Preventive Role of Parents in Adolescent Problematic Internet Game Use in Korea*

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The literature on problematic Internet game use by adolescents most often considered social-relational factors primarily as a consequence of the addictive Internet game use. Using survey data from 593 Korean students and their parents: 295 in senior secondary school (aged 15-18) and 298 in junior secondary school (aged 12-15), of whom 315 (53.1%) were male, the authors investigated the preventive role of parent-adolescent relations in Internet game addiction. Results showed that adolescents with more adolescent-parent social activities and parent-adolescent view alignment regarding games were less likely to develop problematic Internet game use. The findings suggest that parents make efforts to know the latest about their adolescents' social currency and entertainment activities (i.e. Internet game). Also parents need to increase the variety and frequency of activities they can share with their adolescents in order to attempt to block negative effects of excessive Internet games, to prevent dependency, and to channel game playing in a positive direction.

Keywords: social capital; Internet game addiction; parent-child relation; view alignment

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In recent years, the total value of the world game market has grown rapidly and Internet games have become increasingly popular. The gaming industry will be worth $ 44 billion by 2011, up from $ 29 billion in 2005 (Gamespot 2006), and is expected to reach $ 68 billion in 2012 (PricewaterhouseCoopers 2008). The widespread use of home computers and the availability of advanced broadband Internet networks internationally have facilitated the significant growth of the Internet game industry (Maxim 2004; KOGIA 2008). About 73% of adolescents are playing computer games in the U.S. (IGA 2009) and more than 90% of teens are enjoying online games in Korea (KOGIA 2008). However, such growth has escalated social concerns over the popularity of online games, particularly among adolescents, who make up a large portion of game users (Kim and Jeong 2005; Roberts 2000; Van Gelder 2003; Yen et al. 2007). For example, 14% of these young game players in Korea have suffered from addictive symptoms (Kim and Jeong 2005). Similar problems have been found in the U.S., Europe and East Asia (Gentile 2009; Ferraro et al. 2007; Simkova and Cincera 2004; Aslanbay et al. 2009; Tsitsika et al. 2009; Chan 2004; Ngai 2007; China Youth and Children Research Center 2007).

We can define this problematic Internet game use as playing Internet games to the extent that it creates problems in physical/mental health, social life and school/work life. Scholars have admitted that game playing can have certain positive aspects, such as the improvement of education and learning abilities in today's hi-tech world (Gee 2007; Oblinger 2004) therapeutic treatment and rehabilitation effects (Wilkinson et al. 2008); and the enhancement of social skills (Lee and Peng 2006; Yee 2006). Long-term game use, however, is reported to lead to the aggravation of health problems (Gillespie 2002), an increased propensity for violence (Gentile and Gentile 2008; Wallenius et al. 2007), and a reduction in normal social relationships (Blais et al. 2008; Kraut et al. 2002; Wallis 2006). In reviewing prior literature on negative life consequences associated with playing massively multiplayer online games, Liu and Peng (2009) sorted out "physical problems (i.e., fatigue, physical pain, reducing sleep time, skipping meals), personal life problems (i.e., conflicts with friends or family, low social engagement, decreased time management skills), and professional/academic problems (i.e., missing work or school, deteriorated performance)" (p.1306) as three general types.

Given the negative consequences of problematic Internet game use, it is clearly important to identify its possible risk factors so as to prevent its occurrence more efficiently. The prior literature has paid considerable attention to the personal characteristics of excessive Internet game users, such as their sex, level of academic performance, personality, and level of depression/loneliness (Caplan 2002; Griffiths 2000; Hall and Parsons 2001; Young 1998). However, relatively little emphasis has been placed on the role played by the social environment or interpersonal relationships. More attention to the social environment or interpersonal relationship should be paid because previous literature has identified level of depression/loneliness as a very critical source of such problems. Based on a student and parent survey carried out in Korea, which is one of the most wired countries in the world, with more

than 90% of students using Internet games regularly and experiencing no Internet access difficulties (KOGIA 2008), the research reported herein investigated the roles of family relationships in preventing excessive Internet game playing among adolescents, drawing on a social capital framework that focuses on parent-child view alignment (Kim and Schneider 2005). By doing so, this research is to propose a policy measure focusing family social capital frame to escalating social concerns over the popularity of online games among adolescents.

