

Is Internet overuse associated with impaired empathic ability in Korean college students?

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Abstract

The purpose of the present study was to determine whether Internet overuse was associated with empathic ability in college students.

A total 261 participants (145 males and 116 females; mean age of 21.93 years) completed Empathy Quotient (EQ), Young's Internet Addiction Test (IAT), and questionnaires about demographic data and internet using patterns.

Of these 261 subjects, 85 (32.5%) were categorized as over-users. There was no significant difference in EQ total score between the over-user group and the average user group. The over-user group had lower scores of Social Skills than the average user group in subscale profiles. The over-user group stayed longer in cyberspace than the average user group. EQ score was found to have positive correlation with time spent in Internet use and the number of close friends.

Results of the present study suggest that conventional Internet use is positively associated with empathic ability in interpersonal relationships. Therefore, such positive association between Internet use and empathic ability should be considered when evaluating possible problematic internet use.

Abbreviations: ADHD = attention-deficit/hyperactive disorder, DSM-5 = Diagnostics and Statistical Manual of Mental Disorders, Fifth Edition, EQ = empathy quotient, IAT = Young Internet Addiction Test, PIU = problematic Internet use, SNS = social network services.

Keywords: empathy quotient, empathy, Internet addiction, Internet overuse, social networking

1. Introduction

The Internet has become highly accessible over the past 2 decades.^[1] It has extended our informational and interactive capacities. However, widespread use of Internet has emerged a new entity of mental disorder called problematic Internet use (PIU). PIU can be defined as the “use of the Internet that creates psychological, social, school, and/or work difficulties in a person’s life.”^[2] In line with this, Internet gaming disorder was newly included in Diagnostics and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) in Conditions for Further Study.^[3] PIU is highly prevalent in adolescents and young adults in eastern Asian population.^[4,5] Evidences suggest that PIU is associated with psychiatric disorders including depression,^[6] Attention-deficit/hyperactive disorder (ADHD),^[7] and substance use disorders.^[8] In addition, it has been reported that certain individual psychological characteristics such as high harm avoidance, novelty seeking, and reward dependence can predict excessive Internet use.^[9]

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Empathy is an ability to attribute mental state to another person. It entails an appropriate affective/cognitive response in the observer to other person’s mental state.^[10] It plays a key role in social understanding. Normally, developed empathic ability is crucial for sociality and interpersonal relationship. The lack of empathic ability is related to various psychopathologies and social maladjustment including Asperger disorder,^[10] depression,^[11] schizophrenia,^[12] and substance addiction.^[13]

Results from previous studies have suggested that empathic ability might be associated with Internet use. Cyber-bullies have demonstrated lower empathic responses compared with their controls.^[14] Time spent in computer/smartphone/video game has been found to be negatively associated with empathic ability.^[15] Besides, narcissism characterized by the lack of empathy has been shown to be a major cause of social network services (SNS) use.^[16] It is also well known that Internet addiction shares a substantial number of characteristics with substance addiction in which low empathy has been reported.^[17,18] However, few studies have evaluated the association between empathic ability and Internet use in general and their results are mixed. In addition, Internet use pattern has been rapidly changed in the way that the portion of mobile device in Internet usage is becoming bigger and time spent in using SNS is also increasing heavily.^[19] This implies that the purpose of Internet use might have been changed. Therefore, the purpose of this study was to determine Internet usage patterns of young adults in their early 20s and identify those engaging in Internet overuse. Their empathic abilities were also evaluated to determine the influence of Internet use on empathic abilities.

2. Materials and methods

2.1. Sample and procedure

This study was a cross-sectional study. Participants were enrolled via advertisements among university students who were taking

summer courses in a university located in Seoul. Participants were requested to complete questionnaires manually given to them. Drink coupon at value of around \$4 was provided to each participant as a reward. A total of 261 subjects participated in this study. Their basic demographic data are summarized in Table 1. Informed consent was obtained from each participant. This study was approved by the Institutional Review Board of Konkuk University Medical Center.

2.2. Measures

2.2.1. Socio-demographic data. Data on age, sex, major online activity, weekdays/weekend Internet usage time, experience of Internet addiction treatment, membership in online/offline communities, and the number of close friends were collected from participants.

