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Predictors of excessive use of social media and excessive online gaming in Czech teenagers

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Background and aims: Young people's involvement in online gaming and the use of social media are increasing rapidly, resulting in a high number of excessive Internet users in recent years. The objective of this paper is to analyze the situation of excessive Internet use among adolescents in the Czech Republic and to reveal determinants of excessive use of social media and excessive online gaming. *Methods:* Data from secondary school students (N = 4,887) were collected within the 2015 European School Survey Project on Alcohol and Other Drugs. Logistic regression models were constructed to describe the individual and familial discriminative factors and the impact of the health risk behavior of (a) excessive users of social media and (b) excessive players of online games. *Results:* The models confirmed important gender-specific distinctions – while girls are more prone to online communication and social media use, online gaming is far more prevalent among boys. The analysis did not indicate an influence of family composition on both the excessive use of social media and on excessive online gaming, and only marginal effects for the type of school attended. We found a connection between the excessive use of social media and binge drinking and an inverse relation between excessive online gaming and daily smoking. *Discussion and conclusion:* The non-existence of significant associations between family environment and excessive Internet use confirmed the general, widespread of this phenomenon across the social and economic strata of the teenage population, indicating a need for further studies on the topic.

Keywords: excessive Internet use, adolescents, ESPAD, online gaming, social media

INTRODUCTION

The Czech Republic has long been known as a country with exceptionally high prevalence rates of health risk behavior among teenagers (Dzúrová, Spilková, & Vraný, 2016; Spilková, Pikhart, & Dzúrová, 2015), often leading in international comparisons of alcohol, tobacco, and/or cannabis use (e.g., European Monitoring Centre for Drugs and Drug Addiction, 2016; Hibell et al., 2012; Inchley et al., 2016). Recent data from the 2015 results of the European School Survey Project on Alcohol and Other Drugs (ESPAD) have also exposed a high number of exessive Internet users in the Czech Republic (ESPAD, 2015). This emerging phenomena has gained the attention of scholars and mental health specialists, and there is increasing concern and attention surrounding excessive Internet use among young people and its specific forms, such as problematic social networking and risky online gaming.

The issues concerning problematic Internet use and Internet gaming addiction are especially prominent in Southeast Asian countries given the specific cultural and contextual factors surrounding games and gaming (see e.g., Chiu, Lee, & Huang, 2004; Ko, Yen, Chen, Chen, & Yen, 2005; Liau et al., 2015; Peng & Liu, 2010) and in developed countries (see Kuss & Griffiths, 2012 or Kuss, Griffiths, Karila, & Billieux, 2014 for literature reviews). There are considerably less studies examining these specific problems in the post-communist countries of Central and Eastern Europe (although some of these countries occasionally participate in particular specialized surveys, such as the EU Kids Online series or the World Internet Project, etc.). This paper thus aims to decrease the gap in the literature on Internet use in these countries by presenting the first results of a country representative survey among Czech teenagers, which was collected within the 2015 ESPAD survey.

Research on problematic Internet use has intensified during the last decade (Škařupová, 2015; Škařupová & Blinka, 2015). The addition of extreme forms of Internet use as addictive disorders to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) of the American Psychiatric Association has prompted proliferate research within the field in recent years. Some

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scholars believe that behavioral addictions and substance-based addictions share many similarities in their nature (Pontes, Szabo, & Griffiths, 2015) and their addiction-related symptoms and ramifications (loss of control, narrow behavioral focus, life conflicts, craving, and other psychosocial problems, Kuss & Griffiths, 2012). On the other hand, a growing number of researchers rebute that the idiosyncratic characteristics derived from substance use or gambling disorders (particularly tolerance and withdrawal) can be used to assess Internet gaming disorders (Griffiths et al., 2016; Király, Griffiths, & Demetrovics, 2015). This general lack of consensus on the criteria of Internet-related problems presents a strong need to consider components that may be unique to these behaviors.

