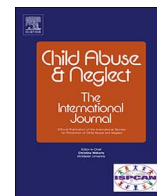


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Full Length Article

## Online sexual solicitation by adults and peers – Results from a population based German sample



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### ABSTRACT

Prevalence of Internet use among adolescents is high, but little is known about the online sexual activities of German adolescents. This study aimed to describe the 12-month prevalence of German adolescents' online sexual experiences with a focus on Online Sexual Solicitation (OSS, subjectively negative online sexual experiences with a peer or any sexual online experience, positive or negative, with an adult). A sample of male and female adolescents aged 14–17 ( $N = 2238$ ) was recruited using online survey panel. The sample was representative for gender and education. Subjects completed an online survey reporting their online sexual activities (i.e., sexual conversation, exchanging pictures, and cybersex) with peers (14–17 y.) and/or adults ( $\geq 18$  y.). Findings illustrated that 51.3% ( $n = 1148$ ) of adolescents had experienced online sexual activity, which mostly involved peers ( $n = 969$ ; 84.4%). In contrast, 23.2% ( $n = 519$ ) of the adolescents experienced OSS with 2.6% ( $n = 57$ ) reporting subjectively negative online sexual interactions with peers and 22.2% ( $n = 490$ ) reporting online sexual interactions with adults, of which 10.4% ( $n = 51$ ) were perceived as negative. The findings suggest that adolescents frequently engage in sexual interactions on the Internet with only a relatively small number perceiving such contacts as exploitative. In addition, females and adolescents with incomplete family situation, foreign nationality, higher education, homo- or bisexual orientation, and those without perceived social support reported OSS significantly more often.

### 1. Introduction

Over the past decades, Internet use has become an integral part of everyday life activities (Pandita, 2017; Roberts, Foehr, Rideout, & Brodie, 1999). The impact of digital and mobile technologies on the lives of children and adolescents has increased substantially. Internet, smartphones and social media have enabled youth to connect with others at any place or any time with messaging apps and social networks being the preferred means of Internet utilization, even for very young children (Feierabend, Plankenhorn, & Rathgeb, 2015; Livingstone & Smith, 2014). Interestingly, youth often compete with one and another on social networks to achieve the largest number of (virtual) “friends” (Webster et al., 2012). These friends, however, often consist of individuals that the individual has never met, or has only a peripheral acquaintance with, in real life.

The ubiquitous access to and engagement with the Internet of our present day lives has also affected how young people experience

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sexuality. The accessibility, affordability and anonymity of the internet allows any individual to gain information on sexual health and education, to flirt and attract attention of others, to experiment with or express their sexuality, and interact with like-minded people, without limited fear of social sanctions (Cooper, McLoughlin, & Campbell, 2000). Ballester-Arnal, Giménez-García, Gil-Llario, and Castro-Calvo (2016) reported the online sexual behavior of adolescents to include primarily: participating in sexual chats; searching for sexual material; and masturbation. Further, young people were found to often intentionally seek out, or become unintentionally exposed to, sexually explicit websites (Cameron, Salazar, Bernhardt, Burgess-Whitman, Wingood, & DiClemente, 2005) and/or engage in cybersex or sexting (Ballester-Arnal et al., 2016; Mitchell, Finkelhor, Jones, & Wolak, 2012).

Despite its potential advantages, using the Internet for social and sexual purposes may increase the risk of adolescent victimization (Guan & Subrahmanyam, 2009). Such online risks include cyberbullying and harassment, unwanted exposure to sexually explicit material, cybergrooming and OSS (Chang, Chiu, Miao, Chen, Lee, & Chiang, 2016; Livingstone, Haddon, Görzig, & Olafsson, 2011).

### 1.1. Defining OSS

The conceptualizations of OSS vary considerably across the literature (Webster et al., 2012). The present study specifically focusses on two of these definitions. First, OSS is defined by Wolak, Mitchell, and Finkelhor (2006) as “...requests to engage in sexual activities or sexual talk or give personal information that were unwanted or, whether wanted or not, were made by an adult” (p. 18). Second, in particular, *unwanted* OSS has been defined by Ybarra, Espelage, and Mitchell (2007) as “...the act of encouraging someone to talk about sex, to do something sexual, or to share personal sexual information, even when that person does not want to” (p. 32). Notably, this second definition does not allude to the age of the victim or the perpetrator.

Several empirical studies on online sexual victimization rely on the definition of *unwanted* interactions (e.g. Finkelhor, Mitchell, & Wolak, 2000; Jones, Mitchell, & Finkelhor, 2012; Wolak et al., 2006; Ybarra, Leaf, & Diener-West, 2003), although problematic sexual interactions (e.g., legally defined child sexual abuse) may happen without the child experiencing them as *involuntary* (Hines & Finkelhor, 2007). Research has suggested that the majority of adolescents willingly engage in online sexual activities (Quayle, 2017). Nonetheless, despite their initial consent, such sexual interactions may turn into subjectively negative experiences if the adolescent realizes they have been tricked, coerced or otherwise victimized. However, the inclusion of only *unwanted* online sexual interactions in the vast majority of past research may have led to biased prevalence estimates of OSS. Equally to the criticism of research on offline sexual abuse (Green & Masson, 2002), research on OSS should not ignore sexual experiences that initially were based on consent, especially if they occur between adults and minors. A functional definition of OSS should therefore consider the victim and perpetrator age as well as the victim’s subjective evaluation of the interaction as positive or negative.

