the Zhejiang Province of China. Our sample comprised 1,253 vocational college students (576 males and 677 females), with an age range of 18 to 23 years (mean age = 18.78, SD = 0.86). Of the samples, 22.7% of them came from urban areas and 77.3% came from rural areas. The average monthly income in 55% of families exceeded ¥3000, which represents higher than the average personal monthly household income (¥3075) in China (2022). In this study, participants completed several online self-report questionnaires measuring aspects such as perceived discrimination, negative emotions, learning burnout, and mobile phone addiction for course credit. Before taking the survey, informed consent was obtained from each participant, complying with the Declaration of Helsinki. This study was approved by the Ethics Committee at Zhejiang Business Technology Institute.

Measures

Perceived Discrimination Scale

The Chinese version of perceived discrimination scale³⁹ was used in this study to test perceived discrimination in higher vocational college students. After revision, the scale consisted of 6 items rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). This scale consisted of two dimensions: individual discrimination (3 items, eg, “I feel that people look down on me”) and group discrimination (3 items, eg, “In general, I feel that people look down on me and my classmates”). A higher total score on the scale indicates a greater perception of discrimination. In this study, the Cronbach’s α of this scale was 0.93, indicating that the perceived discrimination scale has good reliability.

Depression, Anxiety and Stress Scale (DASS-21)

The Chinese version of the Depression, Anxiety, and Stress Scale 21 (DASS-21)⁴⁰ was used in this study to assess participants’ negative emotions over the past six months. The Chinese version of DASS-21 scale with 21 items includes three subscales (ie, depression, anxiety, and stress with 7 items, respectively) rated on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (apply to me very much). A higher score represents an elevated level of negative emotions. In this study, the Cronbach’s α coefficient of the DASS-21 was 0.97, indicating that the Chinese version of the DASS-21 scale has good reliability.

Learning Burnout Scale

The Chinese version of the Learning Burnout Scale⁴¹ was used in this study to measure learning burnout in higher vocational college students. The scale consisted of 20 items rated on a 4-point Likert scale ranging from 0 (completely out of line) to 3 (fully compliance), with the higher scores representing the higher levels of learning burnout. The scale includes three dimensions (ie, depression, improper behavior, and low sense of achievement). In this study, Cronbach’s α coefficient of the learning burnout scale was 0.80, indicating that the Chinese version of the learning burnout scale has good reliability.

Smartphone Addiction Scale

The Chinese version of the Mobile Phone Addiction Tendency Scale for College Students⁴² was used in this study to measure mobile phone addiction in higher vocational college students. The scale includes 16 items consisting of four dimensions (withdrawal symptoms, salient behavior, social comfort, and mood change) rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with the higher scores representing the higher levels of mobile phone addiction. The total score could range from 16 to 80, and scores above 57 are classified as “mobile phone addiction”. In this study, 5.7% of 1253 participants (71 students) were identified as mobile phone addicts, similar to previous research.⁴² In this study, Cronbach’s α coefficient of the scale was 0.91, indicating that the scale has good reliability.

Statistical Analysis

We estimated mediation effects using the structural equation modeling (SEM) method with PROCESS Model 6 macros for SPSS 22.0 software, with 5000 random sample bootstrapping samples and confirmed by 95% confidence intervals.⁴³ Perceived discrimination was analyzed as an independent variable, mobile phone addiction was analyzed as a dependent variable, and negative emotions and learning burnout were analyzed as mediating variables. Meanwhile, gender, age, geographical area, and economic situation were analyzed as control variables.

Results

Common Method Deviation Test

In this study, we performed Harman’s single-factor to test the common method bias of the model consisting of perceived discrimination, mobile phone addiction, negative emotions, and learning burnout. The analysis results suggested that there were 16 common factors with eight values greater than 1, among which the explained variance of the first factor was 14.88%, which was less than the critical standard of 40%, suggesting that there was no problematic common method bias.⁴⁴

Descriptive Statistics and the Correlation Analysis

Table 1 provides a summary of the Means, standard deviations (*SD*), and correlations of the variables in this study. A notable observation is the significant inter-correlation among all primary variables. Specifically, perceived discrimination is positively correlated with negative emotions ($r = 0.39, p < 0.001$), learning burnout ($r = 0.36, p < 0.001$), and mobile phone addiction ($r = 0.35, p < 0.001$). Additionally, negative emotions correlated positively with learning burnout ($r = 0.37, p < 0.001$) and mobile phone addiction ($r = 0.48, p < 0.001$). Learning burnout and mobile phone addiction are also positively correlated ($r = 0.42, p < 0.001$). These findings align with the prerequisites for intermediary effect analysis. Furthermore, with all correlation coefficients being below 0.7, our data effectively sidesteps any concerns of multicollinearity.

