Intensive and excessive Internet use: different predictors operating among adolescents[*]

Dragan Popadić, Zoran Pavlović, and Dobrinka Kuzmanović

Department of Psychology, Faculty of Philosophy,
University of Belgrade, Serbia

The aim of this study was to determine the factors which have a predictive value when it comes to the intensive and excessive use of the Internet among adolescents. Predictors tested included different psychological, behavioural, and socio-demographic variables. The data were collected at the end of 2018 within the framework of the international survey EU Kids Online, on a sample of 863 adolescents from Serbia (434 [50%] males) aged 11 to 17 years. It was shown that the intensive use of the Internet was more characteristic among girls, adolescents with a tendency towards antisocial behaviours, those who think to have advanced digital skills and those whose parents did not apply restrictive forms of mediation. On the other hand, the excessive use of the Internet was related to certain psychological variables, like anxiety, impulsivity, and perceived discrimination on various grounds, but also to the absence of active parental mediation and support in the use of digital technologies.

Key words: screen time, adolescents, excessive Internet use.

Highlights:

- The amount of time spent online was positively correlated with excessive Internet use.
- Restrictive parental mediation predicts the amount of time spent online.
- Excessive Internet use is mostly predicted by the adolescent's anxiety.
- "Depathologization" of screen time within the context of the modern way of life is supported.

Corresponding author: dpopadic@f.bg.ac.rs

The number of children who spend too much time on digital devices and the Internet is increasing. The first cycle of the EU Kids Online survey, conducted in 25 European countries in 2010, showed that the children aged 9 to 16 spent in average one and a half hours a day online (Livingstone, Haddon, Gorzig, & Ólafsson, 2011). According to the findings of the second cycle of this survey, recently conducted in Serbia for the first time, the average time spent on the Internet for the children aged 9 to 17 is about three and a half hours per day (Kuzmanović, Pavlović, Popadić, & Milošević, 2019).

These global trends in the increased time use of the Internet have become the focus of attention of the families and the societies, arousing positive expectations, but concerns as well. On one hand, digital devices and the Internet enrich the children's experience, help them to preserve the old and make new connections, promote learning and personal development, and provide numerous opportunities for entertainment and performing various activities that the child would otherwise do but in more difficult ways (Amichai-Hamburger, McKenna, & Tal, 2008; Livingstone & Haddon, 2009). A series of studies within the digital literacy framework and the digital literacy theory (Glister, 1997; Tsatsou, 2018) have shown that the intensive Internet use – often operationalized as the amount of time spent on the Internet – is positively correlated with a number of desirable characteristics, which points to the enhancing and encouraging effect of digital technologies and the Internet use (Kuzmanović et al., 2019; O'Neill & Dihn, 2012; Popadić, Pavlović, Petrović, & Kuzmanović, 2016; Van Deursen & Helsper, 2018).The use of the Internet has also been recognized as one of the basic children's rights and, hence, preventing or restricting its use, with too little Internet, could be interpreted as violating children's fundamental rights and denying them the skills necessary for living in the 21st century (Livingstone, 2016). From this perspective, the motto that we can formulate as "the more (Internet time), the better" is quite appropriate.

However, spending time on the Internet does not produce positive effects itself. If the use of the Internet is guided by harmonious passions (Vallerland et al., 2007), this may result in the refinement of digital skills and more complex digital activities, but children may be hooked on monotonous, repetitive, or harmful activities that would expose them to various risks, including the risk of excessive Internet use (EIU) (Carrier, Rosen, Cheever, & Lim, 2015). Intensive Internet use (IIU), which implies more time spent online, takes time away from other activities beyond the digital environment that may be more meaningful and developmentally more appropriate for children and adolescents, even if the child is not exposed to negative influences but engages in useful and meaningful activities.

The arrival of the digital media and the Internet has raised positive expectations. Still, there are also concerns that their use could have detrimental effects on the well-being and health of children and adolescents, which get more pronounced as the time spent online gets longer (Khouja et al., 2019; Kraut et al., 1998; Przybylski & Weinstein, 2017; Stiglic & Viner, 2019; Twenge &

Campbell, 2018). This fear, even among the child development professionals, sometimes takes on the form of moral panic, which leads to pathologizing of the behaviour in question.

The worries intensified when the first cases of Internet addiction were recorded in the late 20th century (Young, 1996). Subsequent research found that the clinical image of Internet addiction as a subset of technological addictions corresponded to other forms of behavioural addiction (Beard & Wolf, 2001; Griffiths, 1998; Young & Rogers, 1998). Among others, these included the compulsive need for the repetition of an activity leading to a more intense activity, the loss of interest in the activities not directly related to that specific behaviour, awareness of the inability to control, a disruption of environmental relationships, and the neglect of other needs (Beard, 2005; Byun et al., 2009; Griffiths, 2000).