2.2.2. Young Internet addiction test (IAT). IAT is a self-report questionnaire comprised of 20 questions. Each question was answered with a response (0–5 points) of Likert scale depending on the amount of Internet use. According to Young, total score of 40 points or higher signifies the assumption of problematic Internet use that could influence everyday life while total score of 70 points or higher signifies the assumption of severe Internet addiction.^[20] IAT is one of the most commonly used questionnaires for screening Internet addiction. Its reliability and validity have been evaluated in Koreans.^[21] Participants with IAT total score of less than 40 points were assigned into the average user

group and those with 40 points or higher were assigned into the over-user group.

2.2.3. Empathy quotient (EQ). EQ was developed as a survey with the goal to assess emotional empathic ability by Baron-Cohen and Wheelwright.^[10] It is composed of 60 questions, including 40 questions of empathy items to assess empathic ability and 20 questions of filler/control items. EQ can be divided into 3 specific categories: Cognitive Empathy, Emotional Reactivity, and Social Skills.^[22] We used the Korean version of EQ (translated into Korean) validated in Korean population.^[23]

2.3. Statistical analysis

Student *t* test and χ^2 test were conducted to examine differences in characteristics between Internet over-users and average users for continuous and categorical variables, respectively. Pearson correlation was used to determine the relationship between EQ score and measured variable. All statistical analyses were performed using SPSS version 22 (SPSS, Inc, Chicago, IL). Two-tailed *P* value of less than .05 was considered statistically significant.

3. Results

Demographic characteristics and Internet usage patterns of subjects enrolled in this study are shown in Table 1. The mean age of these participants was 21.9 ± 2.2 years (ranged from 15 to

Table 1
Comparison of characteristics of subjects between the 2 Internet use groups.

		Average user (N=176)	Internet over-user (N=85)	Overall	P value
Age		22.1 ± 2.3	21.6 ± 1.9	21.9 ± 2.2	.114
Gender	Male, %	101 (57.4)	44 (51.8)	145 (55.6)	.392
	Female, %	75 (42.6)	41 (48.2)	116 (44.4)	
Major online activity	Social network services	87 (49.4)	41 (48.2)	128 (49.0)	.355
	Random browsing	54 (30.7)	22 (25.9)	76 (29.1)	
	Games	15 (8.5)	14 (16.5)	29 (11.1)	
	Online contents (music, video, etc.)	17 (9.7)	5 (5.9)	22 (8.4)	
	Shopping	2 (1.1)	2 (2.4)	4 (1.5)	
	Work (email, etc.)	1 (0.6%)	1 (1.2%)	2 (0.8)	
Most commonly used device	Mobile phone	137 (77.8)	64 (75.3)	201 (76.7)	.873
	Personal computer	36 (20.5)	19 (22.4)	55 (21.0)	
	Tablet computer	3 (1.7)	2 (2.4)	5 (1.9)	
Time spent on Internet use	Weekday, h/d	2.1 ± 1.7	2.6 ± 1.8	2.3 ± 1.7	.056
	Weekend, h/d	3.5 ± 1.6	4.9 ± 3.0	4.00 ± 2.3	<.001
	Total, h/wk	17.7 ± 10.4	22.6 ± 13.1	19.3 ± 11.6	.003
Treatment experience due to Internet use	Psychiatry, %	2 (1.1)	0 (0.0)	2 (0.8)	.203
	Counselling center, %	1 (0.6)	0 (0.0)	1 (0.4)	
	None, %	173 (98.3)	84 (98.8)	257 (98.5)	
	No answer, %	0 (0.0)	1 (1.2)	1 (0.4)	
Number of close friends	9.1 ± 6.2	8.6 ± 7.4	8.9 ± 6.6	0.594	
Activity of online community	Yes, %	47 (26.7)	26 (30.6)	73 (28.0)	.252
	No, %	129 (73.3)	58 (68.2)	187 (71.6)	
	Not answer, %	0 (0.0)	1 (1.2)	1 (0.4)	
Activity of offline community	Yes, %	75 (42.6)	35 (41.2)	110 (42.1)	.321
	No, %	101 (57.4)	49 (57.6)	150 (57.5)	
	Not answered, %	0 (0.0)	1 (1.2)	1 (0.4)	
Internet addiction test score		30.0 ± 4.9	49.1 ± 8.6	36.2 ± 11.0	<.001
EQ	Cognitive empathy	4.8 ± 2.4	4.9 ± 2.4	4.8 ± 2.4	.941
	Emotional reactivity	5.4 ± 1.9	5.2 ± 2.1	5.3 ± 2.0	.544
	Social skills	5.1 ± 2.2	4.44 ± 2.0	4.9 ± 2.1	.013
	Total	40.2 ± 11.0	38.6 ± 10.8	39.7 ± 11.0	.272

EQ = empathy quotient.

