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The influence of parents' depression on children's online gaming addiction: testing the mediating effects of intrusive parenting and social motivation on children's online gaming behavior

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Abstract
This study examines the impact of parents' depression on their children's online gaming addiction and investigates the mediating roles of intrusive parenting and children's social motivation for playing online games on this relationship. The data for this study were derived from the Game Use Panel Fifth Year Research conducted by the Korea Creative Content Agency in the first half of 2018. We narrowed the sample down to parent-child dyads of children who were online game players and their parents (both N = 356). We tested the relationships between the variables via hierarchical regression analysis and Hayes's (2013) model PROCESS macro. The results indicated that there is a significant positive relationship between parents' depression and their children's online gaming addiction (B = .33, SE = .11, p < .01). Moreover, the findings showed that the relationship between parents' depression and children's online gaming addiction was significantly mediated by intrusive parenting (B = .06, *Boot SE* = .03, *95% Boot CI* = .007, .15) and children's social motivation for playing online games (B = .12, *Boot SE* = .05, *95% Boot CI* = .014, .24). The results imply that parents' mental health and parenting behavior and children's motivations for playing online games should be considered when evaluating children's online game addiction and devising preventative interventions.

Keywords Parents' depression · Intrusive parenting · Gaming motivation · Online gaming addiction

Introduction

Problematic media use often leads to health problems (Enez Darcin et al., 2016) or risky behaviors (Qudah et al., 2019). For instance, studies have shown that people who play online games in excess are more likely to suffer from anxiety, loneliness, depression, social phobias, and lower academic performance (Gentile et al., 2011; Ko et al., 2005; Lo et al., 2005; Wang et al., 2019). Furthermore, studies have found that adolescents who are still in the process of psychological developmental and have less self-control than adults may be more prone to developing a media addiction (Haug et al., 2015; Kim et al., 2019).

Therefore, several studies have explored the various risk factors for online gaming addictions among adolescents and youths. These studies have found that the social functions and features of online games appeal to people who are unsatisfied with their offline social lives (Griffiths et al., 2004; Peters & Malesky Jr, 2008), and that therefore people suffering from depression (Király et al., 2014), loneliness (Caplan et al., 2009; Krossbakken et al., 2018), social anxiety (Maroney et al., 2019), introversion (Kuss & Griffiths, 2012) or fear of missing out—that is, apprehension that does not connect with what others are doing (Duman & Ozkara, 2019)—seek out online games as social resources, which in turn makes them more prone to addiction.

Studies have also found that when depressed parents are more negative and unsupportive in parent-adolescent interactions, their adolescent children display anxiety, depression, and poor social adjustment (Cox et al., 1987; Langrock et al., 2002; Lovejoy, 1991; Lovejoy et al., 2000; Timko et al., 2008). Given these findings, it is reasonable to suggest that children with depressed parents may see online games as a resource that can help them compensate for the lack of social support they receive from their parents. However, few scholars have considered the potential role of parents'

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depression as a potential determinant in children's problematic media use. Furthermore, little is known in the literature about mechanisms behind the association between parents' depression and their children's online gaming addictions.

Therefore, this study examines both the relationship between parents' depression and their children's online gaming addiction and the mechanisms behind that relationship. It proposes a research model based on a review of the literature linking parents' depression, intrusive parenting, children's social motivations for playing online games, and children's online gaming addiction. This model posits that there is a direct relationship between parents' depression and their children's online gaming addiction and that there is an indirect relationship between the two via intrusive parenting and children's social motivation for playing online games. Thus, the purpose of this study is twofold: (a) to examine the relationship between parents' depression and their children's online gaming addiction; and (b) to test the mediating roles of intrusive parenting and social motivation for online games on this relationship. Before diving in to our study, we will review the literature on the relationships between the variables.

