



Analysis of the Influence Factors of College Students' Game Addiction Under the Background of Big Data Technology

Linming Liu¹ and Jian Wang²(✉)

¹ College of Humanities, Jiangxi University of Traditional Chinese Medicine, Nanchang, China

² Mental Health Education Research Center, Nanchang Normal University, Nanchang, China

11m5481856688@163.com

Abstract. Based on the characteristics of wide coverage, strong representation, and high reliability, big data can be used to predict and reduce the occurrence of public health emergencies, and provide a reference for education managers to understand the mental health of students. This study uses Java technology to randomly select 475 college students from various provinces and cities in China to explore the influencing factors of college students' Internet game addiction. SPSS25.0 regression analysis was used to characterize students' network time, and data mining methods were used to predict high-risk Internet addiction students. The results showed that college students' addiction to online games differed significantly in terms of grade, gender, only child and family status. Rumination thinking played a partial mediating role between negative life events and college students' addiction to online games, with a mediating effect value of 8%. The application of big data technology enables education administrators to understand the mental health of students under the influence of Internet addiction, and to grasp accurate information from the beginning.

Keywords: Big Data · Mental Health · College Students' Online Game Addiction · Java Technology · Negative Life Events · Ruminant Thinking

1 Introduction

The emergence of big data concepts and technologies provides a new perspective for college management and promotion of information-based teaching. The big data technology is introduced into the mental health education of college students, and through data analysis, a reasonable evaluation and judgment of the mental health status of college students is made, which provides an important reference for the effective development of related work. Based on this idea, this paper uses java technology to study the factors that affect college students' game addiction. The rapid updates and advancements of the Internet make it almost ubiquitous in our daily life.

The entertainment methods on the Internet are becoming more and more diverse, and online games have become one of the most important digital entertainment methods for netizens [4]. The latest Internet development statistics report shows that as of March

2020, the number of Chinese netizens reached 904 million, of which 19.5% were college students and above. The number of online game users in China reached 532 million, and the proportion of netizens was 58.9%.

Online games have advantages and disadvantages. While bringing people a pleasant experience, it also makes people addicted and unable to extricate themselves. In turn, it will also have a negative impact on the physical and mental health of college students, as well as on the life and study of college students.

With the increasing incidence of online game addiction, it has brought great harm to the growth of college students. Internet gaming addiction refers to an uncontrollable, excessive and compulsive online gaming behavior that impairs emotions and even social functions.

College students are also in the most critical period of life development. College students' sense of self-identity has not been fully developed, and immersion in online games is more likely to lead to their personal addiction. Li Dongping found that environmental factors such as peers and family have an important impact on online game addiction [5]. Linda believes that self-esteem is inversely related to gaming addiction. Matteo believes that sleep disturbances, game types, and game addiction are related [7]. Wei Hua found that the life events of college students can directly affect game addiction, and can also indirectly affect game addiction through the mediating effect of escape motivation [8]. Li Hao found a significant correlation between negative life events and different types of gaming addiction [6]. Kim research not only found a significant positive relationship between stress and Internet addiction, but also showed that life events related to personal stress are strong predictors of Internet addiction [3].

2 Methods and Materials

2.1 Participant Selection

This study selected 475 college students from many provinces and cities in China on the questionnaire platform. Subjects' informed consent was answered anonymously using uniform guidelines. 212 (44.6%) boys and 263 (55.4%) girls; 183 (38.5%) only children and 292 (61.5%) non-only children; 188 (39.6%) in urban and 287 (60.4%) in rural areas (%); 100 freshmen (22.5%), 86 sophomores (18.1%), 159 juniors (33.5%), 91 seniors (19.2%) and 39 others (8.2%); computers 172 people (36.2%) played games, and 303 people (63.8%) played mobile games.

2.2 Research Tools

- (1) Liu Xianchen compiled a scale of adolescent life events, with a total of 27 items, including 6 factors including interpersonal relationships, study pressure, punishment, loss, and healthy adaptation. Score from "No Impact" to "Extreme Impact" on a scale of 1 to 5, not reversed. The Cronbach coefficient is 0.93.
- (2) Edited by Nolen-Hoeksema and translated by Han Xiu and Yang Hongfei, the Chinese version of the Rumination Thinking Scale consists of three dimensions: symptomatic rumination, introspection and obsessive meditation, with a total of 22 items [2]. Scale 4 is scored on a scale of 1 (never) to 4 (always), The Cronbach coefficient is 0.85.

- (3) Using the Internet Game Addiction Questionnaire, there are a total of 11 questions, with a 3-level score. The questionnaire is based on Gentile experts' opinions. The original scale is coded: 1 equals 0 points, 2 equals 0.5 points, and 3 equals 1 point [1]. The Cronbach coefficient is 0.83.
- (4) Using JAVA and SPSS25.0 to perform descriptive statistical analysis of data, independent sample t-test, variance analysis, correlation regression analysis. Using Hayes' process macro program to analyze the processing effects of mediation.