It is important to consider the current legislation in this context. The legal age of consent varies considerably among jurisdiction of the European countries ranging from 14 years in Germany (Fischer, Schwarz, Dreher, Tröndle, & Schwarz, 2001), 15 in Finland, 16 in the Netherlands and Sweden, to 18 years in the Czech Republic and Italy (Davidson et al., 2011). However, with respect to online victimization, The Council of Europe Convention on Cybercrime (2001) stated that a child is someone under the age of 18. For the present study, OSS between an adult and a minor will therefore refer to interactions between someone under the age of 18 and an adult as 18 years or older.

Reviewing these conceptualizations, the present study defines OSS of youth as *any* online sexual interaction between an adult and a minor, or as negatively perceived online sexual interactions with a peer.

### 1.2. Prevalence and forms of OSS

The most common forms of OSS that have been investigated are sexually explicit conversation, exchanging personal, pornographic or erotic pictures, online descriptions of sexual acts or engaging in cybersex, offline meeting and offline sexual activities (Briggs, Simon, & Simonsen, 2010; Livingstone et al., 2011; Webster et al., 2012).

Estimates of the scope of OSS mostly rely on the number of victims in large survey studies among adolescents. The proportion of young individuals reporting OSS ranges from 9% to 39.5% (Jones et al., 2012; Kloess, Beech, & Harkins, 2014; Livingstone et al., 2011; Montiel, Carbonell, & Pereda, 2016; Shannon, 2008; Ybarra et al., 2003). These studies combine solicitation by peers and adults without reporting separate prevalence rates for different offender ages and only report offender age for specific behaviors, such as meeting offline (Livingstone et al., 2011) or forming close relationships online (Finkelhor et al., 2000). Moreover, as one offender may have hundreds of victims in a short period, victim numbers are unlikely to provide a reliable approximation of the number of perpetrators. In a sample of adult Internet users, Schulz, Bergen, Schuhmann, Hoyer, and Santtila (2015) found that 3.7% reported having solicited at least one adolescent online and 0.5% reported having solicited a child. Further, Chang et al. (2016) reported that 4.2% of their adolescent sample had perpetrated online solicitation.

### 1.3. Risk factors for experiencing OSS

Disclosure of personal information, talking about sex with only individuals known online, and engaging in online sexual interactions were empirically related to increased risk of OSS (Ybarra et al., 2007). Additionally, lack of social support or feeling misunderstood were identified as risk factors for unwanted OSS (Mitchell, Finkelhor, & Wolak, 2001; Wells & Mitchell, 2008; Wolak, Finkelhor, & Mitchell, 2008). In contrast, the monitoring of an individual’s Internet behavior by others (e.g., parental supervision) was found to decrease the likelihood of risky online behavior (Liu, Ang, & Lwin, 2013; Lwin, Stanaland, & Miyazaki, 2008; Marcum, Ricketts, & Higgins, 2010). With respect to victim demography, several studies have found that adolescents are more frequently

victimized than children, and females are more often victimized than males (Jones et al., 2012; Wolak, Finkelhor, Mitchell, & Ybarra, 2008).

#### 1.4. The present study

Reviewing the literature, there are several studies focusing on the facets of OSS. Yet, the current knowledge on the prevalence of OSS may be limited due to the typical focus on only unwanted interactions (e.g., Baumgartner, Valkenburg, & Peter, 2010; Mitchell, Finkelhor, & Wolak, 2007; Wolak, Finkelhor, Mitchell et al., 2008; Ybarra et al., 2007; Ybarra & Mitchell, 2008). A more detailed understanding of the youths' online sexual interactions, positive and negative, with peers and adults, is warranted. To date, there has yet to be published research looking at OSS, specifically considering the age of the individuals involved and the adolescents' subjective evaluation of these interactions.

The purpose of the present study was to provide a nuanced knowledge of adolescents' sexual online behavior by investigating subjectively positive and negative online sexual interactions with adults and peers. Further, the study aimed to contribute to the understanding of risks for adolescents' online victimization. This in turn could help to improve preventative approaches for educational policies, and internet safeguards, to increase adolescent's awareness of the risk of exploitation via the Internet.

Examining self-report data from a large sample of German adolescents aged between 14 and 17 years that was representative for gender distribution and educational achievement, the specific research aims of the present study were to provide: (a) a 12-month prevalence of adolescents' sexual interactions on the Internet (sexual conversation, exchanging of pictures, cybersex) with peers and adults; (b) the prevalence of OSS by adults (OSS-A), OSS by peers (OSS-P), and the prevalence of overall OSS; and (c) an empirical comparison of the sociodemographic characteristics of adolescents reporting OSS to those not reporting any form of OSS.

## 2. Method

### 2.1. Participants

The present study was a cross-sectional online survey including adolescents living in Germany. The stratification of the sample enabled a balanced sample of male and female adolescents at each of 14, 15, 16 and 17 years old. A total of 17,107 adolescents were invited to take part in the study of whom 3308 (19.3%) accessed the questionnaire. Of these respondents, 428 (12.9%) did not complete the survey, 57 (1.7%) completed the questionnaire twice, and 472 (14.3%) had a high percentage (> 80%) of missing values, and were each excluded from further analyses. Further, 113 (4.0%) participants were excluded due to the questionable quality of the data (according to control questions: e.g. *Did you have difficulties in understanding the questions due to your language skills?*).

