

The relationship between parental mediation and Internet addiction among adolescents, and the association with cyberbullying and depression

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Abstract

Objective: This study examined the relationships between parental mediation and Internet addiction, and the connections to cyberbullying, substance use, and depression among adolescents.

Method: The study involved 1808 junior high school students who completed a questionnaire in Taiwan in 2013.

Results: Multiple logistic regression analysis results showed that adolescents who perceived lower levels of parental attachment were more likely to experience Internet addiction, cyberbullying, smoking, and depression, while adolescents who reported higher levels of parental restrictive mediation were less likely to experience Internet addiction or to engage in cyberbullying. Adolescent Internet addiction was associated with cyberbullying victimization/perpetration, smoking, consumption of alcohol, and depression.

Conclusion: Internet addiction by adolescents was associated with cyberbullying, substance use and depression, while parental restrictive mediation was associated with reductions in adolescent Internet addiction and cyberbullying.

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1. Introduction

Internet addiction is an emerging public health issue. The rise of new technologies, such as the Internet and associated social media sites, has exposed adolescents to online risks (pornography exposure, cyberbullying and Internet addiction) and health risks (depression and suicide), which have increased the rates of youth morbidity and mortality [1,2]. Studies have associated Internet addiction with increases in youth cyberbullying problems [3,4] that can cause mental, physical and social harm [5].

Despite wide variations in the instruments that have been used for the diagnosis of Internet addiction, it is characterized by preoccupation, uncontrolled impulses, use that is more than intended, tolerance, withdrawal, impairment of control, devotion of excessive time and effort despite

negative consequences, and impaired decision-making [6,7]. Studies have associated Internet addiction with online activities such as watching online pornography, online gambling [8], using social networking sites and online gaming [9], and online chatting [10]. Internet addiction is currently not included in the Diagnostic and Statistical Manual of Mental Disorders (DSM) V, but Internet gaming disorder is listed in Section 3 as requiring further research.

In addition, studies have associated Internet addiction with psychiatric forms of co-morbidity such as consumption of alcohol [11,12], smoking [13,14], attention deficit and hyperactivity, hostility [15], loneliness [16], low self-esteem [17,18], and depression [14,19]. Moreover, studies have associated factors such as low family functioning [17,20], family dissatisfaction [11], poor parent–adolescent relationships [21,22], and low parental monitoring [23,24] with Internet addiction among adolescents. In contrast, forms of parental restrictive mediation such as rules regarding the time spent online have been negatively associated with Internet addiction [25] and cyberbullying [26–28].

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The prevalence of Internet addiction among adolescents is known to be higher in Asian societies than in Western countries [29]. Despite studies that have documented the psychosocial factors associated with Internet addiction, there has been little research examining parental mediation of youth Internet addiction and cyberbullying in Asian societies. Few studies have examined the relationships between Internet addiction, online risks, and health risks. The present study canvassed junior high school students in Taiwan to compare parental attachment, parental mediation, online risks (cyberbullying and online sexual solicitation), and health risks (dietary behavior, substance use, low self-esteem, and depression) between a group that was addicted to the Internet and one that was not. The relationships between parental mediation, Internet addiction, cyberbullying, substance use, and depression were also examined.

2. Methods

2.1. Participants and procedures

In 2013, a total of 86,887 students attended 62 junior high schools in Taipei City, while 18,353 students attended 25 junior high schools in Yilan county, Taiwan. Based on the sampling frame, which was a list of schools and their student enrollments, a probability-proportionate-to-size sampling method was used to systematically draw a random sample of schools. Eighteen schools in Taipei city and 11 schools in Yilan county agreed to participate in this survey. Three to four classes were randomly selected from each sample school. Approval from the Institutional Review Board at National Taiwan University was obtained.