Table 2
Correlation analysis among variables.

	1.	2.	3.	4.	5.	6.	7.	8.
Age	1							
Gender (Male: 0, female: 1)	-0.414**	1						
Internet use in weekdays, (h/d)	0.105	-0.025	1					
Internet use in weekends h/d	0.065	-0.085	0.572**	1				
Weekly Internet use, h/wk	0.092	-0.054	0.859**	0.791**	1			
No. of close friends	-0.005	-0.093	0.146*	0.096	0.165*	1		
IAT score	-0.068	-0.004	0.249**	0.318**	0.252**	-0.022	1	
EQ score	0.001	0.056	0.172*	0.073	0.154*	0.165**	-0.077	1

EQ = empathy quotient, IAT = internet addiction test.

* P value < .01.

** P value < .001.

28 years). Of these 261 subjects, 145 (55.6%) were males. Their mean time of Internet use was 2.3 ± 1.7 hours per weekday and 4.0 ± 2.3 hours per weekend (19.3 ± 11.6 hours per week). The most common major online activity was SNS (49.0%), followed by random browsing (29.1%), game (11.1%), watching/listening online contents (8.4%), shopping (1.5%), and work (0.8%). Mobile phone was the most commonly used device using Internet (76.7%), followed by personal computer (21.0%) and tablet computer (1.9%). Two participants experienced treatment for problems associated with Internet use. Their average number of close friends was 8.9 ± 6.6 . Of these participants, 28% and 42.1% of them answered that they belonged to online and off-line communities, respectively. Their mean IAT score was 36.2 ± 11.0 . A total of 85 (32.6%) subjects were classified into the over-user group.

There were significant differences in time spent on Internet use, IAT score, and scores of Social Skills (one EQ subscale) between the two groups. Mean IAT score of the average user group was 30.0 ± 4.9 , which was significantly ($P < .001$) lower than that of the over-user group (49.1 ± 8.6). There was no significant difference in age, gender, major online activity, primary device using Internet, engaging in on/off-line community, or the number of close friends between the 2 groups. The over-user group spent longer time on Internet than the average user group (22.6 ± 13.1 h/wk vs 17.7 ± 10.4 h/wk, $P < .001$). Overall EQ score in the average-user group was higher than that in the over-user group. However, the difference between the 2 was not statistically significant ($P = .272$). In terms of subscales, there was no difference in Cognitive Empathy or Emotional Reactivity between the 2 groups. However, the average user group had significantly higher Social Skills score than the over-user group (5.1 ± 2.2 vs 4.4 ± 2.0 , $P = .013$).

Results of correlation analysis for variables related to empathic ability are shown in Table 2. EQ score was significantly associated with daily Internet usage time during weekdays ($r = 0.172$, $P = .005$). It was also significantly associated with weekly Internet usage time ($r = 0.154$, $P = .013$) and the number of close friends ($r = 0.165$, $P = .008$).

4. Discussion

Results of this study revealed that there was no difference in empathic ability measured by EQ total score between the 2 Internet use groups. There was no significant correlation between excessive immersion in Internet and empathy either. However, Internet usage time in quantitative terms was associated with the number of close friends and empathic ability.