Mediation Model Test

As depicted in Table 2 and Figure 1, perceived discrimination significantly positively predicts negative emotion ($\beta = 0.40, p < 0.001$), learning burnout ($\beta = 0.25, p < 0.001$), and mobile phone addiction ($\beta = 0.35, p < 0.001$). Moreover, negative

Table 1 Descriptive Statistics and Correlations Among Variables ($N = 1253$)

Variables	Mean	SD	1	2	3	4	5	6	7
1. Perceived discrimination	23.33	8.69	1						
2. Negative emotions	37.42	13.37	0.39***	1					
3. Learning burnout	57.26	10.99	0.36***	0.37***	1				
4. Mobile phone addiction	39.98	10.44	0.35***	0.48***	0.42***	1			
5. Gender	1.54	0.50	0.04	0.08**	0.02	0.01	1		
6. Age	18.78	0.86	0.03	0.01	-0.01	0.01	-0.04	1	
7. Geographical area	1.23	0.42	0.02	0.04	0.02	-0.02	0.04	0.02	1
8. Economic situation	2.43	1.05	-0.03	-0.01	-0.01	0.02	0.01	-0.02	0.002

Notes: Gender was coded as 1=male, 2=female; Geographical area was coded as 1=urban area, 2=rural area; ** $P < 0.01$ and *** $P < 0.001$.

Table 2 Regression Analysis for Negative Emotions, Learning Burnout, and Mobile Phone Addiction

Dependent Variable	Predictor	R	R ²	F	β	t
Mobile phone addiction	Perceived discrimination	0.57	0.32	83.67	0.12	4.73***
	Negative emotion				0.35	13.11***
	Learning burnout				0.24	9.15***
	Gender				0.04	1.15
	Age				0.01	0.29
	Geographical area				-0.05	-1.99
	Economic situation				0.02	1.05
	Learning burnout				Perceived discrimination	0.44
Negative emotion		0.28	10.13***			
Gender		0.02	0.53			
Age		-0.02	-0.71			
Geographical area		0.002	-0.07			
Economic situation		0.002	0.08			
Negative emotion		Perceived discrimination	0.41	0.16	49.22***	
	Gender	0.12				4.43***
	Age	0.004				-0.14
	Geographical area	0.03				1.29
	Economic situation	0.001				0.05

Notes: *** $P < 0.001$.

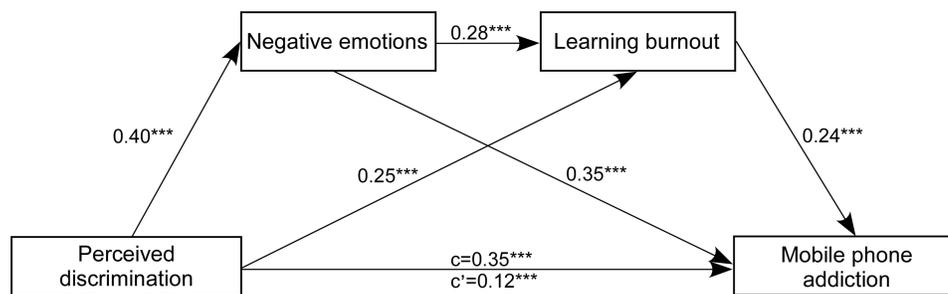


Figure 1 Standardized path coefficients for the mediation model between perceived discrimination and mobile phone addiction. *** $p < 0.001$.

emotion significantly positively predicted learning burnout ($\beta = 0.28$, $p < 0.001$) and mobile phone addiction ($\beta = 0.35$, $p < 0.001$), and learning burnout positively predicted mobile phone addiction ($\beta = 0.24$, $p < 0.001$). After the addition of negative emotion and learning burnout as mediators, the predictive effect of perceived discrimination on mobile phone addiction remains significant ($\beta = 0.12$, $p < 0.001$). These findings suggest that both negative emotions and learning burnout play intermediary roles, albeit partially, in the relationship between perceived discrimination and mobile phone addiction. Thus, the H1 was supported.