Internet addiction has thus become a popular but also a contested and controversial term, on both the conceptual and measurement level (Starcevic & Aboujaoude, 2016). It has been debated whether the term denotes addiction to the Internet or addiction on the Internet, as well as what was the type, number and extent of impairments required to recognize addiction as a diagnostic category (Widyanto & Griffiths, 2007). Other concepts have been proposed to cover the sum of various degrees of impairments whose number, intensity, or duration did not need to exceed the threshold to be considered an addiction and, hence, pathology, such as problematic internet use (Caplan, 2002; Morahan-Martin & Schumacher, 2000; Shapira et al., 2000), pathological internet use (Davis, 2001), compulsive internet use (Meerkerk, Van Den Eijnden, Vermulst, & Garretsen, 2009), unregulated internet use (LaRose, Lin, & Eastin, 2003), excessive internet use (Livingstone et al., 2011; Šmahel et al., 2012), etc. These terms are not used in the sense of a clinical diagnosis, but indicate a potentially pathological behavioural pattern. Additionally, the terms are not used in a uniform way: sometimes they are viewed as interchangeable and also as synonyms for internet addiction (e.g., Weinstein & Lejoyeux, 2010).

In this paper, we will use the term excessive Internet use to denote the use of the Internet that is characterized by compulsiveness, awareness of not having control, irritability, guilt feeling, and conflicts with the environment. We consider the Internet addiction disorder as an extreme case of excessive Internet use. Although the EIU can be accompanied with the excessive time spent online, its defining characteristic and object of measurement is not the time spent online but the pattern of behaviours and feelings that accompany repetitive, compulsive and uncontrollable use of the Internet (Kalmus, Blinka, & Ólafsson, 2015; Šmahel & Blinka, 2012).

Various studies aimed at identifying the protective and risk factors have shown that the EIU is the result of an interaction of numerous factors, such as personal characteristics, psychological problems (lower self-esteem, lower self-efficacy, anxiety, depressive symptoms, attention deficit), environmental factors (incomplete family, the level of parental education), or the ways of using the

Internet (the use of time-consuming applications such as social networking sites and games). The studies have additionally indicated many proximal and distal negative consequences of EIU, including tense family relationships, poorer school achievement, withdrawal from social relationships, or fatigue (Blinka et al., 2015; Ko et al., 2012; Škařupová, Ólafsson, & Blinka, 2015). Hence, the clinical psychological model sheds light on the negative nature of EIU, the risk factors and its negative consequences (Helsper & Šmahel, 2019).

Taking into account the need to distinguish among the necessary, sufficient and contributory factors (Abramson, Metalsky, & Alloy, 1989), it can be said that the IIU, as well as numerous other risk factors that are highly correlated with the EIU, is a contributory but not necessarily a sufficient condition for the EIU.

The reason why the intensive Internet use is not a sufficient condition for the excessive Internet use lies in the fact that the long time spent on the Internet does not have to be accompanied by the symptoms of addiction (Kardefelt-Winther, 2014; Starcevic & Aboujaoude, 2016). The modern way of life requires more and more activities to be performed within the online sphere, and in this sense one might speak of external rather than internal coercion, i.e., the dependence on the Internet rather than Internet addiction. In addition, people can choose to spend a lot of time online because spending time in this way is enjoyable, without having the symptoms of compulsiveness and negative consequences. Glasser (1976) uses the term positive addiction for such activities, which are, inter alia, non-competitive with other daily activities, beneficial to the individual, with no self-criticism involved. Charlton and Danforth (2004) distinguish between computer-related addiction as a form of behavioural dependence and high engagement that can be as long as in the case of addiction, but which is different due to the absence of compulsion and its negative consequences.

The problematic amount of time is not a necessary condition for the EIU since the EIU symptoms may exist even if adolescents do not overuse the Internet or mobile technology or they are not allowed to be online as much as they wish. The EIU implies a compulsive need to spend a lot of time on the Internet. We can, on the one hand, argue that this particular amount of time might not be available to the child due to other obligations, prohibitions or technical restrictions. On the other hand, among those who sought help for Internet addiction in 2008, 60% spent less than three hours a day online (Hinić, 2014), which can hardly be called overuse from the current perspective.

Researchers have repeatedly argued that the amount of time spent online does not by itself imply EIU (e.g., Blinka et al, 2015; Helsper & Šmahel, 2019), as well as that the amount of time spent online is only moderately linked with the Internet-related problems (Škařupová, Ólafsson, & Blinka, 2016). In addition, it has been stated that problematic Internet use (PIU) depends on the nature of the activity rather than on the amount of time itself (Salmela-Aro et al., 2017). Nevertheless, problematic use is often equated with the problematic time on the Internet. Since the length of the time spent online is easier to register and control than the quality of that time, the adults are eager to learn which amount of time they should use as a limit and how to reach such an agreement with their child.

The most common prohibitions/rules that parents impose on their children are related to the Internet time control (Kuzmanović et al., 2019).