PERSONAL CORRELATES OF PROBLEMATIC INTERNET GAME USE

Previous studies have identified several important personal risk factors for Internet game addiction such as gender and performance stress at school. Males are reported salient in Internet gambling addiction (Mitchell 2000; O'Reilly 1996), excessive computer use (Griffiths 1999; Hall and Parsons 2001; Young 1996) and video game use (Anand 2007; Olson et al. 2007; Padilla-Walker et al. 2010). For school age adolescents, academic failure may cause stress, and it is likely that they will engage in problematic behaviors to cope with that stress (Agnew 1992). Therefore, students with a low academic performance may be more likely to engage in Internet games problematically.

Previous studies have also used accessibility (or time displacement) to predict the risks of Internet addiction (Leung 2004; Young 1999). Here, accessibility refers to the opportunity to use the Internet or play games, which is directly linked with the time length or frequency of such use or play. In other words, the longer and/or the more frequently a gamer plays, the greater the potential he or she has to suffer such negative effects as game addiction.

Many studies reported the connection between depression or loneliness and excessive Internet and game use (Griffiths 1998; Young and Rodgers 1998; Davis 2001; Caplan 2003; Kim et al. 2009; Young 2009). Consistently Liu and Peng (2009) found a negative association between offline social skills and preference for life in a virtual world among those playing massively multiplayer online games.

Addictive use of the Internet may counter loneliness or satisfy an unfulfilled desire for sociability (Young 1998). Caplan (2003, 2005) argued that a preference of online social interaction over offline communication plays a significant role in developing negative consequences of problematic Internet use. Liu and Peng (2009) also suggested that online social interaction may be an option to meet with desire for sociability of people lacking social skills. Thus, Internet game addicts may be expected to exhibit a much higher degree of online social self-efficacy but a lower degree of offline social self-efficacy than their less-addicted counterparts.

Compared to researches on the above personal correlates, literature on social correlates of Internet game addiction are scarce. However, although relatively implicit or sometimes

indirect, several studies on Internet addiction (not specific to Internet game addiction) have identified certain risk factors derived from adolescents' family or their peers. For example, among various interpersonal relationships, the relationship between parents and children was reported to affect considerably the degree of adolescents' Internet addiction (Liu and Kuo 2007) and high parent-adolescent conflict significantly increased the degree of adolescents' Internet addiction (Yen et al. 2007). Punamäki and his colleagues (2009) also found that adolescents who use internet excessively are more likely to have weak relationships with friends as well as parents, indicating that friendship quality is an important predictor of adolescents' problematic internet use. These few but important researches call for our attention to social correlates of Internet game addition. In particular, this work pays a special attention to adolescent-parent relations with social capital perspective.

ADOLESCENT-PARENT RELATIONS AND GAME ADDICTION: SOCIAL CAPITAL PERSPECTIVE

Coleman (1988) argued the value of social ties within the family, i.e. social capital, in the transmission of parental normative resources to children. By paying a special attention to connections of those who are around and influence children, he conceptualized the critical importance of densely connected micro social structure of parents and their children as "intergenerational closure." According to him, "intergenerational closure" promotes the capacity of parents in supervising their children by maintaining acquaintance with other parents who are the parents of the friends of their own children. Thus, he argued that when adolescents are integrated through intergenerational closure, they are less likely to develop behavioral problems and more likely to develop desirable norms.

Intergenerational closure functions as a safety net for children by facilitating parental communication with the child. In particular, for social capital within the family, Coleman was interested in the social integration mechanism which can keep adolescents in track or prevent them from deviation. Accordingly, Coleman's conceptualization of social capital emphasizes the social process in the home and relational transmission of norms and expectation through social ties within the family. As part of this process, various parent-adolescent co-activities as social capital may play an important role in preventing adolescents' problematic game playing.

Since Coleman's influential work, numerous studies in the literature have examined the role of social capital in a variety of types of social behavior, ranging from educational achievement (McNeal 1999; Kim and Schneider 2005), health (Hawe and Shiell 2000; Lomas 1998), and substance addiction (Cheung and Cheung 2003) to juvenile delinquency/crime (Hagan and Parker 1999; Lo and Zhong 2006). It seems that social ties within the family are useful in preventing adolescents from engaging in problematic behavior. In the area of substance

addiction, increased evidence has been found to indicate the importance of the family in the prevention of alcohol/drug problems. Cohesive relationships between parents and children (most importantly, parents should spend "quality" time and "quantity" time with their children) can provide children with basic life-skills, positive role models, clear self-images, feelings of love and security, and free channels of communication. Such children will not likely become dependent on substance (Carroll 2000). Specific to Internet use, we could expect that parent-child ties can generate social capital in the form of social learning, knowledge of and attitudes about controlling engagement in online activities, social support, and informal social control, all of which are protective factors against delinquent behavior (Akers 1985; Wright and Cullen 2001). The reciprocal relationship of mutual expectations and obligations in the family may sustain adolescents' commitment to self-control and their perseverance in continuing their everyday school work.