Table 3 delineates a chain mediating role of negative emotions and learning burnout between perceived discrimination and mobile phone addiction. The results indicate that the total indirect effect is 0.23 (SE = 0.02, 95% CI = [0.19, 0.26]). This total indirect effect comprises three specific pathways: the first pathway (perceived discrimination → negative emotion → mobile phone addiction) has an indirect effect of 0.14 (SE = 0.02, 95% CI = [0.10, 0.18]); the second pathway (perceived discrimination → learning burnout → mobile phone addiction) presents an indirect effect of 0.06 (SE = 0.01, 95% CI = [0.04, 0.08]); the third pathway (perceived discrimination → negative emotion → learning burnout → mobile phone addiction) shows an indirect effect of 0.03 (SE = 0.01, 95% CI = [0.02, 0.04]). Remarkably, the bootstrap 95% confidence intervals (5,000 times) for all three pathways exclude zero, which underscores the significance of the chain mediation effect. Thus, the H2, H3, and H4 were supported.

Gender Differences in Negative Emotions

We observed the positive correlation between gender and negative emotions ($r = 0.08$, $p < 0.01$, see Table 1), as well as the significantly positive prediction of gender on negative emotions ($\beta = 0.12$, $p < 0.001$, see Table 2). We further perform the independent sample t -test to compare the perceived discrimination, negative emotions, learning burnout, and mobile phone addiction between males and females. The results show that males and females only show significant differences in negative emotions ($M_{\text{female}} = 38.64$, $SD = 14.24$; $M_{\text{male}} = 36.38$, $SD = 12.50$, $t = 2.08$, $p < 0.05$, Cohen's $d = 0.17$). These findings show that females show greater negative emotions than males.

Table 3 Mediation Effects of Negative Emotions and Learning Burnout

Total, Direct, And Indirect Effect	Effect	SE	95% CI	
			LLCI	ULCI
Total effect	0.35	0.02	0.23	0.31
Direct effect: PD → MPA	0.12	0.03	0.09	0.21
Total indirect effect	0.23	0.02	0.19	0.26
PD → NE → MPA	0.14	0.02	0.10	0.18
PD → LB → MPA	0.06	0.01	0.04	0.08
PD → NE → LB → MPA	0.03	0.01	0.02	0.04

Abbreviations: PD, perceived discrimination; NE, negative emotions; LB, learning burnout; MPA, mobile phone addiction; SE, standard error; CI, confidence interval; LLCI, lower limits of the confidence interval; ULCI, upper limits of the confidence interval.

Discussion

Several lines of evidence show that Chinese higher vocational college students always report experiencing discrimination in their academic pursuits, which often leads to various mental and behavioral challenges.³⁹ Despite its significance, this issue has not garnered widespread public attention. In this study, we identified several key mental and behavioral indicators (eg, negative emotions, learning burnout, and mobile phone addiction) closely associated with perceived discrimination, as evidenced by previous research. Furthermore, we explored the relationship between perceived discrimination and mobile phone addiction by examining the potential mediating effects of negative emotions and learning burnout.

The Impact of Perceived Discrimination on Mobile Phone Addiction

This study explores how perceived discrimination influences mobile phone addiction among higher vocational college students and the underlying mechanisms. Specifically, an increase in the level of perceived discrimination corresponds to a heightened degree of mobile phone addiction among these students, corroborating Hypothesis 1 of our study. In line with previous studies,^{13,39} we found that higher vocational college students reported a relatively high perception of discrimination, with an average score of 23.33 out of 30. Echoing findings from earlier studies,^{42,45} higher vocational college students also exhibited notable levels of 39.98 out of 80. Notably, this is consistent with previous report,⁴⁶ 5.7% of participants (71 students) scored above 57 which is identified as mobile phone addicts. Importantly, our observations revealed that students from vocational colleges who perceived more discrimination consistently reported elevated stress levels, as measured by the DASS-21 scale ($r = 0.52, p < 0.001$). The perceived discrimination could be defined as a strong stressor according to the stress-coping theory,¹⁷ considering that vocational college students tend to have lower self-efficacy and are more prone to psychological and behavioral challenges compared to their undergraduate peers.^{47,48} When confronting persistent perceptions of discrimination in their daily life, they might lean towards negative coping strategies, like excessive mobile phone use.^{30,46} Moreover, our results also support the general strain theory in which individuals' inability to achieve socially defined expectations using conventional methods or failure to achieve positively valued goals may result in deviant behaviors.^{49,50} For vocational college students, failing to enter university in the College Entrance Examination in China is widely considered a lower ability, and the social stereotype may induce a series of deviant behaviors among vocational college students, such as cyberbullying and mobile phone addiction.^{50,51}