The final sample consisted of 2238 adolescents (13.1% of the originally invited sample). Participants of the final sample did not differ significantly from participants who dropped out regarding gender,  $\chi^2(1, N = 2822) = 2.97, p = 0.093$ , family situation,  $\chi^2(1, N = 2761) = 2.77, p = 0.096$ , foreign nationality,  $\chi^2(1, N = 2774) = 0.12, p = 0.731$ , having siblings,  $\chi^2(1, N = 2761) = 1.25, p = 0.264$ , or age,  $t(2821) = 1.61, p = 0.109$ . There was a significant difference between the dropped participants and the final sample with respect to educational achievement (49.5% vs. 55.2% higher educated,  $\chi^2(1, N = 2747) = 5.38, r [95\% CI] = 0.044 [0.007, 0.082], p = 0.020$ ), having a confidential person to talk about problems (88.5% vs. 91.4%,  $\chi^2(1, N = 2726) = 4.06, r [95\% CI] = 0.039 [0.001, 0.076], p = 0.044$ ) and sexual orientation (89.9% vs. 92.9% heterosexual,  $\chi^2(1, N = 2721) = 5.03, r [95\% CI] = 0.043 [0.005, 0.080], p = 0.025$ ). However, the effect sizes were extremely small. To verify the representativeness of the sample, the study sample was compared with adolescents from the general population (14–17 years) regarding gender distribution and educational achievement. The information (absolute and relative frequencies) about the gender distribution and educational achievement of the general population of German adolescents (14–17 years) was requested from the German Federal Statistical Office. In the study sample, the proportion of female adolescents was significantly higher than among adolescents from the general population (53.9% vs. 48.6%,  $\chi^2(1, N = 3211\ 891) = 24.93, r [95\% CI] = 0.003 [0.002, 0.004], p < 0.001$ ). Adolescents attending the academic high school in the study sample were significantly overrepresented compared to adolescents from the general population (55.2% vs. 43.6%,  $\chi^2(1, N = 5,481,238) = 122.6, r [95\% CI] = 0.005 [0.004, 0.006], p < 0.001$ ). However, the effect sizes are extremely small. Thus, it can be concluded, the study sample was representative for adolescents in the general population with respect to gender distribution and education achievement.

### 2.2. Procedure

We realized the present study within a broader research project addressing frequency, etiological models, and consequences of child and adolescent sexual abuse (see Osterheider et al., 2012). A German market research institute contacted the participants via the Internet and guaranteed informed consent would be obtained from all participants. The provider of the panel obtained consent from a pool of adolescents to participate in any online surveys. Using a profiling questionnaire (gender, age, access to the internet), the provider pre-screened all adolescents from the pool for suitability to participate in this particular survey. All suitable individuals were then invited to take part via an email invitation. The recruitment was in accordance with the codes and guidelines on market and social research (2001) of the International Chamber of Commerce (ICC) and the European Society for Opinion and Market Research (ESOMAR) (ICC/ESOMAR, 2005). An additional parental agreement for the participation was not required. According to ADM-Guidelines (Arbeitskreis Deutscher Marktforschungen e.V., 2006) for surveys including minors, the capacity for informed consent can be assumed for adolescents aged between 14 and 17 years.

Using the software package SoSciSurvey, we conducted the investigation as an online survey. Participants received information about the study via email including the hyperlink to the questionnaire. Data was collected (from April to June 2013, and from March to May 2014) and inputted anonymously. Participants could withdraw from the survey at any time and were compensated for their participation (1€ for partial and 2€ for full completion of the survey). We used control questions to ensure nonrecurring participation, to assess the honesty and accuracy of the responses, and to ensure sufficient German language skills.

A comprehensive debriefing statement was included on the last page of the survey to prevent emotional strain. The statement provided contact information (contact to psychologist involved into the survey) for free counselling and specialized victim advisory centers. The study was undertaken in accordance with the Declaration of Helsinki.

### 2.3. Measures

The online questionnaire developed for the study assessed several facets of sexual experiences of adolescents on- and offline on behavioral level (Neutze, Schuhmann, Osterheider, Sklenarova, under review). A range of relevant sexual and non-sexual Internet behaviors were assessed via single-item questions. Questions were developed through collaboration with pedagogues and clinicians that focus on children and adolescents. The average time required to fill in the entire questionnaire was approximately 16 min. The parts of the questionnaire relevant to the study are described below.

#### 2.3.1. Sociodemographic data

We collected basic information about age, gender, foreign nationality, number of siblings, sexual orientation, having a person to talk to about problems in confidence (perceived social support) and level of education from respondents via single, self-constructed items. In Germany, there are several forms of the secondary education with the main difference in the duration and preparation of pupils for higher education. The academic high school (in Germany *Gymnasium*) prepares its pupils for higher education (i.e., University) and ends after grade 12 or 13. Other school types finish after grade 10 or less. Therefore, we coded attending an academic high school (*Gymnasium*) as higher, any other school attendance as lower educational level dichotomously. Additionally, we assessed the context and constraints of an individual's environment on their Internet usage (*When I use Internet I am... private/not private but not monitored by others/monitored by others*) and the adolescents' family situation (complete family with parents living together/parents divorced/parent(s) died, foster family, children's home).

#### 2.3.2. Online sexual experiences

We assessed the various forms of online sexual interactions respondents may have engaged in over the past year via self-constructed single items (multiple responses possible). To reduce the time to complete the questionnaire, we applied filter questions at various stages of the questionnaire.

