

# Chapter 6

## Taking Risks on the World Wide Web: The Impact of Families and Societies on Adolescents' Risky Online Behavior

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## 6.1 Introduction

Internet offers children a wealth of opportunities. But unfortunately, it poses risks as well.<sup>1</sup> Children's engagement in risky online behavior—such as providing personal information or agreeing to meet with a stranger—is an important predictor of whether they will encounter harmful content on the World Wide Web or be confronted with situations such as sexual harassment and privacy violations.<sup>2</sup> Of course, risky online behavior does not always result in harm or exposure to undesirable content. Furthermore, and in line with research on risk taking in general, most children are not heavily engaged in risky online activities.<sup>3</sup> Nevertheless, the potential consequences of adolescents' risky online behavior are a major concern among parents and policymakers.

Not all children engage in risky online behavior. Among those who do, the intensity and frequency of the risks taken varies. Family characteristics are a relevant indicator of children's media and Internet use. In some family homes, children participate in online activities more than in others, including both more and less risky activities.<sup>4</sup> This may be due to different household characteristics, such as family structure (e.g., one vs. two-parent households) and parents' socioeconomic background. Parents' efforts to guide their children's online activities are also socially differentiated. Parents differ in their own experience with the Internet, their strategies for coping with their children's Internet use, and the supply of Internet access in the family home.<sup>5</sup>

Alongside the family, wider society seems to influence children's online behavior as well. That is, the general level of computer skills and usage differs not only between individuals, but between nations as well.<sup>6</sup> In general, a higher prevalence of Internet usage in a country seems to correlate with more online risks.<sup>7</sup> It is therefore of interest to explore how national characteristics, and in particular the prevalence of Internet use, affects adolescents' engagement in risky online behavior, as well as parents' efforts to mediate the risks that their adolescents take online.

The current study explores the effect of contextual factors on adolescents' engagement in risky online behavior from a cross-national and comparative perspective. To do so, it uses EU Kids Online survey data and employs a hierarchical multilevel design. The general research question (RQ) underlying the study is twofold: (1) Do differences in adolescents' risky online behavior stem from differences in family characteristics, parental Internet mediation, and the prevalence of Internet use in a country? (2) Is the relation between parental mediation and

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<sup>1</sup> See e.g., Livingstone et al. 2011b.

<sup>2</sup> Hasebrink et al. 2008; Lobe et al. 2011.

<sup>3</sup> Livingstone et al. 2011b.

<sup>4</sup> Livingstone and Helsper 2010; Notten et al. 2009.

<sup>5</sup> Livingstone and Helsper 2008; Lee 2012; Notten and Kraaykamp 2009b.

<sup>6</sup> DiMaggio et al. 2004; Hargittai 2010; Notten et al. 2009.

<sup>7</sup> Hasebrink et al. 2008; Lobe et al. 2011.

children's risky online behavior dependent on how widespread Internet use is in a country? In today's globalized societies, Internet usage plays an increasingly important role within the home and in society as a whole. Answers to these questions will therefore be of great interest to parents, educators, and policymakers.

## 6.2 Children and Risky Online Behavior

Prior research shows that, when it comes to screen media, high levels of consumption and harmful content may hurt a child's development and well-being in a number of ways, even in the long run. For instance, television seems to hinder a child's cognitive development, arouse aggression, and increase children's risk of becoming overweight.<sup>8</sup> Aside from positive outcomes of specific types of Internet consumption, studies repeatedly show negative effects of Internet use as well. For instance, time spent on social media and playing (violent) computer games, online and offline, may adversely affect a child's healthy development.<sup>9</sup>

Nowadays, most adolescents are online. Social networking has become an immersive phenomenon,<sup>10</sup> and adolescents are highly experienced online communicators.<sup>11</sup> However, young people are often reckless producers of information, which is a major concern.<sup>12</sup> Research shows a correlation between children and adolescents' risky online behavior and consequences like online sexual intimidation and harassment.<sup>13</sup> However, comparative research on particular adolescents' deliberate risk-taking online is rather scarce.<sup>14</sup> Most research does not distinguish between children's intentional engagement in risky online behavior and their (unintentional) encountering of risks. Though they are related, these are two different concepts. The current study focuses explicitly on individual and contextual factors that explain adolescents' deliberate engagement in risky online behavior.

## 6.3 Family Background and Risky Online Behavior

Children grow up within a social context, and generally their immediate family is most influential in guiding their development.<sup>15</sup> Families differ in many ways. Some parents offer their offspring beneficial opportunities; others are less generous

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<sup>8</sup> Notten et al. 2013; Valkenburg 2004.