The Independent Mediating Roles of Negative Emotions and Learning Burnout

Our study proposes that negative emotions and learning burnout mediate the relationship between perceived discrimination and mobile phone addiction, respectively, thus confirming Hypotheses 2 and 3. Firstly, we observed that perceived discrimination is a significant predictor of negative emotions like depression and anxiety. In turn, these negative emotions notably forecast mobile phone addiction. Our findings align with the relative deprivation theory,²² suggesting that individuals often exhibit negative emotions, such as anger, anxiety, and depression when they perceive themselves in a disadvantageous position. Consequently, this negative state can hinder the psychological and behavioral development of individuals.⁵² In practical terms, students in higher vocational colleges often grapple with pronounced relative deprivation, leading to intensified negative emotions.^{24,25} Prior research suggests that individuals experiencing intense negative emotions may be more susceptible to mobile phone addiction, as these devices can offer an escape from external negative stimuli.^{30,53} Consequently, our study reinforces the notion that negative emotions serve as a mediator between perceived discrimination and mobile phone addiction among higher vocational college students.

Secondly, our findings suggest that perceived discrimination is a strong predictor of learning burnout, which in turn significantly predicts mobile phone addiction among higher vocational college students. In line with previous research suggesting the notion that negative responses to daily stressors induce academic burnout among students^{34,35} and the close positive relationship between learning burnout and problematic mobile phone use,³⁸ our research supports the compensatory internet use theory. According to this theory, individuals who perceive themselves in a disadvantageous position (eg, discrimination) always exert mental exhaustion and learning burnout, and finally, these negative situations cause individuals to tend to (excessively) the internet to compensate for their negative emotions, resulting in mobile phone addiction.^{37,38} In

practical terms, students in higher vocational colleges are often accompanied by negative emotions and motivation decrement, leading to learning burnout. Ultimately, the learning burnout may result in excessive use of mobile phone (and mobile phone addiction) throughout individuals' compensation motivation. Based on prior work and our findings, we propose that learning burnout serves as an essential mediator between perceived discrimination and mobile phone addiction among higher vocational college students.

Thirdly, it is noteworthy that both negative emotions and learning burnout in our study are negative factors, which may be integrated in the stimulus-organism-response (SOR) theory pioneered by Mehrabian and Russell in 1974.⁵⁴ The theory elucidates the impact of external stimuli on individuals' mental activities, such as cognition and emotions, and eventually determines behavioral performance. In recent years, numerous studies have extended and applied this theoretical framework across the domains of learning engagement, decision-making, and addictive behavior.⁵⁵⁻⁵⁷ In our study, for higher vocational college students the perceived discrimination can be considered as the external stimuli that trigger a series of negative statuses (eg, negative emotions and learning burnout) and in turn lead to a series of problematic behaviors (eg, mobile phone addiction).

The Chain-Mediating Roles of Negative Emotions and Learning Burnout

We observed the chain-mediating roles of negative emotions and learning burnout between perceived discrimination and mobile phone addiction, thus confirming Hypothesis 4. The chain-mediating effect and the significant correlations among all variables (perceived discrimination, negative emotions, learning burnout, and mobile phone addiction) in our study imply a potential pathway that individuals who experience increased discrimination will exert greater negative emotions, and then induce greater learning burnout, and eventually determine more seriously mobile phone addiction. Our results are consistent with the I-PACE model, which emphasizes the roles of person, affect, cognition, and execution in the development and maintenance of addictive behaviors.⁵⁸ In our study, we discovered that vocational college students facing discrimination (representing the "person" aspect) tend to exert negative emotions (representing the "affect" aspect). Subsequently, these negative emotions intensify learning burnout (spanning both "affect" and "cognition" aspects) via emotional exhaustion, leading to diminished motivation. Ultimately, this learning burnout catalyzes mobile phone addiction (representing the "execution" aspect) due to emotional avoidance and impaired executive control. Based on the I-PACE model and our findings, we delineated a pathway "perceived discrimination negative emotion → learning burnout → mobile phone addiction" to elucidate the mechanisms driving the link between perceived discrimination and mobile phone addiction in Chinese higher vocational college students.

The Theoretical and Practical Implications

For the theoretical implications, our research investigates the effect of perceived discrimination on mobile phone addiction through emotional and cognitive processes (such as negative emotions and learning burnout), deepening our understanding of mobile phone addiction and its essential influential factors. Moreover, for the perceived discrimination that widely existed among Chinese higher vocational college students, we detect the adverse effect of perceived discrimination on their mental processes and behavioral performance, extending the range of application of perceived discrimination.