There are many other ambiguities within the realms of scientific endeavors devoted to this issue. First, many authors urge against the over-pathologizing of Internet use (Starcevic, 2010) since there are varying degrees of Internet use and not everybody using this medium excessively becomes addicted or experiences problems (Holstein et al., 2014). Several studies have also demonstrated beneficial effects of Internet use relating to the workplace (Caplan, 2010; Kim & Chung, 2014), or in easing loneliness and depression (Shaw & Gant, 2002). Second, there is disunity in labeling and terminology; terms such as, "pathological Internet use," "problematic Internet use," "excessive Internet use," "Internet dependency," or "Internet addiction" are often used interchangeably (Kelley & Gruber, 2010). This serious lack of consensus also affects diagnostic and measurement tools for Internet addiction and its specific forms. The first tools evolved from scales used for pathological gambling (Fisher, 1994) and later tools, such as the Nichols Internet Addiction Scale (Nichols & Nicki, 2004), the Internet Addiction Test (Young, 1998), or the Problematic Internet Use Questionnaire (PIUQ; Thatcher & Goolam, 2005) and Demetrovics, Szeredi, and Rózsa's (2008) questionnaire with the same name, emerged. New instruments are being simultaneously proposed and continuously evaluated specifically for the field of Internet gaming disorder, especially after its inclusion in DSM-5 (Király et al., 2015).

In order to shed light on the current situation in the Czech Republic, this paper focuses on the quantification of correlates of excessive Internet use among Czech teenagers. Following recommendations from existing literature, we distinguish between general Internet use and several specific online activities. Therefore, our analytical efforts are limited to social media and online gaming. An emphasis on online gaming is crucial as it has been identified as a risky online activity in terms of the development of Internet addiction and related problems (Blinka et al., 2015). Social media use was chosen because it has become the most popular form of online activity among young people (Bright, Kleiser, & Grau, 2015; Pontes et al., 2015) and the time spent on social media is often reported to be associated with pathological patterns of Internet overuse and addiction (Škařupová, 2015). The aim of this paper is to analyze the situation of excessive Internet use and to reveal determinants of excessive use of social media and excessive online gaming in the Czech Republic.

DATA AND METHODS

Participants

This study uses data collected within the Czech part of the ESPAD in 2015. ESPAD is one of the largest European cross-sectional studies focusing on substance use among adolescents and was initiated in 1995. The study regularly (every 4 years) collates data from more than 30 European countries through a unified methodology of sampling and field data collection applied in participating countries, providing internationally comparable data (e.g., Hibell et al., 2012). The Czech Republic has participated in the ESPAD since 1995, contributing data collected through collaborative efforts between the National Monitoring Centre for Drugs and Addiction and the National Institute of Mental Health (Chomynová, Csémy, Grolmusová, & Sadílek, 2014; Csémy & Chomynová, 2012).

The ESPAD target population is defined as regular students who turn 16 in the calendar year of data collection (students born in 1999), who are present in the classroom on the day of the survey. The ESPAD study covers all grades containing at least 10% of the target population (ninth grade of elementary schools, first grade of secondary schools, and relevant grade of 8-year grammar schools). A stratified random sample of schools from all regions of the Czech Republic was prepared to ensure a representative sample of schools according to the region and type of school attended through the following procedure: (a) a list of schools provided by the Ministry of Education was structured into three groups (grammar schools/gymnasiums, secondary schools with graduation exam, and vocational training schools). The smallest sampling unit was at the level of school sites, as the register does not provide information on number of classes for all schools; (b) within each region, the proportion of type of secondary schools and proportion of elementary schools was adapted to represent regional distribution; (c) one class was randomly selected in every secondary school, two classes were randomly selected in elementary schools (or one in the case of small schools). Overall, 218 schools were selected and contacted, and 41 schools refused to participate and therefore substituted by the nearest school of the same type and region. Three schools failed to be substituted and an additional six were removed from the sample due to unclear school type, resulting in 209 participating schools altogether.

Teachers remained in the classroom throughout the administration of surveys, in accordance with school policies requiring teachers to be responsible for their class and present at all times. The teacher was instructed to remain either in the front or at the back of the classroom for the entire duration of the survey, and to avoid roaming around the classroom to ensure to students that their answers would not be checked by the teacher. The teacher's presense in the classroom was functional in avoiding disturbances in classes as well. The expected time for survey completion was 45 min. In some cases, students continued filling in their surveys during the break after the lesson; according to the country report, the average time to complete the questionnaire was 46 min. Participation in the questionnaire was

voluntary, and students have the right to refuse to fill the questionnaire. Altogether, 8 students (from seven schools) of the 6,985 students present on the day of survey administration refused to fill in the questionnaire (resulting in a response rate of almost 99.9%). In addition, 250 questionnaires were discarded before entered into the database due an to extremely high proportion of missing data; another 20 were eliminated due to the inclusion of offensive remarks as responses.