<sup>9</sup> Livingstone et al. 2011b; Valkenburg and Peter 2011.

<sup>10</sup> Lenhart et al. 2010.

<sup>11</sup> Valkenburg and Peter 2011.

<sup>12</sup> Rockman 2002; Deursen et al. 2011.

<sup>13</sup> Görzig and Ólafsson 2013; Lobe et al. 2011; Peter and Valkenburg 2006.

<sup>14</sup> See e.g., Fogel and Nehmad 2009 for an exception.

<sup>15</sup> Bandura 1977; Bronfenbrenner 1979.

or even expose their children to a rather disadvantageous (media) socialization environment.<sup>16</sup> Since parents are not homogeneously equipped with resources and skills to beneficially guide their children's online activities, in some family homes children are more exposed to negative aspects of Internet use and are more prone to use the Internet in a risky way.<sup>17</sup> With this in mind, the current study examines family socioeconomic status (represented by educational level) and family structure and the impact of these factors on adolescents' risky online behavior.

In general, higher educated parents have more advantageous cognitive and cultural skills to transmit to their children compared to lower educated parents.<sup>18</sup> Moreover, higher educated parents are themselves more experienced and sophisticated users of digital technologies. They tend to have a more positive attitude toward the educational benefits of computers and the Internet, and they are more apt to mediate their children's online activities.<sup>19</sup> Adolescents whose parents are more highly educated are therefore probably more skilled and better informed Internet users, and they are also likely to be more aware of the Internet's potential risks.<sup>20</sup> Accordingly, adolescents from higher socioeconomic parental homes probably engage less in risky online behavior than their peers from lower socioeconomic households.

Family structure is another aspect of social background and is highly important for a child's development and behavior. Children with married or cohabiting parents may benefit from having two adults at home who can bundle their resources and family time.<sup>21</sup> Generally, children from broken homes and single-parent households are 'worse off'. They tend to show more deviant and risky behavior than children from two-parent families.<sup>22</sup> This may be due to stress factors or to financial strains and a more restricted availability of time for parenting. Media research shows that children from single-parent families use digital technologies more often than their peers from two-parent homes.<sup>23</sup> In addition, in single-parent households less time is spent guiding children's media use.<sup>24</sup> Consequently, adolescents from single-parent households are likely riskier online compared to children with two parents at home.

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<sup>16</sup> Hoeve et al. 2009; Patterson et al. 1990; Notten and Kraaykamp 2009b.

<sup>17</sup> D'Haenens 2001; Livingstone and Helsper 2010; Notten et al. 2009.

<sup>18</sup> Bourdieu 1984.

<sup>19</sup> Clark et al. 2005; Pasquier 2001; Paus-Hasebrink et al. 2013.

<sup>20</sup> Livingstone and Helsper 2010; Notten et al. 2009.

<sup>21</sup> Brown et al. 1990; Sayer et al. 2004.

<sup>22</sup> McLanahan and Sandefur 1994; Dornbusch et al. 1985.

<sup>23</sup> Notten et al. 2009.

<sup>24</sup> Notten and Kraaykamp 2009a; Warren 2005.

## 6.4 Parental Internet Mediation and Risky Online Behavior

Even when adjusting for family background considerations, parents may still have different manners and styles for dealing with their children's Internet use. Hence, when studying adolescents' risky online behavior, it is important to include parenting practices and, in particular, parents' mediation of their children's Internet use. Parents vary in the warmth and support they offer their children, but also in the extent and strictness of family rules and supervision. Generally, parental warmth and support, in combination with a certain amount of supervision and family rules, benefits children's development, and reduces their odds of (future) antisocial behavior. The converse is also true: ineffective parenting, as in neglect or inconsistency, is associated with a higher risk of antisocial behavior.<sup>25</sup> Related to these general aspects of parenting, research has defined different types of parental mediation of children's media use.<sup>26</sup> Accordingly, the current study distinguishes two overarching categories of parental Internet mediation: 'instructive' or supportive mediation (i.e., active and co-use forms of mediation of Internet use and safety) and 'restrictive' mediation (i.e., Internet rules and restrictions on use, monitoring, and technical restrictions such as filter software). Note that prior studies show that the intensity of parents' mediation may change as children mature.<sup>27</sup> Therefore, this study focuses on adolescents and controls for age within this group.

Instructive mediation by parents, characterized by parent-child interaction on media use, is generally aimed at enhancing a child's beneficial media use, skills and understanding of media content.<sup>28</sup> Children who were taught by their parents to use media in a responsible way have been found to have higher levels of well-being.<sup>29</sup> Children taught to value privacy offline are cautious with privacy online as well; these children are less likely to disclose personal information on the Internet.<sup>30</sup> Instructive mediation by parents is therefore expected to limit adolescent children's risky online behavior.