In addition, when parents know the latest about their adolescents' social currency and entertainment activities (i.e. online game), we further argue, the social relationship between parents and adolescents may become more effective in channeling adolescents' such latest fads in a positive direction. In this, we adopt Kim and Schneider's (2005) recent refinement of social capital theory drawing on the concept of "relational alignment." According to them, alignment in views about college between parents and children increases the odds of the latter attending a postsecondary institution. Relational alignment may enhance mutual trust between parents and children, and may promote dialogue and activities that are conducive to children's achievements in school. Thus, Kim and Schneider (2005) argued that a match between parents' and adolescents' educational goals promotes the healthy development of adolescents. When the views held by or actions taken by parents are reflective of their adolescents' developing desires and aspirations, these adolescents are more likely to acquire positive social capital and avoid behavioral problems such as Internet game addiction.

Last but not least, we want to emphasize a sociologically cautionary point considering this familial socialization with social capital perspective. Wisconsin model of status attainment (Sewell, Haller and Portes, 1969) first included the influence of significant others (i.e., parents in this study) which was a foundational construct of social capital. When the value of the dyadic relation of parents with their children as social capital has been demonstrated in the transmission of parental expectation and resources to children (Coleman, 1988), it must have been welcomed by its potential for parents to do something independent of socioeconomic backgrounds. However, the specification of the Wisconsin model implies unequal distribution of significant others (micro social structure surrounding adolescents) and social psychological resources (motivations and beliefs generated by the social structure surrounding adolescents) by family socioeconomic status. In fact many sociological studies have found parent-child interactions to vary according to socioeconomic standing (McNeal 1999). Thus we need to take into account socioeconomic background when we consider the association between parent-

child ties and Internet game addiction.

HYPOTHESES

Building upon the foregoing familial social capital argument, this study hypothesized that parent-adolescent engagement in activities may strengthen family ties and prevent adolescents from becoming addicted to Internet game playing. Moreover, if parents realize the importance of information technology to recent societal development and hold similar views about the positive aspects of Internet game playing to those of their adolescents, then they may also become actively involved in high-tech learning activities and more proficient in sharing and supervising their children's game playing. In other words, when parents' attitudes and actions are aligned with those of their adolescent children, the latter's Internet game playing tends not to be addictive.

Two specific hypotheses were derived and tested in this study. The first hypothesis was that joint activities between adolescents and their parents, such as playing games together or dining out, are negatively related to the degree of adolescent game addiction, controlling for personal risk factors (Hypothesis I). The second hypothesis was that adolescents with parent-adolescent view alignment on game playing are more protected from game addiction than those without such alignment (Hypothesis II).

DATA AND METHODS

This study employed data from a Korea Game Industry Agency (KOGIA) survey of the game behavior of Korean youth carried out in 2006. The KOGIA survey was particularly designed to obtain detailed data on adolescent Internet game addiction in Seoul, the capital of Korea.

A total of 632 participants were recruited from six schools that were randomly selected from a list of all schools in the city. Fifteen classes from these schools were also randomly selected. Total data of 593 participants were finally used. Excluded 39 students were: 14 of them did not participate in the survey, 18 students' parents did not complete parents' questionnaire and 7 students were deleted due to missing values in the process of regression analysis. The participants consisted of 295 (49.7%) senior secondary school students (aged 15-18) and 298 (50.3%) junior secondary school students (aged 12-15), of whom 315 (53.1%) were male. Both participants and their parents gave voluntary consent and received 5,000 KRW (about 5 USD) for their involvement in the survey.

Dependent Variable

Degree of Game Addiction

Young (1998) created a detailed 20-item, five-point Likert scale to estimate the degree of Internet addiction based on the pathological gambling standards of the DSM-IV (Diagnostic and Statistical Manual-IV) and her own eight additional standards. The Young's Internet Addiction Test (IAT) was designed to assess the degree of individual's Internet addiction by checking the influence of the addiction on their daily routine, social life, productivity, sleeping pattern, and feelings (Young 1998). The IAT was reported to have high face validity and reliability. Specifically, Widyanto and McMurran (2004) reported that the IAT has a good internal consistency by measuring reliability scores of six sub-concepts from factor analysis: salience, excessive use, neglect work, anticipation, lack of control, and neglect of social life. They also reported high validity of the scale by showing correlations of the sub-factors with average time of Internet use.

