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A cross-national study of direct and indirect effects of cyberbullying on cybergrooming victimization via self-esteem

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ABSTRACT

The present study reports frequency rates of cybergrooming, profiled characteristics of cybergrooming perpetrators, and examine direct and indirect associations between cyberbullying victimization, self-esteem, and cybergrooming victimization. The study sample included 2,162 adolescents between 11 and 19 years from three Western (Germany, the Netherlands, the United States) countries and one Southeast Asian country (Thailand). Across countries, 18.5% of participants reported having had contact with a cybergroomer. Western girls, as compared to boys, were at greater risk to have been contacted by a cybergroomer. No significant sex difference was found for Southeast Asian adolescents. Also, Southeast Asian adolescents reported higher rates of cybergroomer contact as compared to Western adolescents. Cybergroomers were most often males and older than victims. Both cyberbullying victimization and low self-esteem increased the probability of coming into contact with a cybergroomer, and self-esteem mediated the effects of cyberbullying victimization on cybergrooming victimization. The results are discussed in relation to practical implications and future research.

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Estudio internacional de los efectos directos e indirectos del ciberacoso en la victimización por acoso sexual cibernético mediados por la autoestima

RESUMEN

El presente estudio muestra la frecuencia de acoso sexual cibernético y perfiles característicos de los acosadores y examina la asociación directa e indirecta entre la victimización por cyberbullying, auto-estima y victimización por acoso sexual cibernético. La muestra del estudio incluye 2.162 adolescentes entre 11 y 19 años de edad provenientes de tres países occidentales (Alemania, Holanda, Estados Unidos) y un país del sureste asiático (Tailandia). El 18.5% de los participantes de los todos países de la muestra manifestaron haber tenido algún contacto con un acosador sexual cibernético. Las chicas occidentales comparadas con los chicos tienen más riesgo de contacto con un acosador sexual cibernético. No se encontraron diferencias de sexo en los jóvenes del sureste de Asia. Además, los participantes del sureste asiático tuvieron mayor frecuencia de contactos con acosadores sexuales cibernéticos comparado con los adolescentes occidentales. Los acosadores sexuales cibernéticos son en su mayoría hombres mayores que las víctimas. Tanto la victimización por cyberbullying como la baja auto-estima incrementan la probabilidad de entrar en contacto con un acosador sexual cibernético y la auto-estima sirve como mediador de los efectos de la victimización por cyberbullying en la victimización por acoso sexual cibernético. Se comentan los resultados en cuanto a las implicaciones prácticas del estudio e investigaciones futuras.

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Undoubtedly, information and communication technologies (ICTs) have changed the way people interact and communicate with each other rapidly in the last two decades. For adolescents, the use of social networking sites, instant messenger, and mobile Internet devices are an integral component of daily life (Livingstone, Haddon, Görzig, & Olafsson, 2011). This changing media socialization has also affected the sexual socialization of adolescents (Krahé, 2015). In puberty, adolescents begin to establish independence, their own sexual identity, and start dating and intimate relationships. The use of ICTs for sexual self-exploration and self-representation, to flirt with others, to reinforce existing relationships or establish new ones and to make first sexual experiences has increased (Subrahmanyam & Greenfield, 2008). Such use of ICTs also includes accessing sites with information about sexuality, accessing sites with pornographic content, and accessing chat rooms, teen dating sites, and social networking sites where adolescents can meet new people. Adolescence is also marked by curiosity, uncertainties, trying, testing, and crossing borders and may give therefore rise to sexual online solicitation, cybergrooming and online abuse of adolescents. In addition, there is increasing evidence that some adults use ICTs to get access to adolescents in order to solicit and exploit the targeted victim for sexual purposes (Davidson & Gottschalk, 2010).

Several studies have tried to understand why adolescents start to talk to strangers online and which adolescents may be at higher risk online (Baumgartner, Valkenburg, & Peter 2010, 2012; Gámez-Guadix, Almendros, Borrajo, & Calvete, 2015; Peter, Valkenburg, & Schouten, 2006). Although this research can help understanding cybergrooming victimization among adolescents, the magnitude of the problem is still unknown.

Varying authors derived risk factors of cybergrooming victimization from the traditional grooming and sexual child abuse research. However, only a very few clear-cut risk markers have been investigated empirically until now (Wachs, 2014). Research showed that a combination and interaction of online and offline vulnerabilities and risk factors might explain varying risk for sexual online victimization (Averdijk, Mueller-Johnson, & Eisner, 2011). Below, we report previous research conducted on cybergrooming as well as the reasons to expect why cyberbullying victimization and self-esteem might facilitate adolescents to become a victim of cybergrooming victimization.

