

Excessive internet use among European children

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Introduction

The internet has become an integral part of adolescents' lives. Children and young people are engaging in a broad range of activities online, chatting with friends, playing online games, watching videos, listening to music, doing schoolwork, browsing for information, etc (Subrahmanyam and Smahel, 2010). The rapid increase in fast and cheap internet connections since the end of the 1990s has helped to increase the amount of time individuals spend online. Adolescents growing up in the contemporary digital era are among the most prominent internet users and more frequent users than among the older age categories (Lupac and Sladek, 2008). Their online and offline lives are strongly interconnected (Subrahmanyam and Smahel, 2011).

The increased time spent online is prompting questions about whether all individuals are in control of their increasing internet usage. Excessive time spent online has been deemed to influence several aspects of youths' lives: declining school results or even dropping out of school; increased family tension; abandoned hobbies; psychological problems such as depression, anxiety and low self-esteem; and physical health problems due to sleep deprivation and lack of physical activity (Young, 1996; Shapira et al, 2000).

The term 'internet addiction' emerged when the above-mentioned negative outcomes began to be associated with repetitive, compulsive and uncontrollable use of the technology. Different researchers use different terms to describe the same or similar phenomena: pathological internet use (Young, 1996, 1998), problematic internet use (Shapira et al, 2000), internet addiction disorder or addictive behaviour on/to the internet (Widyanto and Griffiths, 2006). In this chapter we use the term 'excessive internet use' to describe this phenomenon.

Although there is agreement about how to describe the symptoms of this phenomenon, researchers are not agreed about the extent to which it can be considered an addiction and, thus, a pathology. Widiyanto and Griffiths (2006, 2007) maintain that it is unclear when speaking about excessive internet use how often the technology is blamed for causing the problem versus how much the technology is mediating problems with origins elsewhere. Also, excessive internet use is not acknowledged as an official disorder and is not included in diagnostic manuals, for example, in the American Psychiatric Association Diagnostic and Statistical Manual IV (DSM IV), and will also not be included in the revision DSM V (Block, 2008).

Excessive internet use has been reported among all age groups, but is especially prevalent among adolescents and emerging adults (Tsai and Lin, 2003; Smahel et al, 2009a). Increased concerns about the negative impact of internet use focus especially on adolescence, since this is a formative period, and misuse of the internet in adolescence might be more harmful than later in life (Kaltiala-Heino et al, 2004). The reported prevalence of pathological excessive use varies, due mainly to a lack of agreement on the 'cut-off point' distinguishing 'addicts' from 'non-addicts'. Within the population of European youth the number of excessive internet users is said to be within the range of 10 per cent. Johansson and Göttestam (2004) surveyed 3,237 Norwegians aged 12-18 using Young's (1996) Diagnostic Questionnaire and evaluated 2 per cent of their sample as having an 'internet addiction', and an additional 8.7 per cent to be exhibiting at-risk internet use. Within a sample of Czech youth, 8 per cent of young adolescents aged 12-15 and 4.5 per cent of 16- to 19-year-olds were considered to be demonstrating all the symptoms of 'addictive behaviour' (Smahel et al, 2009b).

Components of excessive internet use

The components of 'internet addiction', proposed by Mark Griffiths (2000; Widyanto and Griffiths, 2007), based on Brown's (1993) concept of behavioural addiction, are often used to determine pathological extensive internet use. An internet user can be considered addicted if he or she fulfils or scores highly for all the following factors: *salience*, when the activity becomes the most important thing in an individual's life; *mood change*, or euphoria, where subjective experiences are significantly affected by the activity; *tolerance*, the process of requiring continually higher doses of the activity to achieve the original sensations; *withdrawal symptoms*, negative feelings and sensations which occur when unable to perform the activity or after termination of the required activity;

conflict, usually with the individual's closest social surroundings (family), typically accompanied with a significant decrease in school results or dropping out; and *relapse and reinstatement*, the tendency to return to the damaging activity even after periods of relative control. Different scales and factors to measure excessive internet use or 'internet addiction' have been proposed (see Shapira et al, 2000; Ko et al, 2005); however, their basic premise is similar.

Research questions and hypotheses

Although several studies of European samples show no gender differences in tendencies to become addicted (Johansson and Gotestam, 2004; Milani et al, 2009), there is a gender gap in some online applications. A typically male-dominated application, online gaming (MMORPGs), is often claimed to be the type of application with the greatest addictive potential (Ko et al, 2007). Since online gamers are a predominantly male group of excessive internet users, they may be the cause of identified gender gaps. Most studies in this area originate in East Asia and show that adolescents display addictive behaviour on the internet more often than older age categories; however, the differences within this group are unknown. Thus, our first research question focuses on the role of demographic characteristics.

RQ1: Can excessive internet use be predicted by gender and age?