Literature Review

Parents' Depression and children's Online Gaming Addiction

Parents' depression puts their children at risk for various emotional and behavioral problems. Some studies have found that parents' depression may disrupt the family environment and potentially lead children to internalize problems (Gruhn et al., 2016; Kane & Garber, 2009; Mechling, 2015). Other studies have found that parental depression is strongly associated with children externalizing problems through antisocial behaviors (Kim-Cohen et al., 2005), aggression (Langrock et al., 2002), and oppositional-defiant behaviors (Dette-Hagenmeyer & Reichle, 2014). Still other studies have found that depressed parents exhibit negative parental behaviors and engage in more stressful interactions and conflict with their children (Conger et al., 1995; Keitner et al., 1993), and that because family environments may be sources of stress in children's lives (Langrock et al., 2002), children may externalize symptoms in response to this stress.

The literature also indicates that parents' depression may be an important predictor of their children's media addictions. Children develop their social skills best when they grow up in a nurturing family environment—one that features positive parent-child interactions and parental support (Haven et al., 2014). Depressed parents also tend to have fewer supportive or positive interactions with their children (Colletta, 1983; Lovejoy, 1991) and their children are therefore likely to exhibit deficient social skills (Hammen et al., 1987; Korhonen et al., 2014). In addition, because psychological problems are often transmitted across generations, the children of depressed parents are at increased risk for anxiety or depression themselves (Biederman et al., 2001; Langrock et al., 2002; Lieb et al., 2002). According to the compensation hypothesis, people with deficient social skills or little social support may seek compensation for these deficiencies in online media that fulfill their social needs and create new opportunities for socialization (Mesch & Talmud, 2006; Ong et al., 2011; Ruppel & McKinley, 2015).

Indeed, the literature indicates that the social functions of online games are among their most appealing features (Griffiths et al., 2004). Players can interact with one another anonymously and instantly through text, audio, and online game communities (Fox et al., 2018; Lo et al., 2005; Park & Chung, 2011), and can easily build and maintain online social relationships (Domahidi et al., 2014; Schaefer et al., 2011). Indeed, recent research has suggested that online games' main appeal is that they allow individuals to compensate for their deficient social skills or unmet needs for sociability in their offline lives (Chak & Leung, 2004; Peters & Malesky Jr, 2008). Moreover, when people perceive media as a means of receiving some form of social compensation, they increase their media use, deepening their dependence on the media (Bahrainian et al., 2014; LaRose et al., 2003). Significantly for this study, previous studies have found that parents' depression is a risk factor for their children's television overuse (Park et al., 2018) and Internet addiction (Lam, 2015). On the basis of this literature review, we can expect that children who are raised by depressed parents are more likely to be addicted to online games because they may rely excessively on online games to satisfy their unfulfilled social needs. Thus, we propose the following hypothesis:

> **H1**: Parents' depression will be positively related to their children's online gaming addiction. The more depressed parents are, the more addicted their children will be to online games.

Mediation of Intrusive Parenting and children's Social Motivation for Playing Online Games

Previous studies have indicated that depression may disrupt healthy parenting behaviors (Elgar et al., 2007). For instance, depressed parents' behavior is characterized by its negativity and unpredictability (Langrock et al., 2002). Caregivers with depression have been found to withdraw from positive parenting, be more likely to perceive child-rearing as demanding, and rely more heavily on avoidant disciplinary practices (Gelfand & Teti, 1990). In short, depressed parents may be overly involved in their children's lives (Gruhn et al., 2016).

Withdrawn and intrusive parenting behaviors also increase children's risk of developing a tendency to externalize their problems (Goodman et al., 2011; McKee et al., 2008). Negative parenting behaviors in particular have been found to play a significant and predictive role in children's problematic media use (Bae, 2015), in part because a dysfunctional family environment leads children to develop negative feelings, which in turn drive their media use and addiction (Sela et al., 2020). Furthermore, children who grow up in a negative home environment have difficulty developing emotion regulation abilities (Botdorf et al., 2017), which might in turn increase their vulnerability to problematic Internet, smartphone, and video game use as adolescents (Hollett & Harris, 2020; Karaer & Akdemir, 2019; Squires et al., 2020; Wang et al., 2017). Previous studies have demonstrated that children who are exposed to negative parenting behavior (e.g. intrusive, punitive, neglectful, or inconsistent parenting behavior) are more likely to have an Internet and/or smartphone addiction (Kwak et al., 2018; Xin et al., 2018; Xiuqin et al., 2010) or exhibit problematic video game usage rates and patterns. Furthermore, some studies have shown that the link between parents' depression and their children's likelihood of externalizing problems is mediated by parent-child conflicts (Kane & Garber, 2009) and intrusive and withdrawn parenting patterns (Jaser et al., 2007). Based on the above literature review, we assume that children raised by depressed parents are more likely to perceive their parents' parenting behavior as intrusive, which may in turn lead them to develop an online gaming addiction. Hence, we propose the following hypothesis:

> **H2**: Intrusive parenting will mediate the relationship between parents' depression and their children's online gaming addiction.

People who have a limited (Sheldon & Gunz, 2009) or unsatisfactory social life offline (Papacharissi & Rubin, 2000) are more likely to seek out interpersonal interactions online. Expanding on these findings, researchers have shown that poor-quality mother-child relationships can predict people's preference for online communication and online friendships (Szwedo et al., 2011) because online interactions and relationships can be more safe, efficacious, secure, and comfortable (Caplan, 2003). Because children of depressed parents are exposed to more severe stress and negative interactions (or lack of interaction) with family members (Adrian & Hammen, 1993), they may actively seek out social interaction online in order to compensate for their low-quality interactions with their parents. This gives them a strong social motivation for gaming online. Previous studies have suggested that people's motivation for real-life friendships is positively associated with social network service (SNS) use (Floros & Siomos, 2013). Studies have also found that psychological distress can facilitate online gaming addiction by motivating individuals to play games for escapism and achievement (Kardefelt-Winther, 2014) and that the impact of anxious attachment in SNS addiction is mediated by online social support (Liu & Ma, 2019). From this review, we can expect that children raised by depressed parents are more likely to be motivated to engage in social interaction online in order to compensate for the lack or low-quality of interactions with their parents, which may in turn lead them to develop an addition to online gaming. In other words, we suggest that children's social motivation for playing online games might mediate the relationship between their parents' depression and their online gaming addiction. Therefore, we propose the following hypothesis:

> **H3**: Children's social motivation for playing online games will mediate the relationship between their parents' depression and their online gaming addiction.

The Research Model

Our review of the literature linking parents' depression, intrusive parenting, children's social motivation for playing online games, and children's online gaming addiction leads us to present our own research model (Fig. 1). The model postulates that parents' depression has a direct impact on their children's online gaming addiction, and that this impact is mediated via intrusive parenting and children's social motivations for playing online games. To examine the research model, we will describe methods in the next section.

Methods

Participants

The data analyzed in this study were derived from Game Use Panel Fifth Year Research (GUPFYR) conducted by the Korea Creative Content Agency (KOCCA) in the first half of 2018. The GUPFYR sample included 8th-grade students, 11th-grade students, college students, and their parents living in metropolitan areas in Korea. Because online game players were the target group in this research, adolescents and youths who did not play online games were excluded from the data set. This left us with a total sample of 356 students and their parents. The students' average age was 16.78 ($SD = 2.43$) years and they spent an average of 91.15 ($SD = 77.92$) minutes per day playing video games online.