Definition and Prevalence Rates of Cybergrooming

Cybergrooming can be defined as a "process by which a person befriends a young person online to facilitate online sexual contact and/or a physical meeting with them, with the goal of committing sexual abuse "(Webster et al., 2012, S.5). Hence, cybergrooming can comprise unwanted sexual solicitation (i.e., requests to engage in sexual activities), online harassment (i.e., threats or other offensive non-sexual online behavior), flattery, force, threats, bribery (Whittle, Hamilton-Giachritsis, Beech, & Collings, 2013a). Although cybergrooming should not be considered as a linear process, five stages have been identified that include: (1) friendship formation - in this stage the cybergroomer first gathers information, such as sex, age school grade of the intended victim and gets to know the victim; (2) relationship formation - in order to gain the victim's trust, the cybergroomer starts to discuss more private topics with the victim, such as about the family, friends, school, and daily life challenges; (3) risk assessment - at this point the cybergroomer gathers information in order to reduce the likelihood of getting caught, which includes the location of the PC at home and parents' work schedule; (4) exclusivity - the cybergroomer encourages the victim to not disclose their relationship to others; and (5) sexual stages - in this final stage, the victim is persuaded or forced to have sexual conversations online, to send sexually explicit images of themselves and/or take part in sexual activities via video chat (Berson, 2003). Depending on the responses of the victim, one or more stages are skipped and sometimes the order is changed.

Online environments posses favorable conditions for cybergroomers due to the possibilities of anonymized interactions, the lack of geographic boundaries, increased possibilities to get access to an intended victim without getting disturbed through the social environment, and the possibilities to victimize simultaneously varying adolescents (Berson, 2003; Wachs, 2014).

Research on cybergrooming has mainly focused on self-reports (more qualitative approaches than quantitative approaches), police reports or law-enforcement agents interviews. Hence, the prevalence rate of cybergrooming is difficult to determine given the paucity of research and limitation of each method (e.g., unrecorded data when analyzing police reports or self-report bias in survey studies). In addition, previous research does not uniformly define and measure cybergrooming, making it difficult to compare. Finally, the sample sizes and characteristics differ among studies greatly and so statistics vary (Wachs, 2014). Statistics in the following paragraph represent some of the research conducted on sexual online solicitation and more specifically on cybergrooming victimization.

In Germany, 5% of the participants (N = 700, age = 10-18) reported of unwanted sexual online solicitation through an adult perpetrator and additional 7% reported being online solicited by peers (Bitkom, 2011). In another study, 21.4% of participants (N = 512, age = 12-18 years) reported cybergrooming victimization within the last twelve months (Wachs, Wolf, & Pan, 2012). In the Netherlands, in a representative study (N = 1,765, age = 12-17 years), 5.6% of the male participants and 19.1% of the female participants reported unwanted sexual online solicitation (Baumgartner et al., 2010). In a recent study in the Netherlands, 25.4% of the participants (N = 4,453, age = 11-18 years) reported receiving online sexual requests (Kerstens & Stol, 2014). In the USA, in a national survey (N = 1,500, age = 10-17 years), 19% of the participants reported that they had been victims of online sexual solicitation in 2000 (Mitchell, Ybarra, & Finkelhor, 2007), compared to 10% in 2010 (Jones, Mitchell, & Finkelhor, 2012). One of the few studies, investigating online risk for Thai adolescents, found, in a convenience sample of 557 Thai participants between 11 and 18 years old, 80% of participants using ICTs without parental monitoring, 52% reporting no problems with depictions of nakedness, and 33% having encountered people wanting to speak to them about sex in chat rooms (Michelet, 2003). More recently, in a study with a sample of 420 Malaysian adolescents aged between 9 and 16 years old, 17.9% of participants reported unwanted sexual online solicitation (Teimouri et al., 2014).

One of the few cross-national large-scale studies was conducted in 25 European countries (N = 25,142, age = 9-16) and revealed that 22% of the 15-16 year old participants experienced unwanted sexual online solicitation (Livingstone et al., 2011). In sum, the studies show that sexual online risks are a concern of adolescents around the world.

Demographic Characteristics of Cybergrooming Perpetrators and Victims

Research on cybergrooming has focused on both the victims and the perpetrators. Although cybergroomers are predominantly male (Davidson & Gottschalk, 2010; Webster et al., 2012), there is some evidence that women also use ICTs to groom adolescents, especially male victims (Elliott & Ashfield, 2011). Concerning the age of perpetrators, studies based on recorded police cases have shown that cybergroomers are not a homogeneous group. In the National Juvenile Online Victimization study (N-JOV), 23% of online sexual

solicitation perpetrators were between 18 and 25 years old, 41% between 26 and 39 years old, and 35% 40 years and older (Wolak, Finkelhor, & Mitchell, 2004). In another study of recorded cases of sexual online solicitation in Sweden, around one third of the perpetrators were between 18 and 24 years old, one third between 24 and 44, and one third was either under 18 or over 44 years old (Shannon, 2008).