We assessed if a sexual experience occurred (*Yes/No*) for sexual conversation online (*Have you had a sexual conversation online with somebody (known or unknown) within the past year?*), exchanging pictures (*Have you exchanged pictures online with somebody (known or unknown) within the past year?*), and cybersex (*Have you engaged in sexual action online with or in front of somebody (known or unknown) within the past year?*). Cybersex was defined as engaging in virtual sexual activity (having online sex) such as for instance masturbating in front of a webcam. If a respondent answered yes to any of these questions, it was followed up by inquiring about the age ( $\leq 13$  years, 14–17 years, 18–21 years,  $> 21$  years old) and gender (*male, female*) of the online contact for each experience (e.g., *Who was the individual you have had online sexual conversation with within the past year?*). For further analyses, we combined the 18–21 years and  $> 21$  years age categories (*adult*,  $\geq 18$  years old). In addition, we assessed the familiarity with the online contact (*Did you know this person before the online sexual conversation? Answered with yes offline/yes online/no*).

#### 2.3.3. Subjective evaluation of online experiences

We assessed adolescents' evaluation of each of their online sexual interactions (sexual conversation, exchanging pictures, and cybersex) on a 5-point Likert scale ranging from *very disagreeable* (1) to *very agreeable* (5) via self-constructed single item (e.g. *How was the sexual conversation for you?*). The responses *very disagreeable* and *disagreeable* were coded as subjectively negative experiences and *very agreeable* and *agreeable* as subjectively positive experiences.

#### 2.3.4. OSS

We differentiated three forms of OSS: (1) at least one online sexual interaction with an adult (OSS by an adult OSS-A); (2) at least one subjectively negative sexual interaction with a peer (OSS by a peer, OSS-P); and (3) overall OSS, as at least one OSS-A or at least one OSS-P.

#### 2.3.5. Control questions

To improve the quality of the study data, we asked a number of control questions at the end of the questionnaire: *Did you answer honestly? Did you read each question thoroughly? Did you have difficulties in understanding the questions due to your language skills? Did you previously participate at this survey? (yes/no)*. Respondents who failed any control question were dropped from further analyses.

### 2.4. Statistical analyses

To address all three research goals we conducted bivariate analysis using student *t*-tests for metric data and Chi-Square analysis (with Fisher's exact test) for categorical data.

**Table 1**  
Sociodemographic data.

		total sample N = 2238	
age (M, ± SD)		15.5 (1.1)	
		total sample N = 2238	
		n	%
gender	male	1032	46.1
	female	1206	53.9
family situation	complete family	1593	71.2
	parents divorced	571	25.5
	one parent died	57	2.5
	foster family	14	0.6
	children's home	3	0.1
foreign nationality	yes	461	20.6
	no	1777	79.4
siblings	yes	1846	82.5
	no	392	17.5
educational level	higher	1235	55.2
	lower	1003	44.8
confident person	yes	2046	91.4
	no	192	8.6
sexual orientation	heterosexual	2078	92.9
	homosexual	83	3.7
	bisexual	77	3.4

According to Fritz, Morris, and Richler (2012) we calculated Cohen's *d* to determine the effect size for categorical comparisons, with one degree of freedom, as well as for metric data with effect sizes for *d* interpreted as small, medium, and large for values of 0.20, 0.50, and 0.80, respectively (Cohen, 1992). For categorical comparisons, with more than one degree of freedom, the correlation coefficient (*r*) was used to determine small, medium and large effects effect sizes with values of 0.10, 0.30, and 0.50 respectively (Cohen, 1992).

Based on the descriptive nature of the study and the large sample size, we omitted making any alpha-adjustments (e.g., Bonferroni's). The level of statistical significance was set at  $p < 0.05$  (two tailed) for all analyses. To avoid any gender bias, results are presented for female and male adolescents separately.

### 3. Results

#### 3.1. Sample description

The total sample consisted of 2238 adolescents between the ages of 14 and 17 years ( $M = 15.5$ ,  $SD = \pm 1.1$ ). The socio-demographic data of the sample is presented in Table 1. Thirty-two adolescents (1.4%) did not respond to questions about their Internet behavior or online sexual experiences and were found to be significantly younger ( $M = 15.03$ ,  $SD = 1.03$ ) than responders ( $M = 15.50$ ,  $SD = \pm 1.10$ ), ( $t(32) = 2.55$ ,  $d$  [95% CI] = 0.36 [0.01, 0.71],  $p = 0.016$ ). Of the non-responders, males (2.1%,  $n = 22$ ) answered significantly less questions about their online behavior than females (0.8%,  $n = 10$ ),  $\chi^2(1, N = 2238) = 6.70$ ,  $d$  [95% CI] = 0.10 [0.02, 0.19],  $p = 0.012$ . Thus, we further analyzed data of adolescents responding to questions about their online behavior (study sample  $N = 2206$ ) for the study aims.