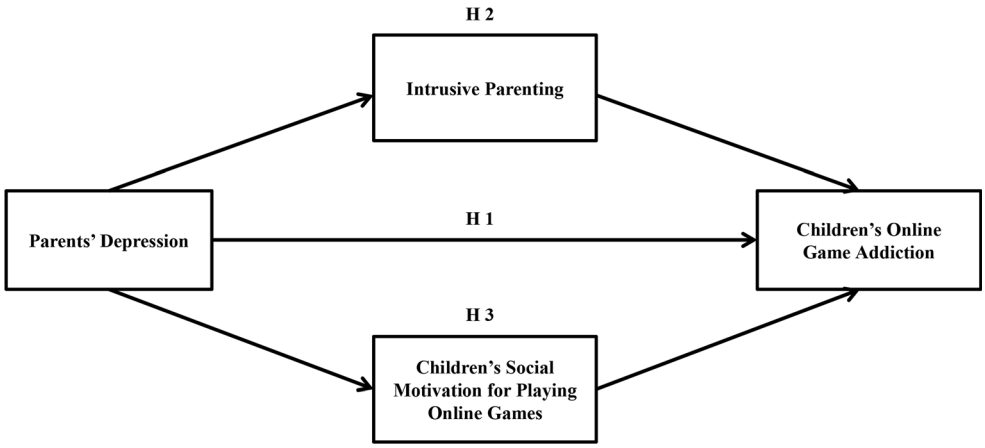

Fig. 1 Research model and pathways related to study hypotheses

Measures

Parents' Depression Parents' depression was measured by the abridged version of the Center for Epidemiologic Studies Revised Depression Scale, which is designed to assess depressive disorders. It comprises 11 statements (e.g., "I felt very depressed last week") and respondents respond to each of these statements on a 4-point Likert scale with values ranging from 1 (rarely) to 4 (very frequently).

Intrusive Parenting Intrusiveness of parenting was measured using a scale devised by the KOCCA to assess Korean parenting behavior (Korea Creative Content Agency, 2013). The scale, composed of six subscales, measured adolescents' perceptions of their parents' monitoring, reasoning, inconsistency, over-expectation, intrusiveness, and affection. The intrusiveness subscale consists of four statements (e.g., "Parents are usually anxious and do not allow me to do what I want to do") and respondents assess each of these statements on a 4-point Likert scale with values ranging from 1 (not at all true) to 4 (very true).

Social Motivation for Playing Online Games Motivation was measured by assessing three statements (e.g., "It is important for me to develop deep and meaningful relationship with other players") adapted from a version of Yee's Inventory of Massively-Multiplayer Online Role-Playing Games (Yee, 2006). Each of the statements was assessed on a 5-point Likert scale, ranging from 1 (not important at all) to 5 (very important).

Children's Online Gaming Addiction Children's online gaming addiction was assessed using a translated and modified version of Young's (1998) Internet Addiction Scale (we modified the scale by adding "gaming" to the questions). The scale contains 20 statements (e.g., "I become preoccupied with ideas of games and often imagine playing games when I am not playing them") and respondents' replies are assessed via a 5-point Likert scale with values ranging from 1 (not at all true) to 5 (always true).

Demographics This study also considered several demographic factors as covariates, including children's gender (boy, girl) and grade (8th grade, 11th grade, college student); parent's gender (male, female) and educational attainment (high school or less, college, graduate school, or more), and families' monthly household income (in 10,000 Korean won, or KWN).

Validity and Reliability Test

We first conducted a confirmatory factor analysis (CFA) for the four variables that together form the proposed research model in order to confirm the validity of the overall factor structure using AMOS 20.0 software. Based on modification indices, we found that we could improve the fit of our model if we allowed some errors within the parents' depression and children's online gaming addiction variables to correlate. Therefore, we estimated a modified CFA model, which allowed 13 correlations between errors within the two variables. The modified CFA model yielded acceptable indices of $\chi^2 = 1278.44$, $df = 643$, $p < .001$, $\chi^2 / df = 1.99$, CFI = .92, TLI = .91, SRMR = .05, and RMSEA = .05 (90% CI = .05, .06).

Next, we calculated Cronbach's alpha in order to examine the reliability of the variables. We did this using SPSS 20.0 software. We found that parents' depression (Cronbach's alpha = .81), intrusive parenting (Cronbach's alpha = .76), children's social motivation for playing online games (Cronbach's alpha = .89), and children's online gaming addiction (Cronbach's alpha = .96) all had satisfactory levels of internal consistency. Thus, we confirmed the validity and reliability of the four variables considered in this study's research model.