Regarding the victims of cybergrooming, previous research suggests that girls are more likely to experience sexual online solicitation and cybergrooming compared with boys, even though it should not been overlooked that boys may become also victimized (Baumgartner et al., 2010; Gámez-Guadix et al., 2015; Jones et al., 2012; Wachs et al., 2012; Whittle, Hamilton-Giachritsis, Beech, & Collings, 2013b). There are different explanations why girls are at higher risk: the early maturity of girls, the more intensive use of ICTs for communication and interaction (i.e., social networking site), specific risky online behavior (i.e., disclosing of private information on social networking sites or disclosing of contact details like phone number, instant messenger id), or the willingness to flirt online and get in contact online with strangers (Katzer, 2009). In addition, a content analysis of personal information posted on social networking sites revealed that girls included riskier and sexual content than boys (Pujazon-Zazik, Manasse, & Orrell-Valente, 2012). Girls might also show a higher risk because perpetrators of sexual abuse are more often heterosexual men who are looking for female victims (Berson, 2003).

Concerning age, research revealed that adolescents are at higher risk of cybergrooming compared to children and adults (Baumgartner et al., 2010; Whittle et al., 2013b). Through a developmental lens, adolescents are more interested in interpersonal interaction and communication, and are more interested in sexual topics and exchange than children. They possess the social, communicative, and cognitive abilities but also the possibilities, since they use ICTs more privately and have more access to ICT compared with children (Livingstone et al., 2011). Older adolescents are not only more at risk of receiving online sexual solicitations but also are more likely to engage in risky online behavior (i.e., talking about sex with strangers, seeking to have online sex, sending of nude/semi-nude pictures and videos, disclosing of private information; Baumgartner et al., 2010; Wachs, Junger, & Sittichai, 2015).

While there is little research on cybergrooming in Western countries, research in Southeast Asian countries like Thailand barely exists. However, there are some incidents to suggest that in Thailand the prevalence rates are same high or even higher compared to Western countries. Since 2008, mobile Internet users in Thailand grew more than 400% and Internet users in Thailand grew more than 660%, rising from 3.5 million in 2001 to 24 million in 2010 (Asia Digital Marketing Association, 2014). This rapid change issues a challenge to parents, schools, and society because in contrast to around 30% of adult regularly Internet users, 75% of Thai adolescents are using ICT regularly (Asia Digital Marketing Association, 2014). In a study, only one quarter of participating Thai parents reported to monitor the online activities of their children (Michelet, 2003). Also, more recently research indicates that most Thai parents do not monitor children's online activities properly (Cook, Heykoop, Anuntavoraskul, & Vibulphol, 2012).

In the same vein, Thailand has been identified as one of the most popular destinations for child sex tourism since the 1980s (Davy, 2014), with the rapid growth of ICTs child sex tourism and hence sexual online abuse. Previous research suggests that sexually abusive acts that do not involve physical contact, such as sex chatting or forcing someone to reveal their body via webcam, are not recognized as forms of sexual online abuse by Thai parents (Michelet, 2003). In sum, there is a need for research on sexual online solicitation among Thai adolescents and cross-national comparative research.

Why investigate the Associations between Cybergrooming and Cyberbullying and Self-Esteem?

There is a large body of literature suggesting that sexual victimization is often associated with other forms of victimization, including verbal, physical, relational victimization (Finkelhor, Ormrod, & Turner, 2007; Ojanen et al., 2015; Yahner, Dank, Zweig, & Lachman, 2014). This research makes it reasonable to suggest that associations between cybergrooming victimization and cyberbullying victimization do exist. Cyberbullying can be defined as "any behavior performed through electronic or digital media by individuals or groups that repeatedly communicates hostile or aggressive messages intended to inflict harm or discomfort on others" (Tokunaga, 2010, p. 278). Victims of cyberbullying lack good peer relationships, feel socially more ineffective, and have greater interpersonal difficulties (Tokunaga, 2010). This social vulnerability might ease manipulation of the victim without getting disturbed by friends who might distract or warn the victim. Research showed that adolescents who feel lonely and bored online show high need for affection and attention and try to find entertainment and social compensation are more likely to communicate online with strangers (Baumgartner et al., 2010; Valkenburg, Peter & Schouten, 2006).

