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Effects of Problematic Game Use on Adolescent Life Satisfaction through Social Support and Materialism

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Abstract

Social concerns about the rapid diffusion in game use among adolescents and the repercussions of their addiction to gaming are evident worldwide. Neglecting to address the issues will harm social balance and sustainability at no distant date. Nevertheless, existing studies largely focus on causal prediction of problematic gaming. This study aims to mine factors that need to be urgently handled through the mechanism analysis between adolescent problematic gaming and their life satisfaction. This study tracked 778 Korean adolescents by analyzing 3-year longitudinal panel data from the Korean adolescent game user cohort research. Data analysis was performed using PLS-SEM approach focusing on bootstrapping

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mediation analysis and importance performance map analysis(IPMA). Our results confirmed that problematic gaming had an indirect effect on adolescent life satisfaction through mediating effects with positive parenting, teacher support, peer support, and perceived materialism rather than a direct effect. In addition, positive parenting was discovered as a factor prioritized in management activities to improve life satisfaction. This study contributes greatly by providing practical and supportive guidance necessary for solving problematic gaming issues and enhancing adolescent life satisfaction.

Keywords: Problematic gaming, Adolescent game addiction, Longitudinal study, IPMA analysis

I. Introduction

The recent swift ascent of the online game market targeting youth hastens the uplift of social concerns about adolescent game addiction worldwide. Some countries threw a sidelight on the situation with clear evidence. A research in China, where more than 50% of game players are adolescents and early adults, of which 64.3% are webaholics (CNNIC, 2017), shows that the prevalence rate of internet gaming disorder(IGD) is 17% of 6,379 subjects tested (Liao *et al.*, 2020). In Germany, a study of 1,001 adolescents found that the prevalence of adolescent IGD was 3.5%, and when combined with social media addiction, the rate rises to 5.0% (Wartberg, Kriston, & Thomasius, 2020). The situation in Korea is no less serious. A survey by the Korea Creative Content Agency(KOCCA) conducted with 63,734 students in 2020 revealed the existence of 0.3% addiction group and 1.6% addiction risk group (KOCCA, 2020). In particular, more than 92% of Korean elementary school boys are game users (NYPI, 2020), and about 10% of middle school students are approaching the risk level of Internet game addiction (Han, Jeong, Jo, Son, & Yim, 2020). The adolescent game addiction issue warns us that it will harm the balance and sustainable development of our society by placing our adolescents in a situation that undermines their life satisfaction (World Health Organization, 2018). Therefore, adolescent game addiction is a challenge to be solved today. However, studies on the dysfunction of adolescent game

addiction are still lacking. Worse, such studies have never been studied from a longitudinal perspective, despite the need to observe constant fluctuations in gaming addiction.

Social support for youth covers families, school teachers, and peers as weighty sources (Rosenfeld, Richman, & Bowen, 2000). From the perspective of social support theory that emphasizes assistance in resolving an individual's emotional or behavioral problems favorably through information, experience, advice, empathy, etc. provided by others, the support from teachers or peers as well as parents may contribute to developing adolescent behavior and relieving the problematic game use (Li *et al.*, 2017). However, high levels of gaming addiction can destroy relationships such as social support and cause conflict (Kuss & Griffiths, 2012). The aftermath of adolescent game addiction will be intuitively disclosed in contextual relationships such as home, school, and peer (Milani *et al.*, 2018). Numerous research results corroborate these contradictory traces.

The inevitable downturn of life quality and psychological exhaustion caused by overindulgence in game will curtail personal satisfaction in life. The side effects of addictive gaming plunge individuals into an undesirable state of life in which their psychological well-being is disrupted by severing interpersonal connections (Lemmens, Valkenburg, & Peter, 2011), and/or by perverting value notion due to the habitual urge to become competitively obsessed with acquiring game items (Richins & Chaplin, 2021).

The positive relationship between parents and children enhances adolescent satisfaction in life and psychology (Elgar, Craig, & Trites, 2013; Piko & Hamvai, 2010). In a homely environment, adolescent game addiction poses a risk of potentially lasting damage to the parent-child relationship. Children who are overly immersed in gaming will not positively tolerate the positive parenting attitudes of their parents. Children deceived by gaming will prioritize the virtual reality in games rather than maintaining family relationships or stabilizing their lives. Avoidance of conversations with parents who interfere with excessive gaming or intentionally shortened communication with other family members substantiate such unfavorable attitudes (Bonnaire, Liddle, Har, Nielsen, & Phan, 2019). Therefore, parents' strict treatment or authoritative parenting implemented to solve the gaming problem repeats the vicious cycle of worsening children's gaming habits rather than alleviating the problematic gaming (Sun & Wilkinson, 2020).