The second type under study here, restrictive mediation, is usually aimed at reducing or preventing children from engaging in unwanted behavior. Prior research has shown that parental supervision and restrictions are associated with less involvement of children in delinquent and norm-breaking behavior, offline and online.<sup>31</sup> An important predictor of risky online behavior is the time children spend

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<sup>25</sup> Baumrind 1991; Steinberg et al. 1994; Patterson et al. 1990; Hoeve et al. 2009.

<sup>26</sup> Valkenburg et al. 1999; Livingstone and Helsper 2008; Nikken and Jansz 2006; Sonck et al. 2013.

<sup>27</sup> See e.g., Clark 2011.

<sup>28</sup> Lobe et al. 2011.

<sup>29</sup> Notten et al. 2013.

<sup>30</sup> See e.g., De Souza and Dick 2009.

<sup>31</sup> E.g., Steinberg et al. 1994; Leung and Lee 2011.

using online media.<sup>32</sup> Parental restrictions on both the time children spend online and the content of their activities is highly effective in reducing a range of online risks.<sup>33</sup> Overall, restrictive mediation by parents, as in setting rules for Internet use, monitoring Internet use, and implementing technical constraints (such as filters), is expected to prevent or at least inhibit risky behavior of adolescents online.

## 6.5 Country Characteristics, Risky Online Behavior, and Parental Mediation

Children's Internet access and use vary not only between families but also between countries.<sup>34</sup> Not only do households differ in their media socialization, the effects of the media climate at home differ between countries as well.<sup>35</sup> Prior research shows that children's odds of encountering online risks correlates with contextual factors, such as a country's rate of broadband penetration and level of schooling.<sup>36</sup> However, these studies do not examine both individual-level and country-level indicators simultaneously, nor do they focus on children's deliberate risk-taking online. The current study concurrently analyzes the impact of family indicators and the level of Internet diffusion in a country on adolescents' engagement in risky online behavior. Moreover, since parents deal with their children's Internet use in different manners, due to individual level and national-level characteristics, this study also relates the impact of parents' Internet mediation to the prevalence of Internet use within the country.

In countries where Internet access is more widespread, that is, where more people use the Internet, children seem to spend more time online than in countries with an overall lower rate of Internet diffusion.<sup>37</sup> A social context with more Internet users suggests more opportunities for digital media use.<sup>38</sup> Since time spent online correlates with risky online behavior,<sup>39</sup> a social context in which Internet use is more common might stimulate experimentation online and greater participation in risky online activities. Hence, it might be expected that in countries with a higher level of Internet diffusion, adolescents will engage more in risky online behavior.

Furthermore, the diffusion of Internet within a country might affect the mediation efforts of parents.<sup>40</sup> In countries where Internet use is widespread, some types

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<sup>32</sup> Lobe et al. 2011; Livingstone and Helsper 2010.

<sup>33</sup> Livingstone and Helsper 2008, Lee 2012; Mitchell et al. 2003.

<sup>34</sup> Lobe et al. 2011; Notten et al. 2009.

<sup>35</sup> Kirwil 2009; Notten and Kraaykamp 2009b.

<sup>36</sup> See e.g., Hasebrink et al. 2008; Lobe et al. 2011.

<sup>37</sup> Livingstone et al. 2011a, b.

<sup>38</sup> Lobe et al. 2011.

<sup>39</sup> Livingstone and Helsper 2010.

<sup>40</sup> Paus-Hasebrink et al. 2013; Lobe et al. 2011.

of parental mediation might be less effective in preventing children from taking risks online. For instance, when more people are online (including teachers and peers), digital knowledge and skills become more widespread, and Internet guidance within the family home might become less essential in determining adolescents' online behavior. However, from a contrasting viewpoint, parents in digitally developed countries will likely be more aware of online risks.<sup>41</sup> These parents might be particularly conscientious in applying preventions and limitations. The current study aims to provide more insight into this intriguing issue.