Another explanation addresses the ICT use of cyberbullying victims which might be a risk for further victimization. Indeed, some research found that victims of cyberbullying used ICTs more compulsively, flirted online with strangers more often, disclosed more private information and contact details like phone number, instant messenger id on social networking sites and sent self-produced images and videos with explicitly sexual content (sexting) more often (Sengupta & Chaudhuri, 2011; Wachs et al., 2015).

Indeed, a study with German adolescents addressing the associations between cybergrooming and cyberbullying victimization revealed that victims of cybergrooming displayed nearly 2 times higher odds ratios to become cybergroomed after controlling for traditional bullying victimization (Wachs et al., 2012). However, this sample was relatively small, with only students from one country and therefore further investigation is needed.

Another crucial risk factor for cybergrooming victimization might be a low self-esteem. Self-esteem is often defined as "a favourable or unfavourable attitude towards the self" (Rosenberg, 1965, p. 15). Self-esteem is crucial for adolescents because previous research has shown that low self-esteem is associated with health-compromising behaviors, including substance use, early sexual activity, eating problems, and suicidal ideation (McGee & Williams, 2000). Low self-esteem was also found to be associated with sexual risk behavior and sexual abuse offline (Wild, Flisher, Bhana, & Lombard, 2004). Hence, low self-esteem could be considered as a risk factor (Fryer, Kraizer, & Mlyoshi, 1987) but might also be a consequence of abuse (Fergusson, McLeod, & Horwood, 2013).

Building on traditional research of child abuse, it is reasonable to suggest associations between low self-esteem and cybergrooming victimization. Low self-esteem is often associated with feelings of worthlessness, inadequacies, deficiencies, and lack of confidence (Rosenberg, 1965), which might explain why cybergrooming victims were found to endure negative feelings associated with cybergrooming (i.e., guilt, self-blame) (Whittle, Hamilton-Giachritsis, & Beech, 2014). The feeling of worthlessness might also explain why victims do not ask for help or believe that no one will believe them. In the same vein, low self-esteem might also make it easier to convey to the child that no one cares what happens.

People with low self-esteem were also found to have a preference for ICT-related communication compared with face-to-face communication (Joinson, 2004). Therefore, it might be that adolescents with low self-esteem prefer also to flirt online, looking for friends online, and prefer establishing online relationships, which might increase the risk for cybergrooming victimization.

In a qualitative interview study, cybergrooming victims reported loosing self-esteem after the cybergrooming victimization (Whittle et al., 2014). In the European Online Grooming Project conducted in four European countries (UK, Belgium, Norway, and Italy) Davidson and Gottschalk (2010) used analyses of police recorded cybergrooming cases to derive risk factors for cybergrooming victimization. They found that the victims of cybergrooming might show lower self-esteem. However, this finding might be distorted as research was not conducted using direct victim accounts. In sum, there is a need for research investigating the associations between self-esteem and cybergrooming victimization with validated scales on a quantitative level.

Lastly, in several studies, lower self-esteem appeared to be associated not only with cybergrooming but also with cyberbullying victimization (Brighi et al., 2012; Olweus, 2012; Patchin & Hinduja, 2010). In the same vein, other research found that negative feedback on social networking profiles lessens adolescents' self-esteem (Valkenburg et al., 2006). Cyberbullying is also known to include negative feedbacks on posting pictures or videos on social networking sites. Therefore, it is reasonable to investigate if self-esteem mediates the associations between cybergrooming victimization and cyberbullying victimization and plays a role in explaining polyvictimization in adolescents.

In summary, previous research found evidence of a relationship between cybergrooming victimization and cyberbullying victimization and between cybergrooming victimization and lowered self-esteem. Research has also found that low self-esteem can put adolescents at an increased risk of being cyberbullied.

The Present Study

This study had three aims: 1) to report the frequency rates of cybergrooming in adolescents by sex, age, and nationality; 2) to investigate demographic characteristics (sex and age) of the cybergroomer reported by the victims, while considering differences in cybergrooming victims by sex and nationality; and 3) to analyze the associations between cybergrooming victimization and cyberbullying victimization and self-esteem, while controlling for sex, age, and nationality. As mentioned above, cyberbullying victims have a higher risk for cybergrooming victimization because of the social vulnerability and risky online behavior. Low self-esteem might be a risk factor because of the emotional vulnerability to the cybergroomer and the preference for using ICTs for interpersonal relations. It is hypothesized that higher involvement in cyberbullying victimization and lower levels of self-esteem is associated with higher probability of experiencing cybergrooming victimization. Additionally, we hypothesized that the association between cyberbullying victimization and cybergrooming victimization is mediated by lower self-esteem in the way that cyberbullying victimization decreases self-esteem that in turn increases the risk of cybergrooming victimization.