Finally, the survey involved 308 participating classes with a collective 6,707 questionnaires returned (cooperation rate 96.1%). For the purposes of our analysis, we excluded elementary school students; the final sample consisted of 4,887 secondary school students (mean age = 16.66; *SD* = 0.878), with near equal distribution of males (51%) and females (49%).

Measures

The ESPAD mandatory questionnaire covers tobacco smoking, alcohol consumption, and illicit drug use, as well as students' attitudes toward them. For the first time, in 2015, the questionnaire included a special module focusing on Internet activities, gaming, and gambling. In this study, we adhere to the question sets from the international ESPAD survey, including questions on the frequency of time spent online, inspired by the Italian school survey (Siciliano et al., 2015), summarizing information from Jia and Jia (2009) and Meerkerk, van den Eijnden, Franken, and Garretsen (2010), as well as the short scale measuring self-perceived problems related to the use of social media and online games adopted from Holstein et al. (2014).

The special gaming and gambling portion included questions examining time spent on the Internet during the last 7 days. Questions devoted to the number of hours spent on the Internet on a typical day during the last 30 days were asked for each of the specific activities (social media, playing online computer games, gambling for money, searching for information, streaming or downloading music, videos, or films, and selling or buying products). For the final analysis, we focused on two activities in particular, social media and online gaming. The questionnaire described social media as, "*communicating with others on the Internet, using for example Facebook, Twitter, Skype, WhatsApp, etc.*," and online gaming as, "*playing online games (war, strategy and first-person shooter games, World of Warcraft, etc.*)." In our further analyses, time categories were merged and dichotomized as either, "normal use" (0–2 hr/day), or, "high use" (2+ hr/day) (Holstein et al., 2014). We are cognizant of the fact that the amount of time spent on social media or on online games has no diagnostic value, especially at present-day when online activities are among the most popular leisure activities, and that some symptoms previously considered as pathological may become normative for current generations of youth (Kardefelt-Winther, 2014).

In order to diagnose the severity of Internet use, we assessed self-perception of the problems with the Internet. Respondents answered, "*How much do you agree or disagree with the following statements on Social Media (resp. gaming on a computer, tablet, console, smartphone, or other electronic device?)*," within a 5-point Likert scale (strongly agree, partially agree, niether agree nor disagree, partially disagree, and strongly disagree) for the following three statements (asked in regard to both social media and online gaming): "*I think I spend way too much time on Social Media (resp. playing games)*"; "*I get in bad mood when I cannot spend time on Social Media (resp. games)*"; "*My parents say that I spend way too much time on Social Media (resp. gaming).*" Each affirmative response (strongly agree and partially agree) were coded "1," the remaining responses were coded "0." Next, two separate summary indexes were constructed for self-reports of perceived problems (social media and gaming), which ranged in value from 0 to 3. We then coded values 0–1 as "low" and values 2–3 as "high" problem scores. These three indexes on perceived problems related to Internet use and gaming were adopted from the work of Holstein et al. (2014) who developed and sucessfully tested the first version of the questionnaire focusing on student's own perception of problems. These new indexes showed acceptable validity and internal consistency and proved to be appropriate, reliable, and valid for use in non-clinical surveys. The consistency measures from our data also reach considerable validity (Cronbach's $\alpha = .867$). However, we have to approach this dichotomized measure critically, since recent literature emphasizes that large-scale questionnaires are incapable of identifying the boundary between truly disordered and less severe cases (Király et al., 2015). The threshold between low and high problem scores is merely an ad hoc value; nevertheless, this threshold was set in adherance to the study of Holstein et al. (2014) since the data used were provided by the ESPAD questionnaire in this form.

Since this study is based on data from a non-clinical survey, we followed the methodological framework suggested by Holstein et al. (2014). However, in determining the dependent variable for further analysis, we combined the above mentioned measures of time use and self-perception of problems into a dichotomized variable, and coded all respondents falling into the category of both high time use and high problem scores as 1, indicating excessive Internet use for both social media and online gaming.