Analysis

We used a hierarchical regression analysis to test the relationship between parental depression and children's online game addiction, using SPSS 20.0 software. In addition, to test the mediation effects of intrusive parenting and social motivation for playing online games in the relationship between parental depression and children's online game addiction, we used a Bootstrap approach to mediation, developed by Preacher and Hayes (Preacher & Hayes, 2008), and similar to Baron and Kenny's approach (Baron & Kenny, 1986), employing model 4 of the PROCESS Macro (Hayes, 2013). Confidence intervals (CIs) were based on 5000 Bootstrap samples to test the validity of the total, and direct and indirect, effects. To control for the effects of a children's gender and grade, and parent's gender, education, and household income, these variables were entered into the model as covariates.

Results

Tables 1 and 2 present the descriptive statistics and zero-order correlations for parents' depression, intrusive parenting, children's social motivation for playing online games, and children's online gaming addiction. All correlation coefficients among the variables were statistically significant.

Table 1 Participant frequencies

	Frequency (%)
Parental Gender	
Female	332(93.3%)
Male	24(6.7%)
Parental Education	
Less than high school	131(36.8%)
College	211(59.3%)
Graduate school or higher	14(3.9%)
Monthly Household Income	
Less than 200	10(2.8%)
201 to 300	29(8.1%)
301 to 400	52(14.6%)
401 to 500	82(23.0%)
501 to 600	68(19.1%)
Greater than $ 601	115(32.3%)
Children's Gender	
Girl	153(43.0%)
Boy	203(57.0%)
Children's Grade	
8th	130(36.5%)
11th	122(34.3%)
College	104(29.2%)

Testing Hypotheses

H1 posited the positive influence of parents' depression on their children's online game addiction. As shown in Table 3, the results indicated that parents' depression positively predicted their children's online game addiction ($B = .33$, $SE = .11$, $p < .01$). The more depressed parents felt, the more addicted their children were to online games. Therefore, H1 was supported.

H2 predicted that intrusive parenting would mediate the relationship between parents' depression and children's online game addiction. As shown in Fig. 2, after controlling for covariates, the total effect of parents' depression on children's online game addiction was significant ($B = .33$, $SE = .11$, $p < .01$). The indirect effect of parents' depression on children's online game addiction through intrusive parenting was also significant ($B = .06$, *Boot SE* = .03, *95% Boot CI* = .007, .15). That is, intrusive parenting partially mediated the relationship between parents' depression and children's online game addiction. Thus, H2 was also supported.

H3 postulated that children's social motivation for playing online games mediates the relationship between parents' depression and children's online game addiction. As already described, the total effect of parents' depression on children's online game addiction was significant ($B = .33$, $SE = .11$, $p < .01$). The indirect effect of parents' depression on children's online game addiction, through children's social motivation for playing online games, was also significant ($B = .12$, *Boot SE* = .05, *95% Boot CI* = .014, .24). Therefore, the relationship between parents' depression and children's online game addiction was partially mediated by children's social motivation for playing online games. Hence, H3 was also supported.

Additional Analyses

Previous studies have found that the impact of parents' depression on the patterns of their children's media addiction varied by the children's gender and developmental stage (Ko et al., 2005; Landman-Peeters et al., 2008; Wickramaratne & Weissman, 1998). Although we did not hypothesize that children's gender and grade level would moderate the relationships between the variables, we figured it would be worthwhile to examine whether they did so using the PROCESS macro (Model 1).

We found that parents' depression and children's gender had no significant interaction effects on children's online gaming addiction ($B = .08$, $SE = .23$, *95% CI* = −.37, .54), intrusive parenting ($B = .17$, $SE = .18$, *95% CI* = −.19, .53), or children's social motivations for playing online games ($B = -.05$, $SE = .27$, *95% CI* = −.58, .49). We also found that parents' depression and children's grade had no significant interaction effects on children's online gaming addiction ($B =$

Table 2 Descriptive statistics for and zero-order correlations between all variables in the model

