

The Effect of Cell Phone Dependence on Social Avoidance Among County High School Students: A Moderated Mediation Model

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doi:10.56397/SPS.2024.06.07

Abstract

Social avoidance is the behavior of an individual who actively avoids social situations, avoids peer groups, and seeks solitude during social interaction. Higher education students are particularly vulnerable to social avoidance. Social avoidance not only affects peer relationships and future development but also generates negative emotions, which seriously affect the psychological health of high school students. The ecosystem theory suggests that individual development is influenced and constrained by many environmental and social factors, and the causes of social avoidance in higher vocational students can be further explored from the micro-system level. Based on the “cognitive-behavioral” model, the network compensation theory of psychological needs, and the ecosystem theory, we not only examined the social environment factors, i.e., the causes of social avoidance due to cell phone dependence, but also explored the internal mechanisms affecting adolescents’ cell phone addiction from the aspects of self-control and peer support. Therefore, in order to examine the relationship between cell phone dependence and social avoidance among senior high school students, this study intends to construct a moderated mediation model to examine the relationship between cell phone dependence and social avoidance among senior high school students and to test the mediating role of self-control and the moderating role of peer support. Through a random sampling method, 600 senior vocational students in Heilongjiang were used as subjects and were surveyed with the Self-Assessment of Cell Phone Use Dependence Questionnaire, Self-Control Scale, Peer Support Questionnaire, Social Avoidance, and Distress Scale. The results showed that: (1) cell phone dependence positively predicted social avoidance among senior students; (2) self-control mediated between the two; the findings of this study have theoretical significance for reducing social avoidance among senior students.

Keywords: social avoidance, cell phone dependence, self-control, peer support

1. Introduction

With the popularization of smartphones, it brings a large number of convenient ways of

communication and provides great convenience for people’s lives, but the excessive use of smartphones can also have a negative impact on

people's physical and mental health, such as psychological dependence, social avoidance, and other psychological problems. For high school students, cell phone dependence is a common phenomenon (LI Xinyi & ZHANG Lian, 2021). In this case, many teenagers are addicted to cell phones, which leads to problems such as decreased academic performance and increased psychological problems. This not only affects the physical health of students but is also detrimental to their psychological development and social adaptation. Studies have found that high levels of cell phone dependence in high school students can have consequences such as emotional disorders and impaired social functioning, such as depression and anxiety. However, some studies have also found that cell phone dependence has a negative impact on high school students' academic performance (Xu Lei, Zhang Qingqing, Niu Gengfeng et al., 2021). In addition, due to the strong social attributes of smartphones, high school students will inevitably develop social avoidance in the process of using smartphones.

Scholars have expressed different definitions of cell phone dependence. For example, foreign scholars Griffiths believe that cell phone dependence is a kind of technological addiction, a non-biochemical addiction to human-computer interaction. According to Parker, cell phone dependence is a dependence or addiction resulting from habitual use of cell phones, emphasizing that excessive use of cell phones leads to adverse consequences (Zhang Yali, 2018). Bianchi and Phillips named cell phone overuse as problematic cell phone use, which is characterized by difficulty controlling oneself, a lack of clarity about how much time is spent on the cell phone, and strong extraversion and low self-esteem personality traits. Enzo et al. defined cell phone dependence as excessive use and intermittent desire to use cell phones based on the relevant theories of behavioral dependence and somatic dependence (Xuefeng Zhang, Qiang Gaofeng, Jingyu Geng et al, 2018). Domestic scholars Shi considered it to be a state in which an individual's behavioral loss of control over the use of cell phones leads to a significant impairment of his or her physiological, psychological, and social functions. According to Wei Yaoyang, cell phone dependence is a phenomenon in which the use of cell phones is excessive for some reasons, leading to psychological or physiological

discomfort for the users. Li Chiyong defines cell phone dependence as excessive reliance on cell phones, which has a negative effect on physical and mental health as well as learning and working life (Zhang Huili, 2022). In summary, cell phone dependence can be summarized as a kind of behavioral addiction phenomenon in which individuals are unable to control themselves and rely excessively on the use of cell phones, resulting in psychological or physiological maladaptation and affecting normal life and work.

