Screening of Problematic Internet Use among Spanish adolescents: Prevalence and related variables

Problematic Internet Use among Spanish adolescents

Abstract

The opportunities and challenges related to Internet use continue to grow, as well as the social concern around problematic Internet use (PIU), online risky behaviors and the intensive use of Internet, mainly among adolescents. The aim of this study was to conduct a general screening of PIU in a large sample of school-based adolescents in Spain (n = 40,955), providing updated prevalence data of PIU and different online risky practices, as well as rates of Internet and social network use. Differences between problematic and non-problematic users were explored in terms of demographics, parental control and motivations for using. The association between PIU and the involvement in other online risky behaviors was also analyzed, as well as the role of intensive use. The findings show that the global prevalence of PIU among Spanish adolescents is 16.3% although this is higher among females, those in their late teens, intensive users and those without parental control. Logistic regression confirmed that both PIU and intensive use are risk factors for being involved in any online risky behavior. A tentative explanation could be that there is a common deficit of personal and social skills underlying PIU, intensive use and most online risky practices. From our perspective, values-based education and life skills training are the best way to reach responsible and sensible use of Internet among adolescents. Parents, schools, institutions and adolescents themselves are called upon to actively engage in facing this problem.

Introduction

Beyond the benefits of the Internet, the challenges arisen from its availability to be used wherever and whenever have been considered, specifically among adolescents.[1,2] In order to understand Internet use among this age-group, it should not be demonized or dismissed as temporary; Internet use is continually increasing and we should keep in mind that this is not a fad, but that it is here to stay. Studying the use of Internet among adolescents is relevant precisely because they are the ones who use Internet the most. According to the most recent data from countries in the European Union, 79% of the population aged 16 to 74 used the Internet in the last three months.[3] This percentage reaches 97% whether considering only adolescents aged between 16 and 19.[3]

Internet plays a crucial role in the education and socialization of adolescents,[4] it is the new meeting place where they can build their identity and acquire or express their values. The habits established at this stage are likely to persist into adulthood and could promote or jeopardize their later health and wellbeing. Moreover, adolescence has traditionally been represented as a critical point for the onset and experimentation of risky behaviors.[5] Therefore, it constitutes a time of high risk for practicing sexting,[6] being involved in online grooming,[7] participating in cyberbullying[8] or developing Problematic Internet Use (PIU).[4]

Prevalence rates for PIU among adolescents vary considerably across studies, partly because of the continuous evolution of the phenomenon itself, and because of the lack of agreement on the defining criteria, the terminology used, the scales developed to measure it and the reference population selected.[9,10] Following previous researches,[11] in this paper the concept of PIU is understood as a clinically significant distress or impairment in social, occupational, or other important areas of functioning associated with Internet use. Therefore, the criteria to distinguish problematic from non-

problematic Internet use can be grouped into four categories: imbalances in life spheres, associated problems, loss of control, and impairment or significant distress.[11] Imbalances in life spheres refer to a significant abandonment of social, professional (including school), or leisure activities in favor of time spent on the Internet. Associated problems include all negative consequences associated with PIU, whether personal, interpersonal, or social. Loss of control includes all aspects related to the inability to stop and to constant preoccupation with Internet-related activities. And significant clinical suffering refers to subjective distress expressed by the person.[11]

A systematic review of studies with adolescents and university students in the USA found a range of PIU prevalence from 0% to 26.3%.[12] Durkee et al. observed a prevalence of pathological Internet use of 4.4%, and 13.5% of adolescents were identified as maladaptive users in a European representative sample (n = 11,956) aged 14–16.[13] Prevalence studies assessing PIU at a Spanish level using large samples are limited. López-Fernández, Freixa-Blanxart and Honrubia-Serrano found 15.5% at-risk users, and 5% problematic users among a sample of 1,131 high school students from the city of Barcelona,[14] while Gómez, Rial, Braña, Varela and Barreiro observed a PIU prevalence of 19.9% among a representative sample of 2,339 compulsory secondary-school students from the North-West region of Spain (Galicia).[15]

PIU is worrying not only because of the high degree of interference in daily life that might cause, but also because it is usually related to other problems. Research on PIU has mostly assessed predictors for PIU such as ADHD,[16,17] depression,[18] tobacco or alcohol use.[19] Less is known about the PIU itself being able to predict other online risky behaviors such as sexting, online grooming or cyberbullying,[20] particularly in a Spanish context.

Furthermore, the influence of the time spent online is still subject to debate. Although it seems that simple frequency of use may not be a good indicator of Internet addiction or risk of addiction,[21]some authors have proposed that intense daily use could be a "time at-risk" for some online risky behaviors.[22] Recently Durkee et al. suggest that being online for excessive hours could be a moderating factor in the relationship between PIU and risky behaviors,[19] but the online risky behaviors were not explored.

Moreover, getting to know the motives behind adolescent Internet consumption is also relevant.[23] Discussing motives for media use in general, McQuail[24] assumes four basic motives: information; personal identity; integration and social identity; and entertainment. The entertainment aspect has been largely associated with PIU, as demonstrated by the inclusion of Internet Gaming Disorder in the appendix of the Diagnostic and Statistical Manual of Mental Disorders, fifth addition[25], although this ignores other types of problematic Internet use unrelated to gaming. Furthermore, several studies have pointed out the prominence of social interaction among activities that have been associated with PIU[26,27], but only a few empirical studies are available[28].