## 6.6 Data, Measurements, and Method

To answer the research question, the study makes use of 'EU Kids Online' survey data gathered in 2010. This offers information on households, parental Internet mediation, and children's online activities in 25 European countries.<sup>42</sup> The aim of the EU Kids Online project is to enhance knowledge about children and parents' experiences and practices regarding risky and safe use of online technologies. See [www.eukidsonline.net](http://www.eukidsonline.net) for more information about the project.<sup>43</sup> The EU Kids Online survey data is combined with country-level data from Eurostat 2012 and UNESCO 2012. Although children between 9 and 16 years of age were included in the original dataset, for reasons of consistency, this study analyzes adolescents between ages 11 and 16 ( $N = 18,709$  respondents). Deliberate risk-taking online is hardly an issue for the younger children (those aged 9 and 10), as also indicated by their high proportion of missing scores (26 %) on the dependent variable risky online behavior. Note that since this study uses cross-sectional data, results and conclusions about causality should be interpreted with care.

### 6.6.1 Measurements

#### 1. Risky online behavior

In the EU Kids Online survey, children answered questions on five risky activities, modeled on the UK Children Go Online survey<sup>44</sup>: 'Have you done any

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<sup>41</sup> Lobe et al. 2011.

<sup>42</sup> Countries included in the EU Kids Online survey: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, The Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Turkey and the UK.

<sup>43</sup> This article draws on the work of the EU Kids Online network, funded by the European Commission (DG Information Society) Safer Internet Programme (project code SIP-KEP-321803). See [www.eukidsonline.net](http://www.eukidsonline.net).

<sup>44</sup> See Livingstone et al. 2011a.

of the following things in the past 12 months; if yes, how often have you done each of these things?': (i) looked for new friends on the Internet; (ii) sent personal information (e.g., my full name, address, or phone number) to someone that I have never met face to face; (iii) added people to my friends list or address book that I have never met face to face; (iv) pretended to be a different kind of person than I really am; (v) sent a photo or video of myself to someone that I have never met face to face. Answer categories were (0) 'never/not in the past year', (1) 'less than once a month', (2) 'one or twice a month', (3) 'once or twice a week', (4) 'every day or almost every day'. A scale was created measuring adolescents' risky online behavior using the mean score on all five items, ranging from 0 to 4 ( $\alpha = 0.76$ ) (6.6 % missing scores).

## 2. Family background

The variable *parental educational level* represents the highest educational level of either parents, ranging from (0) 'none or primary only' to (6) 'tertiary (second stage)', in line with the International Standard Classification of Education (ISCED). Respondents' family structure is measured as living in a (0) 'two-parent' or (1) 'single-parent' household.

## 3. Parental Internet mediation

The EU Kids Online data includes five different types of parental Internet mediation (see, e.g., Livingstone et al. 2011b), which were confirmed by performing a factor analysis.<sup>45</sup> All questions on Internet mediation were answered by the parents. *Active parental mediation of Internet use* (including co-use), is measured by the following questions about things parents sometimes do with their child: (i) sit with him/her while he/she uses the Internet; (ii) stay nearby when he/she uses the Internet; (iii) encourage the child to explore and learn things on the Internet on their own; (iv) do activities together with the child on the Internet. Answer categories were (0) 'no' and (1) 'yes'. A scale was constructed by taking the mean of all four items ( $\alpha = 0.63$ ) (0.3 % missing).

*Active parental mediation of Internet safety* includes six questions asking parents whether they (i) explained why some websites are good or bad, (ii) helped the child when something is difficult to do or find on the Internet, (iii) suggested ways to use the Internet safely, (iv) suggested ways to behave toward others, (v) helped the child when something disturbing happened on the Internet, (vi) talked with the child about what to do when something disturbing happened on the Internet ( $\alpha = 0.82$ ) (0.4 % missing scores).

The variable *parental restrictive mediation on Internet use*, as in parental Internet rules, is measured by asking parents whether their child is allowed to do the following six online activities (0) 'all of the time' or (1) 'only with permission/

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<sup>45</sup> A factor analysis (oblimin rotation) confirmed the five parental Internet mediation indicators (together explaining 52 % of the variance) and showed that two items loaded on more than one dimension: "Talk to the child about what he/she does on the internet" and "Do you make use of software to prevent spam or junk mail or viruses?" These items were therefore excluded.



supervision or never allowed': (i) use instant messaging; (ii) download music or films; (iii) watch video clips; (iv) have his/her own social networking profile; (v) give out personal information to others; (vi) upload photos, videos or music to share with others. A scale was constructed by taking the mean of all four items ( $\alpha = 0.83$ ) (1.6 % missing scores).

*Parental monitoring of Internet use* is measured by four questions on whether parents (0) 'never' or (1) 'sometimes' checked up on what the child was doing on the Internet: (i) which websites the child had visited; (ii) the child's profile on a social network or online community; (iii) which friends or contacts the child had added to social networking profiles; (iv) the messages in the child's email or instant messaging account ( $\alpha = 0.82$ ) (9.3 % missing).