Following class selection, teachers helped give students consent forms to take home to parents requesting consent to have their child participate in the survey. Students also filled out a consent form to indicate their willingness to participate in this study. After the consent forms were collected, researchers visited the schools to conduct the self-administered survey and address students' questions. Students were assured the information would remain confidential and anonymous. A total of 1079 and 838 students in Taipei city and Yilan county, respectively, completed the questionnaire. About one-fifth of students declined to participate in this study. The response rate was 82%.

2.2. Instrument

The self-administered questionnaire was developed based on previous studies such as the EU Kids online survey [30] and the U.S. Youth Internet Safety Survey [31,32]. A group of 8 experts was invited to assess the content validity of the questionnaire. Experts reviewed the draft questionnaire and provided comments and suggestions for improvements. In addition, a pilot survey was conducted at two schools that were not included as sample schools in order to examine the

students' responses to the survey and to evaluate the reliability of the data that the questionnaire would yield.

2.2.1. Online activities

Adolescent Internet use and online gaming weekly use hours were calculated from two questions. a) During the past week, how much time did you spend on the Internet/playing online games per weekday (Monday to Friday)? The response options included the following: "0 min," "1–29 min," "30–59 min," "1 hour–less than 2 hours," "2 hours–less than 3 hours," or "3 hours and more—please fill in the number of hours." b) During the past week, how much time did you spend on the Internet, and playing online games per weekend day (Saturday and Sunday)? The response options included the following: "0 hour," "1 hour," "2 hours," "3 hours," "4 hours," or "5 hours and more—please fill in the number of hours." In addition, participants were asked how many days during the past week they used social network websites/chat rooms.

2.2.2. Internet addiction

Internet addiction was assessed using the Chen Internet Addiction Scale [33]. The Chen Internet addiction scale contains 26 items to assess the core symptoms of Internet addiction and the related problems connected to Internet addiction. For example, participants were asked whether they agreed or disagreed with a statement such as the following: "I find that I stay online longer than I intended," "I neglect family interaction to spend more time online," and, "I feel that life would be boring without the Internet." Each item was evaluated on a 4-point Likert-type scale that ranged from "strongly agree" (scoring 4) to "strongly disagree" (scoring 1). The total score of the scale ranged from 26 to 104. The Cronbach's α of the Chen Internet addiction for the sample was 0.94. A threshold score of 63/64 was suggested to provide good diagnostic accuracy with respect to Internet addiction among adolescents [34]. Students with a score of 64 or higher were classified as having an Internet addiction.

2.2.3. Parental mediation

Parental mediation measures were adapted from the study of 2010 EU Kids Online survey parental mediation scale [30]. Adolescents provided reports of parental mediation including 5 types of rules and practices: active use mediation (4 items), active safety mediation (4 items), monitoring mediation (4 items), technical mediation (4 items), and restrictive mediation (5 items). A sample question of active use mediation was "Do your parents talk to you about what you do on the Internet?" A sample question about active safety mediation was "Do your parents suggest to you ways to use the Internet safely?" A sample question concerning monitoring mediation for adolescents was "Do your parents watch which websites you visit?" A sample question about technical mediation was "Do your parents use filter programs or other means of blocking some types of websites?" The response options for active use, active safety, monitoring, and technical mediation were "no" (scoring 0) and "yes"

(scoring 1). A sample question about restrictive mediation was “Do your parents allow you to use forms of instant messaging such as Skype?” The responses included “can do this” (scoring 0), “can only do this with permission or supervision” (scoring 1), and “can never do this” (scoring 2). A higher score indicated higher parental mediation. The Cronbach’s α of active use, active safety, monitoring, technical, and restrictive mediation subscales were 0.51, 0.76, 0.73, 0.65, and 0.77, respectively.

2.2.4. Parental attachment

Parental attachment was measured using 2 items. Participants were asked the following: “Do you get along with your mother,” and, “Do you get along with your father?” Response options used a four-point Likert-type scale that ranged from “not very good” (scoring 1) to “very good” (scoring 4). Higher scores were equated with a higher level of parental attachment.