The question of the optimal amount of time spent in front of the screen or "How much screen time is too much?" is one of the more challenging questions that attract the attention not only of scientists but also of the general public (e.g., parents, education experts, decision-makers, the media). The organizations responsible for children's health have formulated the recommendations regarding screen time at different ages. According to the first recommendations published by the American Academy of Pediatrics (AAP) in 1999, children under the age of 2 should not spend any time in front of the screen, while those older than 2 should not spend more than two hours in front of the screen (AAP Committee on Public Education, 1999). According to the latest recommendations from 2016, the amount of time in front of the screen for school-age children (above age 6 years) is not strictly recommended. Instead, parents are advised to create an individual plan for using the digital devices and the Internet in collaboration with the child, which will ensure that the time in front of the screen does not substitute the social, cognitive, and physical activities that are important for smooth psychophysical development of the child (AAP, Council on Communications and Media, 2016). Instead of recommending the number of hours in front of the screen, the UK experts advise parents to negotiate the time in front of the screen with their children, respecting their individual needs, interests, usage and activities in and outside of digital environment (Department of Health and Social Care, 2019).

Taking into account the above-mentioned data which point to various dilemmas regarding the time children spend on the Internet and its predominantly negative connotation, which also includes equating the time spent online with the problematic Internet use, this study aims to shed more light on the nature of the intensive and excessive Internet use among adolescents in Serbia. More specifically, the aims of this paper are to examine: (a) the distribution of IIU and EIU in the representative sample of adolescents in Serbia aged 11 to 17 years; (b) the ways in which the IIU and EIU are interrelated, and (c) how the IIU predictors differ from the EIU predictors.

Method

Participants

The study is based on the secondary analysis of the data from the survey conducted on a nationally representative sample of children aged 9 to 17 years ($N = 1,150$). This research formed the part of the *EU Kids Online* project in Serbia (Kuzmanović et al., 2019). It was conducted in 40 primary schools and 20 secondary schools, covering grades 3 to 8 in primary schools, and grades 1 to 3 in secondary schools. A stratified random sample with multiple stages of selection was used. Children were sampled through their schools. The schools were stratified by four main regions of Serbia and the size of the municipality the school belongs to, as well as by the type of school in case of the secondary level of education (grammar vs. vocational schools). The selected schools were sampled randomly and in each school one and only one class of students of the predetermined age was selected. The final result was the sample of

school children aged 9 to 17, which is representative for the school population in terms of age, region, the size of municipality and the type of school (in case of secondary schools).

For the purposes of this paper, we used the data collected in the subsample of adolescents aged 11 to 17 (weighted $n = 863$). The main reason for this is the fact that the younger children (9 to 10 years old) responded to a shorter questionnaire with a smaller number of relevant variables and data for the purpose of this study. Data were weighted to correct for the population parameters.

Data and Questionnaires

The survey was conducted using a pen and paper self-administered questionnaire. The questionnaire covered a large number of variables related to different aspects of children's digital skills and practices, psychological variables, contextual and socio-demographic characteristics.

Socio-demographic variables. This set of variables includes the child's sex, age (in years, $M = 13.89$, $SD = 1.95$), and the size of municipality (a small town – up to 19,999 residents; a middle-sized town – 20,000–99,999 residents; a large town – 100,000 residents and more). Children were also asked to assess their family's standard of living on an eleven-point ladder scale (0 = *worst off*, 10 = *best off, M = 6.68, SD = 1.53*).

Emotional problems. Emotional problems were measured using the five items adapted from Goodman's (1999) Strengths and difficulties questionnaire (SDQ), such as "I am often unhappy, sad, or tearful" (answered by the 1 = *completely untrue* / 5 = *completely true scale*). Due to a relatively large number of missing values, the mean value of at least four answered items was used as a measure of emotional problems ($M = 1.74$, $SD = 0.69$, $\alpha = .79$). Higher scores imply more intense emotional problems symptoms.

Self-efficacy. Nine items adapted from the Schwarzer and Jerusalem (1995) scale were used as a measure of self-efficacy. The scale includes items such as "I can solve most problems if I try hard", which were accompanied by a five-point response scale (1 = *completely untrue* / 5 = *completely true*). The mean value of at least seven answered items was used as a measure of self-efficacy ($M = 2.86$, $SD = 0.68$, $\alpha = .89$), with higher values implying a more prominent sense of self-efficacy.

Sensation-seeking. Sensation-seeking was measured using two items, "I do dangerous things for fun" and "I do exciting things even if they are dangerous" (Stephenson, Hoyle, Palgreen, & Slater, 2003). The mean value of these two items evaluated on a five-point response scale (1 = *completely untrue* / 5 = *completely true*) was used in the analysis ($M = 1.65$, $SD = 0.85$, $\alpha = .87$), with higher values implying more intense sensation-seeking.