Social avoidance is often defined as a psychological strategy that an individual adopts when faced with a social situation, which involves actively avoiding or trying to avoid interacting with others. It may manifest itself as discomfort with invitations, avoidance of group activities, or silence in public situations (T. Xu, 2020). There are often complex psychological reasons hidden behind this behavioral pattern, such as low self-esteem, fear, or insecurity about social situations. Studies have shown that social avoidance is closely related to psychological problems such as depression, anxiety, suicidal ideation, and maladaptive behaviors, which have an impact on the physical and mental health of individuals. As a special group, high school students' excessive dependence on cell phones may lead to social avoidance (Liu Dan, 2018).

Therefore, whether high school students' smartphone dependence triggers social avoidance deserves in-depth study. This study aims to explore the relationship between smartphone dependence, self-control, peer support, and social avoidance among county high school students and to provide a theoretical basis for reducing the degree of smartphone dependence and solving the problem of social avoidance among county high school students.

2. Research Target

High school students in Mudanjiang City, Heilongjiang Province, were selected as subjects, and 410 questionnaires were distributed, of which 400 were valid; among them, 183 were male and 217 were female; 135 were in senior high school, 130 were in senior high school, 135 were in senior high school, 215 were in vocational high school, and 185 were in general high school, and 230 were left-behind children, and 170 were non-left-behind children.

3. Research Tools

3.1 Cell Phone Dependence Scale

The scale was revised by Taushuman et al. (2013) as the Mobile Phone Dependence Inventory (MPDI), which includes withdrawal symptoms, cravings, and physical and psychological effects. The MPDI consists of 13 questions and is rated on a five-point scale, i.e., “Never”, “Occasionally”, “Sometimes”, “Often”, “Always”. The Cronbach’s alpha coefficient was 0.87. The higher the score, the higher the degree of cell phone dependence.

3.2 Social Avoidance Scale

The Social Avoidance and Distress Scale was developed using the revised Watson and Friend by Chunzi Peng et al. The items related to the social avoidance dimension were selected for measurement. The scale consisted of 14 items and was rated on a 2-point scale, with “yes” scoring 1 point and “no” scoring 0 points. Scores range from 0 to 14, with higher scores indicating higher levels of social avoidance. The scale has high internal consistency, with a Cronbach’s alpha coefficient of 0.76.

3.3 Self-Control Scale

Self-Control Scale (SCS) the Chinese revised version by domestic scholars Tan Shuhua and Guo Yongyu contains 19 items. A 5-point scale is used, ranging from not at all, somewhat not at all, not sure, relatively at all, to fully at all, rated from 1 to 5 in that order. The modified version contains a total of 5 dimensions, namely, resisting temptation, healthy habits, abstaining from entertainment, impulse control, and focusing on work, with higher scores on each dimension indicating better self-control. The internal consistency reliability Cronbach’s alpha coefficient for this questionnaire was 0.85.

3.4 Peer Support Scale

In this study, the peer support questionnaire was developed by Dr. Leilei Zhao (2019) from East China Normal University, which has high reliability and validity. This questionnaire is divided into two dimensions of emotional support and message support, in which emotional support includes two aspects of emotional experience and emotional care, which mainly refers to the emotional support in terms of understanding, recognition, respect, and attention felt for the emotional aspects of the peers; message support includes information sharing and decision-making support, which

mainly refers to the sharing of knowledge and other information between the partners, as well as guidance, advice, recommendations, and opinions when encountering problems and opinions, etc. Information support includes both information sharing and decision-making support. Emotional support mainly includes the first, second, fourth, fifth and sixth questions; informational support includes the third, seventh, eighth, ninth and tenth questions. Each question was evaluated with 1-5. “Feeling isolated and helpless in the class” was scored inversely.

4. Statistical Analysis

SPSS 16.0 was used to analyze the data and statistical methods such as t-test and regression analysis.

