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Adolescent sexual risk behavior on the internet

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Does Country Context Matter? Investigating the Predictors of Teen Sexting Across Europe

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Abstract

The aim of this study was to investigate (a) individual and country characteristics that explain adolescents' engagement in sexting and (b) individual predictors that vary across countries. At the individual level, we investigated age, gender, sensation seeking, and frequency of internet use. At the country level, we investigated traditionalism, gross domestic product, and broadband penetration. The sample consisted of 14,946 adolescents (49.7% boys) aged 11 to 16 from 20 European countries. Using multilevel modeling, our findings indicated that age, sensation seeking, and frequency of internet use predicted sexting across all countries. The influence of gender varied across countries. Although country characteristics had no direct effect on adolescent sexting, traditionalism significantly predicted gender differences in sexting. In countries that are more traditional, gender differences were stronger with more boys compared to girls engaging in this behavior. In less traditional countries, these gender differences were less apparent or even reversed.

Does Country Context Matter? Investigating the Predictors of Teen Sexting Across Europe

Sexting – the sending or posting of sexual photos or messages via electronic devices – has received considerable attention from media and researchers. Studies investigating this phenomenon have investigated mainly the prevalence of this behavior as well as age and gender as predictors of this behavior. The prevalence rates differ highly across studies, ranging from 2% to 20% (Livingstone, Haddon, Görzig, & Olafsson, 2011a; Mitchell, Finkelhor, Jones, & Wolak, 2012; The National Campaign to Prevent Teen and Unplanned Pregnancy, 2009). Concerning the predictors of sexting, several studies concluded that older adolescents are more likely to sext than younger adolescents (Lenhart, 2009; Livingstone et al., 2011a; Mitchell et al., 2012). Findings on gender differences, however, are inconclusive. While some studies reported no gender differences in sexting (Hinduja & Patchin, 2010; Lenhart, 2009), other studies reported that more boys than girls send sexts (Baumgartner, Valkenburg, & Peter, 2010; de Graaf, Meijer, Poelman, & Vanwesenbeeck, 2005; Dowdell, Burgess, & Flores, 2011). Moreover, few studies also reported that more girls than boys engage in sexting (Mitchell et al., 2012; The National Campaign to Prevent Teen and Unplanned Pregnancy, 2009).

The differences in prevalence and predictors of sexting, particularly gender differences, may partly result from the characteristics of the country in which the studies were conducted. The vast majority of studies on sexting investigated this behavior in one specific country while cross-national comparisons are widely missing. As a result, contextual factors at the country level have often been ignored. However, it is important to consider the context for at least two reasons. First, the differences in prevalence and frequency of sexting across countries may be due to specific characteristics of a country. For example, in countries with higher internet penetration, adolescents may have more opportunities to engage in this behavior. Second, predictors of sexting may vary across countries. Whereas in some countries, specific individual predictors may have a strong influence on sexting because of particular characteristics of these countries, the same factors may have no or only a weak influence in other countries where these particular characteristics are absent. Investigating contextual factors next to individual factors across different countries may thus provide a more comprehensive picture of youth sexting.

The present study employs data from the EU Kids Online II project, conducted with 14,946 adolescents, 11 to 16-years old, from 20 European countries. This dataset provides a unique opportunity to study sexting from a cross-national perspective. More specifically, the aim of this study is to investigate the factors that explain why adolescents engage in sexting at the individual and the contextual level. At the individual level, we investigate age, gender, and sensation seeking. At the contextual level, we investigate traditionalism.

Frequency of internet use, gross domestic product, and broadband penetration are included as control variables. Moreover, the study investigates whether individual predictors vary across countries and whether characteristics of the country can explain these variations.

Individual Level Predictors of Sexting

Although in many countries only a minority of adolescents engages in sexting (Lenhart, 2009; Livingstone et al., 2011a; Livingstone & Görzig, 2012), it is important to identify these adolescents to be able to effectively prevent this behavior. Specific individual characteristics at least partly determine whether an adolescent engages in sexting. To date, age and gender are the most frequently studied predictors of sexting. Studies conducted in the U.S. (Lenhart, 2009; Mitchell et al., 2012; The National Campaign to Prevent Teen and Unplanned Pregnancy, 2009) and in Europe (Livingstone et al., 2011a) consistently report that older adolescents are more likely to engage in sexting compared to younger adolescents. The increase in sexting behaviors during this age period may be explained by the strong increase in sexual interest during this period (DeLamater & Friedrich, 2002) as well as with an increased use of the internet and mobile phones (Lenhart, Madden, & Hitlin, 2005; Livingstone et al., 2011a). Mid-adolescents are much more interested in sexuality than early adolescents. In addition, older adolescents use the internet more and at the same time, their parents may supervise and monitor their use less frequently. They may thus have more opportunities to engage in sexting.