#### 3.2. 12-months prevalence rates of forms of online sexual interactions

At least one online sexual experience within the past year was reported by 51.3% ( $n = 1148$ ) of the adolescents. Of those, 167 (14.5%) participants reported online sexual interactions exclusively with adults, 605 (52.7%) exclusively with peers, 11 (1.0%) exclusively with younger children, and 365 (31.8%) adolescents reported mixed interactions (with children  $\leq 13$ , and/or peers 14–17, and/or adults  $\geq 18$  years of age). With respect to the diverse forms of online sexual activities within the past year, 24.7% ( $n = 545$ ) of the adolescents reported online sexual conversation, 43.3% ( $n = 955$ ) exchanging pictures, and 6.2% ( $n = 137$ ) engaging in cybersex with their online contacts. Table 2 indicates the 12-month prevalence rates for the different forms of online sexual interactions, by age of the online contact, for male and female adolescents, separately.

**Table 2**  
12-months prevalence of online sexual interactions by age of the online contact.

	experienced		contact of the online sexual interaction									
	yes		child ( $\leq 13$ y.)		peer (14–17 y.)		adult ( $\geq 18$ y.)		mixed		total	
	n	%	n	%	n	%	n	%	n	%	n	%
Male Adolescents $N = 1010$												
sexual conversation	237	23.5	–	–	137	57.8	17	7.2	83	35.0	237	100
exchanging pictures	400	39.6	8	2.0	231	57.8	32	8.0	129	32.2	400	100
cybersex	57	5.6	–	–	14	24.6	8	14.0	35	61.4	57	100
Female Adolescents $N = 1196$												
sexual conversation	308	25.8	–	–	114	37.0	63	20.5	131	42.5	308	100
exchanging pictures	555	46.4	3	0.5	254	45.8	100	18.0	198	35.7	555	100
cybersex	80	6.7	–	–	18	22.5	24	30.0	38	47.5	80	100

Note. Contact = counterpart of the online sexual interaction; mixed = online sexual interaction with children and/or peers and/or adults.

### 3.3. 12-months prevalence rates of OSS-A, OSS-P and overall OSS

#### 3.3.1. OSS-A

In the study sample, 22.2% ( $n = 490$ ) of the adolescents reported at least one OSS-A within the past year. For respondents that had at least one online sexual experience ( $n = 1148$ ) in the past year, 42.7% of them reported at least one incidence of an OSS-A.

In terms of respondents' subjective evaluations, 10.4% ( $n = 51$ ) of the adolescents with at least one OSS-A reported the experience as being *negative* (2.3% of the study sample). Female adolescents reported negative OSS-A significantly more often than male adolescents (13.2%,  $n = 43$  vs. 4.9%  $n = 8$ ),  $\chi^2(1, N = 490) = 8.08, d [95\% CI] = 0.26 [0.08, 0.44], p = 0.004$ .

#### 3.3.2. OSS-P

In the study sample, 43.9% ( $n = 969$ ) of the adolescents reported online sexual interactions with peers, which accounts for 84.4% of the online sexually experienced ( $n = 1148$ ). Subjectively rated *negative* online sexual experiences with peers (i.e., OSS-P) were reported by 2.6% ( $n = 57$ ) of the study sample (5.9% of the adolescents reported online sexual interactions with peers).

Additionally, 17.9% ( $n = 395$ ) reported online sexual interactions with peers that they only knew “virtually” (i.e., had never physically met) which accounted for 40.8% of those reporting at least one online sexual interaction with peers, within the last year.

#### 3.3.3. Overall OSS

The overall amount of respondents reporting an OSS within the past year was 23.2% ( $n = 519$ ) which corresponds to 45.2% ( $n = 519$ ) of the respondents with online sexual experiences in total ( $n = 1148$ ). Among these 519 adolescents reporting at least one OSS, 94.4% ( $n = 490$ ) reported an OSS-A.

### 3.4. Risk groups for OSS

Sociodemographic data of adolescents' that reported an OSS versus those that did not are described in Table 3. Several significant differences between adolescents reporting an OSS and those that did not were found. Adolescents reporting an OSS were significantly more often: (a) older,  $t(935) = 12.83, d [95\% CI] = 0.60 [0.50, 0.70], p < 0.001$ ; (b) female,  $\chi^2(1, N = 2206) = 43.71, d [95\% CI] = 0.28 [0.20, 0.37], p < 0.001$ ; (c) from an incomplete family situation,  $\chi^2(4, N = 2206) = 25.89, r [95\% CI] = 0.10 [0.06, 0.14], p < 0.001$ ; (d) a foreign national,  $\chi^2(1, N = 2206) = 5.39, d [95\% CI] = 0.10 [0.01, 0.18], p = 0.021$ . They also (e) achieved a higher educational level,  $\chi^2(1, N = 2206) = 7.84, d [95\% CI] = 0.11 [0.03, 0.20], p = 0.005$ ; (f) lacked a confidant to talk to (i.e., have no social support),  $\chi^2(1, N = 2206) = 12.44, d [95\% CI] = 0.15 [0.06, 0.23], p < 0.001$ ; and (g) categorize themselves as homo- or bi-sexual,  $\chi^2(2, N = 2206) = 50.76, r [95\% CI] = 0.15 [0.11, 0.19], p < 0.001$ . The relative and absolute frequencies are indicated in Table 3.

