Ševčíková, A., Šerek, J., Macháčková, H., & Šmahel, D. (in press). The extent matters: Exposure to sexual material among Czech adolescents. *Journal of Early Adolescence*.

Abstract

Adolescents use media that exposes them to sexual material. This study focused on adolescents in the Czech Republic, a country with relatively high rates of exposure to sexual material (ESM). A sample of adolescents aged 11 to 15 years (N=495) taken from the project EU Kids Online II was examined for predictors of the following: frequency of ESM, place of ESM, and, for online ESM, the types of sites. The only predictors of sporadic ESM were age and excessive internet use, while age, gender, sensation seeking, and excessive internet use were predictors of frequent ESM. Age and excessive internet use were predictors only of ESM online, while age, gender, emotional problems, sensation seeking, and excessive internet use were predictors of ESM in online and offline environments. High ESM is linked to adolescent vulnerability and also to adolescent psychosexual development. The implications of these findings are discussed in this paper.

Keywords: internet; sexual content; traditional sexual media; early adolescence; EU Kids Online II

Introduction

Exposure to sexual material (ESM) at a young age is a concern that commonly arises with respect to media. Sources of sexual material have greatly expanded beyond the traditional (magazines, videos) as the internet has become an integral part of adolescents' lives, providing nearly unlimited access (Subrahmanyam & Šmahel, 2011). As high levels of ESM at a young age can have broad negative effects on an adolescent's sexuality and well-being (L´Engle, Brown & Kenneavy, 2006) it is important to examine which children are at risk of ESM and to what extent.

This issue is especially topical in the Czech Republic where heightened rates of ESM both offline and online have been found among adolescents (Livingstone, Haddon, Görzig, & Ólafsson, 2011a). The EU Kids Online II survey showed that Czech adolescents aged 9 to 16 years had the second highest rate of ESM offline and online among 25 European countries (Livingstone et al., 2011a). Forty-five percent of all Czech adolescent internet users had seen sexual images either offline or online; 28% had seen them on the internet. In comparison, Germany, a neighbouring country, had the lowest rate of ESM, with only 10% of adolescent internet users having been exposed, 4% online.

These findings provide evidence that almost half of all Czech adolescent internet users between the ages of 9 and 16 have seen sexual material (Livingstone et al., 2011a) and this trend continues with advancing age. Czech emerging adults (aged 19 to 21 years) reported the highest rate of ESM online when compared with six other countries: the USA, Canada, Singapore, New Zealand, Hungary, and China (Subrahmanyam & Šmahel, 2011). To understand these increased rates of ESM in Czech youth, this study aimed to explore how youth are exposed to sexual materials: specifically, to look at the frequency of ESM, place of ESM, and, for online ESM, the types of websites where ESM occurred. There is a lack of

research in this area, and rectifying this could help identify adolescents who are at greater risk for ESM and find ways to protect them against the potential negative outcomes of ESM.

Context: growing up in the Czech Republic

The Czech Republic is a transitional post-communist country in Central Europe with a 40-year history of communist rule. This period was ended by the "Velvet Revolution" in 1989, which produced large-scale cultural changes resulting in intergenerational differences in Czech society (Marada, 2004). With regard to values, Kalmus and Vihalemm (2008) found that the younger Czech generation is more global-minded and has adopted values related to liberalism (emancipation, individualism, consumerism) to a greater extent than the older generation: It is worth noting that liberalism influences sexual behaviour. Specifically, it has been found that Czech attitudes towards sexual behaviour are more liberal and less restrictive than in Western European and American societies, and that their sexual attitudes show patterns of continuous liberalization across generations (Weiss & Zvěřina, 2001).

In addition to historical and cultural transformations, Czech society has also undergone changes caused by the large-scale penetration of information and communication technologies. Internet use among young people has risen markedly. In 2007, 93% of Czech youth aged 12-18 years used the internet, compared with only 63% of Czech adults aged 34-40 (Lupač & Sládek, 2008). However, Czech adolescents seem to lack proper parental control in this area in comparison with other European youths. Czech parents were found to be relatively passive in adopting the following strategies for mediating their children's internet use: setting rules for what children can do online, providing information about online risks, monitoring and restricting children's activities online, and using technical solutions to control

them (e.g. filtering software). Overall, these strategies were less frequently employed in the Czech Republic compared to the European average (Kalmus & Roosalu, 2012).

Based on the above, Czech adolescents live in a specific context characterised by liberalized sexual norms, a generational gap in internet use, and less parental supervision of internet use. This context may affect their ESM.

Predictors of ESM

Predictors of ESM at a young age can be divided into two categories relating to psychosexual development and vulnerability. Firstly, ESM can be interpreted to some extent as a developmentally determined phenomenon in which age, gender, and time spent online may play crucial roles. Previous studies have shown that older adolescents tend to consume sexual material both offline and online more often than younger internet users (Brown & L´Engle, 2009; Wolak, Mitchell & Finkelhor, 2007; Ybarra & Mitchell, 2005). Thus, with increasing age, interest in sexual material may become more normative.

Like age, gender also clearly affects psychosexual development and sexual behaviour. Adult males are more likely to report seeing sexual material than females (Hald, 2006; Traen, Nilsen, & Stigum, 2006) and this trend is also apparent in adolescence (Peter & Valkenburg, 2006; Ybarra & Mitchell, 2005).

With advancing age, adolescents become more active in exploring the internet, which increases time spent online. Recent research documented that youth who spent greater amounts of time online were more likely to report ESM (see Mitchell et al., 2003).