The role of parents also deserves particular consideration. Studies to date examining the association between youth Internet use with parenting style and monitoring demonstrate mixed findings.[29,30] Some studies found that more active parental involvement and greater restriction of their child's Internet use were associated with lower excessive Internet use.[31] However, other studies found no association between parenting styles and time online.[32,33] Thus, more research is needed to clarify the relationship between parenting factors and adolescent Internet use,

The main objective of the present study was to conduct a general screening of problematic Internet use in a large sample of school-based adolescents in Spain, providing updated prevalence figures of PIU and different online risky practices

(contacting strangers, sexting, cyberbullying…), as well as data about Internet and social networking usage habits. In addition, differences between problematic and non-problematic users were assessed, in terms of demographic variables, parental role and motivations for using. The association between PIU and the involvement in other online risky behaviors were also investigated, as well as the role of intensive use. In this respect, this study seeks to be a relevant contribution not only for academics but also for clinicians and parents who might apply the findings obtained to the prevention of PIU.

Materials and Methods

Participants

An online survey of Compulsory Secondary Education students in the Galician region of Spain was carried out. Every secondary school was contacted, trying to achieve full participation of all existing centers in the area (493). The size of the study population amounted to 87,990 students. A total of 255 schools agreed to participate (51.7% participation rate). No significant differences were found between participating and non-participating schools in terms of type of school, area and province. The initial sample size reached 44,051 adolescents (21,670 girls) aged from 12 to 17 (M = 14.07; SD = 1.36), which means a rate of participation of 50.31% of the total number of students.

To achieve the final analysis sample, a missing data analysis and cleaning were conducted. The highest percentage of missing responses for any item was 1.2%, which represents an acceptable value.[34] No significant differences in demographic variables were found between respondents who had any missing data compared to those who didn't. However, 495 respondents completed only the first block of the questionnaire and were thus dropped from the analysis sample. Further exclusions included 568 respondents who answered the whole questionnaire in less than 3 minutes, and 2,033

respondents that had questionable response patterns. The cleaned dataset included 40,955 adolescents (20,291 girls) aged 12 to 17 (M = 14.08; SD = 1.36). An amount of 75.4% attended public schools and 24.6% went to private or charter schools; 55.4% of the students were in lower secondary education (1st and 2nd grade) and 44.6% were in upper secondary education (3rd and 4th grade).

Measures

The online self-administered questionnaire consisted of three sections. The first block was composed of 19 *ad hoc* items about Internet usage habits, a multiple choice question about motivations (*Do you usually connect to the Internet to check your mail/ to use social networks/ to use instant messaging…?*), other question about youth perceptions of parental control over their Internet use (*Do your parents control or limit your Internet use?* Yes/No), and another about parent-child conflict over their use (*Do you usually have arguments with your parents because of Internet use?* Yes/No).

The second section included the Problematic Internet Use Scale in adolescents (PIUS-a).[9] This instrument was chosen for different reasons. Firstly, it is a brief and simple scale (only 11 items) recently validated among adolescents in Galicia. It was developed on the basis of a deep review of the main scales previously proposed by other authors,[35–37] and the DSM-5 diagnostic criteria for Gambling Disorder and Internet Gaming Disorder were taken into account as well as the results of a preliminary study.[15] Moreover, it was enriched by the contributions from a multidisciplinary team of experts, who carried out a critical review of the literature, and it covers the four above-mentioned categories: imbalances in life spheres; associated problems; loss of control; and impairment or significant distress.[11] The expert team also adapted every item to the cultural context and to the language of the young people, provided evidence of the content validity of the scale to be elaborated, and established criteria for analyzing its

discriminative capacity (for more details about the validation process, see the validation study[9]). Its validation study confirmed its unidimensionality through a CFA analysis, and satisfactory psychometric properties were shown (Cronbach's alpha value = .82; ordinal alpha index = .83; sensitivity = .81; specificity =.83) in Spanish adolescents aged 11 to 17.[9] In the present study the one-dimensional structure was again confirmed (GFI = .96; AGFI = .95; CFI = .94; NFI = .94; TLI = .92; RMSEA [90% CI] = .064 [.062 - .065]), as well as an acceptable internal consistency (Cronbach's alpha value = .83; ordinal alpha index = .84). Following the advice from the team of experts, and to ensure the highest possible level of item comprehension in the online self-report survey, the response format was adapted from a five-point Likert agreement scale to a frequency scale with five answer options from 0 *Never* to 4 *Always* (e.g. *You have neglected some of your homework or performed worse in exams because of connecting to the Internet* or *You have given up doing things that you were interested in previously (hobbies, sports, etc.) to get connected*), while maintaining the optimal screening cut-point of 16.[9]

The third section had eight *ad hoc* yes/no questions, based upon previous research[38] about online risky behaviors such as cyberbullying, betting money online, sexting or contacting with strangers (e.g. *In the last 12 months have you been threatened, harassed or humiliated through the Internet?* or *In the last 12 months, have you sent erotic or sexual photos or videos of yourself to someone through the Internet?*) as well as five demographic questions about gender, age, school year, school, and municipality of residence.

Procedure

This study was carried out with the consent and cooperation of both the school leadership and parents' associations, who sent a formal letter supported by the Local

Ministry of Education and University Planning to every parent, with information about the study and the invitation to allow their children to participate. Both parents and their children had the opportunity to refuse the student's participation, without any objection. Participation was totally voluntary and unpaid.

Every participating school designated a teacher or school counsellor responsible for collecting the data. They received a written protocol with technical details and practical instructions about the procedure, and they attended a face-to-face training session.