In an academical environment with teachers and peers who usually form relationships at school or in the classroom, game-addicted adolescents have worse interpersonal relationships with teachers and peers than the non-game-addicted adolescents (Milani *et al.*, 2018). Support from the school provides a positive and active experience for students, and close contact and communication between the school and parents helps to avoid excessive indulgence in game use for the positive and sustainable growth of the youth (Chiu, Lee, & Huang, 2004). For game-addicted adolescents, peer support

will be perceived similarly to teacher support. Adolescence is a period of actively pursuing peer-based activities that can affect life satisfaction (Piko & Hamvai, 2010). However, adolescent game addiction undermines friendships by weakening social functioning (Rasmussen *et al.*, 2015). The cause lies in the widening of the gap in attachment and connection with peers in a situation where adolescents are immersed in game use (Teng *et al.*, 2020). In the dysfunctional mechanism of game addiction, the school acts on behalf of the home. Therefore, adolescents' excessive preoccupation with the game may avoid the support of teachers and peers or make them perceive the support as unreasonable interference or a nuisance.

However, excessive game immersion may lead adolescents to pursue materialism by distorting their perception of value. Materialism refers to the judgment of life value, success, and happiness as material possessions (Richins & Dawson, 1992). Excessive immersion in gaming leads to a positive perception of material values by stimulating the desire to acquire more or better game items or characters that help relieve personal anxiety. The material attachments that addiction prompts adversely affect adolescents' psychological well-being (Richins & Chaplin, 2021).

As mentioned above, we inferred four dimensional factors linked to life satisfaction and summarized the impact of adolescent problematic gaming on them. However, existing research ends by confining the results to elucidating the

causality of the antecedents. Proof of correlational effects with moderators will aid in robust conclusions. Furthermore, setting priorities to handle the decisive factors on life satisfaction by uncovering factors with low performance compared to their high importance will outfit healthy adolescent life in reality. This study focuses on those.

II. Methodology

1. Data

This study used 3-year longitudinal panel data(wave 1 to 3) from the Korean Adolescent Game User Cohort Research data conducted by the Korea Creative Content Agency(KOCCA) targeting 10-17 years old from elementary school to high school. The KOCCA research protocol, which requires prior consent of the survey subjects on ethical issues that guarantees the privacy and confidentiality of sensitive research data, was reviewed and approved by the Institutional Review Boards(IRBs) of Ethics Committee. A quota sampling method adjusted for school grades and gender ratios was used. Panels were interviewed face-to-face by trained professional agents using the same questionnaire according to established survey guidelines. The final 778 adolescents responded continuously during the entire survey period, and the gender distribution was similar(Male 49.0%, Female 51.0%, $Age_{mean}=13.3$). The school grade in the first

wave is elementary school(36.9%; $Age_{mean}=10.6$), middle school(35.1%; $Age_{mean}=13.5$), and high school(28.0%; $Age_{mean}=16.4$). The average daily game use time of respondents was about 56.6 minutes. The average game duration of the respondents was longer in the mobile game(52.8%, Mean=59.7 min) than in the online game(47.2%, Mean=53.5 min). Details on survey methods and data are provided on the KOCCA website(www.kocca.kr accessed on 30/06/2021).

2. Measures

1) Problematic gaming

Problematic gaming refers to adolescents' perception of problems related to time management and performance, withdrawal and social problems, and reality substitutes after immersion in game use. This variable was measured by applying the 20-item Internet Addiction Scale developed by Young (Young, 1998) in the context of adolescents' game use. 5-point Likert scale was used to measure the variable(ranging from 1 "never" to 5 "always"). The sample is "How often do you find that you play games longer than you intended?" (Mean = 2.242, SD = 0.868, Cronbach α = 0.952)

2) Perceived positive parenting

Perceived positive parenting refers to adolescents' positive perception toward parental rearing in the parent-child relationship. This variable was assessed using the 10 positive

items from Korean parenting attitude scale designed by Myo-yeon Huh (Huh, 2004), which was measured on a 4-point Likert scale(ranging from 1 “Strongly disagree” to 4 “Strongly agree”). The sample is “My parents/guardians respect my opinion.” (Mean = 3.170, SD = 0.597, Cronbach α = 0.830)