For the practical implications, our research delineates the negative influential factors on mobile phone addiction in Chinese higher vocational college students. These findings may provide avenues for college managers to take effective measures to attenuate higher vocational college students' mobile phone addiction through providing psychological assistance services for students to reduce perceived discrimination, negative emotions, and learning burnout. It will be better for future research to investigate more influential factors in college students' mobile phone addiction. Moreover, we observed that female students show more negative emotions than male students under the context of stressful situations, supporting the prior notion that females are more susceptible to affective disturbances such as depression, anxiety disorder, and phobia compared to males.^{59,60} Our findings highlight the need for enhanced psychological interventions, such as emotional support and contemplative practices, contributing to the improvement of negative emotions in female students.^{61,62} Future research can go further to explore the psychological and neural mechanisms underlying the gender differences in negative emotions.

Limitations

There are some limitations of this study. First, this study focuses solely on negative mental health factors, overlooking potential positive factors that could mitigate the adverse outcomes of mobile phone addiction. Future research could delve into the potential impacts of positive interevent on mobile phone addiction. Second, while numerous factors influence mobile phone addiction, this study only explores the relationship between perceived discrimination, negative emotions, and learning burnout in higher vocational college students. Future studies might consider incorporating additional personal factors, such as self-efficacy and family socioeconomic status, as mediators or moderators.

Conclusion

In the context of the typological reform and development of higher vocational education in China, this study investigated the relationship between perceived discrimination and mobile phone addiction in higher vocational college students. Our results indicate that perceived discrimination not only directly influences mobile phone addiction, but also impacts it indirectly. The indirect influence occurs through separate mediatory roles of negative emotion and learning burnout, as well as their combined chain mediation effect. This empirical evidence sheds light on the intricate dynamics between perceived discrimination and addictive behaviors among higher vocational college students.

Funding

This work was supported by the Education Science Planning Project of Zhejiang Province (2024SCG269), the Ningbo Education Science Planning Project (2023YGH060), and the Annual Scientific Research Project of Zhejiang Business Technology Institute (KYND202301).

Disclosure

The authors report no conflicts of interest related to this work.

References

1. Chen H, Wang C, Lu T, Tao B, Gao Y, Yan J. The relationship between physical activity and college students' mobile phone addiction: the chain-based mediating role of psychological capital and social adaptation. *Int J Environ Res Public Health*. 2022;19:15.
2. Suseno M, Hayat B, Putra MDK, Bien JK, Rachmawati R, Hartanto H. A differential item functioning (DIF) analysis of the mobile phone problem use scale in Indonesian schools with and without smartphone banned policy. *Cogent Psychol*. 2022;9(1):2137306. doi:10.1080/23311908.2022.2137306
3. CNNIC. CNNIC released the 50th statistical report on china's internet development. 2022; Available from: <https://www.cnnic.cn/n4/2022/0916/c38-10594.html>. Accessed 31, August, 2022.
4. Zhu J, Xie R, Chen Y, Zhang W. Relationship between parental rejection and problematic mobile phone use in Chinese university students: mediating roles of perceived discrimination and school engagement. *Frontiers in Psychology*. 2019;10:428. doi:10.3389/fpsyg.2019.00428
5. Shankar SB, Rani SL, Brundha M. Comparison study of factors associated with smartphone addiction among college students. *Drug Invention Today*. 2020;14:7.
6. Mei S, Hu Y, Wu X, et al. Health risks of mobile phone addiction among college students in China. *Int J Ment Health Addict*. 2023;21(4):2650–2665. doi:10.1007/s11469-021-00744-3
7. Xiao Z, Huang J. The relation between college students' social anxiety and mobile phone addiction: the mediating role of regulatory emotional self-efficacy and subjective well-being. *Frontiers in Psychology*. 2022;13:861527. doi:10.3389/fpsyg.2022.861527
8. Barbar S, Haddad C, Sacre H, et al. Factors associated with problematic social media use among a sample of Lebanese adults: the mediating role of emotional intelligence. *Perspect Psychiatr Care*. 2021;57(3):1313–1322. doi:10.1111/ppc.12692
9. Kang Y, Liu S, Yang L, et al. Testing the bidirectional associations of mobile phone addiction behaviors with mental distress, sleep disturbances, and sleep patterns: a one-year prospective study among Chinese college students. *Frontiers in Psychiatry*. 2020;11:634. doi:10.3389/fpsyg.2020.00634
10. Di Matteo D, Fotinos K, Lokuge S, et al. Automated screening for social anxiety, generalized anxiety, and depression from objective smartphone-collected data: cross-sectional study. *J Med Internet Res*. 2021;23(8):e28918. doi:10.2196/28918
11. Enez Darcin A, Kose S, Noyan CO, Nurmedov S, Yılmaz O, Dilbaz N. Smartphone addiction and its relationship with social anxiety and loneliness. *Behav Inf Technol*. 2016;35(7):520–525. doi:10.1080/0144929X.2016.1158319
12. Pascoe EA, Smart Richman L. Perceived discrimination and health: a meta-analytic review. *Psychol Bull*. 2009;135(4):531. doi:10.1037/a0016059
13. Liu X, Sun X, Hao Q. Influence of discrimination perception on career exploration of higher vocational students: chain mediating effect test. *Frontiers in Psychology*. 2022;13(1):968032. doi:10.3389/fpsyg.2022.968032
14. Hu J, Liu H, Chen Y, Qin J. Strategic planning and the stratification of Chinese higher education institutions. *Int J Educ Dev*. 2018;63:36–43. doi:10.1016/j.ijedudev.2017.03.003
15. Guo Y, Guo S, Yochim L, Liu X. Internationalization of Chinese higher education: is it westernization? *Int Educ Stud*. 2022;26(4):436–453. doi:10.1177/1028315321990745