2.2.5. Online violence and pornography exposure

Online violence and pornography content exposure was measured based on the respondent’s answer to the following: During the past year, how often did you 1) see messages containing violence on the Internet or online games; and, 2) see messages containing pornography on the Internet or in online games. Response options for each item included the following: “never” (scoring 1), “a few times yearly” (scoring 2), “a few times monthly” (scoring 3), “a few times weekly” (scoring 4), and “almost daily” (scoring 5). A higher score indicated higher online violence/pornography content exposure.

2.2.6. Cyberbullying victimization/perpetration

Cyberbullying victimization was measured using 4 items. Participants were asked the following questions. 1) How often has someone made or posted rude comments to, or about, you online? 2) How often has someone posted embarrassing or nude photos of you online? 3) How often has someone spread rumors about you online? 4) How often has someone bullied or hurt you online? Cyberbullying perpetration was measured using 4 items. Participants were asked the following questions: How often have you ever done the following: 1) made rude comments to anyone online; 2) sent or posted others’ embarrassing photos online; 3) spread rumors about someone online; or, 4) made threatening comments to hurt someone online? Response options for each item included the following: “never,” “happened a year ago,” “a few times within a year,” “a few times a month,” and, “a few times a week.” If participants answered “a few times within a year,” or more frequently, for any of the cyberbullying victimization/perpetration items, they were coded as having engaged in cyberbullying victimization/perpetration.

2.2.7. Online sexual solicitation victimization/perpetration

Online sexual solicitation victimization was measured using 2 items. Participants were asked the following questions: 1) How often has someone asked you to talk

about sex online when you did not want to; and, 2) How often has someone asked you to do something sexual online that you did not want to? Online sexual solicitation perpetration was measured using 2 items. Participants were asked the following questions: 1) How often have you asked someone to talk about sex online when they did not want to; 2) How often have you asked someone to do something sexual online when they did not want to? Response options for each item included the following: “never,” “happened a year ago,” “a few times within a year,” “a few times a month,” and, “a few times a week.” If participants answered “a few times within a year,” or more frequently, for any of the online sexual solicitation victimization/perpetration items, they were coded as having engaged in online sexual solicitation victimization/perpetration.

2.2.8. Internet literacy

Internet literacy was measured using 6 items. Sample questions included the following. “When I receive uncomfortable messages (i.e., pornography, violence) online, I will leave the webpage.” “When someone holds a different opinion online, I will express my thoughts clearly and won’t scold them back.” “When someone asks me to talk about sex online or to do something sexual that I do not want to do, I will leave the webpage.” And “It is illegal to steal treasures from other people in online games.” Each item was evaluated using a 4-point Likert-type scale that ranged from “strongly agree” (scoring 4) to “strongly disagree” (scoring 1). A higher score indicated a higher degree of an adolescent’s Internet literacy. The Cronbach’s α of the adolescents’ Internet literacy was 0.83.

2.2.9. Tobacco and alcohol use

Tobacco use was measured based on the respondent’s answer to how often they had ever smoked. Alcohol use was measured based on the respondent’s answer to how often they had ever consumed alcohol. Response options for each item included the following: “never,” “ever before a year,” “a few times within a year,” “a few times a month,” and “a few times a week.” If participants answered “a few times within a year,” or more frequently, they were coded as smokers/alcohol drinkers.

2.2.10. Self-esteem

Self-esteem was assessed using the Rosenberg self-esteem scale [35]. The Rosenberg self-esteem scale contains 10 items that provide a general measure of global self-esteem. For example, participants were asked whether they agreed or disagreed with a statement such as the following: “On the whole, I am satisfied with myself,” “I am able to do things as well as others,” and, “I take a positive attitude toward myself.” Each item was evaluated on a 4-point Likert-type scale that ranged from “strongly agree” to “strongly disagree.” The total score of the scale ranged from 0 to 30. Students with a score of 14 or less were classified as having low self-esteem. The Cronbach’s α for self-esteem scale in the present sample was 0.85.