Method

Participants

Participants included 2,162 adolescents from 6th to 10th grade from three schools in Germany, three schools in the Netherlands, one school in the Unites States and one school in Thailand. Age ranged between 11 and 19 years (M_{age} = 14.49, SD = 1.66). In terms of gender, 45.4% (M_{age} = 14.3, SD = 1.6, n = 982) were boys and 54.6% (M_{age} = 14.5, SD = 1.7, n = 1,180) were girls. Regarding country, the study sample included n = 849 German (M_{age} = 14.1, SD = 1.2), n = 379 Dutch (M_{age} = 14.5, SD = 1.4), n = 234 American (M_{age} = 14.2, SD = 1.7), and n = 700 Thai subsamples (M_{age} = 15.0, SD = 2.0).

Measures

Dependent variable. Until now, there are no instruments with adequate psychometric properties for measuring *cybergrooming* available. In the current study, we assessed cybergrooming by using an instrument that had been used before (Wachs et al., 2012). In order to improve the validity of responses, participants were given first a definition of a cybergroomer before answering the question: "A cybergroomer is a person who is at least 7 years older than you and whom you have known for a long period exclusively through online communication. At the beginning, the online groomer seems to be interested in your daily life problems, but after a certain time s/he appears to be interested in sexual topics and in the exchange of sexual fantasies and/or nude material (pictures or video chats)." Then participants were asked "How many times did you have contact with a cybergroomer in the last twelve months?". The response scale was as follows: 1 = *never*, 2 = *1 or 2 times*, 3 = *2 or 3 times a month*, 4 = *about once a week*, and 5 = *several times a week*. These answer options were derived from the bullying items used in this study in order to enlarge the comparability.

Independent variable:

a) *Cyberbullying victimization.* For the assessment of cyberbullying the Mobbing Questionnaire for Students, by Jäger, Fischer, and Riebel (2007), was used. This questionnaire starts with a definition of cyberbullying to improve validity of responses. This definition contents the three criteria derived from traditional bullying research: intent to harm, power imbalance between victim and perpetrator, and repetition. After the definition, participants could state how often they have experienced four forms of cyberbullying victimization. For the assessment of cyberharassment, participants were asked "How many times has someone sent you threats, defamations, or other aggravating messages via the Internet/cell phone in the last twelve months?"; for cyberdenigration, ". . . did someone spread rumors or defamations about you via the internet/cell phone. . .?"; for cyberouting, ". . . did someone hand on private emails, chat messages or pictures of you to others with the intention of exposing you. . .?"; and for cyberexclusion, ". . .someone excluded you from the group in chats or online games. . .?". All cyberbullying items could be answered on a five point Likert scale: 1 = *never*, 2 = *1 or 2 times*, 3 = *2 or 3 times a month*, 4 = *about once a week*, and 5 = *several times a week*. The four items were used to build a scale, total sample (α = .71, M = 1.35, SD = 0.64, N = 2,160), German (α = .73, M = 1.3, SD = 0.61, N = 849), Dutch (α = .70, M = 1.3, SD = 0.63, N = 379), American (α = .70, M = 1.5, SD = 0.76, N = 232), and Thai subsample (α = .72, M = 1.3, SD = 0.64, N = 700).

b) *Self-esteem.* The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a 10-item scale of global self-esteem, which includes both positive and negative feelings about the self. Participants respond to statements such as "On the whole I am satisfied with myself" and "I feel I do not have much to be proud of", on a four point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*). The higher participants scored on this scale, the higher their self-esteem, total sample (α = .85, M = 2.0, SD = 0.64, N = 2,144), German (α = .89, M = 2.0, SD = 0.75, N = 847) Dutch (α = .82, M = 2.0, SD = 0.55, N = 372), American (α = .89, M = 2.1, SD = 0.74, N = 225) and Thai subsample (α = .76, M = 2.1, SD = 0.49, N = 700).

c) *Sex and age of the cybergroomer.* Participants were asked for sex and age of the cybergroomer. The question *Which sex had the*

cybergroomer? could be answered by stating, *the cybergroomer was male, the cybergroomer was female, both female and male (i.e., a couple)* or *I don't know*. The question *How old was the cybergroomer?* could be answered with *younger than me, older than me, nearly the same age* and *I don't know*.

Demographic variables. Participants were asked for sex and age to determine demographic characteristics. Nationalities were determined after data collection.