Gender differences in sexting are less conclusive. Although typically boys are more likely to use the Internet to satisfy their sexual interests than girls (e.g. by using sexually explicit internet material) (Peter & Valkenburg, 2011), the results on gender differences in sexting are mixed. In the US, Mitchell et al. (2012) reported that more girls than boys send sexts (Mitchell et al., 2012). Several other studies reported no gender differences (Hinduja & Patchin, 2010; Lenhart, 2009). In a qualitative study, Ringrose et al. (2012) examined the meanings of sexting for boys and girls. They found that in the case of sexting, as with many types of sexual behavior, a strong double-standard prevailed. Boys frequently pressured girls into sending sexual pictures, however, girls and boys did not approve of girls sending sexual messages. Furthermore, it was perceived as normal for boys to produce and show off with these images of themselves (Ringrose, Gille, Livingstone, & Harvey, 2012).

In addition to age and gender, psychological characteristics of youth may determine their sexting behavior. One of the most consistent predictors of adolescents' online and offline sexual behavior is sensation seeking. Individuals with high levels of sensation seeking typically report higher numbers of sexual partners (Bancroft et al., 2004; Donohew et al., 2000), they are more likely to engage in casual sex (Seto, Lalumiere, & Quinsey,

1995), and to have unprotected sex (Kalichman, Heckman, & Kelly, 1996). Sensation seeking has also been related to online sexual behaviors, such as compulsive sexual online behaviors (Cooper, Delmonico, & Burg, 2000), usage of online pornography (Peter & Valkenburg, 2006), and engagement in online sexual risk behavior (Baumgartner, Sumter, Valkenburg, & Peter, 2012). Adolescents with high levels of sensation seeking typically search for stimulations in their lives. They may be willing to send sexting messages because they value the excitement and may be less likely to consider potential negative consequences.

Bringing the Context in: Country Differences in Sexting

Most studies on the predictors of adolescents' online behavior and their sexting behavior in particular considered only individual characteristics. Although individual factors are important in explaining behavior, evidence also suggests that broader contextual variables may also influence adolescents' online behavior. Many theories of adolescent development consider the social and cultural context in which children grow up as an important determinant of their behavior (Bronfenbrenner, 1979; Igra & Irwin, 1996). However, empirical studies that considered the broader context are largely missing (Kotchick, Shaffer, & Forehand, 2001). To investigate the influence of country characteristics on teen sexting, it is necessary to compare different countries with each other. Comparing sexting across countries provides the opportunity to not only compare prevalence rates across countries, but also explain these country differences with specific country characteristics. Taking country characteristics into consideration thus helps to explain why sexting is more likely to occur in specific countries and less likely to occur in others.

Cultural values prevailing in a society are one of the most important country characteristics that may influence sexting behavior. Cultural values shape the daily practices, attitudes, and behaviors of a society (Schwartz & Boehnke, 2004). Values are supported and fortified by institutions, such as schools, families, and media and thereby influence the attitudes and behaviors of individuals within a society (DeLamater, 1981; Sprecher, Hatfield, Cortese, Potapova, & Levitskaya, 1994). In this study, we focus on one specific value, namely traditionalism. According to Schwartz' theory of basic human values, traditionalism is defined as "respect, commitment and acceptance of the customs and ideas that traditional culture or religion provide" (Schwartz, 1994).

Traditional countries are characterized by conservative worldviews, unequal gender roles, and restrictive sexual attitudes (Boehnke, 2011; Wood & Eagly, 2010). Previous research has shown that risk taking is less prominent in traditional countries (Arnett & Balle-Jensen, 1993; Kloep, Gueney, Cok, & Simsek, 2009). This may be due to the

restrictive upbringing of children in traditional cultures (Alwin & Felson, 2010). In particular, in terms of sexuality, traditional countries may strongly restrict adolescents' behavior (Sharabany, Eshel, & Hakim, 2008; Widmer, Treas, & Newcomb, 1998).