3 Research Results

3.1 Difference Test of Demographic Indicators

The common method deviation was tested by Harman's single-factor method. The factor analysis of the test items shows that there are 18 factors with characteristic values greater than 1, and the maximum factor explains the variance of 25.46% and the critical standard of less than 40%, indicating that no obvious common method deviation has been found. The differences in gender, family location, and only child were analyzed using independent sample t-tests.

The grade was tested using a one-factor variance analysis, the results of which are shown in Table 1: There are significant differences in gender between game addiction ($t = 4.13, p < 0.001$), and boys have a higher tendency than girls; Negative life events ($t = 7.78, p < 0.001$), ruminant thinking ($t = 4.26, p < 0.001$) and game addiction ($t = 6.42, p < 0.001$) were significantly different in the only child. Negative life events ($t = 2.49, p < 0.05$), ruminant thinking ($t = 2.57, p < 0.05$) and game addiction ($t = 2.32, p < 0.05$) differ significantly in birthplace. Using single-factor variance (LSD) showed significant differences in grades in negative life events ($F = 11.23, p < 0.001$), ruminant thinking ($F = 7.63, p < 0.001$) and game addiction ($F = 7.55, p < 0.001$).

In terms of online game usage, according to Table 2: computer games accounted for 36.2% of the main game types and mobile games accounted for 63.8%. The main way for college students to play is mobile games. In terms of Internet time, the daily Internet time is 1 h down (11.2%), 1 to 2 h (22.9%), 2 to 3 h (20.4%), 3 to 4 h (17.7%) and more than 4 h (27.8%); Daily online gaming time is less than 1 h (36.4%), 1 to 2 h (25.9%), 2 to 3 h (18.9%), 3 to 4 h (9.3%) and more than 4 h (9.5%). Data show that online game addiction is widespread among college students. Such a phenomenon has aroused our great attention. Table 3 shows that Negative life events and ruminant thinking ($r = 0.597, p < 0.01$), game addiction ($r = 0.754, p < 0.01$) showed significant positive correlation. There was a significant positive correlation between ruminant thinking and game addiction ($r = 0.516, p < 0.01$).

3.2 Verification of Mediation Effect

In order to prove the hypothesis of the intermediary effect of ruminant thinking, the intermediary effect test is carried out using the deviation correction percent post Bootstrap method (repeated extraction 5000 times) developed by Hayes, and the results are shown in Table 4 [9]. As can be seen from Table 4: Negative life events have a direct

Table 1. Differences in demographic indicators. (T/F)

	Negative life events	Ruminate thinking	Game addiction
gender	1.43	0.44	4.13***
Only child	7.78***	4.26***	6.42***
Birthplace	2.49*	2.57*	2.32*
grade	11.23***	7.63***	7.55***

NOTE: *P < 0.05, **P < 0.01, ***P < 0.001 (the same as the following)

Table 2. Number of College Students Using Online Games.

	Option	Number	Percentage
Game type selected	Computer Games	172	36.2%
	mobile game	303	63.8%
Average online time per day	Within 1 h	53	11.2%
	1–2 h	109	22.9%
	2–3 h	97	20.4%
	3–4 h	84	17.7%
	More than 4 h	132	27.8%
Average online game time per day	Less than 1 h	173	36.4%
	1–2 h	123	25.9%
	2–3 h	90	18.9%
	3–4 h	44	9.3%
	More than 4 h	45	9.5%

Table 3. Correlation matrix of each variable.

	A	B	C
A Negative life events	1	0.597**	0.754**
B Ruminate thinking	0.597**	1	0.516**
C Game addiction	0.754**	0.516**	1

and significant predictive effect on online game addiction ($\beta = 0.754$, $p < 0.01$), put the intermediary variable ruminant thinking into the negative life events The online game addiction still has a direct and significant predictive effect ($\beta = 0.693$, $p < 0.01$).

In addition, the upper and lower bounds of Bootstrap's 95% confidence interval for the mediating effect of rumination thinking do not include 0. It can be concluded that rumination thinking plays a partial mediating role in the impact of negative life events

Table 4. Mediation effect

path	Effect	t	Lower limit	Upper limit
c	0.754	24.93***	0.694	0.813
a	0.597	16.19***	0.525	0.669
b	0.102	10.61***	0.006	0.192
c'	0.693	18.51***	0.619	0.766

Table 5. Descriptive for demographic variables.

indicators	Negative life events		Ruminate thinking		Game addiction	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Boys	65.08	20.62	50.46	11.04	4.33	2.36
Girls	62.29	21.46	50.04	9.80	3.38	2.65
only child	72.21	17.94	52.61	8.57	4.69	2.23
multiple	58.10	21.16	48.74	11.10	3.25	2.61
Town	66.51	21.03	51.73	9.36	4.13	2.44
Rural	61.60	20.98	49.25	10.87	3.59	2.63
Freshman	58.86	20.13	49.76	10.23	3.51	2.57
Sophomore	73.35	16.56	53.24	7.31	4.76	2.08
Junior	59.84	22.98	47.50	12.05	3.40	2.85
Senior	60.95	20.53	50.38	9.90	3.40	2.46
others	75.05	14.62	55.56	5.44	5.04	1.45
Total score	63.54	21.11	50.23	10.36	3.80	2.57

on the impact. Internet gaming addiction. The direct effect (0.693) and the intermediate effect (0.061) accounted for 92% and 8% of the total effect (0.754).