A number of studies have adopted the IAT scale to examine the degree of Internet addiction (e.g., Ha et al. 2007; Liu and Kuo 2007; Yoo et al. 2004). The scale was also translated into Korean and was used in many studies about Korean adolescents' Internet game addiction as a modified version (e.g., Kim and Jeong 2005; Kwon et al. 2009; Whang et al. 2003). The modified version was made by adding "gaming" to the questions in the original IAT scale (e.g., Do you fear that life without Internet gaming would be boring? or Do you try to hide how long you've been online gaming?). The current study used the modified IAT scale (in Korean) to measure the degree of adolescents' Internet game addiction.

Independent Variables

Social Activities with Parents

The survey asked participants about the frequency with which they engaged in talks and activities in and outside the home with their parents on five items (e.g., sightseeing, going to movies or restaurants, visiting a sports complex or gymnasium, chat, email exchange or information search using Internet) ($\alpha = .696$).

Gaming Activities with Parents

Participants were asked whether they engaged in gaming activities with their parents or not on seven items. They are playing games together; buying game titles, game-related equipment or accessories for them; recommending a particular game, gaming expos, contest or camps; and having a conversation about the contents of a game. ($\alpha = 0.890$)

Relational Alignment between Respondents' and Parents' Views about Games

The survey asked participants, "How do you view game playing?" Their answers ranged from

1 (very negatively) to 5 (very positively). A separate survey asked the same question of the students' parents to allow comparison between students' view and their parents' own view on games. The following alignment variable was created on the basis of this comparison. First, we recoded students' and parents' negative responses (1 = Very negative and 2 = Somewhat negative) as zero and, neutral and non-negative responses (3 = Neutral, 4 = Somewhat positive and 5 = Very positive) as one. Then two dummy variables were created: negative view alignment about game playing, and non-negative view alignment about game playing. Misaligned was the reference category in our analysis.

Control Variables

Control variables based on the foregoing review of the literature were included: sex (male vs. female), school level (junior secondary vs. senior secondary), academic performance (grade ranking from 1 to 6), amount of time spent on games per week (ranging from 6 to 540 minutes), interactions with friends and social self-efficacy in both real life and online game playing. Let us give some details on online/offline social self-efficacy below.

Social Self-efficacy (Offline/Online)

A three-item measure of social self-efficacy in real life was created by modifying the social self-efficacy scales of the Self-Efficacy Questionnaire for Children (SEQ-C) (Muris 2001) and the Self-Efficacy Scale (Sherer et al. 1982). Items include: 1) I often have difficulty making others understand me; 2) Even if there is someone I want to meet, it doesn't work out; and 3) I am not good at talking to other people (α = .69). Similarly three items were used to measure social self-efficacy in playing online games: 1) I actively participate in meetings of online games; 2) I like to meet people while playing online games; and 3) It is important for me to meet other people during online games (α = .69).

Socioeconomic Background

None of the previous studies considered the association between socioeconomic background variables and Internet game addiction. However, as many sociological studies have found parent-child interactions to vary according to socioeconomic standing, also included as basic socioeconomic background variables were "mother with a two-year college education or above" and monthly household income.

Interaction with Friends

Although the present study focuses on family relations, we should not ignore peer effects since scholars have agreed that peers also have a significant impact on adolescent problematic behavior (see the summary in Akers and Sellers [2009]). Rockhill and his colleagues (2007) reported that unsuccessful friendship interaction is associated with depression. As the

emotional depression from poor friendship may be linked to adolescent's game addiction, previous researchers have reported that friendship quality is related to adolescents' problematic internet use or game playing (Punamäki et al. 2009). Our study thus also controlled such peer effects. The survey asked participants about the frequency with which they talked to their friends about daily school work or games, how often they played games with their friends, and how often they recommended game titles to one another. Our Appendix presents a summary of the variables and the measurement used in this study.