The data set also included questions on students' demographics (gender, age, type of school attended – grammar, vocational, secondary with graduation, etc.). Health risk behaviors were assessed for smoking and binge (alcohol) drinking during the last 30 days and marijuana use during the last 12 months. Severity of smoking was measured by the question "*How frequently have you smoked cigarettes during the last 30 days?*" (reported on 7-point Likert scale: not at all, less than 1 cigarette/week, less than 1 cigarette/day, 1–5 cigarettes/day, 6–10 cigarettes/day, 11–20 cigarettes/day, and more than 20 cigarettes/day); smoking at least one cigarette/day was regarded as daily smoking. As an indicator of risky alcohol consumption, we used the definition of binge drinking measured by the question "*How many times (if any) have you had five or more drinks on one occasion during the last 30 days?*" (reported on a 7-point Likert scale: none, once, twice, 3–5, 6–9, 10, or more times); consumption of five or more drinks at least once was

considered as binge drinking. The use of marijuana in the last 12 months was surveyed by the question "*On how many occasions (if any) have you used marijuana or hashish (cannabis)?*" (reported on a 7-point Likert scale: 0, 1–2, 3–5, 6–9, 10–19, 20–39, 40, or more); marijuana use was dichotomized and coded as positive for any reported use during the last 12 months. To describe family composition, we used the question *"Which of the following people live in the same household with you?"* (with possible answeres including: I live alone, father, stepfather, mother, stepmother, brothers, sisters, grandparents, other relatives, and non-relatives). We further categorized this item as complete family (for those with biological mother and father living in the same household), reconstructed family (for those living with one biological parent and one stepparent in the same household), and other type of family composition.

Statistical analysis

Statistical analyses was comprised initially of descriptive analysis for (a) excessive users of social media and (b) excessive players of online games in the Czech Republic. Next, hierarchical binary logistic regression models were constructed to reveal the individual and family discriminative factors and impact of health risk behaviors on these two types of online behavior. Calculations were completed using IMB SPSS Statistics version 20 (IBM Corporation, New York, USA).

Ethics

The ESPAD study is a cross-sectional questionnaire survey carried out in randomly selected school settings with an emphasis on anonymity and voluntary participation. As all participating respondents were over the age of 15, no ethics committee approval or parental consent for student participation was required. The participants returned their questionnaires in sealed envelopes in order to protect their anonymity. Furthermore, researchers followed all relevant legislation in the Czech Republic with regard to personal data protection, i.e., no sensitive or personal data identifying individual students were requested, and the mass processing of data guaranteed participants' anonymity.

RESULTS

Detailed demographic characteristics of the sample are provided in Table 1. Within a total of 4,887 secondary school students, there were 1,267 (26%) students exibiting excessive social media use, and 535 (11%) excessive online gaming. Both subsamples were of similar age (mean age of excessive social media users is 16.6, and in excessive online gamers 16.7 years), and family composition (about 61% of complete families and 14% of reconstructed families in both subsamples). Similar distributions were also found when examining the type of secondary school attended, while there are slightly more excessive online gamers than social

Table 1. Descriptive statistics of the two subsamples – excessive social media use and excessive online gaming

	Excessive social media use		Excessive online gaming	
	$n = 1{,}267$ (25.9%)[a]		$n = 535$ (10.9%)[a]	
Gender				
Male (*n*, %)	**508**	**40.1**	**489**	**91.4**
Female (*n*, %)	**759**	**59.9**	**46**	**8.6**
Age (mean, *SD*)	**16.6**	**0.8**	16.7	0.9
Type of secondary school				
Grammar school (*n*, %)	362	28.6	**121**	**22.6**
Secondary with graduation (*n*, %)	501	39.5	**215**	**40.2**
Vocational (*n*, %)	404	31.9	**199**	**37.2**
Daily smoking				
No (*n*, %)	1,005	79.3	**456**	**85.2**
Yes (*n*, %)	262	20.7	**79**	**14.8**
Binge drinking				
No (*n*, %)	**583**	**46.0**	271	50.7
Yes (*n*, %)	**684**	**54.0**	264	49.3
Marijuana use				
No (*n*, %)	**814**	**64.2**	370	69.2
Yes (*n*, %)	**453**	**35.8**	165	30.8
Family composition				
Complete (*n*, %)	775	61.2	326	60.9
Reconstructed (*n*, %)	175	13.8	71	13.3
Other (*n*, %)	317	25.0	138	25.8

Note. Values in bold indicate categories where significant differences ($p < .05$) between the excessive and non-excessive users were identified (based on the results of χ^2 test, respectively, independent-samples median test for age).
[a]Percentage of the total sample.

media users in vocational schools (37.2% vs. 31.9%) and, on the other hand, more excessive social media users than online gamers among the students in grammar schools (28.6% vs. 22.6%). The studied subsamples mainly differ in gender distribution. The majority of excessive online gamers were boys (91.4%), whereas 60% of excessive social media users were girls. Differences were also found among health risk behavior characteristics of these two groups; excessive social media users seem to indulge in health risk behaviors more than excessive online gamers (20.7% vs. 14.8% for daily smoking, 54% vs. 49.3% for binge drinking, and 35.8% vs. 30.8% for marijuana use).