On the other hand, the upper and lower limits of the 95% confidence interval of Bootstrap of the intermediary effect of ruminant thinking do not include 0, it can be concluded that ruminant thinking plays a part of the intermediary role in the negative life events on the impact of online game addiction. Direct effects (0.693) and intermediary effects (0.061) accounted for 92% and 8% of total effects (0.754) (Table 5).

4 Conclusions

4.1 Characteristics of College Students' Internet Game Addiction

There are significant gender differences in gaming addiction. It may be because boys like to play online games more than girls, and girls play in more diverse ways, such

as listening to music, watching TV shows, shopping etc. For only children, there were significant differences in gaming addiction. The reason may be that only children are more likely to be exposed to online games and addicted to games than non-only children. There were significant differences in gaming addiction in terms of family location. The reason may be that the economic conditions of urban college students are better than that of rural college students, the hardware equipment such as computer equipment is better than that of rural college students, and the knowledge of online games is better than that of rural college students.

There are significant differences in gaming addiction in terms of grades. Freshmen and juniors scored the highest, and seniors scored lowest, perhaps because freshmen in the first year of college entered a completely different environment than before, and self-control was reduced, making it easy to indulge in games. Graduates have a lot of things in all aspects, and the time to play games decreases, and the level of their game addiction decreases.

4.2 Mediation of Ruminant Thinking

This study found that negative life events have a positive predictive effect on game addiction. According to previous studies, negative events are one of the important risk factors for Internet addiction in the adolescent population, but very few extend to specific types of Internet addiction. To some extent, the findings also support Davis's cognitive-behavioral model of pathological Internet use, which tends to be used as a strategy to release stress when college students are exposed to more stressful life events. This study confirms some of the intermediary roles of ruminant thinking in the relationship between negative life events and online game addiction.

College students negative life events can be positive prediction of online game addiction, negative life events as the main source of stress in college students' daily life, college students in the face of negative events constantly thinking about the event itself and the possible bad consequences, thus falling into the ruminant thinking. Negative life events as a source of stress trigger ruminant thinking, resulting in negative emotions, and thus affect the production of game addiction behaviour.

4.3 Recommendations

- (1) We can give full play to the important role of data warehouse and cloud computing media to provide comprehensive and effective data and information support for mental health education in colleges and universities. Teachers can better grasp the characteristics and conditions of college students' psychological development, and formulate targeted strategies for students' psychological healthy growth and individualized educational measures.
- (2) Actively prevent and manage the possible negative life events of college students, publicize through multiple channels, and how to better deal with the corresponding events when negative life events occur. Schools should actively organize collective counseling activities, and allow students to release more healthily. Encourage college students to participate in various skills training and voluntary activities, so that college students can get physical and mental exercise. Most of the data came from

subjects' self-reports and could be assessed in depth by combining experiments or follow-up surveys.

5 Conclusion

(1) Negative life events and ruminant thinking are both significantly positively related to online game addiction. Ruminant thinking plays a part of the intermediary role between negative life events and college students' online game addiction, and its intermediary effect value is 8%. (2) Using big data technology can provide representative reference standards and accurate first-hand information for mental health conditions.

References

1. Cheng, F.Y. (2015). Predicting adolescent problematic online game use from teacher autonomy support, basic psychological needs satisfaction, and school engagement: a 2-year longitudinal study. *Cyberpsychology, Behavior and Social Networking* 18 (4): 228–233.
2. Han, X., and H.F. Yang. 2009. Trial of Nolen-Hoeksema rumination thinking scale in China. *Chinese Journal of Clinical Psychology* 17 (05): 550–551.
3. Kim, H.S., and Y.H. Choi. (2010). The study on the relations among ego-identity, stress, and internet addiction in high school students. *Journal of Korean Academy of Psychiatric and Mental Health Nursing* 19 (2): 173–185.
4. Kwon, H.E., and H. So. 2016. Excessive dependence on mobile social apps: a rational addiction perspective. *Information Systems Research* 27 (4): 919–939.
5. Li, D.P. 2016. Cumulative ecological risk and adolescent Internet addiction: The mediating role of psychological need satisfaction and positive outcome expectations. *Psychological Journal* (12): 1519–1537.
6. Li, H., and S.Q. Wang. 2016. The relationship between the types of internet addiction and life events in college students. *Chinese Journal of Health Psychology* 24 (05): 718–720.
7. Linda, A., and Jackson. (2010). Self-concept, self-esteem, gender, race and information technology use. *Computers in Human Behaviours* 26: 323–328.
8. Wei, H., and Z.K. Zhou. 2012. Internet game addiction: The influence of immersion and its mechanism of action. *Psychological Development and Education* 28 (06): 651–657.
9. Wen, Z.L., and B.J. Ye. 2014. Analysis of mediation effect: Method and model development. *Advances in Psychological Science* 22 (5): 731–745.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