Secondly, in addition to the aforementioned predictors, scholars highlight that adolescent vulnerability predisposes them to ESM at a young age; specifically, relationships between psychosocial difficulties and ESM have been found (Ybarra & Mitchell, 2005;

Wolak et al., 2007). According to Wolak et al. (2007), adolescents reporting depression and negative life experiences were more likely to encounter sexual material on the internet. Since emotional problems may increase adolescents' tendencies to expose themselves to risks (Ethier, Kershaw, Lewis, Milan, Niccolai, & Ickovics, 2006), this study proposes to explore whether adolescents with emotional problems will be more likely to encounter sexual images.

Further, previous studies have provided evidence that heightened sensation-seeking among adolescents increases the likelihood of ESM both offline and online (Brown & L´Engle, 2009; Peter & Valkenburg, 2006). At a young age, accessing forbidden sexual material may be highly stimulating, as it is a novel experience.

Several scholars have also proposed a link between excessive internet use and accessing sexual material online (Meerkerk, Eijnden, & Garretsen, 2006; Shapira et al., 2003). Excessive or problematic internet use (Widyanto & Griffiths, 2007) manifests itself through the following symptoms: salience (when the activity becomes a crucial part of daily life), euphoria caused by the activity, build up of tolerance (the need to increase the activity to achieve the original sensation), withdrawal symptoms, conflict (usually with those closest to the individual), and relapse (Griffiths, 2000; Widyanto & Griffiths, 2007). Despite the importance of this phenomenon, most of the studies providing evidence for a link between excessive internet use and exposure to sexual material have focused on adult samples. There is a lack of research on younger age groups, specifically on adolescents who may also be at risk of excessive internet use (e.g. Van den Eijnden, Meerkerk, Vermulst, Spijkerman, Engels, & Rutger, 2008). Furthermore, it appears that no previous study has focused on the role of excessive internet use as a predictor of online ESM among internet users in early adolescence.

Diversity in ESM

Previous studies have documented that ESM occurs in many forms, which are consequently linked to various predictors (see Mitchell et al., 2003; Wolak et al., 2007; Ybarra & Mitchell, 2005). For instance, differences were revealed in the predictors of online and offline ESM. Increased levels of depression and weaker emotional bonding with a caregiver were linked to increased ESM both offline and online for the same individual, but they did not predict ESM that occurred only offline (Ybarra & Mitchell, 2005). These findings suggest that there are qualitative differences in the predictors for different forms of ESM.

In the Czech Republic, where a large proportion of adolescents have seen sexual material both offline and online (Livingstone et al., 2011a), it seems important to focus on the extent of this ESM. Specifically, it would be useful to know whether adolescent vulnerability predicts ESM. This may mean that those in early adolescence who face psychosocial difficulties could be even more vulnerable to the potential negative outcomes of ESM.

The extent of ESM

The extent of ESM can be operationalized in several ways. The first deals with the frequency of ESM. Due to the increased accessibility of the internet in everyday life, and to websites that use malicious software such as pop-up windows (Wolak, Mitchell, & Finkelhor, 2006) there may be a wide spectrum of experience with ESM at young ages. This experience can range from frequent exposure to sporadic exposure to no exposure at all.

Exposure to sexual material can also be defined by the places where it occurs. Whether the adolescent encounters sexual material only offline (through traditional media, such as magazines, TV, or videos), only online, or in both environments can be crucial. Previous studies have shown that ESM in traditional media such as TV was strongly related to

ESM on the internet (Peter & Valkenburg, 2006). This indicates that ESM both offline and online simultaneously may represent greater ESM than when ESM occurs in only one form.

Similarly, with the integration of the internet into everyday life, the range of online settings where sexual material is easily accessible has expanded. For instance, it has been documented that adolescents encountered sexual material through various websites: X-rated websites with a primary sexual focus (Wolak et al., 2007), peer-to-peer file-sharing networks (Greenfield, 2004), pop-up advertisements (Wolak et al., 2007), and websites without a primary sexual focus, such as social networking sites (Ringrose, 2010). This list shows that adolescents can use various online applications, based on their interests, while browsing the internet. This in turn may result in multiple incidences of ESM that include but are not limited to ESM on sexually-focused such X-rated sites or peer-to-peer file-sharing networks.

Predictors of the extent of ESM

Previous studies have compiled sufficient information about the link between psychosocial risks and premature sexual activities (Bearman & Brückner, 2001; Bellis, Hughes, Calafat et al., 2008; Kuortti & Kosunen, 2009; Orr, Beiter, & Ingersoll, 1991). Premature sexual activity is typically represented by the early onset of sexual behaviour. However, in today's digital age, premature sexual activity may be expanded to include visiting sexually-focused websites and greater ESM. As an association between early sexual activity and concomitant psychosocial risks has been found (Orr et al., 1991), it is hypothesised that risk-related predictors will predict greater ESM, defined through frequent ESM, ESM in both on and offline environments, and visiting sexually focused websites. More precisely, adolescents with higher levels of emotional problems, sensation seeking, and excessive internet use will be more likely to be frequently exposed to sexual materials, to report both offline and online ESM, and to visit sexually focused websites.

Research aim

Recognizing the particularities of the Czech cultural context, the present study aimed to develop a greater understanding of the extent to which Czechs in early adolescence encountered sexual material, and which predictors were related to sporadic and frequent ESM. It also sought to discover where ESM occurred: only offline, only online, or in both environments, while controlling for age, gender, socio-economic status and frequency of internet use. Finally, this study aimed to explore variability in the predictors of ESM across different online applications, such as X-rated websites, peer-to-peer file-sharing websites, pop-up windows, and social network sites.