2.2.11. Depression.

Depression was measured using the Center for Epidemiologic Studies Depression Scale (CES-D) [36]. The CES-D is a 20-item scale that evaluates the presence of depressive symptoms. Participants were asked during the past week how often they experienced feelings such as the following: “I was bothered by things that don’t usually bother me,” and “I did not feel like eating; my appetite was poor.” Response options for each item included the following: “rarely or none of the time (<1 day),” “some or a little of the time (1–2 days),” “occasionally or a moderate amount of the time (3 days),” or “most or all of the time (5–7 days).” The total score of the scale ranged from 0 to 60. Students with 29 or higher were classified as having depression [37]. The Cronbach’s α of the CES-D scale for the present sample was 0.90.

2.2.12. Adolescent characteristics

Adolescent characteristics obtained in the present study included gender (male vs. female), school grade (7th, 8th or 9th grade), area (urban vs. rural), household poverty (yes vs. no), and academic performance (average or above vs. below average).

2.3. Statistical analysis

SAS software was used to perform the statistical analysis. Percentages and means were calculated for all variables. Chi-square and t tests were conducted to compare the Internet-addicted group with the non-addicted group with respect to adolescents’ characteristics, online activities, online risks, and health risks. Multiple logistic regression analyses also were performed to identify factors related to Internet addiction, cyberbullying victimization/perpetration, smoking, alcohol use, and depression.

3. Results

3.1. Adolescent characteristics by Internet addiction status

Adolescent demographic characteristics by Internet addiction status are shown in Table 1. Of the 1867 students, 294 (15.8%) were classified as having an Internet addiction. The percentage of males was significantly higher (61.4%) in the Internet-addicted group than in the non-addicted group (45.9%). In addition, the percentage recording poor academic performance was significantly higher (38.8%) in the Internet-addicted group compared with the non-Internet addicted group (20.7%). The percentages for grade level in school, region of residency (rural vs. urban), and incidence of household poverty were not significantly different between the Internet-addicted group and the non-addicted group.

Table 1

Demographic characteristics by Internet addiction status.

	Non-Internet addiction		Internet addiction		Chi-square test p-value
	n	%	n	%	
Gender					<0.0001
Female	851	54.1	113	38.6	
Male	721	45.9	180	61.4	
School grade					0.0995
7th grade	640	40.7	100	34.0	
8th grade	560	35.6	117	39.8	
9th grade	373	23.7	77	26.2	
Area					0.2853
Urban	878	55.8	174	59.2	
Rural	695	44.2	120	40.8	
Household poverty					0.5556
No	1176	74.8	215	73.1	
Yes	397	25.2	79	26.9	
Academic performance					<0.0001
Average or above	1274	79.3	180	61.2	
Below average	326	20.7	114	38.8	

3.2. Adolescent online risks and parental mediation by Internet addiction status

Adolescent online activities, risks, and parental mediation by Internet addiction status are shown in Table 2. The Internet-addicted group spent more time online (14.3 h/week) and online gaming (9.9 h/week) than the non-addicted group (online: 8.5 h/week, online gaming: 4.5 h/week). In addition, the Internet-addicted group spent more days per week on social network websites (5.1 days/week) and chat rooms (2.8 days/week) than the non-addicted group (social network websites: 3.7 days/week, chat room: 1.7 days/week). Moreover, the Internet-addicted group reported greater levels of online pornography and violence content exposure than the non-addicted group.

In addition, the Internet-addicted group reported lower levels of parental restrictive mediation and active safety parental mediation of child’s Internet use than the non-addicted group. The Internet-addicted group also reported lower levels of parental attachment than the non-addicted group. Moreover, the Internet-addicted group reported fewer days per week eating vegetables and fruit and more days per week consuming sugary drinks compared with the non-addicted group (Table 2).