ANALYSIS AND RESULTS

In the Internet addiction test at the Center for Internet Addiction (www.netaddiction.com), Young suggested three cut-off points for the three groups – average online users, 20-49; users experiencing occasional problems, 50-79; and those experiencing significant problems, 80-100. Out of our 593 sample, 394 adolescents scored 50-79 as experiencing occasional problems ($M = 62.66$, $SD = 7.66$) and 13 adolescents scored 80-100 as suffering significant problems from gaming ($M = 82.54$, $SD = 3.71$). Among those who have score 50 or higher, i.e. at a potential risk or with significant problems in Internet game use, the majority was boys (57.49%) and senior secondary students (56.76%). There was no significant difference between boys and girls in the average game addiction score within the group of adolescents who scored 50 or higher. Senior secondary students, however, exhibited a higher mean of game addiction score ($M = 65.49$, $SD = 8.62$) than that of junior secondary school students ($M = 60.41$, $SD = 6.99$; $t = 6.37$, $p < .001$).

The first aim of our analysis was to determine whether the data exhibited significant differences in parent-adolescent social activities according to socioeconomic status. Table 1 shows the mean differences of parent-student social activities by monthly household income and mother's college education. As the mean monthly household income was found to fall between 3 and 4 million Korean won, the sample was divided into two income groups: those earning less than 3 million Korean won per month were categorized as low-income families and those earning 3 million Korean won or above as high-income families. As can be seen from Table 1, high-income families' mean of parent-student social activities (Mean = 16.98, $SD = 5.23$) was significantly higher than that of low-income families (Mean = 13.70, $SD = 4.36$; $p < .001$). Mother's college education (Mean = 17.64, $SD = 5.26$) also showed a significantly higher mean of parent-student social activities than that of mother with no college education (Mean = 14.42, $SD = 4.69$; $p < .001$). Based on this finding, it was expected that the social dynamics within a family with regard to Internet game use may also differ by socioeconomic status. Thus we ran a series of regression models with the whole sample to see if parent-adolescent relations play a preventive role in adolescents' game addiction. We also ran

Table 1. Mean Differences of Parent-student Social Activities by Monthly Household Income and Mother with University Education

	Mean	S.D.	Mean Difference
Monthly household income			
Low (< KR₩ 3 M)	13.70	4.36	3.28***
High (≥ KR₩ 3 M)	16.98	5.23	
Mother's education			
Less than university	14.42	4.69	3.22***
University	17.64	5.26	

***ρ < .001

models: 1) with the low-income family sample, 2) with the high-income family sample, 3) with the college educated mother sample, and 4) with the no-college educated mother sample to see if the social dynamics within a family differ by socioeconomic status with regard to adolescents' Internet game use.

Table 2 shows the results of four models for the whole sample. Model 1 included only control variables based on previous studies on game addiction. Being male, mother with two-year college education or above, time spent on games and social activities with close friends had no statistically significant association with game addiction net of other variables in the model. Junior secondary school students compare to senior secondary school counterparts (b = -5.46, p < .001), monthly household income (b = -.96, p < .05), academic performance (b = -1.48, p < .01), offline social self-efficacy (b = -2.35, p < .001) had significantly negative association with Internet game addiction scores net of other variables in the model. On the other hand, online social self-efficacy (b = 2.28, p < .001) and game activities with close friends (b = .35, p < .01) showed significantly positive association with Internet game addiction scores net of other variables in the model.

We introduced parent-adolescent social/game activities and parent-adolescent view alignment on games alternatively in Model 2 and Model 3. Parent-adolescent social activities was negatively associated with game addiction scores (b=-.20, p < .05) and parent-adolescent game activities was not significant controlling for the variables in Model 1. Monthly household income became insignificant in Model 2 after introducing parent-adolescent social/game activities. Both negative (b=-8.31, p < .001) and non-negative (b=-1.76, p < .05) parent-adolescent view alignment on games was negatively associated with game addiction scores in Model 3 net of variables included in Model 1.

In Model 4, we considered both social relational dimensions; co-activities and view alignment between parents and adolescents. Parent-adolescent social activities remained negatively significant (b=-.24, p < .05) on game addiction scores and parent-adolescent game activities was not significant as in Model 2. Parent-adolescent negative view alignment

Table 2. Regression (OLS) Models with Social Capital Variables on Game Addiction Scores