Methods

Participants

This study used data from the international research project EU Kids Online II. coordinated by the London School of Economics and Political Science. The project aimed to enhance knowledge of European children's and parents' experiences and practices regarding internet safety and new online technologies. This study was conducted from April to October 2010 across 25 European countries, where 25,142 children aged 9-16 years were interviewed together with their parents.

In the Czech Republic, a registered directory of fixed telephone lines was used for the selection of a representative sample. For the sample selection, municipalities and postal districts for cities with populations over 50,000 were used as a primary sampling unit. The sample was stratified by: (1) region using nomenclature of territorial units for statistics, specifically NUTS 3 (see Eurostat, 2010); (2) level of urbanization, the total number of inhabitants in municipalities or postal districts. Households that had been selected randomly from the register were contacted via telephone and screened for their eligibility to participate

in the study, i.e. being a residential/occupied household with a child aged 9-16 years who used the internet. A total number of 1,438 eligible households were identified, of which 70% (N = 1, 009) successfully participated in the study. For the purposes of the present study, the total sample was narrowed down to Czech adolescents aged 11-15 years (N = 610; 48 % boys). Due to missing answers on some items, however, data from 495 participants were used in the analyses.

Procedure

Data gathering was performed via a survey, conducted by the market research company Ipsos MORI, which was commissioned to work with EU Kids Online and which contracted a national fieldwork agency in the Czech Republic. An agency interviewer went into each preselected household and collected data from the child using an interviewer-administered questionnaire and a self-completion paper-based questionnaire which focused on sensitive information such as online risks and psychological self-evaluation. In households where more than one eligible child was present, one child per household was selected, based on the most recent birthday. The child´s parent also participated in the survey using an interviewer-administered questionnaire. Where both parents were present, the parent who spent the most time with the child participated. The research was conducted in accordance with ESOMAR ethical guidelines and approved by the London School of Economics Research Ethics Committee. Confidentiality and anonymity were guaranteed, and all relevant information and questions were explained to both the parents and the children involved. In addition, the parent was in the vicinity while the child had their face-to-face interview and filled in the self-completed questionnaire.

Measures

The questionnaires for children and parents were developed by members of the EU Kids Online team with guidance from Ipsos MORI and were further tested and refined by a two-phase process of cognitive interviewing and pilot testing (for further details see Livingstone et al., 2011b).

*ESM.*Two questions were used to measure the frequency of ESM. Children were asked about their ESM in general. First, the participants were questioned on their ESM using the following dichotomous response scale: "In the past year, you have seen lots of different images – pictures, photos, videos. Sometimes, these might be obviously sexual – for example, showing people naked or people having sex. Have you seen anything like this in the past 12 months?" Those who answered "yes" were then asked: "How often have you seen these things in the past 12 months?" a single four-point scale with categories "every day or almost every day; once or twice a week; once or twice a month; less often" was used to measure the frequency of ESM (the place of ESM – whether offline or online—was not distinguished). Using these two questions, three categories were developed. All participants who answered "no" to the first question were coded as having "no ESM" (= 0), the participants who answered "yes" to the first question and "less often" to the second question were coded as having "sporadic ESM" (= 1), and the participants who answered "yes" to the first question and "every day or almost every day", "once or twice a week" or "once or twice a month" to the second question were coded as having "frequent ESM" (= 2). This categorization reflected the fact that the answers on the four-point frequency scale were positively skewed and non-normally distributed (Shapiro-Wilk(236) = 0.77, p <.01).

Place of ESM. All participants who reported ESM were asked a dichotomous question about the settings where offline ESM had taken place: "In which, if any, of these places have you seen these kinds of things?" (a) "In a magazine or book", (b) "On television, in a film or a video/DVD". They were then asked a dichotomous question on online ESM: "Have you seen

these kinds of things on any websites in the past 12 months?" Those who reported ESM in a magazine, book, on television, in a film or a video/DVD, but not on websites, were coded as having "only offline ESM" (= 1). Those who reported ESM only on websites were coded as having "only online ESM" (= 2). Those who reported ESM both on websites and in a magazine, book, on television, in a film or a video/DVD were coded as having "both offline and online ESM" (= 3).

Type of online ESM. Participants who had been exposed online were asked: "Which types of website have you seen things like this on in the past 12 months?". The adolescents could tick any of the following alternatives: (a) "On a social networking site", (b) "In images that pop-up accidently", (c) "On an adult/X-rated website", (d) "On a peer-to-peer file-sharing website (e.g. limewire)", and (e) "Other". Based on their answers, they were divided into three mutually exclusive categories. The category "Only in images that pop-up accidently" (= 0) was made up of those who ticked this option only. Participants in this category could not influence the extent of ESM. By differentiating between sexually explicit websites (e.g. X-rated websites or peer-to-peer file-sharing websites including sexually explicit content; see Greenfield, 2004) and not primarily sexually explicit websites (e.g. social networking websites) two further categories were created. The second category "On a social networking site" (= 1) captured those who ticked this option only or together with the option "In images that pop-up accidently". Finally, participants who ticked the options "On an adult/X-rated website" and/or "On a peer to peer file-sharing website", irrespective of whether they ticked any other options, were included in the third category (= 2). Those who answered "Other" or did not specify the type of online ESM were excluded from the categorisation.

Socio-economic status (SES). During the preceding screening process, information was gathered relating to the household's chief income earner's level of education and occupation. This information was grouped and cross-referenced to calculate three-level socio-

economic statuses: low (=0), middle (=1) and high (=2). As educational systems vary across countries, national measures were standardised using the International Standard Classification of Education (ISCED). In the main survey, the parent interviewed was only asked about the highest level of completed education in the household based on which the level of SES of the household unit was assigned (for further details, see Livingstone et al., 2011b or http://www2.lse.ac.uk/media@lse/research/EUKidsOnline/EU%20Kids%20II%20(2009-11)/home.aspx).