16. Tadesse E, Gao C, Sun J, Khalid S, Lianyu C. The impact of socioeconomic status on self-determined learning motivation: a serial mediation analysis of the influence of Gaokao score on seniority in Chinese higher vocational college students. *Child Youth Services Rev.* 2022;143:106677. doi:10.1016/j.chilyouth.2022.106677
17. Lazarus RS. Coping theory and research: past, present, and future. *Psych Med.* 1993;55(3):234–247. doi:10.1097/00006842-199305000-00002
18. Carver CS. You want to measure coping but your protocol' too long: consider the brief cope. *Int J Behav.* 1997;4(1):92–100. doi:10.1207/s15327558ijbm0401_6
19. Shanahan L, Steinhoff A, Bechtiger L, et al. Emotional distress in young adults during the COVID-19 pandemic: evidence of risk and resilience from a longitudinal cohort study. *Psychol Med.* 2022;52(5):824–833. doi:10.1017/S003329172000241X
20. Huang Q, Lin S, Li Y, et al. Suicidal ideation is associated with excessive smartphone use among Chinese college students. In: *Frontiers in Public Health.* Frontiers; 2022:9.
21. Zhang. Li G, Fan Z-y, Tang X-j, Zhang F. Mobile Phone Addiction Mediates the Relationship Between Alexithymia and Learning Burnout in Chinese Medical Students: A Structural Equation Model Analysis. In: *Psychology Research and Behavior Management.* Taylor & Francis; 2021.
22. Walker I, Pettigrew TF. Relative deprivation theory: an overview and conceptual critique. *Br J Soc Psychol.* 1984;23(4):301–310. doi:10.1111/j.2044-8309.1984.tb00645.x
23. Ohno H, Lee K-T MT, Maeno T. Feelings of Personal Relative Deprivation and Subjective well-being in Japan. *Behav Sci.* 2023;13(2):158. doi:10.3390/bs13020158
24. Zhang J, Liu J, Cui S, Shuai H. Perceived justice, negative emotions and delinquency in Chinese high schools and vocational schools. *Psychol Crime Law.* 2022; 2022: 1–12.
25. Xu X, Wang Y, Lu Y, Relative Deprivation ZD. Academic procrastination in higher vocational college students: a conditional process analysis. *Asia-Pac Educ Res.* 2023;32(3):341–352. doi:10.1007/s40299-022-00657-2
26. Zeng Y, Wang G, Xie C, Hu X, Reinhardt JD. Prevalence and correlates of depression, anxiety and symptoms of stress in vocational college nursing students from Sichuan, China: a cross-sectional study. *Psychol Health Med.* 2019;24(7):798–811. doi:10.1080/13548506.2019.1574358
27. Li Y, Li G, Liu L, Wu H. Correlations between mobile phone addiction and anxiety, depression, impulsivity, and poor sleep quality among college students: a systematic review and meta-analysis. *J Behav Addict.* 2020;9(3):551–571. doi:10.1556/2006.2020.00057
28. Feng Z, Diao Y, Ma H, et al. Mobile phone addiction and depression among Chinese medical students: the mediating role of sleep quality and the moderating role of peer relationships. *BMC Psychiatry.* 2022;22(1):567. doi:10.1186/s12888-022-04183-9
29. Hu Y, Guo J, Jou M, et al. Investigating the attentional bias and information processing mechanism of mobile phone addicts towards emotional information. *Comput Hum Behav.* 2020;110:106378. doi:10.1016/j.chb.2020.106378
30. Choksi ST. A study to find out the correlation of mobile phone addiction with anxiety, depression, stress and sleep quality in the college students of Surat city. *Int J Curr Res Rev.* 2021;13(08):137–142. doi:10.31782/IJCRR.2021.13812
31. He L, Yang S, Meng Y. Correlational research on mobile phone addiction and the interpersonal relationship distress of Chinese college students. *Ethics Prog.* 2023;14(1):126–143. doi:10.14746/eip.2023.1.8
32. Leger KA, Gloger EM, Maras J, Marshburn CK. Discrimination and health: the mediating role of daily stress processes. *Health Psychol.* 2022;41(5):332. doi:10.1037/hea0001173