	M (SD)	1	2	3	4
1. Parents' Depression	1.38 (.37)	1			
2. Intrusive Parenting	2.27 (.82)	.11*	1		
3. Children's Social Motivation for Playing Online Games	2.45 (.96)	.11*	.12*	1	
4. Children's Online Game Addiction	2.36 (.82)	.12*	.27**	.47**	1

* $p < .05$, ** $p < .01$

−.02, $SE = .13$, $95\%\ CI = -.28, .24$), intrusive parenting ($B = .05$, $SE = .10$, $95\%\ CI = -.15, .25$), or children's social motivations for playing online games ($B = -.06$, $SE = .15$, $95\%\ CI = -.36, .24$). Therefore, we suggest that the relationships between children's online gaming addiction, intrusive parenting, and children's social motivation for playing online games were not moderated by children's gender and grade level.

Discussion

Our study has several significant findings. We found that parents' depression positively predicts children's online gaming addiction. This finding is consistent with previous studies (Lam, 2015; Park et al., 2018; Xiuqin et al., 2010). We might be able to explain this finding by looking to emotional regulation in children. According to Yu et al. (2013), people who have trouble controlling their emotions tend to become addicted to media. If, as Feng et al. (2008) suggest, children with depressed parents are more likely to have difficulties regulating their emotions, it stands to reason that children raised by depressed parents may have weak emotional self-regulation abilities and therefore be more likely to become addicted to online gaming. Furthermore, because depressed parents are more likely to spend more time on media to relieve unpleasant emotions (Potts & Sanchez, 1994), they may also be less restrictive about their children's online game use, which might facilitate addictive behavior.

This study also identified intrusive parenting's mediating role on the relationship between parents' depression and their children's online gaming addiction. In short, we found that parents' depression positively influences intrusive parenting, which can in turn facilitate their children's online gaming addiction. This finding is similar to those in previous studies on the mediating effects of intrusive parenting on the relationship between parents' depression and adolescents externalizing problems (Jaser et al., 2007) and Internet addiction (Gruhn et al., 2016). We might explain these results by considering that depressed parents tend to exhibit intrusive parenting behaviors, and therefore children raised by depressed parents might spend excessive time gaming online in an attempt to compensate for poor parental support.

This study also found that children's social motivations for playing online games had a mediating effect on the relationship between parents' depression and their children's online gaming addiction. Previous studies have found that a preference for an online social interaction mediated the relationship between psychosocial health and Internet addiction (Caplan, 2003). We suggest that a similar process takes place among children with depressed parents—that is, because parents' depression brings about unsupportive or negative interactions between them and their children (Goodman et al., 1994; Lovejoy, 1991), children with depressed parents may be

Table 3 Hierarchical regression of the relationship between parental depression and online game addiction

Predictors	Step 1			Step 2		
	B(SE)	*β*	*t*	*B*(SE)	*β*	*t*
Children's Gender (Boy=1)	−.28(.09)	−.17	−3.31**	−.29(.09)	−.18	−3.41**
Children's Grade (8th=1)	−.01(.05)	−.01	.12	−.01(.05)	−.01	.12
Parental Gender (Father=1)	−.28(.17)	−.09	−1.62	−.31(.17)	−.09	−1.79
Parental Education (Middle school=1)	.17(.08)	.11	2.00*	.18(.08)	.12	2.17*
Monthly Household Income (Less than 200=1)	.06(.03)	.10	1.91	.07(.03)	.11	2.15*
Parents' Depression				.33(.11)	.15	2.87**
ΔR^2	.07			.02		
F	$F(5, 349) = 5.01$***			$F(6, 348) = 5.64$***		