	Model 1	Model 2	Model 3	Model 4
Constant	65.75***	64.53***	66.48***	65.05***
Control variables				
Male	.57	.39	.78	.59
Junior high school (ref.=senior high school)	-5.46***	-5.45***	-5.41***	-5.40***
Monthly household income	-.96*	-.82	-.88*	-.72
Academic performance	-1.48**	-1.41**	-1.42**	-1.34**
Mother with 2-year college education or above	1.42	1.62	1.44	1.65
Time spent on games per day	.01	.01	.02	.01
Offline social self-efficacy	-2.35***	-2.23***	-2.33***	-2.20***
Online social self-efficacy	2.28***	2.26***	2.31***	2.29***
Social activities with close friends	-.17	.04	-.12	.13
Game activities with close friends	.35**	.38***	.26*	.28*
Parent-adolescent activities				
Parent-adolescent social activities		-.20*		-.24*
Parent-adolescent game activities		.20		.24
Parent-adolescent views alignment on games (ref.=misaligned)				
Negative			-8.31***	-8.74***
Non-negative			-1.76*	-1.80*
N		593		
R^2	.480	.484	.495	.500

*ρ < 0.05, **ρ < 0.01, ***ρ < 0.001

(b=-8.74, p < .001) and non-negative view alignment (b=-1.80, p < .05) on game stayed negatively significant.

Table 3 shows the results of four socioeconomic background groupings of our sample according to monthly household income and level of mother's education. We present only the results of our focal variables in this study, i.e., social capital, net of all other variables in Table 2. First, parent-adolescent social activities were negatively associated with game addiction scores in the low-income family sample (b = -.82, p < .001) and the non-college educated mother sample (b = -.34, p < .01) but no significant association of parent-adolescent social activities with game addiction scores was found in the high income family sample and the college educated mother sample. Parent-adolescent game activities, however, was positively associated with game addition scores in the low-income family sample (b = 1.21, p < .01) and the non-college educated mother sample (b = .72, p < .05). Parent-adolescent game activities showed no significant association with game addiction scores in the high income family sample and the college educated mother sample.

Table 3. Coefficients for Social Capital Variables in Varying Socioeconomic Background Samples

	Low income	High income	Non-college-educated mother	College-educated mother
Parent-adolescent activities				
Parent-adolescent social activities	-.82***	-.06	-.34**	-.16
Parent-adolescent game activities	1.21**	.08	.72*	-.07
Views alignment (ref. = misaligned)				
Negative	-2.42	-10.40***	-4.15	-15.04***
Non-negative	-1.96	-1.65	-.59	-3.75**
N	205	388	317	276
R^2	.606	.484	.570	.491

*ρ < 0.05, **ρ < 0.01, ***ρ < 0.001
Note | All other variables in Table2 are controlled in Table.

We now turn our attention to the view alignment between adolescents and their parents. The bottom two rows of Table 3 display the associations of such view alignment about game playing with game addition scores. First, all four samples exhibited negative coefficients on either negative or non-negative view alignment, although coefficients were insignificant in the low-income family sample and the non-college educated mother sample. Negative view alignment was significant in the high-income family sample ($b = -10.40$, $p < .001$) and the college educated mother sample ($b = -15.04$, $p < .001$). Non-negative view alignment was significant only in the college educated mother sample ($b = -3.75$, $p < .01$) but did not show a significant association with game addiction score in the other three samples. In our supplementary analysis, more than 91% of the adolescents in this study viewed Internet game playing positively. Of the 243 cases of parent-child disagreement, or negative view alignment, 90% (219 cases) stemmed from parents viewing such game playing negatively. The implication of this finding will be discussed in the next section.

DISCUSSION

This study proposed hypotheses on which relatively little emphasis has been placed about Internet game addiction: the role played by the social environment or interpersonal relationships, in particular within the family. Hypothesis I is partially supported. Parent-adolescent social activities, but not gaming activities, are found to have a negative association with adolescents' game addiction scores. In addition, parent-adolescent engagement in mutual activities mediated negatively significant association of monthly household income with game addiction which most existing studies have not been considered in examining such addiction.

In our post hoc analysis, however, parent-adolescent game activities did not show such mediation. This finding is in line with Coleman's argument on the role of intergeneration closure (1988), which functions as a safety net for children by facilitating parental communication with the child. Interestingly, the size of the negative coefficient for parent-adolescent social activities was noticeably larger in the low-income family group, which indicates that the preventive role of social activities is particularly crucial among low-income families. The implication of this finding is that the promotion of frequent social activities between parents and adolescents in low-income families could play a substantive role in preventing adolescents from becoming addicted to Internet games.