Procedure

Participation in this study was voluntary and based on written parental consent. About 95% of eligible pupils participated in the study. In Germany and the Netherlands an online survey was used, while in Thailand and the USA a paper-pencil method was implemented[1]. The survey was completed during one regular school hour in the school's computer lab respective in classrooms under the supervision of trained research assistants. All data were collected in 2013. In all countries, participants were informed that their participation was anonymous and that they were free to withdraw from the study at any time. The average time needed to complete the questionnaire was about 30 minutes. The study was reviewed and approved by the data protection officer and educational authority of the federal state of Lower Saxony, Germany (OS 1 R.24-0541/2 N). In order to prevent distress and further harm from participating in this study, oral and written information was provided where those who had taken part in the research could get counseling online and offline was given.

Data Analysis

Descriptive statistics were used to determine the frequency rates of cybergrooming. Pearson's chi-square test was used to assess the bivariate associations between the bullying typologies and sex and country. Cramer's V was used to calculate the effect size. When assumptions of Pearson's chi-square test were violated (i.e., too few cases) we used Freeman-Halton extension of the Fisher's exact probability test for 3 x 4 or 4 x 4 contingency tables (Freeman & Halton, 1951).

To analyze the multivariate associations between the dependent variable (cybergrooming victimization) and the independent variables (cyberbullying victimization, self-esteem), a simple binary logistic regression was conducted using dichotomous dependent variables, while controlling for demographics (sex, age, nationality). The statistical significance of parameter estimates was determined using bootstrapped procedures (Tabachnick & Fidell, 2013). In the present study, 1,000 bootstrapping samples were derived using 95% confidence intervals.

The decision to dichotomize the outcome variable was made through different reasons. Firstly, the cybergrooming variable was positively skewed, what contradicts the application of OLS-regression and might lead to biased parameter estimates. Logistic regression does not have normality assumptions for the DVs as long as the categories show an adequate absolute case number (e.g., 30 cases; Tabachnick & Fidell, 2013). We accepted loss of statistical power but avoided biased parameter estimates due to non-normal deviated DV. Secondly, treating the outcome-categories (contact vs. no contact) as qualitative distinct in binary regressions allows

for distinct analyses and comparisons of associated risk factors of each group.

Before conducting binary regression analysis we tested two assumptions: multicollinearity and linearity of the logit. Multicollinearity was examined by running a linear regression analysis with all predictors to proof for multicollinearity. The analysis revealed that multicollinearity was not an issue among our independent variables (VIFs < 2.0). In order to proof linearity of logit we ran the regression analysis with cyberbullying victimization and self-esteem as interaction terms of each predictor and the log of itself. Both interactions were not significant, suggesting that the assumption of linearity of the logit has been met for cyberbullying victimization and self-esteem.

Lastly, we conducted mediation analysis using PROCESS macro (Hayes, 2013) to examine whether cyberbullying victimization predicted likelihood of experience with cybergrooming victimization via self-esteem. To estimate the significance of the indirect effect estimate, we used bootstrapping procedure with 1,000 re-samples.

Results

Frequency Rates of Cybergrooming

Concerning our first research question, the data showed that overall 18.5% ($n = 399$) of participants reported that they had at least once contact with a person who tried to sexually solicit them online. Regarding the contact frequencies, 81.5% ($n = 1,755$) reported they had never had contact with a cybergroomer, 10.9% ($n = 235$) reported contact one or two times, 3.0% ($n = 64$) two or three times a month, 1.4% ($n = 30$) once a week, and 3.2% ($n = 70$) several times a week. Table 1 illustrates the frequency rates of cybergrooming victims in total, by sex and nationality.

For further analysis, we dichotomized the cybergrooming variable (yes/no) in order to distinguish between participants who had contact with a cybergroomer and those who had not. In the total study sample, differences in the sex composition of cybergrooming victimization were statistically significant, $\chi^2(1, 2,154) = 24.40$, $p < .0001$, Cramer's V = .106, suggesting that girls were more likely than boys to have contact with a cybergroomer (22.3% vs. 14%). There were no differences in age of participants who had contact with a cybergroomer ($M = 14.2$, $SD = 1.40$) and who had not ($M = 14.6$, $SD = 1.78$), $t(2,149) = -1.88$, $p = .60$. The frequency rates compared by nationality revealed a statistically significant difference. More Thai participants (36.5%) compared with German (10.2%), Dutch (7.4%) or American (12.6%) had at least once contact with a cybergroomer, $\chi^2(3, 2,154) = 224.62$, $p < .0001$, Cramer's V = .323.