Our hypotheses are:

H1: Boys will score higher use than girls for excessive internet use.

H2: Older children will score higher than younger children for excessive internet use.

According to Young (2010), internet addiction is often connected to phenomena such as poor self-esteem and feelings of isolation. These connections have been identified in excessive online gamers (Bessi re et al, 2007) and Cao and Su's (2007) study of Chinese 12- to 18-year-olds reveals that participants who display symptoms of addictive internet behaviour score higher on the subscales of neuroticism, psychosis, lying, emotional symptoms and conduct problems.

Thus, psychological impairment, whether caused by or the cause of pathological overuse of the internet, plays a significant role. According to Ko and colleagues (2006), internet addiction among adolescents is

associated with high novelty seeking. Mehroof and Griffiths (2010) show that sensation-seeking is one of the factors strongly associated with addiction to online games. Lower self-efficacy may also play a role. Davis (2001) states that lower self-efficacy is a cognitive distortion in self, and an individual may use the internet to regain a positive evaluation of their own abilities that is lacking in the offline environment. This leads to our second research question:

RQ2: Can excessive internet use be predicted by psychological variables?

We hypothesise that:

H3: Children who score higher for excessive internet use will have lower self-efficacy.

H4: Children who score higher for excessive internet use will have more psychological difficulties.

H5: Children who score higher for excessive internet use will be greater sensation-seekers.

The personality trait of sensation-seeking is reported to be connected to offline behavioural problems. Ko et al (2006) find that internet addicts more frequently report substance and alcohol use. Internet addiction is also considered a member of the impulse control disorder family. To some extent, the association between internet addiction, sensation-seeking and offline behavioural problems such as aggression and alcohol misuse/abuse lies in the individual's problematic self-control mechanisms. Since there is a correlation between offline and online problematic behaviour (for more details see Chapter 23, and also Chapter 12, this volume), a close relationship between addictive internet use and other types of potentially risky online activities, such as pornography consumption or cyberbullying, can be expected (Juvonen and Gross, 2008; Vandebosch and Cleemput, 2009). The third research question thus is:

RQ3: Can excessive internet use be predicted by risky activities offline and online?

H6: Children who score higher for excessive internet use will display more risky offline activities (behaviour).

H7: Children scoring higher for excessive internet use will display more active risky online activities, where active behaviour means that the individual not only encounters risky material online, but also generates some kind of dangerous behaviour, that is, online perpetration. We expect that active participation could be connected to higher excessive internet use.

(H7a: Meeting strangers from the internet, H7b: Cyberbullying aggression, H7c: Sending sexual messages.)

While the phenomenon of excessive internet use has been studied intensively, most work analyses the relationships of only a few variables. This chapter looks more closely at the connections between online risky activities and excessive internet use, and also at the context of psychological traits. We also study a very large sample that shows the extent of excessive internet use across 25 countries.

Methodology

The study uses data from the international research EU Kids Online II project (details on the project methodology are provided in Chapter 2). This chapter focuses on a subsample of children aged 11–16 ($n=18,709$) (younger children completed a shorter questionnaire that does not include questions about excessive internet use).

Measures

The following variables are described in the Appendix at the end of the book: psychological difficulties, self-efficacy, risky offline activities and sensation-seeking.

- *Frequency of internet use*: this item measures time spent online. Possible answers include: ‘less than once a month’, ‘once or twice a month’, ‘once or twice a week’ or ‘every day or almost every day’. In our data, a higher value of the scale indicated more time spent online.
- *Meeting new online contacts offline*: this variable is a combination of the following three variables: having met strangers online (yes/no), having met strangers offline (yes/no) and number of strangers met offline (see the Appendix). ‘1’ indicates no meetings with strangers online, ‘2’ indicates only meeting strangers online, ‘3’ indicates meeting 1–2 strangers from the internet, offline, and ‘4’ indicates having met 3 or more strangers offline.