Antisocial behaviour. Five questions probed for various forms of children's antisocial behaviour. Children were asked to assess how true or untrue of them (on a four-point scale) were the statements such as "I get very angry and often lose my temper" or "I am often accused of lying or cheating". The mean value of at least four answered items was used as a measure of antisocial tendencies ($M = 1.76$, $SD = 0.45$, $\alpha = .48$). Higher values imply more intense antisocial behaviour.

Impulsivity. Five questions were used to measure the level of children's impulsivity. The statements such as "I am restless, I cannot stay still for long" or "I am easily distracted and find it difficult to concentrate" were assessed on a four-point, *untrue/true* scale. The mean value of at least four answered items was used as a measure of impulsivity ($M = 2.06$, $SD = 0.63$, $\alpha = .61$). Higher values imply more prominent impulsivity.

Perceived discrimination. Children were asked how often (1 = *never* / 5 = *very often*) they felt they were treated badly on the grounds of criteria such as the colour of skin, religion,

or disability (nine items in total). The mean value of at least seven answers was calculated and treated as a measure of the perceived discrimination ($M = 1.31$, $SD = 0.41$, $\alpha = .75$). Higher scores imply a more prominent sense of being discriminated.

Life satisfaction. Life satisfaction was evaluated on an 11-point ladder scale, ranging from 0 – the worst possible life to 10 – the best possible life ($M = 7.59$, $SD = 1.80$).

Family support. The level to which the family context was child supportive was measured by three questions, such as "When I speak someone listens to what I say" (followed by the 1 = *completely untrue* / 5 = *completely true scale*). The mean value of the three items was used as a measure of the level of family support ($M = 3.53$, $SD = 0.57$, $\alpha = .71$), with higher scores implying a more supportive family.

Peer support. Children were asked to evaluate the level of peer support they experienced on three items. They were asked how (1) *untrue* or (4) *true* for them were the statements such as "My friends really try to help me". The mean value of three items was used as a measure of peer support ($M = 3.14$, $SD = 0.84$, $\alpha = .86$), with higher values implying more supportive peers.

School support. School support was measured by five items covering the feeling of safety, peer relations and relationships with teachers (e.g., "I feel safe at school", "Teachers care about me as a person"). The mean value of at least four answered items was used as a measure of school support ($M = 2.95$, $SD = 0.72$, $\alpha = .75$), with higher values implying a more supportive school climate.

Restrictive mediation. Nine items were used to measure the presence of restrictions regarding the Internet use in the family. The children were asked whether they were allowed to do certain things such as using a webcam, downloading music or visiting a social networking site (1) *anytime*, (2) *only with permission or supervision*, or (3) *never*. The mean value of at least seven answered items was used as a measure of restrictive mediation ($M = 1.16$, $SD = 0.34$, $\alpha = .90$), with higher values implying more restrictions for the Internet use.

Active mediation. Active encouragement or help in the use of Internet provided by parents was measured by 11 items. Children were asked how often (1 = *never* / 5 = *very often*) their parents, for example, encouraged them to explore and learn things on the Internet or suggested ways to use the Internet safely. The mean value of at least nine answered items was used as a measure of active mediation ($M = 2.62$, $SD = 0.92$, $\alpha = .89$), with higher values implying higher parental encouragement and engagement.

Peer mediation. Peer's help and support in the Internet use was measured by eight items. Children were asked how often (1 = *never* / 5 = *very often*) their peers, for example, explained why some online content was good or bad or helped them in the past when something on the Internet bothered them. The mean value of at least six answered items was used as a measure of peer mediation ($M = 2.40$, $SD = 1.02$, $\alpha = .92$), with higher values implying more engaged and helpful peers.

Violence victimization. One item was used to measure the children's victimization, i.e. suffering a violent experience. Children were asked whether someone behaved towards them in a nasty of hurtful way in the past year. A binary variable differentiating between those who *did* (1 [28%]) and *did not suffer* (0) violence was used in the analysis.

Exercising violence. Children were also asked whether they themselves behaved in a nasty or hurtful way towards others in the past year. A binary variable differentiating between those who *did* (1 [18%]) and *did not act violently* (0) was used in the analysis.

Digital skills. Digital skills were measured by probing for a number of things that children knew how to do online. On a scale from 1 to 5, where 1 stands for *not at all true of me* and 5 stands for *very true of me*, children were asked to answer how (un)true of them were different statements, such as "I know how to save a photo that I find online", "I know how to

change my privacy settings" or "I know how to install apps on a mobile device (e.g., phone or tablet)". The list included a total of 24 digital skills. The mean values of at least 19 answered items were used as a measure of digital skills, with higher scores implying being more skillful ($M = 4.01$, $SD = 0.68$, $\alpha = .91$).

Breadth of Internet activities. The average number of different activities that were practiced on at least weekly basis during the past month was used as a measure of the breadth of Internet engagement. The activities included such things as "I used the Internet for schoolwork" or "I used the Internet to talk to people from other countries". The mean value of at least 12 activities (out of 15 offered) was used in the analysis ($M = 0.52$, $SD = 0.15$, $\alpha = .75$). Higher values imply more frequently practiced activities.