3) Perceived teacher support

Perceived teacher support refers to the perception of adolescents that their teacher listens to, encourages, and respects themselves. This variable was assessed with the 3-item scale from the Korean social support evaluation scale designed by Kang & Shin (Kang & Shin, 2015), which was measured on a 5-point Likert scale(ranging from 1 “strongly disagree” to 5 “strongly agree”). The sample is “I have a good relationship with my teacher.” (Mean = 3.545, SD = 0.870, Cronbach α = 0.903)

4) Perceived peer support

Perceived peer support refers to the perception of adolescents that they give and receive mutual help among friends based on shared understandings and feelings in the academic situation. This variable was assessed with the 3-item scale designed by Choi & Moon (Choi & Moon, 2010), which was measured on a 4-point Likert scale(ranging from 1 “never” to 4 “always”). The sample is “My friends comfort me when I am sad.” (Mean = 3.168, SD = 0.572, Cronbach α = 0.885)

5) Perceived materialism

Perceived materialism refers to the perception of adolescents that it is important to have material goods in achieving desired conditions. This variable was assessed with the 9-item scale designed by Richins (Richins, 2004), which was measured on a 5-point Likert scale(ranging from 1 “strongly disagree” to 5 “strongly agree”). The sample is “Buying things gives me a lot of pleasure.” (Mean = 2.835, SD = 0.790, Cronbach α = 0.892)

6) Life satisfaction

Life satisfaction refers to the degree of subjective well-being of adolescents perceived in family relationships. This variable was assessed with the 5-item scale designed by Diener *et al.* (Diener, Emmons, Larsen, & Griffin, 1985), which was measured on a 7-point Likert scale(ranging from 1 “strongly disagree” to 7 “strongly agree”). The sample is “In most ways my life is close to my ideal.” (Mean = 4.480, SD = 1.370, Cronbach α = 0.937)

3. Statistical analysis

A three-step approach was used to analyze the data with PLS-SEM method using SmartPLS 3 software(version.3.3.2, Bönningstedt, Germany). The first step validated the reliability and validity of measurement model controlled by gender and age using the entire sample($n = 778$), and then derives hypothetical results from structural model analysis(direct

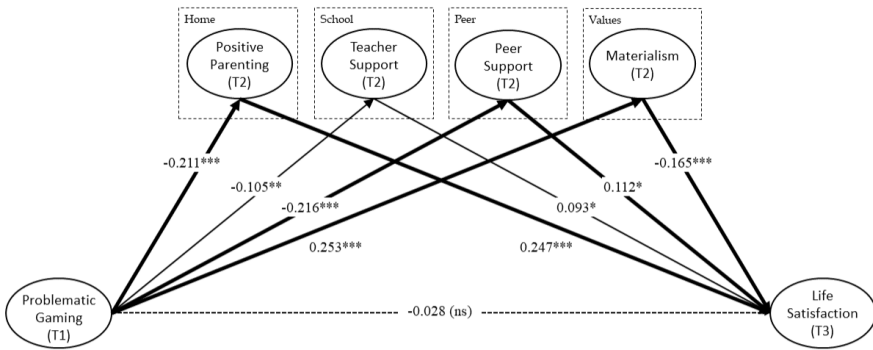
effect). The second step explored how the mediating effects of variables such as positive parenting, teacher support, peer support, and perceived materialism work within the path between problematic gaming and life satisfaction(indirect effects). Unlike the Sobel Test(online calculator) or Baron and Kenny's causal procedure (Baron & Kenny, 1986), indirect effect analysis using a bootstrapping approach as in SmartPLS is perfectly suited to PLS-SEM (Hair Jr, Hult, Ringle, & Sarstedt, 2017). And the final step performed Importance Performance Map Analysis(IPMA), which computes the effect of each factor by comparing the relative importance of a factor to its performance on a target variable(*e.g.*, life satisfaction). This approach helps in prioritizing managerial actions by focusing on uncovering evident factors that are very important but at the same time have relatively low performance (Hair Jr, Sarstedt, Ringle, & Gudergan, 2018).