- *Bullying others online*: this variable is a combination of the following four variables: prevalence of cyberbullying perpetration, measured through a yes/no question about experiencing it; methods of cyberbullying, including mobile phone bullying; prevalence of perpetrating online bullying, measured through a yes/no question about being the perpetrator of bullying; and frequency of online bullying perpetration (see the Appendix). Bullying through mobile phones and the internet are described as ‘bullying others online’. The values are ‘1’ – no online aggressive behaviour; ‘2’ – less frequent (‘less often’) aggressive behaviour; ‘3’ – aggressive behaviour ‘once or twice a month’, ‘4’ – aggressive behaviour ‘once or twice a week’, and value ‘5’ – aggressive behaviour ‘every day or almost every day’.
- *Sending sexual messages*: this combines two variables for prevalence and frequency of sending sexual messages (see the Appendix), scored as follows: ‘1’ – never, ‘2’ – ‘not often’, ‘3’ – ‘once or twice a month’, ‘4’ – ‘once or twice a week’, and ‘5’ – ‘every day or almost every day’.
- *Excessive internet use*: participants were asked to respond to five questions referring to the six factors of addictive behaviour adjusted by Griffiths (2000): mood change and withdrawal symptoms: ‘I have felt bothered when I cannot be on the internet’; salience: ‘I have gone without eating or sleeping because of the internet’; tolerance: ‘I have felt bothered when I cannot be on the internet’; potential conflicts or a decline in social bonds: ‘I have spent less time than I should with family, friends or doing schoolwork because of time spent on the internet’; and relapse and reinstatement: ‘I have tried unsuccessfully to spend less time on the internet’. These questions were scored on a four-point Likert scale from ‘never’ to ‘very often’. An excessive internet use index was created as the mean value of these five items. The Cronbach’s alpha is 0.767.

Results

Table 15.1 shows the occurrence of ‘very often’ and ‘fairly often’ responses as percentages for each of the five items in the excessive internet usage index, across all countries. Table 15.1, column 2 reports the values of the index; higher values are more excessive internet usage in that country. The highest value of the index was for Estonia, followed by Bulgaria, Portugal and the UK. The lowest values were for Italy, Hungary and Belgium.

For the distribution of items on the scale, the highest percentage was for children who responded that they ‘very often’ or ‘fairly often’ had found themselves surfing when they were not really interested

Table 15.1: Percentages of excessive internet use among European countries

Country	Excessive internet usage index (Mean)	I have gone without eating or sleeping because of the internet Very/fairly often (%)	I have felt bothered when I cannot be on the internet Very/fairly often (%)	I have caught myself surfing when I am not really interested Very/fairly often (%)	I have spent less time than I should with either family, friends or doing school-work because of time I spent on the internet Very/fairly often (%)	I have tried unsuccessfully to spend less time on the internet Very/fairly often (%)
Austria	0.14	4	7	13	9	8
Belgium	0.11	2	9	15	8	8
Bulgaria	0.22	8	30	14	12	17
Cyprus	0.20	10	16	23	13	19
Czech Republic	0.18	3	12	17	12	13
Germany	0.14	6	7	10	11	8
Denmark	0.16	2	5	21	15	14
Estonia	0.23	2	16	30	14	21
Greece	0.16	5	12	20	8	15
Spain	0.18	4	15	31	8	12
Finland	0.16	2	7	14	11	9
France	0.12	2	10	16	10	11
Hungary	0.10	2	8	8	7	9
Ireland	0.21	9	16	19	20	20
Italy	0.09	2	4	7	10	11
Lithuania	0.15	6	9	10	12	10
Netherlands	0.14	3	7	14	6	12
Norway	0.20	4	13	27	15	14
Poland	0.13	3	7	12	8	9
Portugal	0.22	11	24	23	23	22
Romania	0.17	5	9	13	14	18
Sweden	0.16	2	6	24	19	14
Slovenia	0.13	2	12	13	6	11
Turkey	0.15	6	10	12	11	12
UK	0.21	5	19	20	27	18
Total	0.16	4	11	15	13	12

(15.3 per cent across all European countries); the lowest percentage was for children who responded that they had ‘very often’ or ‘fairly often’ gone without eating or sleeping because they were using the internet (4.4 per cent across all European countries).

A hierarchical, three-step, linear regression (see Table 15.2) was used to determine associations and to test the proposed hypotheses relating to excessive internet usage and children’s demographic variables, relevant psychological concepts and online/offline risks. In step 1, we include the demographic variables (see model 1), the psychological variables are added in step 2 (see model 2), and variables for online and offline risks are added in step 3 (see model 3). The demographic variables included are age and gender; pre-analysis shows that other demographic variables, such as size of locality, population density and the level of education of household head are not associated with excessive internet use.

In the first step of the regression, both age and gender are associated with excessive internet use (confirming H1 and H2). Boys scored very slightly higher than girls. Since gender differences are only significant in model 1 and not other models, it seems that the gender differences are explained by the psychological variables. The psychological concepts self-efficacy, psychological difficulties and sensation-seeking are added to the regression in model 2.

Table 15.2: Linear regression: factors associated with excessive internet usage

	Model 1		Model 2		Model 3	
	B	β	B	β	B	β
(Constant)	-0.082**		-0.369**		-0.457**	
Age	0.018**	0.175	0.015**	0.147	0.007**	0.066
Gender	-0.011**	-0.032	-0.004	-0.012	-0.005	-0.013
Self-efficacy			0.010*	0.025	-0.001	-0.003
Psychological difficulties			0.201**	0.274	0.179**	0.245
Sensation-seeking			0.029**	0.165	0.017**	0.095
Risky offline activities					0.084**	0.100
Meeting new online contacts offline					0.028**	0.124
Bullying others online					0.024**	0.055
Sending sexual messages					0.024**	0.040
Frequency of internet use					0.044**	0.137
R ²	0.032		0.155		0.214**	
F	199.273**		445.619**		331.554**	
ΔR ²	0.032		0.123		0.059	

Notes: * $p < 0.05$, ** $p < 0.01$.