Intensive Internet use (IIU). The amount of time spent online was measured by two items. Children were asked to estimate the number of hours they spent online during a school day and on weekends (in general, without a specific time frame). The answer categories ranged from (1) *little or no time at all* to (9) *seven hours and more time*. Children's answers were then recoded into the number of hours mentioned in the selected category (for example, the third category was "About an hour" and it was expressed numerically as 1 hour). The scores for a regular, working day were multiplied by 5 and added to the score for the weekends multiplied by 2. The total score was then averaged and the obtained measure presents the average number of hours that a child daily spent online ($M = 3.73$, $SD = 1.94$).

Excessive Internet use (EIU). EIU is defined as "the manifestation of excessive, obsessive, compulsive or generally uncontrollable and problem-causing use of new digital technologies" (Kalmus, Blinka, & Ólafsson, 2015, p. 1). A seven-item scale covering various symptoms of the excessive Internet use was used as a measure of the excessive Internet use. The scale was developed based on the earlier, five-item scale, used in the *EU Kids Online* 25-country survey conducted in 2010 (Livingstone et al., 2011; Šmahel et al., 2012; Helsper & Šmahel, 2019). The quasi-validation of the scale (Škařupová et al., 2015) proved its suitability for use in the general population surveys. Children were asked to evaluate on a four-point scale, ranging from *never* to *very often*, how often they went without eating or sleeping because of the Internet; felt bothered when they could not be on the Internet; caught themselves using the Internet although they were not really interested; spent less time with either family, friends, or doing schoolwork because of the Internet; tried unsuccessfully to spend less time on the Internet. In the 2018 survey, besides the five questions included earlier, children were asked to evaluate how often in the previous twelve months they experienced conflicts with the family or friends because of the time spent on the Internet and how often they thought the amount of time spent on the Internet caused problems for them. In this survey, they were given a five-point scale (1 = *never* / 5 = *daily or almost daily*). The measure of the EIU was twofold. We first inspected how many children experienced each of the enlisted behaviours on at least weekly basis. Afterwards, the mean value of all seven items was calculated ($M = 1.72$, $SD = 0.79$, $\alpha = .84$). Higher scores indicate more prominent EIU.

Data Analysis

Data were analysed using the IBM SPSS Statistics 21 Software. Descriptive statistics, chi-square test and Cramer's V measure of association, linear correlation and multiple linear regression analysis were performed. The conventional levels of significance of the statistical tests (.05, .01, .001) were applied. Firstly, we report on the distribution of the intensive and excessive Internet use in the sample of adolescents aged 11 to 17 as a whole and on the relationship between the two variables. Secondly, we focus on two multiple linear regression models which were performed in order to analyse the relative, independent importance of socio-demographic and psychological characteristics, as well as the contextual and digital skills and engagement variables for (1) intensive and (2) excessive Internet use.

Results

The Distribution of Intensive and Excessive Internet use

More than two-thirds of adolescents aged 11 to 17 did not report the presence of any negative consequences related to EIU on a weekly basis (M = 0.68, SD = 1.33). Approximately one quarter of adolescents experienced at least one negative consequence, while all seven components were found in only one adolescent. On the other hand, a large number of adolescents spent a significant number of hours per day online. For example, more than one quarter of respondents (29%) spent more than five hours online every day.

The number of EIU indicators is only weakly related to the number of hours spent online, $\chi^2(49)$ = 171.53, $p < .01$, Cramer's V = .17 (Table 1). In general, the number of adolescents who spent more time online was higher among those who expressed a larger number of the EIU indicators. Still, more than one third of those who spent seven hours or more per day online expressed none of the EIU indicators, while some adolescents who spent relatively little time online (between one and two hours) reported relatively high levels of the EIU indicators (five).

Table 1
The number of EIU indicators among children aged 11–17 by the average daily time spent online

		Number of EIU indicators								
		0	1	2	3	4	5	6	7	Total
IIU (Time online)	Up to 1 hour	72 (96%)	2 (3%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	75 (100%)
	1–2 hours	84 (89%)	7 (7%)	2 (2%)	0 (0%)	0 (0.0%)	1 (1%)	0 (0%)	0 (0%)	94 (100%)
	2–3 hours	113 (81%)	13 (9%)	11 (8%)	1 (1%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)	139 (100%)
	3–4 hours	93 (73%)	18 (14%)	7 (6%)	1 (1%)	4 (3%)	4 (3%)	0 (0%)	0 (0%)	127 (100%)
	4–5 hours	91 (64%)	21 (15%)	10 (7%)	6 (4%)	6 (4%)	5 (4%)	3 (2%)	0 (0%)	142 (100%)
	5–6 hours	49 (51%)	19 (20%)	18 (19%)	3 (3%)	4 (4%)	3 (3%)	1 (1%)	0 (0%)	97 (100%)
	6–7 hours	36 (51%)	11 (16%)	8 (11%)	6 (9%)	6 (9%)	1 (1%)	1 (1%)	1 (1%)	70 (100%)
	7 hours and more	27 (38%)	12 (17%)	10 (14%)	10 (14%)	5 (7%)	5 (7%)	2 (3%)	0 (0%)	71 (100%)
Total		558 (69%)	103 (13%)	66 (8%)	27 (3%)	26 (3%)	19 (2%)	7 (1%)	1 (0%)	815 (100%)

Note. percentages relate to row Totals.