3.3. Cyberbullying, substance use and mental health by Internet addiction status

Occurrences of adolescent cyberbullying, substance use, and mental health issues by Internet addiction status are shown in Table 3. The Internet-addicted group had significantly higher rates of cyberbullying victimization (30.0%), cyberbullying perpetration (24.2%), online sexual solicitation victimization (18.8%), and online sexual solicitation perpetration (5.5%) than the non-addicted group (cyberbullying victimization: 12.9%, cyberbullying perpetration: 7.8%,

Table 2

Online activities, risks, and parental mediation by Internet addiction status.

	Non-Internet addiction		Internet addiction		<i>t</i> test
	Mean	SD	Mean	SD	p-value
Online activities					
Internet use (h/wk)	8.5	8.9	14.3	12.7	<0.0001
Online gaming (h/wk)	4.5	7.0	9.9	10.4	<0.0001
Social network website (day/wk)	3.7	2.7	5.1	2.5	<0.0001
Chat room (day/wk)	1.7	2.5	2.8	3.0	<0.0001
Online content risks					
Pornography content exposure	1.9	1.1	2.6	1.3	<0.0001
Violence content exposure	2.3	1.3	2.8	1.3	<0.0001
Parental mediation					
Active use	2.0	1.2	2.2	1.3	0.1267
Active safety	2.1	1.5	1.9	1.6	0.0155
Monitoring	1.5	1.4	1.6	1.5	0.0927
Technical	1.1	1.2	1.2	1.3	0.3527
Restrictive	1.9	2.3	1.3	1.8	<0.0001
Parental attachment	4.2	0.8	3.8	0.8	<0.0001
Dietary behavior					
Vegetable/fruit intake (day/wk)	4.5	2.2	3.9	2.4	0.0008
Sugary drink intake (day/wk)	2.9	2.8	3.9	3.6	<0.0001

Non-Internet addiction n=1571; Internet addiction n= 293.

online sexual solicitation victimization: 8.7%, and online sexual solicitation perpetration: 1.2%). In addition, the Internet-addicted group reported significantly higher rates of smoking (12.0%) and consumption of alcohol (36.0%) than the non-addicted group (smoking: 4.7%, consumption of alcohol: 19.5%). Moreover, the Internet-addicted group also had higher rates of low self-esteem (25.9%) and depression (22.4%) than the non-addicted group (low self-esteem: 15.5%, depression: 9.1%).

3.4. Factors related to Internet addiction and cyberbullying

Multiple logistic regression analysis results showed that factors associated with Internet addiction included the following: male gender, poor academic performance, lower Internet literacy, lower parental attachment, higher active use

parental mediation, lower active safety parental mediation, and lower restrictive parental mediation. In addition, factors associated with cyberbullying victimization/perpetration included male gender, higher school grade, lower Internet literacy, lower parental attachment, lower parental restrictive mediation, and Internet addiction (Table 4).

3.5. Relationships between Internet addiction, substance use, and depression

Multiple logistic regression analysis results showed that after controlling for other factors, Internet addiction, cyberbullying perpetration and depression were associated with smoking and consumption of alcohol. In addition, after controlling for other factors, Internet addiction, cyberbullying victimization, and poor academic performance was associated with depression (Table 5).

4. Discussion

One-seventh of the junior high school students canvassed in this study could be characterized as having an Internet addiction. Consistent with prior studies [9,10,38], our results showed that male students were more likely to be addicted to the Internet. This may have been due to the time spent by males playing online games, while females spent more time on social network sites [38,39]. In addition, this and other studies [20,40] found that students who had poor academic performance were more likely to develop an Internet addiction. The development and implementation of Internet addiction prevention programs should include gender-specific components and vulnerable group considerations.

Our results were similar to prior studies [21,25,41,42] that found lower parental attachment was related to Internet

Table 3

Online risks and health risks by Internet addiction status.