33. Goreis A, Asbrock F, Nater UM, Mewes R. What mediates the relationship between ethnic discrimination and stress? Coping strategies and perceived social support of Russian immigrants in Germany. In: *Frontiers in Psychiatry.* Frontiers Media SA; 2020. 11.
34. Wang S, Li H, Chen X, Yan N, Wen D. Learning burnout and its association with perceived stress, social support, and the big five personality traits in Chinese medical students during the COVID-19 pandemic: a cross-sectional study. *BMC Psychiatry.* 2022;22(1):785. doi:10.1186/s12888-022-04453-6
35. Liu Y, Cao Z. The impact of social support and stress on academic burnout among medical students in online learning: the mediating role of resilience. *Front Public Health.* 2022;10:938132. doi:10.3389/fpubh.2022.938132
36. Stoliker BE, Lafreniere KD. The influence of perceived stress, loneliness, and learning burnout on university students' educational experience. *Coll Stud J.* 2015;49(1):146–160.
37. Kardefelt-Winther D. A conceptual and methodological critique of internet addiction research: towards a model of compensatory internet use. *Comput Hum Behav.* 2014;31:351–354. doi:10.1016/j.chb.2013.10.059
38. Li S, Xu M, Zhang Y, Wang X. The more academic burnout students got, the more problematic mobile phone use they suffered? A meta-analysis of mainland Chinese adolescents and young adults. *Frontiers in Psychology.* 2023;13:1084424. doi:10.3389/fpsyg.2022.1084424
39. Dong J, Liu W, Zhou C, Sun Y, Chen G. The relationship between perceived discrimination and learning burnout of secondary vocational students: the mediating effect of professional identity and psychological capital. *J Spec Educ.* 2020;1(4):76–80.
40. Gong X, Xie X, Xu R, Luo Y. Psychometric properties of the Chinese versions of dass-21 in Chinese college students. *Chin J Clin Psychol.* 2010;18:443–446.
41. Lian R, Yang L, Wu L. Relationship between professional commitment and learning burnout of undergraduates and scales developing. *Acta Psychologica Sinica.* 2005;37(5):632–636.
42. Chen L, Yan Z, Tang W, Yang F, Xie X, He J. Mobile phone addiction levels and negative emotions among Chinese young adults: the mediating role of interpersonal problems. *Computers in Human Behav.* 2016;55:856–866. doi:10.1016/j.chb.2015.10.030
43. Hayes AF, Rockwood NJ. Conditional process analysis: concepts, computation, and advances in the modeling of the contingencies of mechanisms. *Am Behav Sci.* 2020;64(1):19–54. doi:10.1177/0002764219859633
44. Podsakoff PM, Organ DW. Self-reports in organizational research: problems and prospects. *J Manage.* 1986;12(4):531–544. doi:10.1177/014920638601200408
45. Wang W, Mehmood A, Li P, et al. Perceived stress and smartphone addiction in medical college students: the mediating role of negative emotions and the moderating role of psychological capital. In: *Frontiers in Psychology.* Frontiers Media SA; 2021. 12.
46. Gao T, Li J, Zhang H, et al. The influence of alexithymia on mobile phone addiction: the role of depression, anxiety and stress. *J Affective Disord.* 2018;225:761–766. doi:10.1016/j.jad.2017.08.020
47. Pan Y, Yang Z, Han X, Qi S. Family functioning and mental health among secondary vocational students during the COVID-19 epidemic: a moderated mediation model. *Pers Individ Dif.* 2021;171:110490. doi:10.1016/j.paid.2020.110490
48. Wen Y, Chen H, Pang L, Gu X. The relationship between emotional intelligence and entrepreneurial self-efficacy of Chinese vocational college students. *Int J Environ Res Public Health.* 2020;17(12):4511. doi:10.3390/ijerph17124511