Predictors of the IIU and EIU

In line with a relatively weak relationship between the IIU and EIU, both the pattern of correlations between the IIE/EIU and the included variables

and their predictive values for the time spent online and/or excessive Internet use point to some major differences in the psychological content of the two dimensions of *screen time*. Table 2 contains data on zero-order correlations between two main variables and the included predictors, as well as regression coefficients. On the bivariate level, those adolescents who have more emotional problems, who were more impulsive or prone to sensation-seeking and antisocial behaviour and with a greater sense of being discriminated against spend more time online. Girls and older adolescents also spent more time online. Lower levels of family or school support were related to more time spent online, as well as the experience of violence, either as a victim or as a perpetrator. More skilful adolescents and those who practice more various activities online also spent more time on the Internet. The average time spent online had the highest (and negative) correlation with restrictive mediation.

The EIU was positively correlated with certain psychological variables, such as anxiety, sensation-seeking, antisocial behaviour, impulsivity, and perceived discrimination. Similarly, the more developed the digital skills and the more various the activities practiced online, the higher the EIU was. Victimized children and those who acted violently towards others were more likely to use the Internet excessively. Similarly, the higher level of active or restrictive parental mediation is related to lower levels of the EIU.

When it comes to the bivariate relationship between the EIU and the time spent online and other variables, the relationships are similar, but some differences should be pointed out. The correlation coefficients between the EIU and psychological variables (such as emotional problems and impulsivity) are higher than the analogous coefficients in the case of the time spent online. Similarly, digital skills and engagement are more intensely related to the time spent online than the EIU. Finally, some variables were related to only one of the two dimensions of screen time. For example, lower life satisfaction is related (only) to the more prominent EIU.

The multiple regression model which predicts the IIU proved to be statistically significant, $F(21, 428) = 10.33$, $p < .001$. The set of included variables explains 30% of variance in the time spent online among children. Similarly, the model which included the same set of predictors with the EIU as a dependent variable proved to be significant, $F(21, 397) = 14.52$, $p < .001$, explaining 41% of variance in the EIU scores. The results of the two multiple linear regression models are shown in Table 2.

Table 2

Multiple linear regressions predicting the IIU and EIU from the set of predictors

	Dependent Variable: IIU			Dependent Variable: EIU		
	β	95% CI	Zero-order	β	95% CI	Zero-order
Constant	1.25			-.74		
Sex (Girls)	.10*	[.03, .71]	.09*	.05	[-.06, .21]	.17***
Age	.06	[-.03, .15]	.33***	.09	[-.00, .07]	.29***
SES	.05	[-.05, .17]	.06	.01	[-.04,.05]	-.01
Size of municipality	-.01	[-.26, .21]	.03	.04	[-.05,.14]	.12**
Life satisfaction	.03	[-.07, .13]	-.05	.04	[-.02,.06]	-.12**
Self-efficacy	-.06	[-.44, .08]	.02	-.01	[-.12,.10]	.00
Emotional problems	.08	[-.06, .47]	.22***	.22***	[.15,.37]	.46***
Sensation-seeking	.07	[-.05, .36]	.27***	.09	[-.00, .16]	.31***
Antisocial behaviour	.16**	[.18, 1.02]	.37***	.11*	[.01, .36]	.46***
Impulsivity	.08	[-.05, .50]	.28***	.16**	[.08,.31]	.41***
Perceived discrimination	.00	[-.46, .47]	.17***	.15**	[.12, .50]	.42***
Family support	-.00	[-.33, .31]	-.14**	-.03	[-.17, .09]	-.19***
Peer support	.02	[-.15, .26]	.05	.07	[-.01, .16]	.07
School support	-.01	[-.28, .20]	-.14**	-.01	[-.11, .09]	-.17***
Restrictive mediation	-.26***	[-2.05, −.83]	-.45***	-.06	[-.41, .10]	-.26***
Active mediation	-.08	[-.37, .04]	-.26***	-.11*	[-.18, −.00]	-.19***
Peer mediation	-.06	[-.62, .12]	-.06	.08	[-.02, .28]	.08
Violence victim (Yes)	-.01	[-.44, .36]	.13**	.02	[-.12, .21]	.28***
Act violently (Yes)	-.01	[-.49, .40]	.21***	.04	[-.11, .26]	.29***
Breadth of Internet activity	.01	[-1.03, 1.38]	.20***	.09	[-.00, .97]	.27***
Digital skills	.14**	[.17, 1.02]	.32***	-.04	[-.25, .10]	.11*
Adj. R^2	.30			.41		

* $p < .05$, ** $p < .01$, *** $p < .01$.