As Hypothesis II stated, view alignment between parents and their adolescent children was found to have negatively significant association with game addiction scores. More specifically, both negative and non-negative view alignment was found to lower the degree of adolescent game addiction net of controls. In particular, negative such alignment did so in the high-income family sample and the college educated mother sample. What attracts our attention here is the significance of parents and adolescents sharing a non-negative or positive view of games.

As we reported at the end of result section, parents' negative attitudes toward games were mainly responsible for parent-adolescent misaligned view on games. Given the popularity of online game playing among Korean adolescents, and the importance of such game playing to the culture at large, rejection of the games industry is unlikely to be effective. A more effective approach in this environment would be to block the negative effects of Internet games, prevent dependency upon them, and push game playing in a positive direction (Buckingham 2000). If parents do realize the importance of the changing technological environment for the younger generation, particularly in terms of entertainment, then they may agree with their adolescents about the positive aspects of Internet game playing. Then, they can enhance mutual trust among them, increase common topics they can share, and reduce parent-child conflicts. Therefore, while parents make efforts to know the latest about their adolescents' social currency and entertainment trends (i.e. online game), they need to increase the variety and frequency of activities they can share with their adolescents. Though the results of this study cannot establish causal relationships, they suggest that such parents efforts make the parent-adolescent relation become more effective in channeling adolescents' such latest fads in a positive direction. Parents who are making themselves familiar with rapidly changing new media technology should be better positioned to share and supervise their children's game playing.

The findings presented here are similar to the prior literature which has focused on the personal aspects of Internet game addiction, such as their sex, personality, and level of depression/loneliness (Caplan 2002; Griffiths 2000; Hall and Parsons 2001; Young 1998). In addition, junior secondary school students were found to have lower such scores than their counterparts in senior high school. It is conjectured that this finding is related to the intense

educational competition in Korea (Seth 2002). Such pressure may escalate the stress experienced by adolescents, particularly senior secondary students who are closer to making the transition to college or university. Such findings are also consistent with Agnew's general strain theory (Agnew 1992), one of the mainstream theories to explain delinquency. That is, academic pressure as a source of strain, especially when students feel that they are unable to achieve that high, will lead to negative effects (i.e. anger, resentment, fear, disappointment, or despair) and then increase the chances that one will engage in drug use or other delinquent behaviors.

CONCLUSION, STUDY LIMITATIONS, AND DIRECTIONS FOR FUTURE RESEARCH

This study has several limitations that provide directions for future research. First, additional data should be gathered from a greater number and variety of countries. An important limitation of this study is that the data were gathered only in Korea. Future research could compare the factors that affect game addiction in countries with different Internet use environments, and identify the different patterns of the effects of those factors across countries. Although Seoul shares with other East Asian cities the social, cultural, and structural spin on the family, it also has unique features, as do other cities such as Hong Kong and Shanghai.

For instance, the one-child policy in mainland China has reduced family sizes and therefore nurtured a soft parenting style, whereas families in Korea still adhere to the authoritarian father figure due to persistent Confucian and patriarchal values. Moreover, under British influence, Hong Kong established an even more hierarchical school system than either Seoul or Shanghai. Hong Kong has three bands of mainstream secondary schools, with the bands based on student quality and public examination performance. Teachers in Band One schools are more likely to be capable of using information technology and of providing students with guidance on Internet game playing. Band One schools may also have more resources and greater motivation to organize training activities that involve parents. Thus, the social capital of students in these schools is continually enhanced. Finally, the rapid social change and increased internal migration in mainland China may have fostered community instability that is not prominent in Hong Kong and Seoul. Thus, a comparative investigation of Internet game addiction in these three East Asian societies would be a fruitful avenue for future research.

Although the significance of social capital within the family is acknowledged here, parental involvement in extra-familial ties can also foster the production of external family social capital, which may be important in protecting teenagers against game addiction. Deviance scholars (Sampson et al. 1999) have consistently noted the protective effects of extra-familial resources against delinquent behavior. The formation of external family social capital requires parents to engage in resource-seeking activities outside the family (Burt 2001). The building of

extra-familial ties can be facilitated by parental participation in parent-teacher associations, school/community activities, and interactions with the parents of their children's friends. Such connections among the significant adults around a child may provide him or her with social support in a more efficient way, promote learning, facilitate the collective efficacy of control, and provide parents with greater and earlier access to information on compliant and non-compliant behavior in their children (Jenkins 1997; McNeal 1999; Sampson et al. 1999). Moreover, involvement in school/community activities and programs that offer Internet knowledge and technological literacy can expand parents' scope of resources for the knowledge of and proper guidance on the latest youth culture in regard to online game playing. Assuming that parents may sometimes take their children with them when they engage in such activities, children may gain the opportunity to observe and work with their parents and other adults who are involved in conventional out-of-home activities, thereby enhancing the socialization of normative values (Boisjoly et al. 1995; Furstenberg et al. 1999).