49. Agnew R. Foundation for a general strain theory of crime and delinquency. *Criminology*. 1992;30(1):47–88. doi:10.1111/j.1745-9125.1992.tb01093.x
50. Peng Y, Zhou H, Zhang B, Mao H, Hu R, Jiang H. Perceived stress and mobile phone addiction among college students during the 2019 coronavirus disease: the mediating roles of rumination and the moderating role of self-control. *Pers Individ Dif*. 2022;185:111222. doi:10.1016/j.paid.2021.111222
51. Guo S. Cyberbullying and delinquency in adolescence: the potential mediating effects of social attachment and delinquent peer association. *J Interpers Violenc*. 2022;37(19–20):NP18837–NP18864. doi:10.1177/08862605211040828
52. Mummendey A, Kessler T, Klink A, Mielke R. Strategies to cope with negative social identity: predictions by social identity theory and relative deprivation theory. *J Pers Soc Psychol*. 1999;76(2):229. doi:10.1037/0022-3514.76.2.229
53. Hames JL, Hagan CR, Joiner TE. Interpersonal processes in depression. *Annu Rev Clin Psychol*. 2013;9(1):355–377. doi:10.1146/annurev-clinpsy-050212-185553
54. Mehrabian A, Russell JA. *An Approach to Environmental Psychology*. Cambridge, MA: the MIT Press; 1974.
55. Li J, Zhang S, Ao W. Why is instant messaging not instant? Understanding users' negative use behavior of instant messaging software. *Comput Hum Behav*. 2023;142:107655. doi:10.1016/j.chb.2023.107655
56. Yang J, Peng MY-P, Wong S, How CW. E-learning environmental stimuli influence determinates of learning engagement in the context of COVID-19? SOR model perspective. *Frontiers in Psychology*. 2021;12:584976. doi:10.3389/fpsyg.2021.584976
57. Mason MC, Zamparo G, Marini A, Ameen N. Glued to your phone? Generation Z's smartphone addiction and online compulsive buying. *Comput Hum Behav*. 2022;136:107404. doi:10.1016/j.chb.2022.107404
58. Brand M, Young KS, Laier C, Wöfling K, Potenza MN. Integrating psychological and neurobiological considerations regarding the development and maintenance of specific internet-use disorders: an interaction of person-affect-cognition-execution (I-PACE) model. *Neurosci Biobehav Rev*. 2016;71:252–266. doi:10.1016/j.neubiorev.2016.08.033
59. Yuan J, Luo Y, Yan JH, Meng X, Yu F, Li H. Neural correlates of the females' susceptibility to negative emotions: an insight into gender-related prevalence of affective disturbances. *Human Brain Mapp*. 2009;30(11):3676–3686. doi:10.1002/hbm.20796
60. Liu L, Zhang T, Xie X. Negative life events and procrastination among adolescents: the roles of negative emotions and rumination, as well as the potential gender differences. *Behav Sci*. 2023;13(2):176. doi:10.3390/bs13020176
61. Kemeny ME, Foltz C, Cavanagh JF, et al. Contemplative/emotion training reduces negative emotional behavior and promotes prosocial responses. *Emotion*. 2012;12(2):338–350. doi:10.1037/a0026118
62. Liu H, Wu F, Liao G, Mai S, Ouyang M. Impact of the intensive psychological intervention care on post-traumatic stress disorder and negative emotions of teenage female patients seeking an induced abortion. *Frontiers in Psychiatry*. 2023;14:1033320. doi:10.3389/fpsyg.2023.1033320

Psychology Research and Behavior Management

Dovepress

Publish your work in this journal

Psychology Research and Behavior Management is an international, peer-reviewed, open access journal focusing on the science of psychology and its application in behavior management to develop improved outcomes in the clinical, educational, sports and business arenas. Specific topics covered in the journal include: Neuroscience, memory and decision making; Behavior modification and management; Clinical applications; Business and sports performance management; Social and developmental studies; Animal studies. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/psychology-research-and-behavior-management-journal>