Finally, we compared sex and age differences in Western (Germany, the Netherlands, and USA) and the South East Asian (Thailand) participants by dichotomizing the nationality variable. In total, fewer Western participants reported having contact with a cybergroomer compared with Southeast Asian participants (9.9% vs. 36.5%), $\chi^2(1, 2,154) = 221.90$, $p < .0001$, Cramer's V = .321.

Western girls were significantly more likely to have contact with a cybergroomer than Western boys (14.0% vs. 6.1%), $\chi^2(1, 1,456) = 25.19$, $p < .0001$, Cramer's V = .132. However, in Southeast Asian participants no statistically significant differences between boys (40.4%) and girls (34.7%) were observed, $\chi^2(1, 698) = 25.19$, $p = 0.13$, indicating that Southeast Asian girls were not more likely involved in cybergrooming than boys. There were no differences in age for Western victims ($M = 14.2$, $SD = 1.40$) and non-victims ($M = 14.3$, $SD = 1.45$), $t(1, 451) = -0.531$, $p = .595$ or in South East-Asian victims ($M = 14.8$, $SD = 1.92$) and non-victims ($M = 15.1$, $SD = 2.04$), $t(696) = 1.6$, $p = 0.091$.

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[1] To test whether the method of data collection (paper and pencil versus online) had any undue influence on the study results, we re-run all analyses with a dummy coded variable "method of data collection" (paper and pencil versus online) added to a set of control variables. The effect of the data collection method on our dependent variable, namely cybergrooming victimization was not statistically significant; furthermore, we did not observe any changes in the obtained results.

Table 1
Frequency Rates of Cybergrooming by Sex and Nationality.

	Sex		Nationality				
	Male	Female	German	Dutch	American	Thai	Total
Never	842	913	762	349	201	443	1755
	86.0%	77.7%	89.8%	92.6%	87.4%	63.5%	81.5%
One or two times	69	166	69	19	21	126	235
	7.0%	14.1%	8.1%	5.0%	9.1%	18.1%	10.9%
Two or three times a month	24	40	8	4	3	49	64
	2.5%	3.4%	0.9%	1.1%	1.3%	7.0%	3.0%
About once a week	17	13	4	0	4	22	30
	1.7%	1.1%	0.5%	0.0%	1.7%	3.2%	1.4%
Several times a week	27	43	6	5	1	58	70
	2.8%	3.7%	0.7%	1.3%	0.4%	8.3%	3.2%
Total	979	1175	849	377	230	698	2154
	45.5%	54.5%	39.4%	17.5%	10.7%	32.4%	100.0%

Sex and Age of Cybergroomers

To answer our second research question, participants were asked whether they knew which sex and age the cybergroomer had. Concerning the sex of the cybergroomer, participants most often reported that the perpetrators were male (66.3%, $n = 269$), followed by female (25.4%, $n = 103$), not knowing the sex (5.7%, $n = 23$) and both male and female (i.e., couples) (2.7%, $n = 11$). More boys than girls reported not knowing the sex of the perpetrator (10.4% vs. 3.3%), fewer boys reported being sexually online solicited by a male perpetrator compared with girls (43.7% vs. 77.5%), more boys than girls reported being sexually online solicited by a female perpetrator (44.4% vs. 15.9%), fewer boys reported being cybergroomed by a male and female cybergroomer (i.e., a couple) (1.5% vs 3.3%), Fisher-Freeman-Halton's test, $p = .000$. More Dutch participants (32.1%) reported compared with German (11.5%), American (14.8%), and Thai (0%) participants that they did not know the sex of the Cybergroomer. Fewer German participants (12.6%) reported being sexually online solicited by a female perpetrator compared with Dutch (14.3%), American (37.0%), and Thai participants (29.5%), $\chi^2(3, 406) = 64,74$, $p < .000$, Cramer's V = .282.

Regarding age of the cybergroomer, participants reported most often not knowing how old the perpetrator was (49%, $n = 387$), followed by older perpetrators (35%, $n = 276$), perpetrators in the same age 12.5% ($n = 99$), and younger perpetrators (3.4%, $n = 27$). Significantly more boys than girls reported being sexually online solicited by a younger person (6.2% vs. 2.1%), $\chi^2(3, 789) = 9.64$, $p < .05$, Cramer's V = .111. Some significant country differences were found. More Thai participants (55.3%) reported not knowing the age of the perpetrator compared with Dutch (14.3%), German (27.6%), and American participants (7.1%). More American participants (17.9%) reported being sexually online solicited by younger perpetrators compared with Dutch (3.6%), German (2.3%), and Thai (2.9%). Fewer Thai participants reported being sexually online solicited by person in the same age (9.4%) compared with Dutch (28.6%), German (29.9%), and American (14.3%). More American students (60.7%) reported being sexually online solicited by older persons compared with Dutch (53.6%), German (40.2%), and Thai (32.4%), $\chi^2(3, 789) = 89.61$, $p < .000$, Cramer's V = .195.