Most adolescents (71.8%,  $n = 1584$ ) reported being in a private context when using the Internet, 22.2% ( $n = 490$ ) stated not being private but not being monitored by others (authorities). Monitored Internet behavior by others (authorities) was reported by 6.0% ( $n = 132$ ) of the adolescents. A significant relationship was found between the 25.1% ( $n = 397$ ) of respondents using the internet in privacy, the 23.9% ( $n = 117$ ) not being private and not being monitored, and the 3.8% ( $n = 5$ ) being monitored by authorities who also reported an OSS ( $\chi^2(2, N = 2206) = 30.70, r [95\% CI] = 0.10 [0.06, 0.14], p < 0.001$ ). No OSS was reported by 74.9% ( $n = 1187$ ) of those surfing privately, by 76.1% ( $n = 373$ ) of those surfing not privately (without monitoring by authorities), and by 96.2% ( $n = 127$ ) of those monitored by authorities.

**Table 3**  
Group differences with respect to online sexual solicitation (OSS).

		with OSS n = 519		without OSS n = 1687	
age (M, ± SD)**		16.0 (1,0)		15.3 (1.1)	
		with OSS n = 519		without OSS n = 1687	
		n	%	n	%
gender***	male	172	33.1	838	49.7
	female	347	66.9	849	50.3
family situation***	complete family	327	63.0	1239	73.4
	parents divorced	167	32.2	399	23.7
	one parent died	16	3.1	41	2.4
	foster family	8	1.5	6	0.4
	children's home	1	0.2	2	0.1
foreign nationality*	yes	125	24.1	327	19.4
	no	394	75.9	1360	80.6
siblings	yes	435	83.8	1382	81.9
	no	84	16.2	305	18.1
educational level**	higher	315	60.7	906	53.7
	lower	204	39.3	781	46.3
confident person***	yes	456	87.9	1565	92.8
	no	63	12.1	122	7.2
sexual orientation***	heterosexual	450	86.7	1598	94.7
	homosexual	26	5.0	55	3.3
	bisexual	43	8.3	34	2.0

Note. OSS = online sexual solicitation (any online sexual interaction with an adult ≥ 18 y. and/or negatively perceived online sexual interaction with a peer).

\* Groups with and without OSS differ significantly at the  $p < 0.05$  level.

\*\* Groups with and without OSS differ significantly at the  $p < 0.01$  level.

\*\*\* Groups with and without OSS differ significantly at the  $p < 0.001$  level.

## 4. Discussion

The current study aimed to describe online sexual experiences and experiences of OSS among male and female German adolescents.

### 4.1. Forms of online sexual interaction

Approximately one quarter (24.7%) of the young participants reported to have sexually conversed with someone online (with peers and/or with adults), 43.3% reported to have exchanged pictures and 6.2% had engaged in cybersex. Arguably, exchanging personal pictures, particularly with peers, does not imply an exploitative nature. Nonetheless, it has been argued that exchanging pictures irrespective of the depicted content may be an antecedent for further sexual interactions and potential enable online solicitation and sexual exploitation (Webster et al., 2012). For example, the use of exchanged pictures to blackmail victims into sexual exploitation has been identified as one of the diverse range of online offender strategies (Bergen et al., 2014; Briggs et al., 2010; Malesky, 2007; O'Connell, 2003; Shannon, 2008). Thus, exchanging personal pictures (including those defined by the adolescents as “normal”) may increase one's vulnerability to online victimization, especially when adolescents exchange pictures with unknown individuals or with adults. Notably, some adolescents of the study sample (2.0% males and 0.5% females) admitted to exchanging pictures with children ( $\leq 13$  years of age) and correspondingly, they themselves, would be classified as an *adolescent* offender in terms of German legislation. According to German law, any sexual interaction (including online behavior) between a legally responsible individual ( $\geq 14$  years of age) and a child ( $\leq 13$  years of age) constitutes a criminal offence. However, based on the present study's data, it is not possible to determine if these adolescents were aware of the fact that they potentially committed an illegal act. This highlights the necessity of educational policies focusing not only on the risk for becoming a victim but also (unintentionally) a perpetrator on the Internet.

### 4.2. Prevalence rates of OSS

Overall, one in two respondents (51.3%) reported at least one online sexual interaction with (who they perceived to be) peers or adults. This indicates that the Internet, as a medium for sexual interaction, is a considerable part of youth sexuality, as previously

noted by Livingstone and Mason (2015).

Approximately one fifth of the adolescents (22.2%) were victims of OSS-A within the past year accounting for nearly half of those having at least one online sexual experience (43%). The majority of the sexual experiences on the Internet were reported to be made with (perceived) peers (84.4%). Nearly three percent were victims of OSS-P. However, since 40.8% of peer-to-peer experiences occurred with peers the adolescent had never met in person, we cannot rule out that for some of these interactions, the contact may have been with an adult representing themselves as an adolescent. In fact, several studies have found that sexual offenders will utilize the inherent anonymity of the Internet to change aspects of their identity (e.g., age, appearance, etc.) to engage in online sexual interactions with minors (Kloess et al., 2014; Webster et al., 2012). On the other hand, Wolak, Finkelhor, and Mitchell (2004) reported that only five percent of adult online abusers pretended to be teens themselves. Nevertheless, the relatively high number of online sexual interactions with unknown peers that adolescent respondents in the study endorsed is alarming considering previous research that online interactions with strangers increase the risk for sexual victimization (Wolak, Finkelhor, & Mitchell, 2008).