Frequency of internet use. How often adolescents used the internet was then assessed. Respondents were asked: "How often do you use the internet?" with possible answers being: "less than once a month" (= 1), "once or twice a month" (= 2), "once or twice a week" (= 3), "every day or almost every day" (= 4). This scale was treated as continuous, higher scores indicating more frequent internet use.

Emotional problems. Six items were used to capture participants' emotional problems, which were derived from the Strength and Difficulty Questionnaire (Goodman, Ford, Simmons, Gatward, & Meltzer, 2003). Respondents were asked, "How true is this of you?" regarding the following symptoms (a) "having a lot of headaches, stomach-aches or sickness"; (b) "being very angry and often losing their temper"; (c) "often feeling unhappy, sad or tearful", (d) "being nervous in new situations and easily losing confidence"; (e) "being easily distracted and finding it difficult to concentrate"; and (f) "having many fears, being easily scared". The three-point response scale was used: "not true" (= 1), "a bit true" (= 2) and "very true" (= 3). Scale scores were computed by averaging the items; a higher score indicated greater emotional problems. The scale was internally consistent (α = .69).

Sensation seeking. To assess the extent of sensation seeking, the items suggested by Stephenson, Hoyle, Palmgreen, and Slater (2003) were adopted. Participants were asked:

"How true is this of you?" with two items: "I do dangerous things for fun" and "I do exciting things, even if they are dangerous". These were answered on a scale "not true" (= 1), "a bit true" (= 2) and "very true" (= 3). Scale scores were computed by averaging the items; a higher score indicated more sensation seeking. The scale was internally consistent (α = .79).

Excessive internet use. Participants were asked five questions, which referred to the aforementioned six factors of addictive behaviour adjusted by Griffiths (2000). The five questions used in the present study were derived from the ten-item version of the scale measuring symptoms of problematic internet use (Šmahel & Blinka, 2012; Šmahel, Vondráčková, Blinka, & Godoy-Etcheverry, 2009). One question capturing mood changes addressed two factors: euphoria and withdrawal symptoms. Participants were asked how often in the past 12 months they had gone without eating or sleeping because of the internet (salience); how often they felt bothered when they could not be online (euphoria and withdrawal symptoms); how often they caught themselves surfing when they had not really been interested (tolerance); whether they dedicated less time to their family, friends or schoolwork because of the time spent on the internet (conflict); and whether they tried to spend less time on the internet without success (relapse and reinstatement). Four-point response scales were offered: "never/almost never" (= 1) "not very often" (= 2) "fairly often" (= 3) and "very often" (= 4). Scale scores were computed by averaging the items; a higher score indicated more problematic internet use. The scale was internally consistent (α= .78).

Data analysis

Three multinomial logistic regression models, including the same predictors, were estimated. First, the frequency of ESM was predicted using "no ESM" and "sporadic ESM" as reference categories which were compared with "frequent ESM". Second, the place of ESM was predicted with "no ESM", "only online ESM", and "only offline ESM" serving as

reference categories which were compared with "both offline and online ESM". Finally, the type of online ESM was predicted. ESM only to images that pop-up accidentally was set as a reference category in order to compare accidental online ESM with ESM on social networking sites and ESM on pages where sexually explicit material is usually sought (adult/X-rated and peer-to-peer sharing websites).

The fit of all logistic regression models (i.e. whether the estimated values of outcome variables matched the observed values) was assessed by the Hosmer –Lemeshow (H-L) statistic, which is recommended if multiple continuous variables are present (Agresti, 2002). Since the H-L statistic is available only for binary logistic regression, the advice of Hosmer and Lemeshow (2000) was followed to assess the fit of multinomial models by applying the test individually to all binary comparisons between the categories of the outcome variable. Data were analysed using the PASW (SPSS) Statistics 18 software.

<center>Results</center>

Descriptive statistics

Descriptives of all variables are presented in Table 1.

--- Table 1 ---

Out of 610 participants, 74 did not answer the question on frequency of ESM and 88 did not answer the question on the place of ESM (see Table 1). Moreover, several participants had missing values on some predictor variables. Therefore, a total number of 495 participants could be used when predicting the frequency of ESM ($N_{Excluded} = 115$), and a total number of 483 participants could be used when predicting the place of ESM ($N_{Excluded} = 127$). The comparisons between participants who were included and excluded from the analyses showed no significant differences in their mean age ($t_{608} = -.71$, $p = .48$; $t_{608} = .68$, $p = .50$),

socioeconomic status ($t_{600} = .67$, $p = .50$; $t_{600} = 1.32$, $p = .19$), frequency of internet use ($t_{608} = -.56$, $p = .58$; $t_{608} = .17$, $p = .87$), emotional problems ($t_{600} = 1.45$, $p = .15$; $t_{600} = 1.12$, $p = .26$), or sensation seeking ($t_{597} = .43$, $p = .67$; $t_{597} = 1.39$, $p = .16$), and gender ($\chi^2_1 = .78$, $p = .38$; $\chi^2_1 = .02$, $p = .90$; in all the parentheses, the former test refers to the prediction of the frequency of ESM, while the latter refers to the prediction of the place of ESM). Regarding excessive internet use, included and excluded participants did not differ when predicting the frequency of ESM ($t_{580} = 1.24$, $p = .21$), but they differed when predicting the place of ESM ($t_{580} = 2.74$, $p < .01$), with excluded participants having slightly greater excessive internet use than included participants ($M_{Included} = 1.46$, $SD_{Inlcuded} = .53$; $M_{Exluded} = 1.62$, $SD_{Excluded} = .57$).