The data collection period lasted three weeks. On the data collection sessions, the trained teacher of each school gave information about the purpose of the study, invited students to participate in it and gave instructions for completing the questionnaire. Anonymity and confidentiality of responses were guaranteed. Every student got a single-use, personal and non-transferable password. If any incident occurred, the trained teachers had the possibility to contact telephone technical support. Data were collected in the schools' computer rooms in small groups during the school day, and they were given up to 30 minutes to complete the questionnaire. The Bioethics Committee of the University of Santiago de Compostela approved this study.

Statistical analysis

A descriptive analysis was conducted to investigate different rates of Internet use habits. Prevalence of PIU among adolescent users was calculated and stratified by gender, grade, school, intensive use, and parental control. The motivations behind the use of the Internet were analyzed from a general and stratified perspective. The prevalence of several online risky behaviors was also measured by looking for differences between problematic and non-problematic users, and intensive and non-intensive users. Differences in categorical variables were analyzed using χ^2 analyses, and effect size statistics were also examined (Phi coefficient).

Finally we tried to determine if PIU and/or intensive use could be predictive factors of other online risky behaviors. Univariate and multivariate logistic regression models with gender and age adjusted were used to estimate crude and multivariable adjusted prevalence odds ratios (POR) with 95% CI, respectively. All statistical analyses were conducted using the IBM SPSS Statistics v. 20.

Results

The final analysis sample for this study included 39,993 adolescent Internet users, since 962 adolescents reported no Internet use (2.3%) and therefore had no further data.

Prevalence of Internet use among Galician adolescents was 97.7%. Table 1 shows the usage habits among Internet users. Most of them connected daily (73.7%), for a longer time during weekends than during weekdays (more than 2 hours = 64% vs 45.7%). Those adolescents who connected daily, more than 3 hours during weekdays, and more than 5 hours during the weekends were considered intensive users (17.9%). The smartphone was the most used device to access the internet (81.8%), instant messaging was used by 94% of the users, and social networks by 93.5%. Regarding the perceived parental Internet involvement, almost one out of two parents did not control their children's Internet use (48.9%), and 17.7% had frequent parent-child conflict because of their Internet use.

[Insert table 1 here]

Concerning PIU, the results obtained indicated that the prevalence among adolescent Internet users was 16.3%. As Table 2 shows, those who were females, in 3rd or 4th grade, from private/charter schools, intensive users, and did not have parental control, presented significantly higher rates of PIU.

[Insert table 2 here]

Although the motivations for using the Internet were varied, instant messaging applications use (76.1%), social networking sites use (67.6), and downloading (56,2%) stood out among the rest. Table 3 presents the differences in the motivational profile behind non-problematic and problematic Internet users. Significantly higher rates were found in problematic Internet users for most motivations, with the exception of studying, checking email, and reading newspapers/blogs.

[Insert table 3 here]

In relation to the prevalence of online risky behaviors, 31.4% of the adolescents had been in online contact with strangers in the last 12 months, and 1 out of 3 of these cases had met them in person. Furthermore, 8.9% of the adolescents had been cyberbullied in this period, while 6.8% admitted to having been cyber-aggressors. Data also showed that 4% of adolescents practiced sexting, and 3.9% were blackmailed with publishing and disseminating photos or videos of themselves on the Internet. As Table 4 shows, the prevalence of these were about two to three times significantly higher in adolescents detected as problematic internet users by the screening scale, and in adolescents classified as intensive users.

[Insert table 4 here]

Finally, logistic regression analysis predicting the different online risky behaviors of PIU, intensive use and demographic variables were conducted (see Table 5a and Table 5b). Being older was a risk factor for every behavior and being male was found to be a risk factor for every practice, except for being cyberbullied (OR = 0.56 (95% CI, 0.52 - 0 60) and being blackmailed with publishing and disseminating photos or videos of themselves on the Internet (no gender differences were found). Adolescents with PIU and intensive use had a much greater risk of being involved in any online risky behavior, from both univariate and multivariate perspectives. Particularly, PIU

increased the risk of being a cyberbully (POR = 3.69 [95% CI: 3.38 - 4.03]) and being blackmailed with publishing and disseminating photos or videos of themselves on the Internet (POR = 3.33 [95% CI: 2.97 – 3.74]), while being an intensive user increased the risk of contacting strangers (POR = 1.89 [95% CI: 1.78 – 2.00) and meeting strangers (POR = 2.22 [95% CI: 2.06 – 2.39). The comparatively higher influence on any online risky behavior came from the PIU condition.

[Insert tables 5a&5b here]

Discussion

The results of this study show that Internet use among adolescents is a generalized phenomenon. The current prevalence among Spanish adolescents is 97.7%, an identical figure to that of Europe [3]. Percentages over 90% are also reported in terms of social networking, mobile phone and instant messaging applications use.

The prevalence found of PIU is 16.3%. These estimations are similar to those detected by previous Spanish studies[14,15] which could indicate that it is becoming a relatively constant problem over the time. One plausible explanation could be that, despite the social alarmism created around PIU in adolescents, very little has been done in terms of prevention and intervention in our context, which turns into high figures throughout the years.

In our study, being female is associated to higher percentages of PIU, a piece of information that contradicts the result found in most studies[39,40] but coincides with previous results in the Spanish context.[13] Beyond differences based on the grade and type of school, what makes the biggest difference is parental control in their children's Internet use; an association that has been highlighted by recent papers in the Internet field[31] and that has been vastly reported in other areas such as the substance use.[41]

Intensive use has been showed to be associated to PIU (φ = .252), although this condition is neither sufficient nor necessary to become a problematic Internet user.