Tables 2 and 3 describe three hierarchical binary logistic regression models for assessing the impact of health risk behavior (daily smoking, binge drinking, and marijuana use), controlled for gender, age and type of school, and adding family composition, separately for excessive use of social media (Table 2) and excessive online gaming (Table 3).

The models show important gender differences among social media users, boys exhibiting half the likelihood toward excessive social media use in comparison with girls. Significant differences were also found between the types of school attended, with graduating students of secondary schools and vocational schools having a higher likelihood of becoming high time users of social media compared with their peers attending grammar schools. Age is a significant factor in excessive use of social media in all three steps of the model; with increasing age the likelihood of being an excessive social media user decreases. Adding health risk behavior and family variables into the model reduces the effect of school type. Binge drinking is the only variable found to play a role on adolescents' excessive use of social media, binge drinkers tend to become excessive social media users significantly more often than those who do not binge drink. This effect also remains the same after adding the family composition variables. The non-significant effect of family composition is rather surprising and indicates that the health behavior of an individual (alcohol use, respectively binge drinking in this case) functions as a stronger predictor of high-risk social media use than the individual's family environment.

A different picture appears when analyzing similarly constructed regression models for assessing the impact of health risk behavior, controlled for gender, age and type of school, and adding family composition for excessive online games players (Table 3). Gender differences were especially prominent, boys turn out to be excessive online gamers with much higher likelihood than girls. At the same time, students of secondary school with graduation tend to be excessive online game players more often than those from grammar schools. Interestingly, the difference between grammar school students and those from vocational schools was not significant. The effect of school type (secondary with graduation) also remains significant after adding health risk variables and family composition in the final model. From the health risks assessed, surprisingly, only daily smoking seems to be related to excessive gaming, as a protective predictor for excessive online gaming (the risky gamers tend to smoke less than their non-gaming counterparts). Again, this effect remains the same after adding the family composition variable. Excessive online gaming, however, does not seem to differ according to family composition.

Table 2. Hierarchical binary logistic regression models for excessive use of social media

	Model 1			Model 2			Model 3		
	B	OR	95% CI for OR	*B*	OR	95% CI for OR	*B*	OR	95% CI for OR
Constant	1.246	3.475		1.455	4.243		1.399	4.053	
Gender (girl = ref. +)	−0.578	0.561	(0.491, 0.641)**	−0.628	0.533	(0.466, 0.611)**	−0.629	0.533	(0.465, 0.510)**
School (grammar school = ref. +)									
Secondary with graduation	0.183	1.201	(1.023, 1.409)	0.126	1.134	(0.963, 1.335)	0.131	1.140	(0.968, 1.343)
Vocational	0.185	1.204	(1.012, 1.432)	0.106	1.112	(0.927, 1.335)	0.116	1.123	(0.934, 1.349)
Age (in years)	−0.129	0.879	(0.809, 0.954)**	−0.153	0.858	(0.789, 0.933)**	−0.149	0.861	(0.792, 0.937)**
Daily smoking (no = ref. +)				−0.082	0.922	(0.767, 1.108)	−0.078	0.925	(0.768, 1.113)
Binge drinking (no = ref. +)				0.522	1.686	(1.460, 1.949)**	0.521	1.684	(1.459, 1.944)**
Marijuana use (no = ref. +)				0.081	1.085	(0.932, 1.263)	0.086	1.090	(0.936, 1.270)
Family composition (complete family = ref. +)									
Reconstructed							−0.039	0.962	(0.789, 1.172)
Other							−0.069	0.933	(0.798, 1.092)
Hosmer and Lemeshow test[a]			7.700			3.090			3.596
Sig.			0.463			0.929			0.892
Nagelkerke R^{2b}			0.027			0.045			0.046

Note. Dependent variable: excessive social media use (coded as 1), non-excessive social media use (coded as 0). OR: odds ratio.
[a]Hosmer–Lemeshow statistics indicates a poor fit if the significance value is less than 0.05.
[b]Although the Nagelkerke R^2 appears low, Hosmer and Lemeshow (2000, p. 167) declare that "low R^2 values in logistic regression are the norm and this presents a problem when reporting their values to an audience accustomed to seeing linear regression values." They advise against routine publishing of R^2 values with results from logistic models. However, they find them helpful in the model building state as a statistic to evaluate competing models, which is also the way we present them in our analysis in Tables 2 and 3.
**$p < .01$.