5. Findings

5.1 Common Method Bias Test

In order to avoid the influence of common method bias on the results of the study, some of the questions were reverse-scored in the questionnaire design beforehand, and subjects were allowed to answer anonymously during the administration process; the Harman one-way test was used to test all the items for common method bias afterwards (Zhang Yali, Lu Guizhi, Song Xiangmei, et al, 2018). The results of the test showed that a total of five factors had eigenvalues greater than 1 both unrotated and rotated, and the variance explained by the first factor both unrotated and rotated was 33.20%, which was less than the critical value of 40%. This indicates that there is no common method bias problem in this study.

5.2 Description of Questionnaire Scores

The results of the descriptive and correlation analyses showed (see Table 1): Mobile phone dependence ($M=4.36$, $SD=0.94$), Self-control ($M=2.21$, $SD=0.55$), Peer support ($M=4.33$, $SD=1.14$), Social avoidance ($M=2.27$, $SD=0.49$) Correlation analyses of the variables showed that cell phone dependence was positively correlated with self-control, cell phone dependence was positively correlated with social avoidance, and cell phone dependence was negatively correlated with peer support. Self-control was negatively correlated with peer support, and peer support was negatively correlated with social avoidance.

Table 1. Results of descriptive statistics, correlation analysis

	M	SD	cell phone dependence	self-control	Peer Support	social avoidance
cell phone dependence	4.36	0.94	1			
self-control	2.21	0.55	0.29**	1		
Peer Support	4.33	1.14	-0.38**	-0.16**	1	
social avoidance	2.27	0.49	0.39**	0.54**	-0.20**	1

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

5.3 The Relationship Between Cell Phone Dependence and Social Avoidance in High School Students: A Moderated Mediation Model Test

First, the mediating effect of the relationship between cell phone dependence and social avoidance was tested by using Model4 in the SPAA macro prepared by Hayes (2012), controlling for school and grade level. The results showed that the effect of cell phone dependence on social avoidance was significant ($\beta = 0.39$, $t = 9.08$, $p < 0.001$), and after the mediator variable was put in, the effect of cell phone dependence on social avoidance was still significant ($\beta = 0.24$, $t = 5.96$, $p < 0.01$), and cell phone dependence also had a significant

positive predictive effect on self-control ($\beta = 0.32$, $t = 7.35$, $p < 0.001$). In addition, the upper and lower bounds of the bootstrap 95% confidence intervals for the direct effect of cell phone dependence on the impact of social avoidance as well as the direct effect of self-control did not include 0 (see Table 2). The data suggest that, on the one hand, cell phone dependence directly predicts social avoidance and, on the other hand, cell phone dependence predicts social avoidance through the mediating effect of self-control. This direct effect (0.24) and mediating effect (0.16) accounted for 60% and 40% of the total effect (0.4), respectively.

Table 2. Mediation effect test for self-control

regression equation		fitness index			Significance of coefficients	
outcome variable	predictor variable	R	R ²	F(df)	β	t
social avoidance		0.39	0.15	28.1(3)		
	cell phone dependence				0.39	9.08***
	students				-0.16	-1.83*
	grade				0.02	0.67
self-control		0.36	0.13	22.95(3)		
	cell phone dependence				0.32	7.35***
	students				-0.35	-3.97***
	grade				0.06	1.71
social avoidance		0.60	0.35	63.46(4)		
	cell phone dependence				0.24	5.96***
	self-control				0.48	11.99***
	students				0.01	0.11
	grade				-0.24	-0.87

Note: Each variable in the model was treated with standardized Z-scores and then brought into the regression equation, as follows.

Table 3. Decomposition of total effects, direct effects, total effects

	Efficiency value	Boot standard error	Boot limit	lower	Boot cap	relative value	effect
aggregate effect	0.40	0.05	0.31		0.47		
direct effect	0.24	0.04	0.16		0.32	60%	
intermediary effect	0.16	0.02	0.11		0.21	40%	

Note: All values are retained to two digits by rounding, as below.