Psychological difficulties and sensation-seeking are positively associated to excessive internet use; the association for self-efficacy is not significant in model 3 (H3 is rejected). We find confirmation that youth with more psychological difficulties and greater need for sensation-seeking are at greater risk of excessive usage (confirming H4 and H5). Among the psychological variables, the highest associations are between psychological difficulties and excessive use. In model 3, online and offline risks and frequency of internet use are added to the regression. Risky offline activities, meeting new online contacts offline, bullying others online, sending sexual messages and frequent internet use are positively associated to the excessive usage index. The highest association is for risky offline activities. Hypotheses H6 and H7 (a-c) are confirmed.

Discussion

This chapter has analysed the associations between excessive internet usage and demographic, psychological and risky behavioural variables. Boys scored slightly higher than girls for excessive internet usage, but the difference is not significant when psychological variables are taken into account. This finding is in line with other research on Europe (Johansson and Gotestam, 2004; Milani et al, 2009) that does not find gender differences. However, it contrasts with the stereotype of boys having problems controlling time spent online, or as constituting a 'nerd culture' (Kendall, 2002). We found that a stronger predictor of excessive use is age: older children tended to score higher than younger children. This may be related to the reduced monitoring of older children by their parents (Eastin et al, 2006), with the result that their time and activities online are less controlled. Although younger adolescents have fewer self-controlling mechanisms and may therefore be more vulnerable to excessive internet use, it is presumed that parental monitoring and rearing styles are important here. The greater knowledge of and experience with digital technology of older adolescents may also contribute to their higher excessive internet use scores, since, overall, older children use the internet more and are therefore more 'dependent' on both its negative (overuse of online games) and positive (information gains, communication with peers) aspects (see Chapter 2 for more details).

The strongest predictor of excessive internet usage among the psychological variables seems to be psychological problems, but sensation-seeking and risky offline activities are also associated with excessive usage, and this has been confirmed in other studies (Ko et al,

2006; Cao and Su, 2007). This is perhaps an indication that psychological predictors of excessive use are similar for Asian and for European children. The Taiwan study shows relations between excessive internet use and substance use (Ko et al, 2006) and also, aggressive behaviour (Ko et al, 2009). This supports the hypotheses that adolescents' online and offline problems are interconnected (Subrahmanyam and Smahel, 2011). The analysis in this chapter shows weak connections between risky offline activities and excessive usage. Further research is needed to investigate the relations between offline risky activities and excessive internet use, since the available data on risky offline activities is not sufficiently detailed to allow firm conclusions. Studies of the relationships between excessive internet use and other online risks are scarce. A study of a representative sample of Czech youths aged 12–18 reveals moderate correlations between cyberbullying experiences and two components of addictive behaviour: conflict and salience (Smahel et al, 2009c). These results might indicate that not only are offline risks and excessive internet usage interconnected, but also that other online risks can be related to excessive use. This is confirmed by the findings in this chapter of associations with active online risky activities, including making new contacts online, being the perpetrator of cyberbullying and sending sexual messages. Among the online risk variables, the strongest relation is between excessive internet usage and meeting strangers encountered on the internet in the real world; this is among the more risky behaviours since it could have physical consequences. This finding is in line with research showing that the stronger the preference among youths for online communication, and the greater the number of friends met online, the more symptoms of excessive use that will be demonstrated. Conversely, the more online addictive behaviour that young people demonstrate, the greater will be the number of their online friends (Smahel et al, 2012).

The analysis in this chapter has some limitations. First, since it involved 25 countries and 20 different languages, there are some methodological limitations (as discussed in Chapter 2 and 3). Second, the five-item scale used to assess excessive internet use allows only one item per factor of excessive use; this enabled us to operationalise the scale as an index, but measuring more items would allow deeper analysis of the serious cases of excessive internet use.

Conclusion

This chapter set out to discover associations between excessive internet use and demographic, psychological and risky behaviour variables.

Excessive internet use was described using the five factors of addictive behaviour (Griffiths, 2000). Excessive internet use among European children is shown to be associated with psychological, online and offline risky activities and, to some degree, demographic variables. The best predictors of excessive use seem to be psychological difficulties. However, there are associations between risky offline and active online risky activities. These risky online activities include more numerous meetings with new contacts ('strangers') online, and being an active perpetrator of cyberbullying or sexting.

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