Although European countries are homogeneous in many aspects, differences in cultural values persist within these countries (Widmer et al., 1998). In particular, the northwestern European countries, such as Sweden, Denmark, and Norway, are characterized by more permissive sexual attitudes (Arnett & Balle-Jensen, 1993; Weinberg, Lottes, & Shaver, 1995) compared to southern European and some eastern European countries, like Italy and Poland (Widmer et al., 1998). These differences in values are observable, for example, in different sex education programs at schools (Parker, Wellings, & Lazarus, 2009). Adolescents in traditional countries may thus be less likely to engage in sexual behaviors. It may therefore be assumed that sexting is less prevalent in traditional countries.

Interactions Between Individual Level and Country Level Characteristics

National research on the individual predictors of sexting typically assumes, at least implicitly, that the effects of these individual factors are generalizable to other countries. However, whether this is true, has rarely been tested. Country characteristics may not only have a direct effect on adolescents' sexting behavior, but may also moderate the effects of individual predictors on sexting. Due to specific characteristics of a country, some individual characteristics may have a stronger effect on sexting in one country than in another.

As discussed above, traditional values are strongly related to specific gender roles (Sprecher et al., 1994; Wood & Eagly, 2010). These values determine whether women are subjected to more or less social restrictions concerning the expression of their sexuality (DeLamater, 1981). As a result, countries can be characterized as sexually restrictive (traditional) or sexually permissive (non-traditional). Sexually permissive and restrictive countries have different views concerning gender-appropriate sexual behavior. In sexually restrictive countries, traditional gender roles promote sexual passiveness of women and dominance and agency of men (Kiefer & Sanchez, 2007; Marston & King, 2006). In these countries, the sexuality of women is subjected to more social restrictions compared to the sexuality of men (Weinberg et al., 1995). In contrast, in more sexually permissive countries, such as the Scandinavian countries, it is normative for women to express their sexual wishes and desires (Weinberg et al., 1995). In these countries, female sexuality is characterized by more active sexual behaviors of women. Gender differences in permissive societies are generally much less pronounced than in traditional, sexually restrictive societies (Petersen & Hyde, 2010).

It may therefore be expected that in less traditional societies, gender differences in sexting are less pronounced compared to more traditional countries. This is in line with a recent meta-analysis (Petersen & Hyde, 2010) that found smaller gender differences in sexual behaviors in countries with greater gender equity. In permissive societies, it is more appropriate for adolescent girls to express their sexuality. Thus, they may be more willing to send sexual messages or pictures. In countries that are more traditional, this behavior may be perceived as inappropriate for adolescent girls. In these countries, more boys than girls may engage in sexting. Inconsistent gender differences found in previous studies on sexting may therefore at least partly be explained by the traditionalism of a country.

Although the effects of cultural values may be most prominent for culturally determined individual characteristics, such as gender, it may also influence the relation of sensation seeking and age with sexting. For example, Arnett (1992) suggests that whether sensation seeking leads to risk behavior among adolescents depends on the social context of these adolescents. Arnett (1992) argues that sensation seeking makes risk behaviors more likely but it is the broader context of the socialization environment including cultural values which determines whether adolescents have the possibility to express this behavior. According to Arnett (1992), societies differ in the degree of restrictiveness they impose on individuals and the range of individual differences perceived as acceptable. In restrictive societies, sensation seeking may be expressed to a lesser degree because in these societies, adolescents are restricted in their behavior and norms (Arnett, 1992; Arnett & Eisenberg, 2007). It may thus be argued that in traditional countries, which are typically characterized by more restrictive upbringing of children, the influence of sensation seeking on adolescents' sexting behavior is weaker than in countries with a more liberal upbringing.

The same may hold for age differences. In traditional, sexually restrictive countries, teenage sexuality may be perceived as inappropriate. In less traditional countries, teenage sexuality is perceived as a part of normal adolescent development and may therefore be less restricted (Weinberg et al., 1995; Widmer et al., 1998). In these countries, adolescents may thus engage in sexual behaviors at younger ages. Therefore, in these countries, age differences in sexting may be less pronounced.

The Present Study

Because most previous studies have investigated sexting in one specific country, mainly in the US, it is not clear yet whether the predictors of sexting found in these studies are generalizable to other countries and contexts. The aim of the present study, therefore, was to investigate the predictors of adolescent sexting in 20 European countries. The study thereby examines individual as well as country characteristics that influence sexting.