Table 3. Hierarchical binary logistic regression models for excessive online gaming

	Model 1			Model 2			Model 3		
	B	OR	95% CI for OR	*B*	OR	95% CI for OR	*B*	OR	95% CI for OR
Constant	−2.281	0.102		−2.537	0.079		−2.559	0.077	
Gender (girl = ref. +)	2.575	13.137	(9.628, 17.924)**	2.559	12.924	(9.466, 17.645)**	2.560	12.931	(9.471, 17.655)**
School (grammar school = ref. +)									
Secondary with graduation	0.279	1.322	(1.032, 1.695)	0.317	1.372	(1.069, 1.763)	0.318	1.374	(1.069, 1.767)
Vocational	0.016	1.016	(0.786, 1.315)	0.096	1.101	(0.844, 1.435)	0.097	1.102	(0.844, 1.440)
Age (in years)	−0.108	0.898	(0.800, 1.007)	−0.091	0.913	(0.812, 1.025)	−0.090	0.914	(0.813, 1.028)
Daily smoking (no = ref. +)				−0.380	0.684	(0.514, 0.910)**	−0.380	0.684	(0.513, 0.911)**
Binge drinking (no = ref. +)				0.054	1.055	(0.860, 1.296)	0.053	1.055	(0.859, 1.295)
Marijuana use (no = ref. +)				−0.029	0.972	(0.778, 1.214)	−0.029	0.972	(0.777, 1.215)
Family composition (complete family = ref. +)									
Reconstructed							0.031	1.032	(0.773, 1.377)
Other							−0.031	0.969	(0.774, 1.214)
Hosmer and Lemeshow test[a]			9.263			3.547			2.472
Sig.			0.321			0.896			0.963
Nagelkerke R^2			0.185			0.188			0.188

Note. Dependent variable: excessive online gaming (coded as 1), non-excessive online gaming (coded as 0). OR: odds ratio.
[a]Hosmer–Lemeshow statistics indicates a poor fit if the significance value is less than 0.05.
**$p < .01$.

DISCUSSION

This paper analyzed the situation of excessive Internet use in the Czech Republic. The results show that the use of the Internet, especially for networking and gaming, forms an important part of teenagers' lives. Almost 26% of our respondents were classified as excessive social media users and 11% as excessive online gamers. These two activities, however, represent different types of online behavior, and there is a need to distinguish between online gaming and social media use, and perceive them as separate concepts that should not be combined into a unique category of generalized Internet use. Whereas the use of social media is a typical feature for teenagers throughout Europe (according to Livingstone, Mascheroni, Ólafsson, & Haddon, 2014, 93% of 15–16 years old have their profile at any social networking site), in terms of online gaming, Czechs are situated around the European average (83% men and 61% women in the age of 15–24 years reported playing online games during the last 12 months, compared with the European average of 80%, respectively, 61%; ISFE, 2012). However, 11% of excessive gamers appears a relatively high proportion, although it is extremely intricate to make international comparisons in Internet gaming since the data on prevalence comes from studies with different assessment tools stemming from different theoretical background, with differing cut-off values, sample populations, and sampling methods, etc. (Király et al., 2015; Kuss & Griffiths, 2012).

The paper revealed determinants of excessive use of social media and excessive online gaming with regard to demography, type of school attended, family composition, and risk behaviors. Regression models confirmed important gender specifics of the excessive use of the selected online activities. Girls are more prone to online communication and social media use (Bonetti, Campbell, & Gilmore, 2010; Holstein et al., 2014), whereas computer gaming is far more prevalent among boys (Desai, Krishnan-Sarin, Cavallo, & Potenza, 2010; Holstein et al., 2014) including higher occurrence of experienced problems with online gaming among boys (Király et al., 2014). Nevertheless, when it comes to social networking, the difference between boys and girls is not that marked (even boys are frequent users of social media applications); especially in comparison with the popularity of online computer games, where the gender gap is truly marked. Holstein et al. (2014) point out that different ways of spending computer time may appeal differently to boys and different age groups.