The variable *parental technological restrictions* is constructed using the mean of the following items: Do you make use of any of the following? (i) parental controls or other means of blocking or filtering some types of website, (ii) parental controls or other means of keeping track of the websites your child visits, (iii) a service or contract that limits the time your child spends on the Internet. Answer categories were coded (0) 'no' and (1) 'yes'. A scale was constructed using the mean of the three items ( $\alpha = 0.65$ ) (9.4 % missing).

#### 4. Individual-level control variables

Children's frequency of Internet use and online skills are related to encountering online risks.<sup>46</sup> Therefore, this study includes a measure of *adolescents' Internet use*, indicating whether the adolescent uses the Internet (0) 'once a month or less', (1) 'once or twice a month', (2) 'once or twice a week', (3) '(almost) every day'. Furthermore, parents' own media consumption influences their children's use of media, but also the intensity and type of parental mediation.<sup>47</sup> Thus, the current study controls for parents' frequency of Internet usage. The variable *parental Internet use* indicates whether parents use the Internet (0) 'never' to (4) '(almost) daily'.

This study also takes into account the *age* and *gender* of the respondents (i.e., adolescents), since these factors are highly relevant in risk taking in general and also in Internet use and risk taking online,<sup>48</sup> even within the narrow age group of adolescence. Moreover, effects and type of parental media socialization are found to differ with the age and gender of their children.<sup>49</sup>

#### 5. Country-level characteristics

This study includes a measure of how widespread Internet use is within a country. A *country's Internet diffusion* indicates the proportion of the total

<sup>46</sup> Livingstone and Helsper 2010.

<sup>47</sup> Notten and Kraaykamp 2009a; Lee 2012.

<sup>48</sup> Notten et al. 2009; Peter and Valkenburg 2006.

<sup>49</sup> Paus-Hasebrink et al. 2013; Notten and Kraaykamp 2009a; Sonck et al. 2013.

**Table 6.1** Descriptive statistics of all variables

	Mean	Std. Dev.	Min	Max
Adolescents' risky online behavior	0.49		0.00	4.00
<i>Individual level (level 1)</i>				
Parental educational level	3.52	1.40	0.00	6.00
Single-parent family (1 = yes)	0.21		0.00	1.00
Age adolescent	13.57	1.68	11.00	16.00
Gender adolescent (1 = female)	0.50		0.00	1.00
Daily Internet use adolescent	2.78	0.47	0.00	3.00
Daily Internet use parent	3.11	1.40	0.00	4.00
Parental active mediation use	0.52	0.33	0.00	1.00
Parental active mediation safety use	0.64	0.33	0.00	1.00
Parental restrictive mediation use	0.43	0.32	0.00	1.00
Parental monitoring	0.39	0.39	0.00	1.00
Parental technological restrictions	0.19	0.30	0.00	1.00
<i>Country level (level 2)</i>				
Internet diffusion (%users) (62 = 0)	0.00	16.64	-31.60	26.40
Educational level (years) (16 = 0)	0.00	1.10	-4.05	2.05

Source EU Kids online,  $N$  level 1 = 15431,  $N$  level 2 = 25

population of that country that used the Internet on a weekly basis in the year preceding measurement (2009).<sup>50</sup> For reasons of interpretation this variable is centered to its mean ( $M = 62$ ). Since different measures of a nation's Internet usage and penetration (e.g., broadband penetration, percentage of households with Internet access) highly correlate,<sup>51</sup> the percentage of frequent Internet users in a country may also be perceived as a general indicator of a country's ICT readiness and development. The current study controls for a *country's educational level*, which is represented by the years of expected education.<sup>52</sup> This indicator relates to the informational aspect of Internet use ('information society') and a country's general level of development.<sup>53</sup> See Appendix A for more detailed information on the country-level characteristics.

Finally, respondents with missing scores on one of the included variables were omitted, resulting in a final sample of 15,431 respondents. Table 6.1 presents the descriptive statistics for all variables included in the analyses.

<sup>50</sup> Eurostat 2012.

<sup>51</sup> Lobe et al. 2011; Notten et al. 2009.

<sup>52</sup> UNESCO 2012.

<sup>53</sup> See e.g., Lobe et al. 2011; Notten et al. 2009.