Appendix. Variable Measures and Descriptive Statistics

	Measure	Mean	S.D.
Dependent variable			
Game addiction	20- 100	55.29	14.00
Control variables			
Male	1=Male; 0=Female	.53	.50
Junior high school	1=Junior high school; 0=Senior high school	.50	.50
Monthly household income	1 < KR₩ 2 M(illion) KR₩ 2 M ≤ 2 < KR₩ 3 M KR₩ 3 M ≤ 3 < KR₩ 4 M KR₩ 4 M ≤ 4 < KR₩ 5 M 5 > KR₩ 5 M	3.19	1.20
Academic performance (grade percentile)	90% ≤ 1 ≤ 100% 70% ≤ 2 < 90% 50% ≤ 3 < 70% 30% ≤ 4 < 50% 10% ≤ 5 < 30% 6 = top 10%	4.27	.94
Mother with 2-year college education or above	1=Mother with 2-year college education or above; 0=Mother with education lower than 2-year college education	.47	.50
Time spent on games per day (continuous)	6–540 minutes	78.25	52.34
Offline social self-efficacy (sum of 3 items) (a) I often have difficulty making others understand me. (b) Even if there is someone I want to meet, it doesn't work out. (c) I am not good at talking to other people. These items were reverse scored coded to scaling so that positive scores on this index indicate positive evaluations of students' self-efficacy in real life.	3–15 1=Not at all…; 3=Neutral…; 5=Very true	9.37	2.34
Online social self-efficacy (sum of 3 items) (a) I actively participate in a meeting (guild, Hyeol, etc.) in games. (b) I like to meet people in a game. (c) It is important for me to meet people in a game.	3–15 1=Not at all…; 3=Neutral…; 5=Very true	8.22	2.39

	Measure	Mean	S.D.
Social activities with close friends Consultation (conversation) with your friends about the daily life.	1–6 1=Never 2=Once a year 3=Once or twice in 6 months 4=Once or twice in 3 months 5=Once or twice a month 6=More than once a week	5.41	1.23
Game activities with close friends (sum of 3 items) (a) Conversation with your friends about the contents of a game. (b) Playing a game with your friends. (c) Your friends have recommended a good game.	3–18 1=Never 2=Once a year 3=Once or twice in 6 months 4=Once or twice in 3 months 5=Once or twice a month 6=More than once a week	11.49	4.49
Independent variables			
Parent-adolescent social activities (sum of 5 items) (a) Consultation (conversation) with your parents about the daily life (b) Outdoor activities with your parents (Eat out/movies/trips/exercises/plays etc.) (c) Chat (or mail exchange) on the internet with your parents (d) Internet search for information with your parents (e) Watching movies/ animations/cartoons on the internet with your parents	0–25 0=Never 1=Once a year 2=Once or twice in 6 months 3=Once or twice in 3 months 4=Once or twice a month 5=More than once a week	10.92	5.22
Parent-adolescent game activities (sum of 7 items, 1=Yes; 0=No) (a) Playing a game with your parents (b) Your parents have recommended (or purchased) a good game (title). (c) Your parents have purchased the game-related equipment. (Game machines such as PS2 and Gameboy, cartridge, etc.) (d) Your parents have purchased (or recommended) a game magazine or manual. (e) Purchasing a game (title) with your parents (including an online shopping) (f) Your parents have recommended (or participated in with you) a game camp/program/contest/exhibition. (g) Having a conversation with your parents about the contents of a game.	0–7	2.04	2.23

	Measure	Mean	S.D.
Adolescent's view on games	1–5 (1=Very negative…; 3=Neutral…; 5=Very positive)	3.45	.77
Parents' views on games	1–5 (1=Very negative…; 3=Neutral…; 5=Very positive)	2.49	.83
Parent-adolescent negative view alignment on games Both parents and a student have a negative view on games. (Very negative/Negative)	1=Having negative view on games; 0=No	.05	.21
Parent-adolescent non-negative view alignment on games Both parents and a student have a non-negative view on games (Neutral/Positive/Very positive)	1=Having non-negative view on games; 0=No	.55	.50

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