When all other things were controlled for, girls, children prone to antisocial behaviour, more skilful children and those with more relaxed rules regarding the Internet use in the family spent more time online. When other variables were controlled for, almost all of the psychological variables or the experience of violence proved irrelevant for the amount of time spent online, although they were significantly correlated with it on the bivariate level.

The EIU was, on the other hand, predicted by higher anxiety, impulsivity, and perceived discrimination, as well as by the lack of active parental encouragement and help in Internet use. Many other variables which were significantly correlated with the EIU on a bivariate level, such as digital skills and engagement or support variables, proved to be non-significant predictors of the EIU.

Discussion

The obtained results support the thesis that, in spite of the significant correlation between the amount of time spent on the Internet and the EIU, the IIU should not be treated as a necessary or sufficient condition for the existence of the excessive use of the Internet. This is shown by the fact that, although every fifth adolescent (18%) spent six or more hours a day online, almost one half of respondents (44%) did not report the presence of any negative consequences related to the EIU. In addition, the predictors of the IIU and EIU are found to be different. The EIU was significantly more linked with the stress-related variables. This finding is quite in line with several recent studies which show that problematic Internet use (e.g., Kaess, Durkee, Brunner et al., 2014; Strittmatter et al., 2016) or dysfunctional Internet use (Tsitsika et al., 2014) – the concepts similar to our EIU measure – are more prominent in the adolescents who show signs of psychosocial (e.g., social isolation) and emotional distress (e.g., emotional problems). It is argued that adolescents who already have some real-life problems or emotional issues turn to the Internet as a tool of alleviating or coping with psychological distress (Durkee et al., 2012; Tsitsika et al., 2014; Strittmatter et al., 2016). Similarly, the mood management hypothesis (Reinecke & Vordeter, 2013) states that some children turn to the Internet in order to cope with stress and everyday problems and seek relief and escape. In line with our results, we can slightly revise this hypothesis by stating that such adolescents are more prone to developing compulsive patterns of Internet use, but not necessarily to spending more time online. In addition, the association of the EIU with impulsivity confirms that the children who need immediate stimulation and reward are more prone to addiction symptoms (Ko et al., 2012). Still, it must be borne in mind that this is a cross-sectional, correlational study that reveals correlations between variables and not their causal links or the direction of possible causal connections.

The results of several recent studies have corroborated our finding that the amount of time spent online is neither necessary nor sufficient factor for the EIU. In one study (Laconi et al., 2018) where a weak correlation between the PIU and the time spent online was found, the correlations of the PIU with a set of psychopathological variables varied from .10 to .42, while the correlations of the time spent online during week days and during the weekends with the same set of variables ranged from .09 to .14 and from .00 to .01, respectively. In the specific realm of video gaming, Kiraly et al. (2017) found that, while gaming time was weakly-to-moderately correlated with problematic gaming, the association between psychiatric symptoms and gaming time was substantially weaker (in fact, close to zero) than the association between psychiatric symptoms and problematic online gaming, which led the authors to conclude that intense video gaming was not essentially problematic. Similarly, one study showed that time spent online, tested unfortunately on the bivariate level only, distinguished those adolescents that used the Internet in an adaptive, maladaptive and pathological way (Durkee et al., 2012). Still, the data from the same cross-national project

showed that the hours spent online proved to be a non-significant predictor of the PIU in a two-year longitudinal study in seven European countries (Strittmatter et al., 2016).

Since our results indicate that the IIU can partly arise due to high engagement rather than addiction, it may be helpful to accept Charlton's suggestion (Charlton, 2002; Charlton & Danforth, 2004) to distinguish the criteria that are central in the classification of computing-related addictions (relapse and reinstatement, withdrawal, behavioural salience, and conflict) from the other criteria (euphoria, tolerance, and cognitive salience) while measuring the EIU. These latter criteria are peripheral indicators that may be more related to high engagement than to addiction.

While restrictive parental mediation is related to the lower IIU but without evidence of being effective in reducing the EIU, active parental mediation is associated with the reduced EIU but not with the IIU. One previous study (Kalmus, Blinka, & Ólafsson, 2015) found that lower EIU was associated with active parental involvement, but only when the child had experienced online harm, and with restrictive mediation. Others reported on the relevance of low parental involvement, implying the lack of psychological and emotional support as the most significant predictor of the PIU (Durkee et al., 2012).