### 6.6.2 *Methods and Models*

In this study several multivariate multilevel models are estimated to provide insight into the relation between family characteristics, Internet diffusion within a country, and risk-taking online by adolescents.<sup>54</sup> Multilevel modeling takes into account the hierarchical structure of the EU Kids Online dataset, that is, the fact that the adolescents under study (individual level) are nested in 25 different European countries (country level). This method enables simultaneous estimation of the effects of individual *and* country-level factors on adolescents' engagement in risky behavior online, resulting in more correct estimates than models that do not take the nesting structure into account.<sup>55</sup>

Several multilevel models are estimated and presented in Table 6.2. In model 1, all control variables and family social background features are included. Model 2 adds parental Internet mediation, and model 3 includes the country-level characteristics (all fixed effects). Table 6.3 presents the results of the estimated cross-level interactions; that is, interactions are estimated between a specific type of parental Internet mediation (individual level) and the Internet diffusion within a country (country level). These cross-level interactions test whether the effects of parental mediation on adolescents' risk-taking online might differ between countries (random effects) with different levels of Internet diffusion.

## 6.7 Results

Table 6.2 shows the results for the multilevel regression models. Model 1 shows that, as expected, adolescents with higher educated parents are less likely to engage in risky online behavior compared to peers with lower educated parents ( $b = -0.025$ ). Also, adolescents growing up in a single-parent household engaged significantly more in risky behavior online than their peers in two-parent households ( $b = 0.045$ ). This finding is in line with previous research on the effects of single-parent families on various types of deviant behavior. Model 1 also includes several control variables. The findings reveal that older adolescents engage more in risky online behavior ( $b = 0.057$ ). The results also show that adolescents who spend more time online participate more in risky online activities ( $b = 0.150$ ), and girls seem to participate in such activities less often than boys ( $b = -0.041$ ). Finally, controlled for all other variables, parents' frequency of Internet use does not have a significant effect on their adolescent children's engagement in risky online behavior. Model 1 also shows that most of the variance in adolescents' risky

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<sup>54</sup> Although the variable 'risky online behavior' is skewed, a robustness check showed that logistic modeling resulted in the same substantive findings.

<sup>55</sup> Snijders and Bosker 1999.

**Table 6.2** Multilevel regression models on adolescents' risky online behavior

	Model 1		Model 2		Model 3	
	<i>b</i>	s.e.	<i>b</i>	s.e.	<i>b</i>	s.e.
Intercept	-0.583***	0.055	0.102	0.056	-0.112	0.061
<b>Individual level (level 1)</b>						
<i>Family background</i>						
Parental educational level	-0.025***	0.004	-0.023***	0.004	-0.023***	0.004
Single-parent family (1 = yes)	0.045***	0.013	0.039**	0.012	0.040***	0.012
<i>Parental Internet mediation</i>						
Parental active mediation use			-0.041*	0.018	-0.042*	0.018
Parental active mediation safety			0.024	0.018	0.024	0.018
Parental restrictive mediation use			-0.309***	0.018	-0.310***	0.018
Parental monitoring			0.035*	0.015	0.035*	0.015
Parental technological restrictions			0.022	0.018	0.021	0.018
<i>Control variables</i>						
Age adolescent	0.057***	0.003	0.038***	0.003	0.038***	0.003
Gender adolescent (1 = female)	-0.041***	0.010	-0.038***	0.010	-0.039***	0.010
Daily Internet use adolescent	0.150***	0.011	0.136***	0.013	0.112***	0.011
Daily Internet use parent	-0.007	0.004	-0.008	0.004	-0.007	0.004
<b>Country level (level 2)</b>						
Internet diffusion/10 (% users/ 10)					-0.014	0.014
Educational level (years) (16 = 0)					-0.016	0.019
Individual-level variance	0.374***	0.004	0.367***	0.004	0.367***	0.004
Country-intercept variance	0.012***	0.004	0.010***	0.003	0.009***	0.003
Log likelihood	28686.622		28382.388		28378.730	

Significance \*\*\* $p \leq 0.001$ , \*\* $p \leq 0.01$ , \* $p \leq 0.05$  two-tailed test

Source EU Kids Online,  $N$  level 1 = 15431,  $N$  level 2 = 25

behavior is due to variations at the individual level (here including characteristics of the family and the child); only a small proportion of the variance in risk-taking online is due to differentiation between countries (3.3 %).