Based on theoretical reasoning and previous findings, we expect that individual characteristics, such as age, gender, and sensation seeking, have an influence on youth sexting. More specifically, we predict that older adolescents are more likely to engage in sexting. Moreover, we expect that adolescents with higher levels of sensation seeking are more likely to sext. The dominant view in the literature seems to suggest that individual characteristics are the driving force behind risk behavior. At the same time, we observe a variety in prevalence rates and strength of predictors, which might partly reflect national diversity. This diversity calls for an approach that considers the context of the study and its participants. Thus, in addition to the individual factors, we expect that traditionalism as a country characteristic predicts sexting behavior. We assume that sexting is less prevalent in countries that are more traditional. Finally, this study examines whether the effects of individual characteristics vary across countries. We assume that contextual factors may explain some of the inconclusive findings reported in previous studies. In particular, we expect that gender differences are greater in countries that are more traditional compared to less traditional countries. Moreover, we expect that the influence of sensation seeking on sexting is less strong in traditional countries and that age differences in sexting are larger in traditional countries.

Because previous studies have shown that the frequency of internet use influences on adolescents' online sexual risk behavior (Baumgartner, Sumter, Peter, & Valkenburg, 2012), we included this variable as a control variable at the individual level. Moreover, we included the percentage of broadband penetration and gross domestic product as control variables at the country level because both indicators related to youth encountering online risks in previous studies (Lobe, Livingstone, Olafsson, & Vodeb, 2011).

To investigate individual and country characteristics across 20 countries, we employed multilevel modeling. Multilevel modeling is the most appropriate method for analyzing data with a hierarchical structure (i.e., individuals nested within countries). Multilevel modeling can be used to investigate the effect of country characteristics by simultaneously controlling for the effects of individual characteristics (Hox, 2010; Snijders & Bosker, 1999). Moreover, it allows us to examine cross-level interactions as postulated for the interaction between traditionalism and the individual predictors.

Method

Sample and Procedure

We conducted a secondary analysis of the data collected as part of the EU KIDS Online II project.³ Within this project, 25,142 internet using children aged 9 to 16 from 25 European countries were interviewed about their online experiences. By means of random stratified sampling, approximately 1,000 children were interviewed in spring and summer of 2010 in each country. The survey was administered to the children in their homes. The interview consisted of a face-to-face interview and a self-completion part for sensitive questions. Questions about sexual experiences, including sexting, were only administered to adolescents aged 11 to 16. This resulted in a sample of 18,709 adolescents aged 11 to 16. Of the 25 European countries, data for all contextual variables were available only for 20 countries. The included countries were: Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Slovenia, Sweden, and the United Kingdom. The final sample consisted of 14,946 adolescents (49.7% boys) with a mean age of 13.49 ($SD = 1.39$). A detailed description of the recruitment and sampling procedures can be found elsewhere (Livingstone, Haddon, Görzig, & Olafsson, 2011b).

Measures

Sexting. Sexting was measured by asking participants whether they have sent or posted a sexual message (example: words, pictures or videos) of any kind on the internet in the past 12 months. Answer options were “yes”, “no”, “don’t know”, or “prefer not to say” (7.8%). The last two options were treated as missing answers in the analyses.

Sensation seeking. Sensation seeking was measured with the two-item short sensation seeking scale (Stephenson, Hoyle, Palmgree, & Slater, 2003). The two items were “I do dangerous things for fun” and “I do exciting things even if they are dangerous”. Response categories were 0 (*not true*), 1 (*a bit true*), and 2 (*very true*). Answers to these two questions were added, so that the final variable could take values ranging from 0 to 4, $M = 0.80$ ($SD = 1.07$).

Internet use. The frequency of internet use was measured with three questions. “How often do you use the internet?” Response categories were: 1 (*every day or almost*

³ The EU Kids Online project is a research network including 25 European countries. The aim of the project is to chart the online experiences of European children. The project is core funded by the EC Safer Internet Program. More information about the project, the data, as well as further findings can be found here: www.eukidsonline.net.

every day), 2 (once or twice a week), 3 (once or twice a month), or 4 (less than once a month). Moreover, participants indicated the time spent on the internet “on a normal school day” and “on a normal non-school day”. Response categories ranged from “none at all” to “more than four hours” in half hour intervals. Out of these three questions, internet use in minutes per day was calculated, $M = 104.43$ ($SD = 64.84$).