	Non-Internet addiction		Internet addiction		Chi-square test
	n	%	n	%	p-value
Online contact risks					
Cyberbullying victimization	203	12.9	88	30.0	<0.0001
Cyberbullying perpetration	123	7.8	71	24.2	<0.0001
Online sexual solicitation victimization	136	8.7	55	18.8	<0.0001
Online sexual solicitation perpetration	19	1.2	16	5.5	<0.0001
Substance use					
Smoking	74	4.7	35	12.0	<0.0001
Alcohol consumption	305	19.5	105	36.0	<0.0001
Mental health					
Low self-esteem	242	15.5	75	25.9	<0.0001
Depression	139	9.1	64	22.4	<0.0001

Non-Internet addiction n=1571; Internet addiction n= 293.

Table 4
Factors of Internet addiction and cyberbullying victimization/perpetration.

	Internet addiction		Cyberbullying victimization		Cyberbullying perpetration	
	O.R.	95%CI	O.R.	95%CI	O.R.	95%CI
Gender (male=1, female=0)	1.66	1.26–2.19	1.62	1.23–2.13	1.59	1.14–2.22
School grade	1.08	0.91–1.29	1.20	1.01–1.43	1.35	1.09–1.67
Area (rural=1, urban=0)	0.83	0.63–1.10	0.69	0.53–0.92	0.85	0.61–1.18
Poor academic performance (yes=1, no=0)	2.37	1.77–3.16	1.05	0.77–1.44	1.09	0.75–1.58
Internet literacy	0.45	0.35–0.58	0.53	0.41–0.68	0.40	0.30–0.54
Parental attachment	0.74	0.63–0.86	0.79	0.68–0.93	0.78	0.65–0.95
Parental mediation						
Active use	1.24	1.08–1.42	1.07	0.93–1.22	1.02	0.87–1.20
Active safety	0.84	0.74–0.94	0.96	0.85–1.08	0.92	0.79–1.06
Monitoring	1.09	0.98–1.22	1.03	0.92–1.15	1.07	0.93–1.23
Technical	1.06	0.93–1.21	1.14	1.00–1.29	1.05	0.90–1.23
Restrictive	0.87	0.81–0.94	0.89	0.82–0.95	0.83	0.75–0.91
Internet addiction (yes=1, no=0)			1.82	1.32–2.52	2.13	1.47–3.07

Multiple logistic regression was conducted.

Internet addiction model N=1790 (yes n=284, no n=1506).

Cyberbullying victimization model N=1787 (yes n=278, no n=1509).

Cyberbullying perpetration model N=1787 (yes n=182, no n=1605).

addiction and cyberbullying, while parental restrictive mediation was negatively associated with adolescent Internet addiction and cyberbullying. Other studies [43,44] also found that parenting style was associated with adolescent Internet addiction and cyberbullying. Studies suggested that measures such as promoting family functions and parental mediation of Internet use by children were needed to prevent Internet addiction and online risks [45,46].

This study was consistent with prior studies [13,14,47,48] that found that Internet addiction was associated with youth tobacco and alcohol use. In addition, this study and prior studies [3,4] found that adolescent Internet addiction was associated with cyberbullying perpetration and cyberbullying victimization. A study [49] found that Internet addiction and alcohol dependence share common characteristics that may lead to aggression. Future research should examine possible neurobiological similarities between substance use disorders and behavioral addictions [50]. Moreover, this study found that adolescents' Internet literacy was associated with reductions in Internet addiction and cyberbullying. The strengthening of youth digital literacy is suggested for schools and families in order to prevent youth online risks.

Moreover, this study found that Internet addiction and cyberbullying victimization were associated with depression. Adolescents with an Internet addiction may have more chances to engage in cyberbullying perpetration and/or victimization, while cyberbullying experiences may exacerbate depression. Other studies have also indicated that Internet addiction is comorbid with depression and hostility [19]. Due to high comorbidity, studies have suggested that

Table 5
Factors of smoking, alcohol consumption, and depression.