III. Results

In our measurement model, the reliability of items, the internal consistency or construct reliability, and convergent validity were all acceptable. Accordingly, the follow-up results are as follows.

First, the hypothetical test results from the structural model are depicted as in Figure 1(direct effect). The problematic gaming in Time 1 had a statistically significant negative effect

on positive parenting, teacher support, and peer support in Time 2, and had a statistically significant positive effect on perceived materialism in Time 2. In the next dimension, life satisfaction in Time 3 was statistically significantly positively influenced by positive parenting, teacher support, and peer support in Time 2, while it was statistically significantly negatively affected by perceived materialism in Time 2. However, there was no statistically significant relationship between the problematic gaming in Time 1 and life satisfaction in Time 3. The results enable logical inference that the effect of problematic gaming on life satisfaction is not a direct cause but an indirect cause via positive parenting, teacher support, peer support, and perceived materialism.



〈Fig. 1〉 Results of hypothesis test and mediation effect analysis notes: One asterisk (*) indicates $p < 0.05$, two asterisks (**), $p < 0.01$, and three asterisks (***), $p < 0.001$. ns indicates not significant. Solid line indicates statistical significance. Bold line represents both statistical significance and significant indirect effect pathways. Dotted line is statistically insignificant.

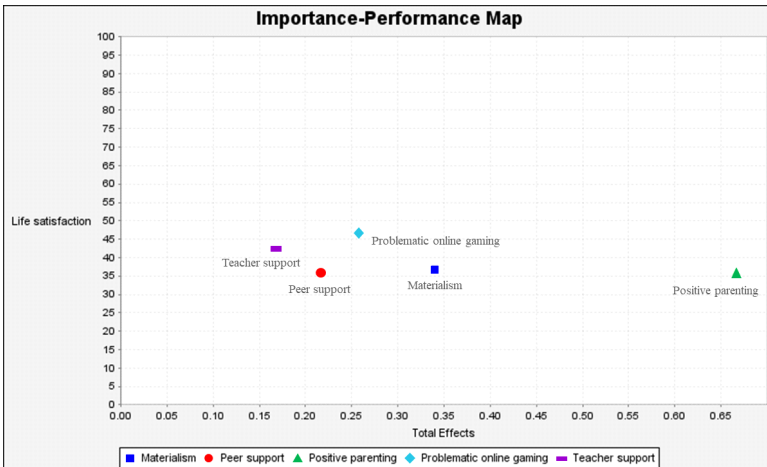
Second, the results of mediation analysis are presented in Table 1(indirect effect). Mediation effects emphasize a kind of interaction. The bootstrapping results show that the three indirect effects are statistically significant as follows: Problematic Gaming (T1) → Positive Parenting (T2) → Life Satisfaction (T3), Problematic Gaming (T1) → Peer Support (T2) → Life Satisfaction (T3), Problematic Gaming (T1) → Materialism (T2) → Life Satisfaction (T3). These results recommend the following meaningful guidance proposals. As problematic gaming indirectly affects life satisfaction through interaction with positive parenting, peer support, and perceived materialism, the problematic gaming in adolescence deserves close monitoring in its interaction with the three factors.

〈Table 1〉 Results of mediation analysis using PLS–SEM bootstrapping

Path (n = 778)	Beta (β)	Confidence interval		T-values
		LL	UL	
Indirect effects				
Problematic Gaming (T1) → Positive Parenting (T2) → Life Satisfaction (T3)	-0.052	-0.079	-0.032	4.265***
Problematic Gaming (T1) → Teacher Support (T2) → Life Satisfaction (T3)	-0.010	-0.024	-0.001	1.538
Problematic Gaming (T1) → Peer Support (T2) → Life Satisfaction (T3)	-0.024	-0.045	-0.006	2.355*
Problematic Gaming (T1) → Materialism (T2) → Life Satisfaction (T3)	-0.042	-0.065	-0.022	3.826***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, STDEV = standard deviation, T1 = construct measured at wave 1, T2 = construct measured at wave 2, and T3 = construct measured at wave 3, LL = lower limit, UL = upper limit

Lastly, the IPMA results are illustrated in Figure 2. IPMA highlights factors with high importance and low performance. In the results, all five input factors targeting life satisfaction have similar performance levels. However, unlike other factors, one factor had exceptionally high importance compared to its low performance(see the positive parenting). The results provide useful hints for prioritizing factors to be managed for effective betterment of life satisfaction. Figure 2 illustrates that preferential treatment of positive parenting can dramatically improve adolescent life satisfaction, since the variable indicates a relatively high importance(total effect) compared to other variables with similar performance.