When interpreting the responses on the EIU scale, it is important to note that the extent to which someone believes their behaviour is problematic depends on the subjective feelings and the interpretation of one's behaviour, which is shaped by social norms and in relation to others (Škařupová, Ólafsson, & Blinka, 2016). It should be added that these norms are age- and culture-specific (Harley, Morgan, & Frith, 2018). Differences in culture-specific norms may be partly responsible for wide variations found between European countries in the prevalence of pathological Internet use (Durkee et al., 2012; Laconi et al., 2018; Šmahel et al., 2012; Tsitsika et al., 2014) and in the association between the PIU and psychopathology (Kaess et al., 2014).

This study has the following strength and limitations. Since the majority of the EIU studies were conducted in China, South Korea, and Taiwan (Beard, 2010), it may be argued that the present research serves as a useful contribution to gathering information on the Internet use among young people in Europe, using the instruments and the sample that allow comparison with other European countries. On the other hand, several limitations are present.

The use of digital devices such as mobile phones does not always assume the use of the Internet (e.g., when listening to music, making selfies, communicating via SMS). For this reason, some authors emphasize the term human-machine interaction, and not just Internet use. They speak of, for instance, problematic smartphone use (Škařupová, Ólafsson, & Blinka, 2016) and various forms of technological dependency (Griffiths, 1995) defined as behavioural dependency involving human-machine interaction. Similarly, the concept of screen time is broader than the time spent on the Internet. Although the intense and problematic use of digital technologies is becoming the focus of the public and professionals, we have opted for a more common discourse on the use of the

Internet, primarily because the questions in the used questionnaire were related to the time spent on the Internet and the problems associated with it.

Since the data were cohort based, it is risky to generalize the findings to other ages. The link between the time spent online and EIU may be different at older ages, because, at that point, the distribution of the time spent on the Internet may be different, the expectations and norms regarding Internet use may be different and the opportunities and the scope of different forms of mediation may also be different than at younger ages.

The measures used in this study were based on self-assessments. Hence, their validity is determined not only by the child's insight into his/her own behaviour and mental states and honesty, but also by the child's understanding of the meaning of the offered questions and answers and what was expected of the child with this respect. The assessment of the time spent online or digital aids is inherently unreliable, but with the shift of activity towards mobile devices that are constantly available and constantly connected to the Internet, the question of the time spent on the Internet takes on a different, unclear meaning. It is possible that many statements about the excessive time spent on the Internet do not imply that the child actively used the Internet. Instead, this might mean that the device they carry around is constantly connected to the Internet.

A set of questions pertaining to the EIU, as well as some other measured variables, required the child to state the frequency of different events over a one-year time span. It is hard to expect that such judgments given by children would be very reliable. On the other hand, the time frames for some questions were related to significantly shorter or indefinite time periods, which further complicates postulating a possible direction of influence.

Conclusions

Based on the results of the present study, the following can be concluded: (a) the vast majority of adolescents (more than two-thirds) did not report the presence of any negative consequences related to the EIU on a weekly basis; a large number of adolescents spent a significant number of hours per day online – more than one quarter of respondents (29%) spent more than five hours online every day; (b) the number of excessive use indicators is only weakly related to the number of hours spent online, Cramer's $V = .17$; (c) the IIU is positively predicted by female gender, antisocial behaviour and digital skills, and negatively by restrictive parental mediation; the EIU is positively predicted by emotional problems, impulsivity, antisocial behaviour and the perceived discrimination and negatively by active parental mediation. The recommendation from this study would be that the optimal screen time should not depend on the amount of time spent online, but on the content and quality of the activities, child characteristics and adult educational practices, i.e., the wider context of the Internet use. Far more important than the amount of time spent online is the issue of what the children use the Internet for.

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Intenzivna i prekomerna upotreba interneta: različiti prediktori koji deluju kod adolescenata

Dragan Popadić, Zoran Pavlović i Dobrinka Kuzmanović

Odeljenje za psihologiju, Filozofski fakultet, Univerzitet u Beogradu, Beograd, Srbija

Cilj ovog istraživanja bio je da se utvrde faktori koji imaju prediktivnu vrednost u odnosu na intenzivnu i prekomernu upotrebu interneta kod adolescenata. Ispitivani prediktori bile su različite psihološke, bihejvioralne i socio-demografske varijable. Podaci su prikupljeni krajem 2018. godine u okviru međunarodnog istraživanja *EU Kids Online*, na uzorku od 863 adolescenata iz Srbije (434 [50%] mladića) uzrasta od 11 do 17 godina. Utvrđeno je da je intenzivna upotreba interneta više karakteristična za devojke, za adolescente koji imaju tendencije prema antisocijalnom ponašanju, za one koji misle da imaju napredne digitalne veštine i za one čiji roditelji ne koriste restriktivne forme medijacije. S druge strane, prekomerna upotreba interneta bila je povezana sa psihološkim varijablama poput anksioznosti, impulsivnosti i percipirane diskriminacije po različitim osnovama, ali i sa odsustvom aktivne roditeljske medijacije i podrške u odnosu na upotrebu digitalnih tehnologija.

Ključne reči: vreme provedeno za ekranom, adolescenti, prekomerna upotreba interneta