Traditionalism. The indicator of traditionalism was taken from the European Social Survey 5 (2010). The European Social Survey regularly investigates values in 26 European countries. Values in the European Social Survey were measured with a modified version of the Portrait Values Questionnaire (Schwartz et al., 2001). Each item describes a person with specific values, and participants have to evaluate how similar they are to this person. Response categories ranged from 1 (*very much like me*) to 6 (*not like me at all*). Two items measured traditionalism. Items were reversed coded so that higher values indicated more traditionalism (ranging from 0 to 5). The mean score of these two items for each individual within a specific country was aggregated to receive a general indicator of traditionalism for each country. These means were weighted using a design and a population weight (for more information on these weights and their calculation see European Social Survey 5, 2010). Mean traditionalism ratings ranged from 2.83 for Norway to 3.98 for Cyprus (see Table 7.1). All following analyses are based on these weighted traditionalism scores. Because there is a discussion on whether the scores of the Portrait Values Questionnaire need to be corrected for individual differences in the use of response scales, we also calculated these corrected values (see European Social Survey 5, 2010). None of the reported findings differed if the corrected scores were used in the analyses. We, therefore, report findings based on the uncorrected values.

Gross-domestic product per capita (GDP). The GDP has been widely considered an indicator of a country’s standard of living. GDPs ranged from 4,800 € for Bulgaria to 64,500 € for Norway (see Table 7.1).

Broadband penetration. As an indicator of technological infrastructure, the percentage of broadband penetration within a country was used. Broadband penetration ranged from 13.9% in Bulgaria to 38.4% in the Netherlands (see Table 7.1).

Data Analytical Approach

For descriptive data analysis the EU Kids Online data was weighted using a weight that accounts for country-specific design as well as for country-specific non-response effects. The country-specific design weight corrects for unequal probabilities of participant selection. The country-specific non-response weight adjusts for biases due to under- or over-representation of specific respondent types. The weight is adjusted according to key

demographic variables such as age, gender, religion, and education (see Livingstone et al., 2011b).

To investigate whether the individual as well as country level variables influence sexting, we conducted multilevel analysis using the statistical program HLM 6 (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2004). Multilevel analysis was used because it takes into account that individuals are clustered within countries and that there is variance within the countries as well as between the countries (Hox, 2010). Because of the hierarchical data structure, we have two data levels, the individual level (1st level) as well as the country level (2nd level).

Because the outcome variable ‘sexting’ was a binary variable, a multilevel logistic regression model was used based on a Bernoulli distribution. The parameters were estimated using the penalized quasi likelihood procedure with higher-order Laplace approximation. The Laplace procedure is meant to produce the most accurate estimates in cases of binary dependent variables (Guo & Zhao, 2000; Hox, 2010). All continuous individual and country level variables, except for gender, were entered grand-mean centered in the analysis (Hox, 2010).

The multilevel models were analyzed using a stepwise procedure (Hox, 2010). The first model was an “empty” model with no predictor variables included, also called the intercept-only model. The intercept-only model estimates whether countries differ in the outcome variable ‘sexting’. In the second model, fixed effects for all individual level predictors were added. An effect is fixed if it is expected that this effect does not differ across countries. Thus, the overall effects of these variables across all countries are estimated. The third model included also the effects of the variables at the country level. This model allows us to estimate whether the country variables explain variance in sexting between countries. The fourth model was a random coefficient model. In this model, it is examined whether any of the slopes of the individual level variables differ between countries. If a slope significantly varies between countries, it implies that the effect of this variable differs across countries. The fifth and final model included the cross-level interactions. Interaction terms between all individual level variables that had a significant slope variation in the previous model and the country level variable traditionalism were added. This model examined whether country differences in traditionalism can explain the random slope variances of the individual level variables.

To investigate the model fit of the multilevel models, the deviance was calculated for each model. The smaller the deviance, the better the model fit. If the deviance of a model is significantly smaller than the deviance of the previous one, this indicates that model fit has improved (Hox, 2010; Raudenbush et al., 2004).

Results

Descriptives

Table 7.1 depicts the prevalence of sexting for adolescent boys and girls in the 20 European countries. In most countries, only 1% to 5% of boys and 1% to 4% of girls engaged in sexting. Only in the Czech Republic and Sweden, prevalences for sexting were much higher for both boys (10.3% and 12.9%) and girls (10.1% and 10.2%). In most countries, more boys than girls engaged in sexting. This gender difference was most pronounced in Cyprus, Italy, and Germany. Only in Finland, Denmark, and Norway, more girls than boys engaged in sexting. In a few countries, gender differences were very small (e.g. in the Czech Republic, Estonia, and the Netherlands). As expected, older adolescents were more likely to engage in sexting. Among the 11 to 13 year olds, only 1.5% engaged in sexting, whereas among 14 to 16 year olds, 4.6% engaged in sexting.