Model 2 includes the five different types of parental Internet mediation, representing instructive, and restrictive parenting, next to family background indicators and controls. The results suggest that active parental mediation of Internet use does reduce adolescents' engagement in risky online behavior. Hence, adolescents engage less in risky behavior online if their parents are involved with their Internet use ( $b = -0.041$ ). Overall, restrictive mediation, as in rules set by parents on children's Internet use, seems most effective in preventing or inhibiting risky behavior online ( $b = -0.309$ ). When parents set rules for Internet use, their

**Table 6.3** Multilevel regression models on adolescents' risky online behavior

	Model 3(a)		Model 3(b)		Model 3(c)		Model 3(d)		Model 3(e)	
	<i>b</i>	s.e.	<i>b</i>	s.e.	<i>b</i>	s.e.	<i>b</i>	s.e.	<i>b</i>	s.e.
<i>Cross-level interactions<sup>a</sup></i>										
Parental active mediation use × Internet spread	0.026*	0.011								
Parental active mediation safety use × Internet spread			0.014	0.011						
Parental restrictive mediation use × Internet spread					0.014	0.015				
Parental monitoring × Internet spread							0.023*	0.011		
Parental technological restriction × Internet spread									0.016	0.012
Log likelihood	28367.931		28375.762		28347.167		28360.216		28374.947	

Significance \*\*\* $p \leq 0.001$ , \*\* $p \leq 0.01$ , \* $p \leq 0.05$  two-tailed test

Source EU Kids Online,  $N$  level 1 = 15431,  $N$  level 2 = 25

<sup>a</sup> All variables are included (similar to model 3 Table 6.2). For reasons of presentation, only the estimates for the cross-level interactions are shown

(adolescent) children are significantly less likely to engage in risky online behavior compared to adolescents whose parents do not set rules for Internet use. In contrast to the expectation, the findings show a significant positive relation between parental monitoring and adolescents' risky online behavior ( $b = 0.035$ ). It is unlikely that parental monitoring, such as checking up on what their children are doing on the Internet, stimulates adolescents' risky behavior. This positive relation therefore most likely represents a reversed causality. That is, when adolescents are reckless online, their parents probably increase their level of supervision. This coincides with conclusions of other studies on parenting and deviant media behavior, some of which use the same dataset.<sup>56</sup> When controlling for all other factors, active parental mediation of Internet safety and technological restrictions, such as Internet filters in the family home, appear to have no influence on adolescents' risky behavior.

Model 2 shows that the significant effect of parental social background is hardly affected by including the mediation strategies. For parental educational level, only 8 % of the effect is explained by parental Internet mediation. The effect of single-parent families on adolescent children's risky behavior online also runs partly via parent's Internet mediation (14 %), though the direct effect of growing up in a single-parent household is still highly relevant. These findings suggest that parental Internet mediation might function as a useful tool for guiding adolescents' online activities, regardless of family background.

Model 3 includes the country-level characteristics. The results suggest that Internet diffusion within a country and its level of schooling do not significantly affect adolescents' risk-taking online. Thus, contrary to the expectation, the proportion of people using the Internet in a country does not affect 11–16-year old adolescents' risky online behavior.

Table 6.3 presents the estimates of the cross-level interactions.<sup>57</sup> Model 3a seems to suggest that the impact of parents' active mediation of Internet use becomes somewhat less pronounced (i.e., more positive) with increased Internet diffusion in a country ( $b = 0.026$ ). This means that active mediation by parents is less successful in reducing adolescents' risky online behavior in countries where Internet use is more common. The positive impact of parental monitoring, on the other hand, seems to increase in countries where more people use the Internet, as presented under model 3d ( $b = 0.023$ ). This suggests that parents are more likely to monitor adolescents' online activities in countries with greater Internet penetration. All other cross-level interactions are non-significant, meaning that the prevalence of Internet use in a country does not affect the impact of parental safety-related mediation, Internet rules, and technological restrictions on adolescents' engagement in risky online behavior. This also implies that, regardless of the level of diffusion of Internet in a country, parental restrictions on Internet use

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<sup>56</sup> See e.g., Kalmus et al. 2013.

<sup>57</sup> Due to collinearity and non-convergence of the model, it was not possible to include all cross-level interactions simultaneously.

are highly relevant in preventing and inhibiting adolescents from engaging in risky online behavior.

## 6.8 Conclusions

Internet use is inescapable in European societies today, for parents, but also for children and adolescents. Internet is a source of valuable information and means of communication. But it also poses risks, especially for young people. This study focused on adolescents' engagement in risky online behavior. The first aim of the study was to explore the extent to which adolescents' risky online behavior is related to parental social background, the intensity of parents' mediation of Internet use, and the diffusion of Internet use within a country. The second aim was to find out whether the impact of parental mediation differs depending on how widespread Internet use is in a country. To accomplish these aims, this study used the EU Kids Online dataset, including 15,431 adolescents in 25 countries.