<Fig. 2> Results of importance-performance map analysis(IPMA). Note: in analysis settings, the target construct is life satisfaction, where all predecessors are selected as options. The quality criteria classifies the importance(total effect on the x-axis) and performance effect(based on a score of 50 on the y-axis) as relatively high or low.

IV. Discussion

This study analyzed the problematic gaming of Korean adolescents on their life satisfaction by tracking their game use attitudes for 3 years among the longitudinal panel data of KOCCA. Rating the social support source dimensions(home, school, and peer) and gaming perception revelation(materialism), our model focused on the direct and indirect effects of problematic gaming. In addition, we identified managerial priorities to treat factors required to enhance adolescent life satisfaction in gaming context by calculating the relative performance compared to importance of individual factors through IPMA analysis.

Our new finding highlights the following points. First, problematic gaming indirectly influenced adolescent life satisfaction by mediating variables rather than acting as a direct cause. The life satisfaction was directly affected by mediating variables such as positive parenting, teacher support, peer support, and materialism perception, and problematic gaming of adolescents was a direct cause of the mediating variables. The results are in line with the preceding results. However, the relationship between problematic gaming and life satisfaction is remarkable with insignificance (Teng *et al.*, 2020). Early symptoms of game addiction in adults significantly predict low life satisfaction later. However, adolescents and early adults may refute the results (Scharkow, Festl, & Quandt, 2014). The unusual results may be related to

the differences in the adolescents' gaming goals. Unlike adults, adolescents will use online gaming for communication purposes, where the use may just be their habit. Resultingly, problematic gaming will not significantly affect their life satisfaction.

Second, the mediating effect emphasizes the interactive effect with problematic gaming as a causer. Except for teacher support, the mediating effects of positive parenting, peer support, and materialism perception significantly affected adolescent life satisfaction through interaction with adolescent problematic gaming. Weak interactions with teacher support may be due to poor communication accessibility with teachers compared to parents or peers. Whereas communication with teacher is physically confined to the school or classroom, adolescent gaming is largely carried out outside the school. Thus, the insignificant mediating effect of teacher support is acceptable.

Lastly, the priorities to manipulate to augment adolescent life satisfaction are highlighted. IPMA schematizes the evaluation of factors that will drive adolescent life satisfaction in two aspects of importance-performance. The results suggest that positive parenting, teacher support, and peer support have lower performance compared to importance compared to other variables. In particular, positive parenting was uncovered to be the most effective approach to alleviating problematic gaming and enhancing adolescent life satisfaction because of its relatively low performance while having the highest importance.

This study contributed to filling the gaps of previous studies in that problematic gaming dysfunction on life satisfaction was longitudinally tracked, and high-efficiency variables in management were unveiled. However, this study has the following limitations to advance the adolescent game research. First, social support theory and materialism perspective are insufficient to understand the mechanism of adolescent game use. More diverse contexts and situations need to be considered. Second, the characteristic comparison of groups with different game use conditions(eg., school grades) may provide in-depth results. Further studies on this are considered. Lastly, adolescent problematic gaming trend implies the existence of various potential groups within the longitudinal sample(eg., addiction risk group, addiction non-risk group). In particular, more profound implications may exist within a certain group(eg., addiction risk group). The further study will be very dominant.

In sum, adolescent game use among peer groups of gender or age can supply useful social values, which may help improve life satisfaction. However, excessive game use may impair life satisfaction by being combined with game addiction symptoms (Phan, Prieur, Bonnaire, & Obradovic, 2020). Our results empirically prove the mechanism that problematic gaming negatively affects adolescent life satisfaction. In particular, the IPMA results highlight the potential of positive parenting to significantly increase the life satisfaction of adolescents who play problematic games. These results are very convincing in

the Korean context. Many Korean parents have a strong tendency to cope with their children's game use behavior by harsh and negative parenting in order to improve their children's academic performance (Jeon, Lee, Kim, Kim, & Jeong, 2021). Adolescents in problematic gaming are more often exposed to such unfavorable upbringing. In the end, positive parenting as the best solution for problematic gaming will provide a decisive clue to ensuring the sustainability of our society.

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