Multilevel Modeling

All multilevel models are depicted in Table 7.2. The first model (M1) was the intercept-only model and included no predictors. The model indicated that the probability of engaging in sexting across all countries is 0.026. The significant country level intercept indicated that sexting varies across countries, $p < .001$. Ten percent of the variance in sexting was between countries.⁴

Model 2 (M2) included the fixed effects of the first level predictors: age, gender, sensation seeking, and frequency of internet use. As expected, older adolescents were significantly more likely to engage in sexting than younger adolescents, $p < .001$. Adolescents with higher levels of sensation seeking and adolescents who use the internet more frequently were also significantly more likely to engage in sexting, $p < .001$ and $p < .001$, respectively. Gender had no significant influence on sexting across all countries.

Model 3 (M3) additionally included the effects for the country level predictors. This model thus investigated whether traditionalism, controlled for broadband penetration and GDP, has an influence on youth sexting beyond the effects of individual level characteristics. However, none of the country level predictors had a significant influence on sexting indicating that country characteristics had no direct effect on the prevalence of sexting in a country.

⁴ The second-level variance was calculated as follows: $u_0/(u_0+\pi) = 0.371/(0.371+3.29) = 0.10$ (see Hox, 2010)

In the next model (M4), we assessed whether the slopes for age, gender, sensation seeking, and frequency of internet use had significant variance components. A significant variance component of a random slope of an individual level predictor indicates that the effect of this predictor varies across countries. Only the variance component for the random slope for gender was significant (variance component for gender = 0.30, $df = 19$, $\chi^2 = 45.40$, $p = .001$, all other variance components $\leq .003$, all p at least $\geq .28$). This indicates that, as expected, gender differences in sexting varied across countries. The effects of age, sensation seeking, and frequency of internet use were the same in each country.

The final model (M5) was conducted to investigate whether traditionalism could explain the varying gender differences across countries. Thus, the cross-level interaction between gender and traditionalism was included in this model. The interaction between traditionalism and gender was significant, $p < .05$. This indicates that traditionalism could partly explain gender differences in sexting across countries. In countries that were more traditional, gender differences were more pronounced, with more boys engaging in sexting. In less traditional countries, these gender differences were smaller, indicating that equal amounts of girls and boys engaged in sexting.

The model fit, as indicated by the deviance, significantly improved in each step of the modeling process. Only the fit of Model 2 and Model 3 did not significantly differ because the inclusion of the second level predictors did not improve the model. The explained variance at the second level only changed marginally from 10 % to 8% because the second level characteristics had no direct influence on sexting.

Table 7.1. Percentages of Sexting for Boys and Girls and Country Characteristics per Country

	Percentage Sexting			Country Characteristics		
	Boys %	Girls %	Total %	Traditionalism Mean	GDP in 1000 €	Broadband Penetration %
Belgium	5.3	3.6	4.4	3.41	32.60	30.00
Bulgaria	0.5	1.3	0.9	3.64	4.80	13.90
Cyprus	5.2	0.6	3,8	3.98	21.60	23.20
Czech Republic	10.3	10.1	10.2	3.06	14.20	20.40
Denmark	0.3	1.7	1.1	2.91	42.50	31.30
Estonia	2.2	3.8	3.0	3.17	10.70	26.00
Finland	2.8	3.0	2.9	2.95	33.60	29.10
France	4.9	1.6	3.1	3.14	29.80	31.50
Germany	4.1	0.6	2.4	3.26	30.30	31.30
Greece	3.1	0.7	2.0	3.73	20.10	18.60
Hungary	1.7	0.3	1.0	3.50	9.70	19.70
Ireland	4.4	2.6	3.5	3.28	34.90	22.90
Netherlands	1.1	0.7	0.9	2.98	35.40	38.40
Norway	1.3	2.2	1.8	2.83	64.50	35.30
Poland	2.6	1.1	1.9	3.50	9.30	14.90
Portugal	3.4	2.6	3.0	3.30	16.20	19.60
Slovenia	4.1	1.1	2.6	3.74	17.30	23.60
Spain	1.8	0.8	1.3	3.52	22.80	22.50
Sweden	12.9	10.2	11.5	2.95	37.00	31.90
UK	4.0	3.0	3.5	3.20	27.40	30.60