Next, out of 153 participants who indicated that they were exposed online (i.e. only online or both offline and online), 55 did not specify the type of their online ESM or chose the "other" category (see Table 1). Another seven participants had missing values on some predictors. Therefore, data from 91 participants were used when predicting the type of online ESM. The comparisons between included and excluded participants showed no significant differences in their socioeconomic status ($t_{147} = -1.39$, $p = .17$), emotional problems ($t_{150} = .14$, $p = .89$), excessive internet use ($t_{148} = -1.65$, $p = .10$), or gender ($\chi^2_1 = .24$, $p = .62$). However, included participants were slightly older ($t_{151} = -2.99$, $p < .01$; $M_{Included} = 14.02$, $SD_{Inlcuded} = 1.28.$; $M_{Exluded} = 13.35$, $SD_{Excluded} = 1.46$), and had greater frequency of internet use ($t_{151} = -2.52$, $p = .01$; $M_{Included} = 3.95$, $SD_{Inlcuded} = .23$; $M_{Exluded} = 3.79$, $SD_{Excluded} = .52$) and sensation seeking ($t_{149} = -2.11$, $p = .04$; $M_{Included} = 2.52$, $SD_{Inlcuded} = 1.21$; $M_{Exluded} = 2.10$, $SD_{Excluded} = 1.15$).

Predicting the frequency of ESM

Multinomial logistic regression analysis was employed to predict the odds of being sporadically or frequently exposed, regardless of online/offline setting (Table 2). A test of the

full model versus a model with intercept only was statistically significant (LR χ^2_{14} = 182.51, p < .01), which meant that the full model explained a significant amount of the original variability in the frequency of ESM. Moreover, all individual models had a good fit to the data, as indicated by non-significant goodness-of-fit tests (H-L χ^2, see Table 2). Adjusted odds ratios are presented thorough the text and the tables.

--- Table 2 ---

In a model using "no ESM" as a reference category, higher age (OR = 1.36, p < .01) and greater excessive internet use (OR = 1.79, p < .05) predicted greater odds of being sporadically exposed. Other predictors, including gender and sensation seeking, were not significant. Higher age (OR = 2.19, p < .01), male gender (OR = 2.75, p < .01), greater sensation seeking (OR = 1.70, p < .01), and greater excessive internet use (OR = 3.75, p < .01) predicted greater odds of being frequently exposed, compared to not being exposed.

In a model using "sporadic ESM" as a reference category, higher age (OR = 1.61, p < .01), male gender (OR = 3.41, p < .01), greater sensation seeking (OR = 1.36, p < .05), and greater excessive internet use (OR = 2.09, p < .01) predicted greater odds of being frequently exposed.

Predicting the place of ESM

The likelihood of being exposed only offline, only online, and in both environments was predicted using multinomial logistic regression (Table 3).The difference between the intercept only model and the full model was significant (LR χ^2_{21} = 141.51, p < .01). This suggests that a significant amount of the original variability in the place of ESM was explained. At the same time, all individual models fitted well to the data (see Table 3).

--- Table 3 ---

In a model using "no ESM" as a "reference category, only higher age (OR = 1.34, p < .01) significantly predicted the likelihood of being exposed only offline. Likewise, higher age (OR = 1.72, p < .01) and also excessive internet use (OR = 2.08, p < .05) predicted greater odds of being exposed only online, compared to not being exposed. Finally, higher age (OR = 1.80, p < .01), male gender (OR = 1.88, p < .05), greater emotional problems (OR = 2.31, p < .05), greater sensation seeking (OR = 1.58, p < .01), and greater excessive internet use (OR = 2.76, p < .01) predicted a greater odds of being exposed in both environments, compared to not being exposed.

In a model using "only offline ESM" as a reference category, none of the variables significantly predicted greater odds of being exposed only online. The strongest predictor was male gender (OR = 2.12, p = .07), but the effect was not significant. Higher age (OR = 1.34, p < .05) and male gender (OR = 2.09, p < .05) predicted greater odds of being exposed in both environments, compared to being exposed only offline.

Finally, in a model using "only online ESM" as a reference category, no variable in the model predicted greater odds of being exposed in both environments.

Predicting the type of online ESM

Finally, a multinomial logistic regression model was used to predict the odds of being exposed on social networking sites and on adult/X-rated or peer-to-peer file-sharing websites (Table 4). A test of the full model versus the intercept only model was significant (LR χ^2_{14} = 34.42, p < .01), thus a significant amount of the original variability was explained. All the individual models fitted well to the data (see Table 4).

--- Table 4 ---

In a model using "ESM only to images that pop up accidentally" as a reference category, only greater sensation seeking (OR = 1.85, p < .05) predicted greater odds of being exposed on social networking sites. Further, males (OR = 9.45, p < .01), with greater emotional problems (OR = 6.02, p < .05), and greater sensation seeking (OR = 2.46, p < .01) predicted a higher likelihood of being exposed on adult/X-rated and/or peer-to-peer file-sharing websites, compared to ESM through images that pop up accidentally.

Finally, in a model using "ESM on a social networking site" as a reference category, male gender (OR = 9.31, p < .01) predicted greater odds of being exposed on adult/X-rated and/or peer-to-peer file-sharing websites.