5.4 Moderated intermediation

Table 4. Moderated mediated effects model

Regression equation (N=493)		fitness index			Significance of coefficients	
outcome variable	predictor variable	R	R ²	F(df)	b	t
social avoidance		0.60	0.36	39.14(7)		
	cell phone dependence				0.22	5.06***
	self-control				0.44	11.43***
	Peer Support				-0.05	-1.23
	students				-0.38	-0.51
	grade				0.005	0.24
	Cell phone dependence* Peer support				0.06	1.66*
	Self-control* Peer support				0.09	2.49*

Process model 59 was used to test the moderating role of peer support between self-control and social avoidance, as shown in Table 4, cell phone dependence significantly and positively predicted social avoidance ($\beta=0.22$, $p<0.001$), and self-control also significantly and positively predicted social avoidance ($\beta=0.44$, $p<0.001$). The interaction term between self-control and peer support was a significant positive predictor of social avoidance ($\beta=0.09$, $p<0.05$). The results showed that peer support moderated between self-control and social avoidance. At lower levels of peer support (M-1SD), self-control significantly positively predicted social avoidance ($\beta=0.09$, $p<0.01$), and

at higher levels of peer support (M+1SD), self-control positively predicted social avoidance ($\beta=0.14$, $p<0.01$). The mediating effect values of self-control in the self-test of cell phone dependence and social avoidance and their 95% confidence intervals were later analyzed at the level of peer support (M-1SD; M; M+1SD), and the results obtained were consistent with the simple effects analysis. Although the mediating effects of self-control were significant at all levels of peer support, the mediating effects of self-control in cell phone dependence and social avoidance increased with increasing levels of peer support.

Table 5. Mediating effects at different levels of peer support

	Peer Support	efficiency value	Boot standard error	Boot lower limit	Boot cap
The mediating	3.39(M-1SD)	0.09	0.03	0.03	0.17
	4.33(M)	0.12	0.03	0.07	0.18

role of self-control	5.227(M+1SD)	0.14	0.04	0.07	0.24
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6. Talk Over

In this study, it was found that the level of cell phone dependence and social avoidance of county high school students was significantly higher than that of urban high school students. This indicates that the level of cell phone dependence of county high school students is higher than that of urban high school students. Among county high school students, due to high academic pressure, adolescents tend to use cell phones to relieve academic pressure, and since self-control is an important psychological mechanism for individuals to adapt to life and maintain a healthy lifestyle, a high level of self-control significantly reduces individuals' negative emotions such as anxiety and depression caused by failure and frustration, as well as stress-induced behavioral problems (Ma, Shu Tao, Yu Huai Huang & Yan Kun Ma, 2020).

In addition, the level of peer support of county high school students was significantly higher than that of urban high school students, which may be due to the closed environment and lack of peer support of county high school students. Social interaction is one of the important psychological needs of adolescents, but because county high school students are often neglected and restricted to a certain extent in their families, schools, and societies, county high school students often need to alleviate loneliness and anxiety by interacting with their peers. And high level of peer support can significantly reduce the level of social avoidance among county high school students, broadening peer support as a pathway is very necessary (Lim, S, 2022).

7. Reach A Verdict

Cell phone dependence has an effect on social avoidance through the mediating role of self-control. When the level of cell phone dependence is high, cell phone dependence has a stronger negative predictive effect on social avoidance; when the level of self-control is low, cell phone dependence has a stronger positive predictive effect on social avoidance.

Peer support plays a moderating role between cell phone dependence and self-control, and the effect of cell phone dependence on social avoidance is weakened when the level of peer

support is high. Therefore, the level of cell phone dependence can be reduced by increasing the level of self-control of high school students and increasing their level of peer support, which in turn reduces their level of social avoidance.

From the predictive effect of cell phone dependence on social avoidance, it can be seen that attention should be paid to cultivating high school students' self-control ability, focusing on the effect of peer support, and decreasing social anxiety in the prevention and treatment of social avoidance, so as to enhance high school students' social interaction ability and improve their mental health.

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