Another remarkable result is that using instant messaging and social networking is, by far, the main reason for using the Internet, and that more than 93% of adolescents are registered, at least, in one social network. This finding is consistent with previous researches[42,43], and might suggest that the Internet is, above everything else, an environment for interaction and socialization; the new playground for our adolescents.

The motivational factors can also be a way of further differentiating between problematic and non-problematic users. In the case of problematic users, rates of uploading and downloading content are significantly higher, and the social component of the Internet is even more present with markedly higher percentages in social networking, or chats and forums use. Similar results have been previously found, indicating that those who show symptoms of Internet Addiction are likely to proportionately engage more than the general population in sites that serve as a replacement for real-life socializing.[44] The possible underlying mechanism is the psychological concept of reward and reinforcement.[45] Many Internet entertainment and social interaction applications provide psychological rewards according to a variable–ratio reinforcement schedule.[45] So if the behaviour is a certain type of input, such as the placement of a posting, and the reward is other users' reactions to the input, this may result in the person who made the original post to receive a neurochemically-induced high in the form of increased dopamine in the brain's reward circuit.[46] The uncertainty of the timing and nature of responses to posts can lead people to spend large amounts of time online monitoring responses (and posting rejoinders).

The study of online risky practices reveals that the most prevalent behavior is contacting strangers, a practice that strongly increases among problematic users. This

growing trend among problematic users is repeated in every practice, and the intensive use is also associated to higher rates in any online risky behavior. Given the concurrent nature of different risky patterns,[47] the implication of PIU and intensive use on adolescents' risk of other online risky behaviors was assessed. The results show that PIU is not an isolated phenomenon but is related to every behavior studied, increasing the risk of being involved in any online risk. If an adolescent is a problematic internet user, that means they use the Internet with patterns demonstrating a loss of control. In fact, several neuroimaging studies have suggested diminished efficiency of response-inhibition processes in IA groups relative to healthy controls.[48,49] This feature will influence all of their online experience, making the co-occurrence of PIU and online risks such as sexting, cyber-blackmailing, or contacting strangers more common. Intensive use was also related to every online risk, but to a lesser extent, which coincides with the conception of "time at-risk" of Ybarra and Mitchell.[22]

It might be thought that behind PIU, intensive use and most of online risky practices, there is a common deficit of personal and social skills. Along the same lines, previous researchers found that PIU is related to loneliness and shyness,[35] or that the main reason to contact strangers is a mixture of being bored, curious, and inhibited in face-to-face conversation.[50] Other studies found that being a cyberbully is significantly associated with less perceived social support from friends,[51] or that self-esteem is a protective factor for cyber-victimization.[52] The European Commission states that education and empowerment of the children are the best tools to reach a responsible use of Internet among adolescents.[53]

From our perspective, values-based education and life skills training are the best way towards a sensible Internet use. This approach consists of explicit and/or implicit activity to promote children's understanding and knowledge of values, and to instill the

children with skills so they can enact particular values as individuals, and as members of the wider community.[54] Moreover its implementation seeks to achieve an optimal, healthy and realistic self-esteem in adolescents, generate a positive outlook on life in them, assisting them in making ethical judgements, and enhancing their sense of social responsibility.[55] This approach has already shown its effectiveness in preventing other risky behaviors such as alcohol or substance abuse in adolescents,[56] which means that adopting it is an investment in preventive armor for our adolescents' health. However, this is not, and should not be, the only action taken. Regulatory development and technical and legal control are some of the additional measures that must be adopted for the safeguarding of young people. In this line, new offences such as online grooming and cyberbullying have been recently incorporated into criminal law, including the Spanish one. Moreover, parental and school observation is also crucial, since they occupy a privileged place in carrying out protective measures.

The large sample is the major strength of this study. To the extent of our knowledge, this research has the largest sample ever used to conduct a study on PIU and online risky behaviors in Spain. However, there are also some limitations. The cross-sectional design is unable to account for temporal relationships, thus causality could not be determined. Our study relied on self-reported data, prone to recall and social desirability biases. Therefore, it is impossible to figure out if the adolescents have over-reported or underreported their Internet use or their parents'control. Nevertheless, self-reporting alcohol and substance use has been found to be as reliable or even better than other methods of detection,[57,58] so there are good grounds for considering self-report measures as appropriate for this context as well.

On the other hand, national or international PIU prevalence comparisons should be treated with caution. The use of different evaluation tests or screening scales, since there

is not a worldwide accepted tool, is an obstacle in the road to comparability. However, this is a common limitation that researchers on the field face nowadays. In this regard, one of the most critical challenges for future research is to achieve consensus on the conceptualization of the phenomenon, on the identification of its criteria, and on the use of a common evaluation tool. Otherwise the comparison among different studies will continue to be difficult.[15]

Conclusions

This study shows how the problematic internet use is related to demographic variables, parental control and intensive use as well as to other online risky behaviors, revealing the complex reality of the phenomenon. Parents, schools, institutions and adolescents themselves are called upon to understand each other and actively engage in preventing and facing this problem, since such a multifaceted issue requires complementary approaches to be solved. Future research should also take into account possible relations between PIU and other risky behaviors such as substance and alcohol use, considering the idea of an addiction profile among young adolescents.[59]

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References

1. Bélanger RE, Akre C, Berchtold A, Michaud P-A. A U-shaped association between intensity of Internet use and adolescent health. *Pediatrics*. 2011;127:330-335. doi:10.1542/peds.2010-1235.