Discussion

The present study of Czech adolescents focused on both high and low exposure to sexual material. Higher ESM was defined through the frequency, location (offline or online), and the type of ESM (on online sexually explicit websites akin adult/X-rated or a peer-to-peer file-sharing website). It was hypothesized that risk-related predictors such as emotional problems, sensation seeking, and excessive internet use would predict greater ESM. This expectation was confirmed. When compared with the "no ESM" category, these predicted frequent ESM and both offline an online ESM. A similar trend was found for the type of ESM, where their effects were also present in predicting ESM on an adult/X-rated or a peer-to-peer file-sharing website when compared with ESM via images that pop up accidentally. Moreover, these predictors coincided with frequent ESM as opposed to sporadic ESM. It is assumed that frequent ESM at young age represents a risky form of early sexual behaviour that vulnerable adolescents are more likely to experience (Bearman & Brückner, 2001; Bellis et al., 2008; Kuortti & Kosunen, 2009; Orr et al., 1991). Both protection against ESM for this

group and raising awareness of ESM's potential negative outcomes should be subjects of public concern.

In greater detail, emotional problems predicted both offline and online ESM and particularly ESM on a adult/X-rated or peer-to-peer file-sharing websites. This finding seems to be consistent with previous studies providing evidence for the link between ESM on the internet and emotional problems, specifically depressive symptoms (Wolak et al., 2007). However, it remains unclear how emotional problems, representing internalizing behaviour, are linked to ESM on a adult/X-rated and/or a peer-to-peer file-sharing websites, especially if this type of exposure is considered to be an intentional activity, which may represent externalizing behaviour. More research is therefore needed to explain the link between emotional problems and ESM on sexually explicit websites.

In line with prior research (Brown & L´Engle, 2009; Peter & Valkenburg, 2006), sensation-seeking had a significant effect on ESM. Specifically, a heightened need for sensation-seeking predicted greater ESM (i.e. frequent ESM, both offline and online ESM, and ESM on a adult/X-rated and/or peer-to-peer file-sharing websites). Surprisingly, sensation-seeking also predicted ESM on social networking sites, an environment which is not so explicitly focused on sexual content. It is therefore assumed that there must be a higher level of sensation-seeking for exposure to sexual material to occur in environments which are not primarily sexually explicit (such as social networking sites). It is possible that adolescents with heightened sensation needs might behave in a more exploratory way on social networking sites, as well as post sexual content themselves more often.

Although excessive internet use was expected to predict higher ESM (see Meerkerk et al., 2006), this study showed that this variable was also a significant predictor of sporadic and only online ESM. The findings indicate that young internet users who lack the skills to

regulate their online activities and resist the incentives provided by the internet may experience various extents of ESM (see Eccles, Buchanan, Flanagan, Fuligni, Midley, & Yee, 1991). Interestingly, this study did not show a link between excessive internet use and ESM on sexually focused online applications such as adult/X-rated or peer-to-peer file-sharing websites. It may be too early for young internet users to develop problematic internet use for sexual purposes, and exposure to sexual material in early adolescence may be a side effect of some other form of problematic internet use such as overuse of online communication, which has been documented as having a strong addictive potential in this developmental period (see Van den Eijnden et al., 2008).

Apart from risk-related predictors, this study showed that age and gender were both important predictors of ESM. However, each of these played a slightly different role in predicting ESM. With advancing age, adolescents were more likely to see sexual materials, both to a lesser extent (e.g. sporadic ESM, only offline or only online ESM) and to a greater extent (e.g. frequent ESM or both offline and online ESM) in comparison to no exposure. It is assumed that for some Czechs in early adolescence, low levels of ESM or even slightly higher levels of ESM may be an ordinary part of maturing as their interest in sexuality increases with age (Bearman & Brückner, 2001; Weinstein & Rosen, 1991). Thus, the greater ESM predicted by increased age may be a part of psychosexual development. However, ESM in these cases may be unintentional (unsolicited exposure), especially given that parental surveillance generally decreases with age (Livingstone et al., 2011).

Furthermore, male gender predicted a greater ESM (e.g. frequent ESM and both offline and online ESM) (when compared with no exposure) and in addition ESM on adult/X-rated and/or peer-to-peer file-sharing websites. On the other hand, gender was unrelated to rates of lower-level ESM (e.g. sporadic ESM). To understand the effects of gender on ESM, previous research should be considered. It has been suggested that gender matters only in

intentional ESM (i.e. no gender differences were found in unintentional ESM, while in terms of intentional ESM, boys were more likely to see sexual material online than girls) (Mitchell et al., 2003; Wolak et al., 2007). This may be a reflection of boys´ stronger interest in sexual material and their desire to search for it (Peter & Valkenburg, 2006; Traen et al., 2006). In other words, greater ESM among boys may be understood as a particularity of male psychosexual development. This interpretation of unintentional and intentional ESM may also be applicable to the type of ESM. Gender was unrelated to ESM on social networking sites but was linked to ESM on adult/X-rated and peer-to-peer file-sharing websites. In comparison to adult/X-rated and peer-to-peer file-sharing websites, social networking sites cannot be considered a primary source of intentionally sought sexual material. This may indicate that ESM on social networking sites was unintentional.

In summary, the study showed two main patterns. Higher ESM seems to arise from adolescents' vulnerability (risk-related predictors) and psychosexual development, specifically, the interest in sexuality, which seems to be expressed by the effect of increased age and male gender (see the above discussion on the role of those predictors). These two patterns may have two different implications. Firstly, sensation-seeking adolescents and those suffering from emotional problems or excessive internet use should be the target of intensive care-giver supervision to protect them from ESM, as its negative effects are akin to the accelerated onset of sexual behaviour (Bleakley, Hennessy, Fishbein, & Jordan, 2008; Brown & L´Engle, 2009). More generally, Czech parents who provide less frequent mediation of their children´s internet use (see Kalmus & Roosalu, 2012) should improve their parental mediation strategies to reduce the risk of excessive internet use and thus in turn the risk of ESM. Secondly, when considering the causal association between higher ESM and the adoption of attitudes objectifying women (see Brown & L´Engle, 2009; Peter & Valkenburg, 2010a) or the belief that sex is primarily physical and casual rather than affectionate and

relational (Peter & Valkenburg, 2010b), adolescents, particularly boys, also deserve more attention. Specifically, the study indicates that media, including the internet, represent an important place of sexual socialization (i.e. providing sexual information, sexual stimuli, sexual scripts etc.) which should not be ignored or restricted as the internet provides adolescents with opportunities and supports social inclusions (Kalmus, Runnel, & Siibak, 2009; Livingstone et al., 2011a). Instead of restricting access to the internet, caregivers and teachers should talk with adolescents about the meaning and their understanding of mediated sexual content. This may also call for the provision of sex education that includes the discussion of sexual material in media, particularly internet use for sexual purposes.