Table 7.2. Findings of the Multilevel Analysis

	M1		M2		M3		M5	
	Coefficient (S.E.)	Odds Ratio (CI)	Coefficient (S.E.)	Odds Ratio (CI)	Coefficient (S.E.)	Odds Ratio (CI)	Coefficient (S.E.)	Odds Ratio (CI)
Fixed Effects								
Individual level								
Gender			-0.18 (0.11)	0.83 (0.68, 1.03)	-0.18 (0.11)	0.83 (0.66, 1.05)	-0.31 (0.21)	0.74 (0.49, 1.10)
Age			0.26*** (0.04)	1.30 (1.21, 1.39)	0.26*** (0.05)	1.30 (1.18, 1.42)	0.26*** (0.05)	1.30 (1.18, 1.43)
Sens. seeking			0.49*** (0.67)	1.63 (1.43, 1.85)	0.49*** (0.07)	1.63 (1.43, 1.85)	0.49*** (0.07)	1.63 (1.41, 1.88)
Internet use			0.01*** (0.00)	1.01 (1.00, 1.01)	0.01*** (0.00)	1.01 (1.00, 1.01)	0.01*** (0.00)	1.01 (1.00, 1.01)
Country level								
Traditionalism					-0.69 (1.11)	0.51 (0.05, 5.75)	-0.06 (1.04)	0.94 (0.11, 8.49)
GDP					0.00 (0.00)	1.00 (1.00, 1.00)	0.00 (0.00)	1.00 (1.00, 1.00)
Broadband					-0.01 (0.04)	0.99 (1.00, 1.00)	-0.01 (0.05)	0.99 (0.90, 1.10)
Cross-level interact.							-1.78*	0.17
Gender x Traditional.							(0.76)	(0.04, 0.75)
Intercept	-3.67*** (0.17)	0.03 (0.02, 0.04)	-3.98*** (0.22)	0.02 (0.01, 0.03)	-3.98*** (0.25)	0.02 (0.01, 0.03)	-3.97*** (0.27)	0.02 (0.01, 0.03)
Random Effects								
Intercept	0.37*** (0.14)		0.36*** (0.13)		0.33*** (0.12)		0.34*** (0.13)	
country level								
Deviance	28858.04		27801.57		27800.39		27779.13	

Note. Model 4 is not included in this table. All variance components of M4 are mentioned in the text.

Discussion

Although sexting has received much research attention in recent years, it has been investigated mainly from a national perspective, predominantly in the US. Therefore, most of our knowledge about sexting is based on US American studies. Because the knowledge of sexting in Europe is limited, we do not know whether findings from the US can be generalized to European countries. The aim of the present study, therefore, was to broaden our understanding of sexting by investigating the predictors of this behavior among 20 European countries. By taking a cross-national perspective, this study was able to delineate individual as well as country characteristics that influence sexting. The study has three main findings.

The first finding is that the individual level characteristics age and sensation seeking are universal predictors of sexting, as the effects of these two characteristics were the same across all 20 countries. Older adolescents and adolescents with higher levels of sensation seeking were more likely to engage in sexting. In line with studies conducted with US teenagers, sexting seems to increase during adolescence (Hinduja & Patchin, 2010; Lenhart, 2009; Mitchell et al., 2012). This may be due to the typical developmental changes that individuals undergo in this period, in particular pubertal development. Hormonal changes that characterize puberty have been consistently linked to an increase in sexual curiosity and exploration (DeLamater & Friedrich, 2002). Sexting may be considered as a part of these developments. The current study does not allow us to determine whether sexting peaks in middle or late adolescence or whether the prevalence of sexting even further increases during adulthood. The report of the National Campaign to Prevent Teen and Unplanned Pregnancy (2009) reported that young adults are even more likely to engage in sexting compared to adolescents. In contrast, Baumgartner et al. (2012) have shown that the prevalence of online sexual risk behavior, including sexting, decreases in the transition to adulthood. Further studies need to investigate the development of these behaviors in more detail. The strong influence of individual characteristics on adolescents' sexting behavior emphasizes the importance of personality characteristics to explain this behavior. This indicates that these two characteristics influence adolescents' sexting behavior regardless of which European country these adolescents live. However, this is not the case for all individual characteristics.

The second and possibly most important finding of this study is that, although country characteristics had no direct effect on adolescent sexting, traditionalism significantly predicted gender differences in sexting. Taken all countries together, gender had no effect on sexting. However, we found that gender differences varied across countries. Whereas in some countries, more males than females engaged in sexting (e.g. Cyprus, Italy, Germany), in other countries more girls than boys engaged in sexting (e.g.