With respect to the respondents' subjective evaluation of their online sexual interactions, respondents' interactions with peers (known as well as unknown) were rarely perceived as negative experiences (5.9%). Although the percentage is higher for sexual interaction with adults (10.4%), it still appears to be seldom regarded as negative. Thus, similar to the report from Wolak, Finkelhor, Mitchell et al. (2008), the majority of adolescents engaging in online sexual activities with adults on the Internet rarely perceive themselves as victims of OSS-A. Nevertheless, it is still possible that a negative perception (or consequences) of the interaction will not be fully realized until later in the adolescents' lifespan (Green & Masson, 2002). An individual, especially an adolescent who is not fully cognitively developed, may reappraise a mutually consenting sexual experience later in life, and ultimately, feel victimized causing considerable psychological distress (Green & Masson, 2002). In fact, it is quite possible that online sexual exploitation may confer similar consequences to victims as offline child sexual abuse such as substance misuse or risky sexual behavior, post-traumatic stress disorder and/or self-harm behavior (Andrews, Brewin, Rose, & Kirk, 2000; Gilbert et al., 2009; Yates, Carlson, & Egeland, 2008). Moreover, even an individual's intentional exposure to sexually explicit material online has been found to be positively associated with online victimization (Jonsson, Priebe, Bladh, & Svedin, 2014).

#### 4.2.1. Lower rates of OSS?

Based on the current study's definition of OSS (i.e., online sexual interactions with adults and/or subjectively rated negative online sexual interactions with peers), approximately one in four of German adolescents (23.2%) reported to have experienced online sexually solicitation within the past year. Thus, nearly half of the sexual experiences on the Internet (45.2%) were, by this definition, exploitative, and of these, 94.4% involved adults. In contrast, the rates of OSS, with respect to only the subjectively negative online sexual interactions, were much lower (e.g., 2.6% with peers and 2.3% with adults).

Considering previous research has found that 9%–39.5% of American or European children and adolescents reported *unwanted* OSS (Baumgartner et al., 2010; Jones et al., 2012; Mitchel, Jones, Finkelhor, & Wolak 2013; Montiel et al., 2016; Shannon, 2008; Ybarra & Mitchell, 2008), this study's overall OSS rate would range beyond the highest and lowest values of previous studies. On the other hand, the percentages of subjectively negative sexual interactions are low compared to the abovementioned study results. The probable reason for this discrepancy is the fact that previous studies defined OSS mostly in terms of it being unwanted. In contrast, this study included a more diverse definition in order to capture situations in which the interaction may at first be voluntary (and non-negative), yet, after processing the event, the adolescent may evaluate it as a negative experience. Consequently, the focus of the present study was not limited to unwanted experiences, but rather, included subjectively negative experiences. Further, the disparate age ranges (14–17 years old) and interaction timeframes (e.g., within a year) may have contributed to the discrepancies found with previous research.

Interestingly, it is possible that sexual solicitation may (currently) occur more frequently via non-internet browser communication technologies, such as with messaging services like WhatsApp, Snapchat and Facebook messenger, which may not be categorized by adolescents as being *online*. Considerably more research needs to be undertaken regarding adolescent use of messaging and phone apps as it is known that motivated offenders will quickly adapt to new technological mediums to exploit others, particularly when those mediums lack sufficient safe-guards and knowledge of victimization risk (Wortley & Smallbone, 2012).

#### 4.3. Risk groups for OSS

With respects to victim characteristics, one finding of the present study is that girls reported more than twice as many online sexual interactions with adults than male adolescents. Accordingly, youth surveys of online sexual exploitation have consistently found more female than male victims (Baumgartner et al., 2010; Jones et al., 2012; Livingstone et al., 2011; Mitchell et al., 2007; Wachs, Wolf, & Pan, 2012). One explanation for this discrepancy may be that girls have been found to share more personal information online than boys and are therefore at a higher risk for being involved in online sexual interactions, in general (Mitchell, Wolak, & Finkelhor, 2008). Further, studies have also reported riskier online behavior among girls (Pujazon-Zazik, Manasse, & Orrell-Valente, 2012). However, boys have been found to underreport sexually abusive experiences in general (Cermak & Molidor 1996; Finkelhor 1980) and may have underreported sexual interactions in the current study. In fact, boys in the present study were found to respond significantly less than girls to questions about their online (sexual) behavior.

The current study found that older adolescents were more likely to report OSS, replicating previous research in the area (Jones et al., 2012; Schulz et al., 2015; Wolak, Finkelhor, Mitchell et al., 2008). It has been postulated that older adolescents are more accessible victims, as they use the Internet and social sites more routinely than younger adolescents or children and with less supervision and safeguards (Livingstone et al., 2011; Schulz et al., 2015). Higher education was also associated with frequency of

reporting OSS. Again, this association may be mediated by a more frequent Internet use among adolescents with higher education, creating greater potential for victimization.

Other previously identified risk factors of OSS have been found to be a lack of social support and feeling misunderstood (Mitchell et al., 2001; Wells & Mitchell, 2008; Wolak, Finkelhor, & Mitchell, 2008). Similarly, the present study found that adolescents in incomplete family situations, or lacking a confidant to talk to about problems, were more likely to report OSS.

Additionally, adolescents with homo- or bi-sexual orientation were also more likely to report OSS. It is well known that minors use the vast knowledge base and inherent anonymity that the internet provides to access information about their evolving sexuality, and more specifically, their sexual identity (Livingstone & Smith, 2014). However, visiting sites providing information on sexuality, sexual orientation and sexual identity, particularly if the site has an interactive forum in which the individual can interact with others, could increase the situational risk for victimization. For example, insecurities about their sexual identity and a desire to connect with similar others, may make these individuals more prone to engage in the attention and guidance of others, which could initiate an exploitative situation (Grosskopf, 2010). However, more information on the association of sexual orientation and OSS is needed (Livingstone & Mason, 2015).