2. Rial A, Gómez P, Picón E, Braña T, Varela J. Identification and Characterization of Adolescent Internet User's Profiles. *The Spanish Journal of Psychology*. 2015;18:e50. doi:10.1017/sjp.2015.55.

3. Eurostat. *Survey on Information and Communications Technology (ICT) Usage in Households and by Individuals*. Luxembourg, Luxembourg: Eurostat; 2015.

4. Leung L. Stressful life events, motives for Internet use, and social support among digital kids. *CyberPsychology & Behavior*. 2007;10:204-214.

5. Casey BJ, Getz S, Galvan A. The adolecent brain. *Developmental Review*. 2008;28:62-77. doi:10.1016/j.dr.2007.08.003.

6. Mitchell KJ, Finkelhor D, Jones LM, Wolak J. Prevalence and Characteristics of Youth Sexting: A National Study. *Pediatrics*. 2012;129:13-20. doi:10.1542/peds.2011-1730.

7. Whittle H, Hamilton-Giachritsis C, Beech A, Collings G. A review of online grooming: Characteristics and concerns. *Aggression and Violent Behavior*. 2013;18:62-70. doi:10.1016/j.avb.2012.09.003.

8. Slonje R, Smith PK, Frisén A. The nature of cyberbullying, and strategies for prevention. *Computers in Human Behavior*. 2013;29:26-32. doi:10.1016/j.chb.2012.05.024.

9. Rial A, Gómez P, Isorna M, Araujo M, Varela J. PIUS-a: Problematic Internet Use Scale in adolescents. Development and psychometric validation. *Adicciones*. 2015;27:47-63.

10. Kuss DJ, Griffiths MD, Karila L, Billieux J. Internet Addiction: A Systematic Review of Epidemiological Research for the Last Decade. *Current pharmaceutical design*. 2014;20:4026-4052. doi:10.2174/13816128113199990617.

11. Acier D, Kern L. Problematic Internet use: Perceptions of addiction counsellors. *Computers & Education*. 2011;56(4):983-989. doi:10.1016/j.compedu.2010.11.016.

12. Moreno MA, Jelenchick L, Cox E, Young H, Christakis DA. Problematic Internet use among US youth: A systematic review. *Archives of Pediatrics & Adolescent Medicine*. 2011;165(9):797-805. doi:10.1001/archpediatrics.2011.58.

13. Durkee T, Kaess M, Carli V, et al. Prevalence of pathological internet use among adolescents in Europe: Demographic and social factors. *Addiction*. 2012;107(12):2210-2222. doi:10.1111/j.1360-0443.2012.03946.x.

14. Lopez-Fernandez O, Freixa-Blanxart M, Honrubia-Serrano ML. The Problematic Internet Entertainment Use Scale for Adolescents: Prevalence of problem Internet use in Spanish high school students. *Cyberpsychology, Behavior, and Social Networking*. 2013;16:108-118. doi:10.1089/cyber.2012.0250.

15. Gómez P, Rial A, Braña T, Varela J, Barreiro C. Evaluation and early detection of problematic Internet use in adolescents. *Psicothema*. 2014;26:21-26. doi:10.7334/psicothema2013.109.

16. Yen J-Y, Ko C-H, Yen C-F, Wu H-Y, Yang M-J. The comorbid psychiatric symptoms of Internet addiction: Attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *The Journal of Adolescent Health*. 2007;41:93-98. doi:10.1016/j.jadohealth.2007.02.002.

17. Sariyska R, Reuter M, Lachmann B, Montag C. Attention Deficit/Hyperactivity

Disorder is a Better Predictor for Problematic Internet use than Depression: Evidence from Germany. *Journal of Addiction Research & Therapy*. 2015;6:1-6. doi:10.4172/2155-6105.1000209.

18. Chang F-C, Chiu C-H, Lee C-M, Chen P-H, Miao N-F. Predictors of the initiation and persistence of Internet addiction among adolescents in Taiwan. *Addictive behaviors*. 2014;39:1434-1440. doi:10.1016/j.addbeh.2014.05.010.
19. Durkee T, Carli V, Floderus B, et al. Pathological Internet Use and Risk-Behaviors among European Adolescents. *International Journal of Environmental Research and Public Health*. 2016;13:294, 1-17. doi:10.3390/ijerph13030294.
20. Nartgün SS, Cicioglu M. Problematic Internet use and cyber bullying in vocational school. *International Online Journal of Educational Sciences*. 2015;7:10-26. doi:10.15345/iojes.2015.03.018.
21. Gamito PS, Morais DG, Oliveira JG, Brito R, Rosa PJ, Gaspar de Matos M. Frequency is not enough : Patterns of use associated with risk of Internet addiction in Portuguese adolescents. *Computers in Human Behavior*. 2016;58:471-478. doi:10.1016/j.chb.2016.01.013.
22. Ybarra ML, Mitchell KJ. Online aggressor/targets, aggressors, and targets: A comparison of associated youth characteristics. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. 2004;45:1308-1316. doi:10.1111/j.1469-7610.2004.00328.x.
23. Bischof-Kastner C, Kuntsche E, Wolstein J. Identifying problematic Internet users: development and validation of the Internet Motive Questionnaire for Adolescents (IMQ-A). *Journal of Medical Internet Research*. 2014;16(10):e230: 1-12. doi:10.2196/jmir.3398.
24. McQuail D. *McQuail's Mass Communication Theory. 6th Edition*. London, UK:

SAGE Publications Ltd; 2010.

25. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders. Fifth Edition*. Washington, DC: American Psychiatric Publishing; 2013.

26. Tsitsika A, Critselis E, Kormas G, et al. Internet use and misuse: A multivariate regression analysis of the predictive factors of internet use among Greek adolescents. *European Journal of Pediatrics*. 2009;168(6):655-665. doi:10.1007/s00431-008-0811-1.

27. Van Den Eijnden RJJM, Meerkerk G-J, Vermulst AA, Spijkerman R, Engels RCME. Online Communication, Compulsive Internet Use, and Psychosocial Well- Being Among Adolescents: A Longitudinal Study. *Developmental Psychology*. 2008;44(3):655-665. doi:10.1037/0012-1649.44.3.655.

28. Müller KW, Dreier M, Beutel ME, Duven E, Giralt S, Wölfling K. A hidden type of internet addiction? Intense and addictive use of social networking sites in adolescents. *Computers in Human Behavior*. 2016;55:172-177. doi:10.1016/j.chb.2015.09.007.

29. Li W, Garland EL, Howard MO. Family factors in Internet addiction among Chinese youth: A review of English- and Chinese-language studies. *Computers in Human Behavior*. 2014;31(1):393-411. doi:10.1016/j.chb.2013.11.004.

30. Valcke M, Bonte S, De Wever B, Rots I. Internet parenting styles and the impact on Internet use of primary school children. *Computers & Education*. 2010;55(2):454-464. doi:10.1016/j.compedu.2010.02.009.

31. Kalmus V, Blinka L, Ólafsson K. Does it matter what mama says: Evaluating the role of parental mediation in European adolescents' excessive internet use. *Children & Society*. 2015;29:122-133. doi:10.1111/chso.12020.

32. Eastin M, Greenberg B, Hofschire L. Parenting the Internet. *Journal of Communication*. 2006;56:486-504.

33. Lee S-J, Chae Y-G. Children's Internet use in a family context: influence on family relationships and parental mediation. *CyberPsychology & Behavior*. 2007;10(5):640-644. doi:10.1089/cpb.2007.9975.

34. Cohen J, Cohen P. *Applied Multiple Regression/Correlational Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates; 1983.

35. Caplan SE. Problematic Internet use and psychosocial well-being: Development of a theory-based cognitive–behavioral measurement instrument. *Computers in Human Behavior*. 2002;18:553-575. doi:10.1016/S0747-5632(02)00004-3.

36. Huang Z, Wang M, Qian M, Zhong J, Tao R. Chinese Internet addiction inventory: Developing a measure of problematic Internet use for Chinese college students. *CyberPsychology & Behavior*. 2007;10(6):805-812. doi:10.1089/cpb.2007.9950.

37. Young KS. Internet Addiction: The emergence of a new clinical disorder. *CyberPsychology & Behavior*. 1998;1(3):237-244.

38. Livingstone S, Haddon L, Görzig A, Ólafsson K. *Risks and Safety on the Internet: The Perspective of European Children. Full Findings*. London, UK: EU Kids Online; 2011.

39. Kormas G, Critselis E, Janikian M, Kafetzis D, Tsitsika A. Risk factors and psychosocial characteristics of potential problematic and problematic internet use among adolescents: A cross-sectional study. *BMC public health*. 2011;11:595, 1-8. doi:10.1186/1471-2458-11-595.

40. Wang H, Zhou X, Lu C, Wu J, Deng X, Hong L. Problematic Internet Use in high school students in Guangdong Province, China. *PloS ONE*. 2011;6:e19660.

doi:10.1371/journal.pone.0019660.

41. Steinberg L, Fletcher A, Darling N. Parental Monitoring and Peer Influences on Adolescent Substance Use. *Pediatrics*. 1994;93:1060-1064.

42. Lenhart A. *Teens, Social Media and Technology Overview 2015*. Washington, DC: Pew Research Center; 2015.

43. Perrin A. *Social Media Usage: 2005-2015*. Washington, DC: Pew Research Center; 2015.

44. Morrison CM, Gore H. The relationship between excessive Internet use and depression: a questionnaire-based study of 1,319 young people and adults. *Psychopathology*. 2010;43:121-126. doi:10.1159/000277001.

45. Greenfield D. The Addictive Properties of Internet Usage. In: Young K, de Abreu CN, eds. *Internet Addiction: A Handbook and Guide to Evaluation and Treatment*. Hoboken, NJ, USA: John Wiley & Sons, Inc.; 2007:133-153. doi:10.1002/9781118013991.ch8.

46. Soh PC-H, Charlton JP, Chew K-W. The influence of parental and peer attachment on Internet usage motives and addiction. *First Monday*. 2014;19(7). doi:10.5210/fm.v19i7.5099.

47. Dodd LJ, Al-Nakeeb Y, Nevill A, Forshaw MJ. Lifestyle risk factors of students: a cluster analytical approach. *Preventive medicine*. 2010;51:73-77. doi:10.1016/j.ypmed.2010.04.005.

48. Dong G, DeVito EE, Du X, Cui Z. Impaired inhibitory control in "internet addiction disorder": A functional magnetic resonance imaging study. *Psychiatry Research*. 2012;203(2):153-158. doi:10.1016/j.pscychresns.2012.02.001.

49. Dong G, Zhou H, Zhao X. Male Internet addicts show impaired executive control ability: Evidence from a color-word Stroop task. *Neuroscience Letters*.

2011;499(2):114-118. doi:10.1016/j.neulet.2011.05.047.