Several limitations must be considered when interpreting the results of this study. Only Czech internet users, who were recruited through land lines, participated in this survey, which may limit the generalizability of the findings. Also, due to the sensitivity of this topic, the questions did not examine exactly what kind of sexual pictures the adolescents encountered. Therefore it is not known to what extent Czechs in early adolescence were exposed to nudity and sexually explicit material portraying genitals or people having sex. Further, the vicinity of parents may have affected the response rates, as the attrition in the questions on type of ESM was not negligible. More detailed measures assessing specific frequencies of exposure in different contexts and SES could have been used. Finally, as the present analyses were based on cross-sectional data, it is important to recognise that the causal relations between the studied predictors and exposure to sexual material are not definitive, and further research using a longitudinal approach would be valuable.

In conclusion, this study showed that the level of ESM at a young age is important. In regards to the frequency of ESM, vulnerable adolescents were more likely to be exposed to sexual materials. Further, ESM at young age seemed to be an outcome of psychosexual development, likely resulting from increasing interest in sexuality.

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Table 1. Descriptive statistics.

	N	%	M (SD)	Range
Age	610		12.99 (1.47)	11-15
Gender	610	48.4 (boys)		
Socioeconomic status	602		1.25 (0.60)	0-2
Frequency of internet use	610		3.80 (0.49)	1-4
Emotional problems	602		1.49 (0.39)	1-2.83
Sensation seeking	599		1.88 (1.10)	1-3
Excessive internet use	582		1.49 (0.54)	1-4
Frequency of ESM				
No ESM	300	56.0		
Sporadic ESM	123	22.9		
Frequent ESM	113	21.1		
Total	536	100.0		
Place of ESM				
No ESM	300	57.5		

Only offline	69	13.2
Only online	47	9.0
Both offline and online	106	20.3
Total	522	100.00
Type of online ESM		
Only via images that pop up accidentally	30	19.6
On a social networking site	24	15.7
On an adult/X-rated and/or peer to peer file-sharing website	44	28.8
Other or missing values	55	35.9
Total	153	100.00

Table 2. Logistic regression models predicting the frequency of ESM to sexual material.

	Reference category: No ESM (N = 275)						Reference category: Sporadic ESM (N = 113)		
	Sporadic ESM (N = 113)			Frequent ESM (N = 107)			Frequent ESM (N = 107)		
	B(SE)	*OR*	*95% CI*	*B(SE)*	*OR*	*95% CI*	*B(SE)*	*OR*	*95% CI*
Intercept	-7.24(1.55)**			-16.00(2.15)**			-8.77(2.29)**		
Age	0.31(0.09)**	1.36	(1.15-1.62)	0.78(0.12)**	2.19	(1.75-2.74)	0.48(0.12)**	1.61	(1.27-2.04)
Gender (0 = girls)	-0.22(0.25)	0.81	(0.50-1.30)	1.01(0.30)**	2.75	(1.53-4.96)	1.23(0.32)**	3.41	(1.84-6.35)
Socioeconomic status	-0.27(0.20)	0.76	(0.52-1.13)	0.08(0.24)	1.08	(0.68-1.73)	0.35(0.25)	1.42	(0.87-2.32)
Frequency of internet use	0.22(0.28)	1.25	(0.73-2.14)	0.01(0.36)	1.01	(0.51-2.03)	-0.21(0.40)	0.81	(0.37-1.77)
Emotional problems	0.50(0.32)	1.65	(0.89-3.08)	0.52(0.38)	1.68	(0.80-3.54)	0.02(0.39)	1.02	(0.48-2.17)
Sensation seeking	0.22(0.12)	1.25	(0.99-1.59)	0.53(0.13)**	1.70	(1.33-2.19)	0.31(0.13)*	1.36	(1.05-1.77)
Excessive internet use	0.58(0.28)*	1.79	(1.04-3.08)	1.32(0.29)**	3.75	(2.13-6.59)	0.74(0.28)**	2.09	(1.22-3.61)
H-L χ^2 (df)	4.36(8)			12.55(8)			8.79(8)		

Note. R^2 = .36 (Nagelkerke), .19 (McFadden). B = Unstandardised regression coefficient. SE = Standard error. OR = Odds ratio. CI = Confidence interval for OR. ** $p < .01$. * $p < .05$.

Table 3. Logistic regression model predicting the place of ESM to sexual material.