Denmark, Finland, Norway). In some countries equal numbers of boys and girls engaged in sexting (e.g. the Netherlands, Czech Republic). The prevailing values in a country could partly explain varied gender differences. In countries that are more traditional, gender differences were stronger, with more boys compared to girls engaging in this behavior. In traditional countries, girls may be more restricted in their behavior, particularly in their sexual behavior. In these countries, girls may be less able to express their sexuality. In less traditional countries, these gender differences were less apparent or even reversed.

This finding is in line with previous findings showing that gender differences in sexuality tend to be smaller in permissive societies (Petersen & Hyde, 2010). Thus, our results strongly support the idea that biological factors alone cannot explain gender differences in adolescent risk behavior (Perry & Pauletti, 2011; Wilsnack, Vogeltanz, Wilsnack, & Harris, 2000). Although biological differences between boys and girls may make a specific behavior more likely, the cultural context also determines whether adolescent girls and boys engage in this behavior (Block, 1983).

Our finding that the influence of gender on sexting varied across countries, whereas the influence of sensation seeking did not, is not surprising. Gender and gender-appropriate behavior is highly culturally determined. The effect of sensation seeking as a psychological variable is less culturally influenced, and may therefore be similar across countries. These findings are in contrast to Arnett (1992) who argued that the extent to which sensation seeking is related to risk behavior depends on the restrictiveness of the socialization environment. Although we found no evidence for this claim in our study, the effect of sensation seeking on sexting may still vary in societies that differ more strongly in their values than the European countries in this study. Moreover, Arnett (1992) explicitly argued that the socialization environment also includes parents, peers, schools, and neighborhoods. These less distal factors may still determine the strength of sensation seeking. For example, restrictive parenting may limit an adolescent's manifestation of sensation seeking, independent of the restrictiveness of the country as a whole.

The finding that the effects of age and sensation seeking did not differ across countries is somewhat reassuring considering that most studies are conducted within one nation and that often these findings are generalized to other contexts. Although it is crucial to consider the cultural context when investigating the effects of culturally determined variables like gender, a focus on a single country may be warranted if the factors studied are psychological and the findings are generalized to countries with comparable characteristics.

The final finding of this study is that in contrast to the strong effects of the individual characteristics, country characteristics had no direct influence on adolescent sexting above the effects of individual characteristics. Contextual factors at the country

level may thus be less important in explaining individual behavior than personality characteristics. This is not surprising because the country characteristics we studied are much more distal factors than individual characteristics. Moreover, the European countries in this study were homogenous in many aspects, including the prevalence of sexting. Only Sweden and the Czech Republic deviated strongly from the other countries in their sexting rates. This indicates that there may still be specific characteristics at the country level that explain the high prevalence rates in Sweden and the Czech Republic in contrast to other countries. Therefore, future studies should include other characteristics at the country level that may be able to account for these country differences. For example, factors that are more strongly related to online safety, such as safety programs at schools or country specific internet policies.

Limitations

Several limitations should be considered when interpreting the results of this study. One of the main problems when studying rare behaviors such as sexting is that the data was highly skewed. In the case of sexting, only few adolescents in each country engaged in this behavior. Skewed data are challenging for many common statistical methods and may lead to biased coefficient estimations. We tried to evade estimation problems by using a binary outcome variable. Logistic regressions are relatively robust to skewed data. Moreover, we estimated coefficients using Laplace numerical integration which has been shown to be the most robust estimation method (Guo & Zhao, 2000; Hox, 2010). Typically, logistic regressions conducted with skewed data lead to underestimations of the effects (King & Zeng, 2001). The reported results are therefore more likely to be too conservative rather than too lenient. Nevertheless, some caution is required when interpreting and generalizing the findings.

Moreover, the study was limited to 20 European countries. Out of the 25 countries included in the EU Kids Online project, only 20 countries were analyzed for which traditionalism values were available (see ESSS-5). Therefore, the interpretation of the findings should be limited to those specific 20 countries. More studies are needed to investigate whether findings are further generalizable.

Conclusion

In sum, the present study shows that when investigating sexting, and possibly online risk behavior in general, the broader cultural context cannot be ignored. Although we found no direct influence of country characteristics on adolescent sexting behavior, country context still mattered. Despite the relative similarity of the 20 countries that were investigated in this study, gender differences varied across these countries and this

variation was partly explained by traditional values. It may be expected that these country differences are even more pronounced when comparing countries that are more diverse, such as western and non-western countries.

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