	Smoking		Alcohol drinking		Depression	
	O.R.	95%CI	O.R.	95%CI	O.R.	95%CI
Gender (male=1, female=0)	1.49	0.97–2.28	0.85	0.67–1.08	0.59	0.43–0.81
School grade	1.29	0.99–1.67	1.44	1.25–1.67	1.00	0.82–1.22
Area (rural=1, urban=0)	2.80	1.82–4.33	0.98	0.77–1.24	0.80	0.58–1.10
Poor academic performance (yes=1, no=0)	2.47	1.61–3.70	1.27	0.97–1.66	1.59	1.13–2.22
Parental attachment	0.73	0.58–0.92	0.91	0.80–1.05	0.65	0.55–0.77
Internet addiction (yes=1, no=0)	1.59	0.99–2.55	1.73	1.28–2.33	1.92	1.33–2.76
Cyberbullying victimization (yes=1, no=0)	1.44	0.85–2.45	1.22	0.88–1.69	2.54	1.73–3.72
Cyberbullying perpetration (yes=1, no=0)	2.27	1.27–3.87	2.07	1.44–2.99	1.23	0.78–1.94
Depression (yes=1, no=0)	1.76	1.04–2.97	1.47	1.04–2.07		
Smoking (yes=1, no=0)					1.43	0.81–2.52
Alcohol consumption (yes=1, no=0)					1.37	0.95–1.98

Multiple logistic regression was conducted.

Smoking model N=1792 (yes n=106, no n=1686).

Alcohol consumption model N=1792 (yes n=398, no n=1394).

Depression model N=1791 (yes n=202, no n=1589).

Internet addiction screening should include other psychiatric disorders in order to improve the management and prognosis of Internet addiction [51–53].

This study found that adolescents with an Internet addiction had greater levels of online content risks (online pornography/violence exposure), online contact risks (cyberbullying victimization/perpetration and online sexual solicitation victimization/perpetration), and health risks (more sugary drinks, less vegetable/fruit intake, smoking, alcohol use, low self-esteem, and depression) compared with adolescents who were not addicted to the Internet. Other studies [54,55] have also found that adolescents with an Internet addiction were more likely to have inappropriate dietary behaviors, poor diet quality [54], a negative lifestyle [55], a habit of watching online pornography, and a habit of online gaming [8]. These results confirm the importance of implementing Internet addiction prevention programs in order to prevent mental and physical harm to youth.

4.1. Limitations

This research had some limitations. First, social desirability bias may have influenced the truthfulness of reports of online risks by adolescents. However, confidentiality was emphasized, and trained investigators immediately collected

the questionnaires. Second, about one-fifth of students declined to participate in this study. Potential biases from selection and refusal to participate must be considered. Finally, this study was cross-sectional. The study precluded causal inferences. Future research is needed to examine the longitudinal influences of parental mediation on adolescents' Internet risks and longitudinal relationships between Internet addiction, online risks, and health risks.

4.2. Conclusion

One-seventh of the junior high school students canvassed in this study were addicted to the Internet. Adolescents with an Internet addiction had greater levels of online risks (pornography/violence exposure, cyberbullying, and online sexual solicitation) and health risks (less vegetable/fruit intake, more consumption of sugary drinks, smoking, consumption of alcohol, low self-esteem, and depression). Multiple logistic regression analysis results indicated that adolescents with an Internet addiction were more likely to engage in cyberbullying victimization/perpetration, smoking, consumption of alcohol, and depression. In addition, adolescents who perceived lower parental attachment were more likely to have an Internet addiction, engage in cyberbullying, be a smoker, and experience depression, while adolescents who perceived parental restrictive mediation were less likely to have an Internet addiction and to engage in cyberbullying victimization/perpetration.

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