50. Peter J, Valkenburg PM, Schouten AP. Characteristics and motives of adolescents talking with strangers on the Internet. *CyberPsychology & Behavior*. 2006;9:526-530. doi:10.1089/cpb.2006.9.526.

51. Calvete E, Orue I, Estévez A, Villardón L, Padilla P. Cyberbullying in adolescents: Modalities and aggressors' profile. *Computers in Human Behavior*. 2010;26:1128-1135. doi:10.1016/j.chb.2010.03.017.

52. Álvarez-García D, Núñez JC, Dobarro A, Rodríguez C. Risk factors associated with cybervictimization in adolescence. *International Journal of Clinical and Health Psychology*. 2015;15:226-235. doi:10.1016/j.ijchp.2015.03.002.

53. European Commission. *Communication from the Comission to the European Parliament, the Council, the European Economic and Social Committee and the Comittee of the Regions: European Strategy for a Better Internet for Children*. Brussels, Belgium: European Commission; 2012.

54. Zbar V, Brown D, Bereznicki B, Hooper C. *Values Education Study: Final Report*. Melbourne, Australia: Curriculum Corporation; 2003.

55. Mergler AG, Spooner-Lane R. What pre-service teachers need to know to be effective at values-based education. *Australian Journal of Teacher Education*. 2012;37(8):66-81. doi:10.14221/ajte.2012v37n8.5.

56. European Monitoring Centre for Drugs and Drug Addiction. *EMCDDA Insights - Prevention of Substance Abuse*. Luxembourg, Luxembourg: Office for Official Publications of the European Communities; 2008.

57. Babor TF, Kranzler HR, Lauerman RJ. Early detection of harmful alcohol consumption: Comparison of clinical, laboratory, and self-report screening procedures. *Addictive Behaviors*. 1989;14:139-157. doi:10.1016/0306-

4603(89)90043-9.

58. Winters KC, Stinchfield RD, Henly GA, Schwartz RH. Validity of adolescent self-report of alcohol and other drug involvement. *International Journal of the Addictions*. 1990;25:1379-1395.

59. Suris JC, Akre C, Ambresin A-E, Berchtold A, Piguet C, Zimmermann G. Problematic Internet Use and Substance Use in Adolescence. *Journal of Adolescent Health*. 2014;54(2):S8. doi:10.1016/j.jadohealth.2013.10.032.

Table 1.

Descriptive statistics of Internet usage habits among adolescent Internet users

Internet usage habits	Total (%)
FREQUENCY OF USE	
• Occasionally (sometime a month)	5.6
• Weekly (sometime a week)	20.7
• Daily (every day or almost every day)	73.7
HOURS PER DAY (WEEK DAYS)	
• Less than 1 hour	23.0
• Between 1 and 2 hours	31.3
• Between 2 and 3 hours	18.6
• Between 3 and 5 hours	13.6
• More than 5 hours	13.5
HOURS PER DAY (WEEKENDS)	
• Less than 1 hour	12.9
• Between 1 and 2 hours	23.1
• Between 2 and 3 hours	22.3
• Between 3 and 5 hours	18.5
• More than 5 hours	23.2
INTENSIVE USERS	17.9
TIME SLOT	
• From 8am to 2pm	13.8
• From 2pm to 4pm	36.5
• From 4pm to 9pm	65.9
• From 9pm to 12pm	39.8
• After 12pm	13.4
DEVICES USED TO ACCESS THE INTERNET	
• Personal computer	26.2
• Laptop	41.4
• Tablet	25.3
• Smartphone	81.8
OWNERSHIP OF DEVICES	
• Mobile phone	91.7
• Smartphone	75.4
INSTANT MESSAGING	94.0
• Whatsapp	90.6
SOCIAL NETWORKING SITES USE	
• None	6.5
• 1	9.5
• 2	14.3
• 3	18.0
• 4 or more	51.7
• Never or hardly ever	4.9
• Occasionally	10.3
• Weekly	23.1
• Daily	61.7
PARENTAL INTERNET INVOLVEMENT	
• Perceived parental control	51.1
• Parents-child conflict	17.7

Table 2.

Prevalence of PIU according to demographic variables, intensive use and parental control

VARIABLES		PIU (%)	χ^2	φ
GENDER	Males	14.7	71.47**	.042
	Females	17.8		
GRADE	1st & 2nd	14.6	100.09**	.050
	3rd & 4th	18.3		
SCHOOL	Public	15.3	82.97**	.046
	Private/ charter	19.2		
INTENSIVE USE	No	11.8	20700.48**	.252
	Yes	36.8		
PARENTAL CONTROL	No	19.8	353.44**	.094
	Yes	12.9		

** $p < .001$

Table 3.

Differences in motivational profile for Internet use

MAIN MOTIVATIONS FOR INTERNET USE	Total (%)	NON PIU (%)	PIU (%)	χ^2	φ
Instant messenger (IM)	76.1	74.6	83.9	259.75**	.081
Social networking	67.6	64.7	82.2	760.04**	.138
Downloading	56.2	53.6	69.4	554.48**	.118
Studying	52.3	54.5	41.0	398.96**	.100
Listening to music	49.2	46.9	60.8	420.31**	.103
Watching online series, matches	46.5	45.0	54.1	181.06**	.067
Online games	34.5	33.9	37.4	28.70**	.027
Uploading information	33.6	29.5	54.5	1519.80**	.195
Checking email	29.8	30.4	26.3	45.53**	.034
Leisure and entertainment	20.7	19.9	25.0	88.30**	.047
Reading the newspaper, blogs	18.5	18.7	17.5	5.45*	.012
Online shopping	12.3	11.0	19.2	335.20**	.092
Chats and forums	7.6	6.2	15.1	624.32**	.125
Others	8.3	7.6	12.2	153.29**	.062

*$p < .05$ ** $p < .001$

Table 4.