* $p < .05$, ** $p < .01$

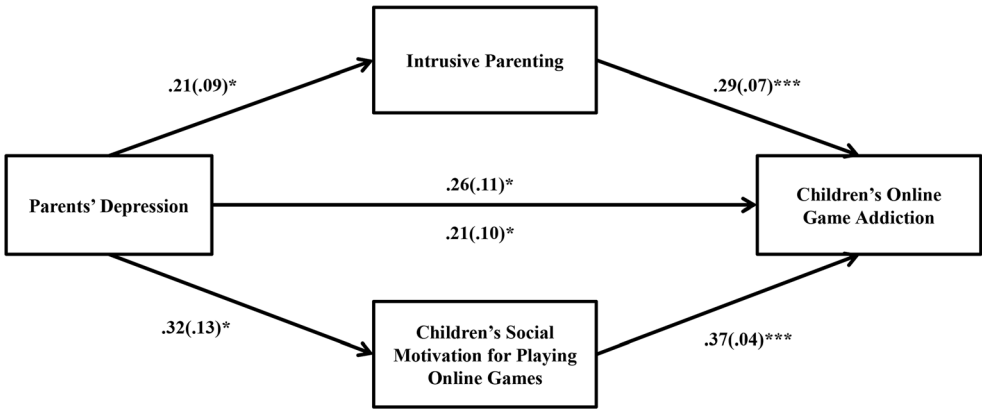

Fig. 2 Research model. Path values are unstandardized coefficients (standard errors). *$p < .05$, **$p < .01$, ***$p < .001$

motivated to game online in order to make up for this lack of support and thus be more likely to become addicted.

In summary, this study both explored the literature surrounding parents' depression, intrusive parenting, children's social motivations for playing online games, and children's online gaming addictions, and tested a novel research model regarding the relationships between these variables. It found that parents' depression directly influences their children's online gaming addiction and indirectly affects it via intrusive parenting and children's social motivations for playing online games. Although the literature has accumulated considerable evidence regarding the relationship between adolescents' media addictions and parental factors—including parent-adolescent conflict (Yen et al., 2007), parental violence (Kwak et al., 2018), or negative parenting style (Lian et al., 2016)—this study contributes to the literature by considering parents' depression as a risk factor for children's online gaming addiction. Moreover, our study is the first to our knowledge attempt to investigate two separate mechanisms that might mediate how parents' depression affects their children's online gaming addiction. This study also extends previous studies on the direct relationship between parents' depression and their children's addictive media use (e.g. Lam, 2015; Park et al., 2018; Xiuqin et al., 2010) by including parenting and game-related factors as mediation variables in our model.

Our study's findings have a variety of practical implications. They can be used to design or improve educational or health interventions to prevent online gaming addictions in children. Specifically, our findings might help researchers and practitioners develop effective family-based interventions to facilitate a warm family environment or offer some alternative way for children to fulfill their social and relationship needs. We suggest that counselors and teachers need to encourage children with depressed parents to find such alternative social channels and that they educate parents about the potential problems of parental depression and/or negative parenting styles.

Our study had a few limitations. First, although the impact of parents' depression on their children's online gaming addiction may be mediated by children's stress and depression, the fact that psychological problems are transmitted across generations (Biederman et al., 2001; Langrock et al., 2002; Lieb et al., 2002), was not taken into consideration in the current study. Furthermore, our study was not able to consider other important variables—including rejective, over-protective, or demanding parenting styles and escapist or avoidant media use motives—or assess their potential effects because this data was not available in our sample. Future studies could explore other mediating variables that might explain the relationship between parents' depression and their children's online gaming addiction. Second, although previous studies have found that parental factors—including parent-adolescent conflict (Yen et al., 2007), parental violence (Kwak et al., 2018), or negative parenting styles (Lian et al., 2016)—can influence adolescents' media addictions, we did not consider those factors in our research model. Future researchers could examine these kinds of factors in order to compare their effects and the magnitude of these effects on children's online gaming addiction. Third, the cross-sectional nature of this study might raise some concerns about its ability to infer causal relationships, so future studies should take a longitudinal approach to better establish the causal relationships proposed by this study. Finally, future studies could extend our methods to other cultural settings to verify and generalize our results beyond the Korean context.

Data Availability The datasets generated during and/or analysed during the current study are available in the the Korea Creative Content Agency (KOCCA) repository, https://www.kocca.kr/gameguide/contents.do?menuNo=203709.

Declarations

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the

institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of Interest The authors declare that there is no conflict of interest.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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