	Reference category: No ESM (N = 275)								
	Only offline ESM (N = 65)			Only online ESM (N = 43)			Both offline and online ESM (N = 100)		
	B(SE)	OR	95% CI	B(SE)	OR	95% CI	B(SE)	OR	95% CI
Intercept	-7.64(1.85)**			-10.09(2.29)**			-12.78(1.94)**		
Age	0.29(0.11)**	1.34	(1.09-1.65)	0.54(0.13)**	1.72	(1.32-2.23)	0.59(0.11)**	1.80	(1.46-2.21)
Gender (0 = girls)	-0.10(0.29)	.90	(0.51-1.60)	0.65(0.36)	1.91	(0.95-3.86)	0.63(0.28)*	1.88	(1.08-3.27)
Socioeconomic status	-0.15(0.24)	0.86	(0.54-1.38)	-0.13(0.29)	0.88	(0.50-1.56)	-0.22(0.23)	0.80	(0.51-1.25)
Frequency of internet use	0.17(0.33)	1.19	(0.62-2.28)	-0.13(0.37)	0.88	(0.42-1.83)	0.08(0.34)	1.08	(0.55-2.12)
Emotional problems	0.64(0.38)	1.90	(0.90-4.03)	-0.05(0.51)	0.95	(0.35-2.61)	0.84(0.37)*	2.31	(1.12-4.75)
Sensation seeking	0.18(0.15)	1.19	(0.90-1.59)	0.26(0.16)	1.29	(0.94-1.78)	0.46(0.13)**	1.58	(1.23-2.02)
Excessive internet use	0.54(0.32)	1.71	(0.92-3.19)	0.73(0.37)*	2.08	(1.01-4.25)	1.01(0.28)**	2.76	(1.60-4.75)
H-L χ^2 (df)	6.98(8)			7.90(8)			5.36(8)		
	Reference category: Only offline ESM (N = 65)						Reference category: Only online ESM (N = 43)		
	Only online ESM (N = 43)			Both offline and online ESM (N = 100)			Both offline and online ESM (N = 100)		

		OR		B(SE)	OR	95% CI	B(SE)	OR	95% CI
Intercept	-2.45(2.68)			-5.14(2.34)			-2.70(2.65)		
Age	0.25(0.15)	1.28	(0.95-1.73)	0.29(0.13)*	1.34	(1.04-1.72)	0.04(0.15)	1.05	(0.78-1.40)
Gender (0 = girls)	0.75(0.42)	2.12	(0.94-4.81)	0.74(0.35)*	2.09	(1.06-4.13)	-0.02(0.39)	0.99	(0.46-2.13)
Socioeconomic status	0.02(0.34)	1.02	(0.53-1.97)	-0.08(0.27)	0.93	(0.54-1.59)	-0.10(0.31)	0.91	(0.49-1.67)
Frequency of internet use	-0.30(0.47)	0.74	(0.30-1.84)	-0.09(0.44)	0.91	(0.39-2.14)	0.21(0.46)	1.23	(0.50-3.03)
Emotional problems	-0.69(0.57)	0.50	(0.16-1.54)	0.19(0.44)	1.21	(0.52-2.84)	0.89(0.54)	2.43	(0.84-7.02)
Sensation seeking	0.08(0.19)	1.09	(0.75-1.58)	0.28(0.16)	1.32	(0.98-1.80)	0.20(0.17)	1.22	(0.88-1.70)
Excessive internet use	-1.69(0.40)	1.21	(0.55-2.68)	0.48(0.32)	1.61	(0.86-3.01)	0.28(0.36)	1.33	(0.66-2.67)
H-L χ^2 (df)		4.32(8)			14.38(8)			3.47(8)	

Note. R^2 = .28 (Nagelkerke), .13 (McFadden). B = Unstandardised regression coefficient. SE = Standard error. OR = Odds ratio. CI = Confidence interval for OR. ** $p < .01$. * $p < .05$.

Table 4. Logistic regression models predicting the type of online ESM.

	Reference category: Only in images that pop up accidentally (N = 28)						Reference category: On a social networking site (N = 20)		
	On a social networking site (N = 20)			On an adult/X-rated and/or a peer to peer file-sharing website (N = 43)			On an adult/X-rated and/or a peer to peer file-sharing website (N = 43)		
	B(SE)	*OR*	*95% CI*	*B(SE)*	*OR*	*95% CI*	*B(SE)*	*OR*	*95% CI*
Intercept	-6.80(5.77)			-12.46(6.17)*			-5.65(6.77)		
Age	0.17(0.24)	1.18	(0.73-1.91)	0.29(0.23)	1.33	(0.84-2.11)	0.12(0.25)	1.13	(0.69-1.86)
Gender (0 = girls)	0.01(0.67)	1.02	(0.27-3.76)	2.25(0.69)**	9.45	(2.45-35.50)	2.23(0.69)**	9.31	(2.40-36.11)
Socioeconomic status	-0.10(0.51)	0.90	(0.33-2.43)	-0.32(0.50)	0.73	(0.28-1.92)	-0.21(0.51)	0.81	(0.29-2.21)
Frequency of internet use	0.84(1.32)	2.31	(0.17-30.48)	1.12(1.35)	3.06	(0.22-42.98)	0.28(1.51)	1.33	(0.07-25.54)
Emotional problems	0.64(0.94)	1.89	(0.30-11.93)	1.79(0.89)*	6.02	(1.04-34.74)	1.16(0.88)	3.19	(0.57-17.92)
Sensation seeking	0.61(0.31)*	1.85	(1.00-3.42)	0.90(0.30)**	2.46	(1.37-4.44)	0.29(0.28)	1.33	(0.77-2.32)
Excessive internet use	-0.77(0.62)	0.46	(0.14-1.55)	-0.82(0.57)	0.44	(0.14-1.33)	-0.06(0.58)	0.94	(0.30-2.95)
H-L χ^2 (df)	4.18(8)			10.42(8)			10.67(8)		

Note. R^2 = .36 (Nagelkerke), .18 (McFadden). B = Unstandardised regression coefficient. SE = Standard error. OR = Odds ratio. CI = Confidence interval for OR. ** $p < .01$. * $p < .05$.