The significant differences between different types of school and excessive use of social media and online games may be related to the different study demands of these particular schools. Whereas the students at grammar schools usually have higher academic aspirations (and therefore prefer to use the Internet for study purposes, information seeking, etc.), attending vocational training schools is characterized by less demanding preparation for classes, more frequent problems at school or higher engagement in other forms of risk behavior, such as substance abuse (Dzúrová, Csémy, Spilková, & Lustigová, 2015). The secondary schools with graduation represent a certain intermediate stage between these two school types and as such also demonstrated intermediate values when it comes to social media. In this regard, it is surprising that the highest probability for excessive online

gaming is revealed for the category of students from secondary schools with graduation exams.

Several studies document familial protective factors of online gaming in adolescents (Liau et al., 2015); nevertheless, our analysis showed no coherent evidence of the influence of family composition on excessive online gaming and excessive social media use. This leads us to the conclusion that there might be other important characteristics influencing Internet use in teenagers other than the family environment. In this vein, the literature mentions mainly personality traits (Caplan, 2010; Casale & Fioravanti, 2015; Kelley & Gruber, 2010), mental health (Caplan, 2003; Davis, 2001; Wong, Yuen, & Li, 2015), and other psychological factors that verifiably affect excessive Internet use (Sim, Gentile, Bricolo, Serpelloni, & Gulamoydeen, 2012) or directly relate to online gaming (Gentile et al., 2011; Kuss & Griffiths, 2012; Liau et al., 2015).

In regard to the associations of excessive use of social media and online gaming and health risk behaviors, contrary to some scientific evidence (Durkin & Barber, 2002; Kuss & Griffiths, 2012; Weinstein, Feder, Rosenberg, & Dannon, 2014), there was a rather protective relation found between excessive online gaming and the risk of daily smoking. On the other hand, this study found a significant connection between the excessive use of social media and binge drinking. The cross-sectional nature of the data, however, limits the ability to formally test causality. According to problem behavior theory, different problematic behaviors in adolescents often occur together and are interrelated, rather than causally linked (Jessor, 1991; Jessor & Jessor, 1977; Ko et al., 2008).

Strengths and limitations

The strengths of this paper are mainly its large sample size and its high representativeness providing the first important insight into Internet use of Czech teenagers. There are, however, some limitations to this study. The data are self-reported and thus possibly prone to various biases (such as social desirability or memory recall). Second, the questions on frequency of the use for specific online activities within the ESPAD questionnaire do not take into account different patterns of use on weekdays and over weekends. Third, the "delimitation" of both social media and online games should be problematized. Social media, as defined in the questionnaire, includes the use of both social networking sites and instant messaging tools, but these applications have different patterns of use (Škařupová, 2015). Similarly, the question on gaming presents rather a random list of game types and one game title, which is not a precisely formulated question, considering the myriad of online games available today. Fourth, the estimation of time spent using social media or online games is not easily quantified given the way in which these applications are used. Online gaming typically involves an individual's full concentration, while "social media" are often used in parallel with other activities.

Recommendations for future research and practice

The findings from this study are limited to Czech students. Further analyses should focus on other national samples to compare the demography and patterns of Internet use across countries. In addition, longitudinal studies are needed to confirm the direction and causality of the revealed associations. The findings related to demographical and familial context of excessive use of social media or online gaming have great importance for the practice of primary prevention, which forms part of the system of primary prevention regularly executed within elementary and secondary schools throughout the country.

CONCLUSIONS

This paper aimed to offer a general overview of the first available data collected among Czech teenagers, with a special focus on time-consuming applications, such as social media and online games. The greatest differences revealed in the excessive use of social media and online gaming are the gender differences, and gender is the most significant factor in the demography of particular types of Internet use behavior. Moreover, the non-existence of significant associations between most of the health risk behavior types and family environment indicators used in the study with excessive Internet use (namely the use of social media and engagement in online gaming) confirms a more complex picture of this phenomenon across the adolescent population, detecting a need for more detailed analysis of these issues (especially the future inclusion of individual psychological factors in analysis). Primarily, the potential heterogeneity among excessive Internet users cannot be neglected given the slightly differing profile of excessive users of social media and excessive online gamers (e.g., with regard to the school type).

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