Prevalence of online risky practices

Online risky practices in the last 12 months	Total (%)	NON-PIU (%)	PIU (%)	χ^2	φ	Non-Intensive Use (%)	Intensive Use (%)	χ^2	φ
Contacting strangers	32.1	27.6	55.1	1876.19**	.217	27.9	51.5	1494.18**	.194
Visiting porn sites	17.3	15.3	27.7	581.24**	.121	15.7	24.6	324.90**	.090
Meeting strangers	10.3	7.7	23.3	1414.12**	.189	7.7	22.2	1337.85**	.183
Being cyberbullied	8.9	7.0	18.7	928.77**	.153	7.6	14.5	345.60**	.093
Being a cyberbully	6.6	4.6	17.3	1398.63**	.188	5.2	13.4	645.71**	.128
Betting and gambling sites	3.8	3.1	7.5	285.67**	.085	3.3	6.2	135.74**	.059
Sexting	3.7	2.6	9.5	742.74**	.137	2.8	7.9	422.57**	.103
Being blackmailed with publishing and disseminating photos or videos of yourself on the Internet	3.7	2.6	9.1	642.60**	.127	3.1	6.3	160.87**	.064

** $p < .001$

Table 5a.

Logistic regression models for predicting different online risky behaviors from PIU, intensive use and demographic variables

Variable	Contacting strangers		Porn sites		Meeting strangers		Cyberbullying victim	
	Univariate POR (95% CI)	Multivariate[1] POR (95% CI)	Univariate POR (95% CI)	Multivariate[1] POR (95% CI)	Univariate POR (95% CI)	Multivariate[1] POR (95% CI)	Univariate POR (95% CI)	Multivariate[1] POR (95% CI)
GENDER								
Female	1	1	1	1	1	1	1	1
Male	1.16 (1.11-1.21)	1.25 (1.20-1.31)	8.61 (8.01- 9.26)	10.87 (10.07-11.74)	1.08 (1.01-1.15)	1.21 (1.13-1.29)	0.56 (0.52-0.60)	0.59 (0.55-0.63)
AGE	1.38 (1.36-1.41)	1.32 (1.30-1.35)	1.56 (1.53-1.60)	1.61 (1.58-1.65)	1.46 (1.42-1.50)	1.37 (1.34-1.41)	1.16 (1.13-1.19)	1.11 (1.08-1.14)
PIU								
Non PIU	1	1	1	1	1	1	1	1
PIU	3.22 (3.05-3.40)	2.70 (2.55-2.86)	2.12 (1.99-2.26)	2.40 (2.22-2.58)	3.61 (3.37-3.87)	2.81 (2.61-3.03)	3.09 (2.86-3.33)	2.68 (2.48-2.90)
INTENSIVE USE								
Non Intensive use	1	1	1	1	1	1	1	1
Intensive use	3.43 (3.21-3.68)	1.89 (1.78-2.00)	1.75 (1.65-1.87)	1.47 (1.37-1.59)	3.43 (3.21-3.68)	2.22 (2.06-2.39)	2.06 (1.91-2.23)	1.39 (1.28-1.51)

Notes: POR = prevalence odds ratio; CI = confidence interval. [1]Adjusted for other independent variables included in the column

1

Table 5b.

Logistic regression models for predicting different online risky behaviors from PIU, intensive use and demographic variables

Variable	Cyberbullying aggressor		Betting and gambling sites		Sexting		Sextortion	
	Univariate POR (95% CI)	Multivariate[1] POR (95% CI)	Univariate POR (95% CI)	Multivariate[1] POR (95% CI)	Univariate POR (95% CI)	Multivariate[1] POR (95% CI)	Univariate POR (95% CI)	Multivariate[1] POR (95% CI)
GENDER								
Female	1	1	1	1	1	1	1	1
Male	1.70 (1.57-1.85)	1.96 (1.80-2.13)	8.78 (7.46-10.35)	9.72 (8.24-11.47)	1.53 (1.38-1.70)	1.72 (1.55-1.92)	0.94 (0.85-1.04)	1.01 (0.91-1.12)
AGE	1.31 (1.27-1.35)	1.23 (1.19-1.27)	1.42 (1.37-1.48)	1.37 (1.32-1.43)	1.46 (1.41-1.52)	1.38 (1.32-1.43)	1.16 (1.11-1.20)	1.10 (1.06-1.14)
PIU								
Non PIU	1	1	1	1	1	1	1	1
PIU	4.34 (3.99-4.71)	3.69 (3.38-4.03)	2.54 (2.27-2.84)	2.46 (2.19 – 2.78)	4.03 (3.62-4.48)	3.30 (2.95-3.70)	3.72 (3.34-4.15)	3.33 (2.97-3.74)
INTENSIVE USE								
Non Intensive use	1	1	1	1	1	1	1	1
Intensive use	2.85 (2.62-3.10)	1.88 (1.71-2.06)	1.95 (1.74-2.18)	1.54 (1.36-1.74)	2.98 (2.67-3.32)	1.84 (1.64-2.08)	2.07 (1.85-2.32)	1.36 (1.20-1.53)

Notes: POR = prevalence odds ratio; CI = confidence interval. [1]Adjusted for other independent variables included in the column