Finally, previous findings have demonstrated that parental monitoring can decrease an adolescents' risky online behavior (Liu et al., 2013; Lwin et al., 2008; Marcum et al., 2010). Similarly, adolescents in the current study, whose internet behavior was under surveillance by guardians, reported significantly less experiences of OSS.

It is important to note that, although several group differences on descriptive data regarding the OSS were found, the effects, apart from age and gender, were small. Thus, although there is evidence for some adolescents being more vulnerable to OSS than others, the interpretation of the aforementioned risk factors should be made with caution.

#### 4.4. Limitations of the study

Several limitations of the study should be considered. First, the response rate of 13% was relatively low, albeit comparable to other studies on this topic (Couper, 2000; Ybarra, Rosario, Saewyc, & Goodenow, 2016). Nonetheless, low response rates have been noted as a potential limitation of online surveys (Evans and Mathur, 2005). As a consequence, the current results may be biased by the voluntary nature of the study and reflect a subgroup of individuals that differ systematically from those who chose not to participate or quit the survey prematurely. The second limitation concerns adolescents' openness regarding sexual activities. However, online surveys have been found to be particularly suitable to avoid reporting bias (Evans & Mathur, 2005) and may have permitted participants to answer more honest. However, as with any self-report method, the possibility of false responding cannot be excluded. Third, in this type of self-report study, a respondents' reporting of a peer-to-peer interaction may have in fact (unbeknownst to them) been an interaction with an adult misrepresenting their age (and gender) (Suler, 2004). This would be a concern, as an overrepresentation of peer-to-peer interactions would likely result in an underestimation of OSS-A and overall rates of OSS. Yet, this problem applies to the research in the field of Internet interaction in general. Finally, assessing online sexual behavior and subjective evaluation using only single item-response questions may have restricted overall measurement validity. For future research, a valid and reliable instrument to assess online sexual behavior would aid in increasing the accuracy of comparisons across international studies.

Despite these limitations, the analyses suggest representativeness of the present sample regarding gender and education, which enables the transfer of the findings to this special general population group of German adolescents aged between 14 and 17 years. Further, the large sample provided a robust and accurate estimation for the prevalence rates of behaviors with a relatively low base rate in the population.

#### 4.5. Practice implication

Reviewing the present findings, a considerable amount of online sexual interactions comprised of peer-to-peer interactions. However, due to the anonymity of the Internet for both victim and offender and the notable number of interactions with "peers" respondents' had never physically met, there is a danger that some of these interactions were in fact with adults posing as minors. Similarly, adolescents may underestimate the (future) sexual implications of engaging in an online interaction that (at first) appears *nonsexual*. For some offenders the intent may be to access pictures (or webchats) of the minor for sexual gratification, whereas for others it may be to seek longer pseudo-intimate contact, with a goal of eventually meeting the minor in person for sexual exploitation (cybergrooming). In some cases, offenders may do both, using pictures and other information gleaned as leverage against the minor to blackmail, force to meet, or to enable further access to pictures, information or sensitive material in an escalating fashion (Webster et al., 2012). Consequently, it is important to raise adolescents' awareness for the diverse motivations and possible criminal intentions of their online acquaintances. At the same time, the awareness of the consequences for themselves and, very importantly, of the possibility of becoming offender should be raised. Adolescents need to be explicitly educated about the illegality of engaging in sexual activities on the Internet with children (in Germany under the age of 13).

Although the majority of adolescents did not perceive the OSS-A as a negative experience, we cannot infer that this type of interaction, particularly with an adult, is not problematic. Livingstone and Smith (2014) point to the fact that adolescents are not fully aware of the potential (emotional) consequences of sexual exposure online. It is clear that further and continued education of the dangers and risks involved in engaging in any online interaction, particularly a sexual one, is much warranted in adolescence. To gain more information about the consequences of OSS, future research should address the association of different sexual online interactions with emotional problems in childhood and adolescence.

Accordingly, the present study results suggest that preventive awareness campaigns and trainings should consider specific risk groups for online sexual victimization such as girls, older adolescents, and those with a perceived lack of social and familial support. Additionally, results also suggest that victim-focused prevention should be targeted at those that identify as homo- or bi-sexual, as sexual orientation was found to be a salient risk factor for OSS. Although girls were found to be more affected by OSS than boys, it is possible that boys underreported their online sexual interactions, particularly problematic or distressing ones. Therefore, it is poignant that boys be targeted with lower-threshold prevention strategies and education should be focused on supporting boys to overcome barriers of disclosure.

#### 4.6. Conclusion

The present study offers insight into the frequencies, characteristics and subjective evaluations of German adolescents' online sexual interactions. By investigating the exploitative and potentially negative nature of these interactions this study has provided a better understanding of youth's online victimization. Some results suggest lower prevalence rates of OSS compared to previously reported frequencies, which could indicate that first successes of victim focused prevention efforts have become apparent. However, this is only a very cautious assumption because the different definition of OSS in the present work does not allow the direct comparison with previous study results. In conclusion, the current study findings point simultaneously to an overall unawareness of the inherent dangers in online sexual interactions among adolescents and a notably concerning perception that these interactions are generally not negative.

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#### Conflict of interest

The authors declare no conflict of interest.

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