Lack of empathic impairment in Internet overuse in the present study was inconsistent with results of a previous study by Melcher et al^[24] reporting an association between low empathic ability and PIU in Chinese and German sample. A number of previous studies on the relationship between psychological trait and PIU have viewed excessive Internet use as a maladaptive and self-regulatory strategy.^[25] Our results can be reconciled with previous ones by taking what people do with Internet into account. SNS was the most common purpose of using Internet in our sample. Only 11% of participants answered that gaming was their major purpose of using Internet. In fact, psychological traits that could severely hinder social interactions have been mostly reported in Internet users for online gaming.^[26,27] However, most previous studies on generalized PIU did not report Internet usage pattern, including the study of Melcher et al.^[22] Online game addictions are related to dysfunctional impulsivity,^[28] higher level of aggression,^[29] poor off-line relationship,^[30] and lack of empathy.^[15] On the other hand, excessive SNS engagement has been linked to relatively less interfering correlates such as sensation seeking and neuroticism.^[31,32] After a thorough review on SNS addiction, Kuss and Griffiths^[33] have argued that most SNS users predominantly use them for social purposes to maintain networks established off-line. Alloway et al^[34] have also suggested that Facebook activities encourage empathic ability by facilitating social connections. A study by Wang et al^[31] supports the idea that online gaming addicts are less prosocial than subjects with SNS addiction. They investigated differences in personality traits according to different online activity and found that less conscientiousness and low openness were associated with gaming addiction while SNS addiction was associated with neuroticism and extraversion.^[29] In line with this, the DSM-5 has specified Internet addiction by suggesting Internet “gaming” disorder,^[3] implying that people who are excessively immersed in games may show different psychological characteristics from those who are addicted to other areas of Internet. Besides, weekly Internet usage time was positively correlated with EQ scores and the number of close friends in the present study, consistent with results of Wright and Li^[35] showing that time spent on Internet was related to online prosocial behaviors. These results suggest that excessive Internet use is not necessarily associated with impaired empathic ability as long as its main purpose is social networking. It might support off-line social relations.

In addition to Internet usage pattern, the degree of Internet overuse should be considered when interpreting results of the present study. Previous studies on PIU have tended to investigate subjects who had lost control in using Internet. However, in the present study, very few subjects had IAT score of more than 70 or

experience of being treated for Internet overuse. Therefore, those who were classified as Internet over-user in this study might have a low level of addiction that does not impact daily lives even though they found themselves problematic users. Although many previous studies have regarded individuals with IAT score of more than 40 points as Internet addicts as in this study, there are clear limitations in applying IAT scores in decisions to label the presence of clinical problem according to our previous research study.^[36] However, it is possible to define this as a state where individuals experience subjective difficulties in controlling Internet usage without impairment in daily life functions. Combined with results of the present study, it can be concluded that excessive Internet use is not related to impaired empathic ability unless it causes functional impairments.

Regarding subscales of EQ, the Internet over-user group showed significantly lower performance in Social Skills compared to the average-user group. Social Skill aspect is determined by responses to five questions in EQ, including questions such as “I find it hard to know what to do in a social situation.” and “I do tend to find social situations confusing.” Considering implied meaning of these questions, a decrease in this subscale is better understood as a lack of confidence in social skill rather than a lack of emphatic abilities per se. Consistent with this, a psychometric analysis of EQ subscale has suggested that Social Skills are poorly associated with “brain maleness” which EQ is supposed to evaluate.^[37] Therefore, it is plausible that excessive Internet use by people who have minimal functional problems is associated with the lack of confidence in social situations. It has been suggested that lower confidence in social relationships would lead to a higher desire of using SNS to maintain social relationships rather than to strive for advancing real world relationships.^[38] Existing researches have also shown that SNS use is associated with shyness and social anxiety.^[39,40]

Limitations of this study should be noted when interpreting results of this study. First, this was a cross-sectional study. Therefore, no cause-effect direction between measured variables could be drawn based on results of this study. Longitudinal studies are needed to confirm the results of the present study. Second, we did not measure psychological symptoms of subjects. Information on symptoms such as depression and anxiety would make enable us to explain differences between the 2 groups more thoroughly. Besides, since psychological symptoms are known to be associated with excessive Internet use, controlling for these symptoms might have yield different results. Lastly, the studied population in the present study consisted of young college students. Therefore, the conclusion drawn in this study should be examined in populations that come from different backgrounds before being generalized.

Despite these limitations, this study carries significant implications. To the best of our knowledge, this is the first study that reports the association between Internet overuse and empathic ability. We found that Internet overuse in general was not related to impaired empathy ability in college students. We measured Internet use both qualitatively and quantitatively and showed that higher level of empathic ability was associated with quantitative measure of Internet use, suggesting that Internet use might actually act as functional aid to help interpersonal relationships. Internet usage might increase sociality by giving rewards and balance in terms of psychological stability to those who have low social skills and high social anxiety. Therefore, substantial influence of Internet usage on social interactions should be considered when evaluating possible PIU or subjective control difficulties in Internet usage in this population.

Author contributions

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