The findings of this study point to four general conclusions. First, adolescent children from lower educated and single-parent households engage more in risky online behavior than children from more 'advantageous' households. Adolescents in lower educated and single-parent homes are more attracted to risky online behavior, which is possibly due to factors like a lower stock of beneficial parental resources and various stress factors within the home. Educators and media-education programs might therefore give increased consideration to this consistently more vulnerable group of adolescents and their parent(s).

Second, Internet mediation seems to be an effective tool for parents to influence their adolescents' risky online behavior. Parents' active involvement in their children's Internet use prevents or at least reduces adolescents' risky online behavior. Rules restricting Internet use are especially effective in reducing children's risky online behavior. By teaching children to use the Internet in a beneficial way and by limiting the amount of time that children spend online, parents reduce their children's odds of participating in risky online activities. Parental monitoring is positively correlated with risky online behavior. This probably indicates that parents are more likely to check up on what their adolescent child does online if they have a history of risky online behavior.

Third, in countries where Internet use is widespread, adolescents are not more likely to participate in risky online behavior than in countries where Internet use is less prevalent. Hence, engaging in risky online behavior does not seem to depend on the number of Internet users in the wider social context or the level of digital development of a country. Therefore, in limiting adolescents' risky online behavior, this study suggests that policy programs should predominantly focus on the immediate environment of children.

Fourth, the findings of this study suggest that the spread of Internet use somewhat alters the impact of some parental mediation styles on adolescents' risky

online behavior. For instance, in countries where Internet use is more prevalent, also among peers and within school environments, parent–child interaction on adolescents’ use of the Internet seems less influential in limiting risky online behavior. The correlation between parental monitoring and risky behavior increases as Internet use becomes more common. This might reflect parents’ growing concerns about their children’s risky online behavior in more digitalized countries. Above all, applying rules for Internet use in the family home proves to be a key way to reduce adolescents’ risky online behavior, regardless of the level of Internet diffusion within a country. This suggests that in modern countries, where parenting styles are often more permissive, parents should nonetheless be encouraged to restrict their children’s Internet use.

In exploring the impact of several contextual factors on adolescents’ risky online behavior, this study used cross-sectional data. Since parental and adolescents’ behavior are measured at one point in time, especially regarding parental mediation and children’s risky online behavior, conclusions about causality should be interpreted with care. Another relevant point of discussion is the relation between parental Internet mediation and children’s age. As children mature, parents tend to adjust their mediation strategies, and children respond differently to parental mediation as they mature. Although this study takes into account the variation in age among adolescents, future research concerning risky online behavior might differentiate more explicitly between ages. Also, this study suggests that parents are more likely to check up on their adolescent children’s Internet use when their children show more risky online behavior. However, what these parents do with the information they gather remains unclear. Since the relevance of monitoring seems to increase in more digitalized countries, research unraveling the causality and implications of parental monitoring and online risks seems highly relevant.

Overall, since Internet use and digital applications are ever more ubiquitous, the findings of this study urge policymakers and educators to further stimulate parents to be involved in and, especially, to set rules for their children’s Internet use. Many parents might find it difficult to restrict adolescents’ online activities. They might therefore benefit from policies supporting them in keeping their rules and in guiding their children into critical online users. It is also worthwhile to recognize that adolescents from problematic and less supportive family backgrounds are more vulnerable to risky behavior, including online. With Internet use becoming increasingly common in schools and more mobile, a more active role will be called for, for instance, of teachers, and youth workers.



## Appendix A

**Table A.1** Country-level characteristics

	<i>N</i>	Risky online behavior (mean)	Internet diffusion (% users)	Schooling (expected years)
Austria	586	0.51	67	15.0
Belgium	635	0.44	70	15.9
Bulgaria	646	0.52	40	13.7
Cyprus	585	0.56	45	13.8
Czech Republic	673	0.58	54	15.2
Germany	696	0.47	71	15.6
Denmark	658	0.38	82	16.9
Estonia	667	0.71	67	15.8
Greece	473	0.49	38	16.5
Spain	605	0.22	54	16.4
Finland	724	0.41	79	17.1
France	588	0.45	65	16.1
Hungary	585	0.32	57	15.3
Ireland	616	0.38	60	17.9
Italy	645	0.56	42	16.3
Lithuania	581	0.73	55	16.0
Netherlands	724	0.39	86	16.7
Norway	734	0.40	88	17.3
Poland	629	0.40	52	15.2
Portugal	564	0.48	42	15.5
Romania	587	0.70	31	14.8
Sweden	704	0.57	86	15.6
Slovenia	705	0.58	58	16.7
Turkey	227	0.58	30	11.8
UK	594	0.41	76	15.9

Source EU Kids Online, *N* level 1 = 15431; *N* level 2 = 25

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