Associations between Cybergrooming and Cyberbullying and Self-Esteem

Regarding our third research question, we analyzed whether cyberbullying victimization and low self-esteem increased the probability of reporting cybergrooming victimization. For this analysis, we estimated a logistic regression model including cyberbullying victimization and low self-esteem as predictors.

Cybergrooming was dichotomized as a criterion variable. In the regression analysis we controlled for sex, age, and nationality. As Table 2 illustrates, there were statistically significant influences on whether participants were cybergroomed. The model was significant, Log likelihood (null) = 2059.30; LR (full) = 1715.41; LR $\chi^2 = 15.37$, $df = 8$, $p < .05$, Nagelkerke's $R^2 = .231$. Cyberbullying victimization and cybergrooming victimization were significantly associated ($B = 0.812$, $p = .0001$). Also self-esteem and cybergrooming victimization had a statistically significant relationship ($B = -0.226$, $p = .02$). Specifically, each increase of one point on the five point scale of cyberbullying victimization was associated with increasing the odds of cybergrooming victimization by 2.2 times ($OR = 2.25$, 95% CI % [1.9, 2.6]) and each increase of one point on the four point self-esteem scale was associated with decreasing the odds ratios by 0.80 times ($OR = 0.80$ CI 95% [0.65, 0.97]). In addition, girls ($B = 0.278$, $p = .03$) and Southeast Asian participants ($b = 1.76$, $p = .0001$) were significantly more likely to suffer cybergrooming victimization.

To analyze whether the association between cyberbullying victimization and cybergrooming victimization was mediated by self-esteem, a mediation model was tested. Results revealed both significant direct effects of cyberbullying victimization on self-esteem ($B = -0.149$, $p < .001$, 95% CI [-0.19, -0.11]) and on the likelihood of experiencing cybergrooming victimization in the past ($OR = 2.45$, 95% CI [$p < .001$, 95% CI 2.02, 2.96]). Additionally, higher self-esteem decreased likelihood of ever being cybergroomed ($OR = 0.77$, 95% CI [$p = .021$, 95% CI 0.61, 0.96]). The indirect effect of cyberbullying victimization on cybergrooming victimization through self-esteem was small, but statistically significant ($B = 0.04$, 95% bootstrapped CI [0.01, 0.09]). In the mediation analysis, we controlled for age, sex, and dichotomized nationality (Western vs. Southeast Asian country, Figure 1).
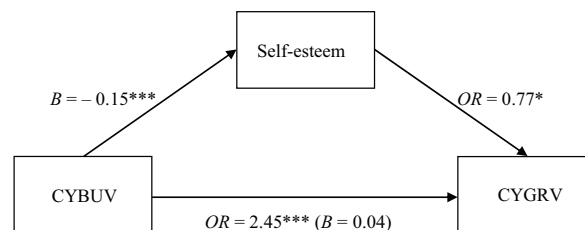

Figure 1. Direct and indirect effects of cyberbullying victimization (CYBUV) and self-esteem on cybergrooming victimization (CYGRV). The indirect effect of cyberbullying victimization on cybergrooming victimization via self-esteem is reported in parentheses.
* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2

Coefficients of the Model Predicting whether an Adolescent had Contact with a Cybergroomer or not.

	B *	SE	Wald	p	OR	C.I. 95%
Cyberbullying	0.812 [0.650 – 0.970]	0.085	92.14	.000	2.25	1.90 – 2.65
Self-Esteem	-0.226 [-0.030 – -0.435]	0.100	5.07	.024	0.80	0.65 – 0.97
Being a girl	0.278 [0.034 – 0.523]	0.130	4.61	.032	1.32	1.02 – 1.70
Age	-0.038 [-0.112 – 0.030]	0.035	1.21	.270	0.962	0.899 – 1.03
Southeast Asian	1.762 [1.49 – 2.03]	0.129	186.58	.000	5.82	4.52 – 7.49
(Constant)	-3.539 [-4.65 – -2.44]	0.568	38.81	.000	0.029	

Note. * 95% BCa bootstrap confidence intervals based on 1,000 samples.

Discussion

ICTs possess many benefits to adolescents and play an important role in their daily interaction and communication. Despite the numerous benefits of ICTs, there are also several potential risks that can be detrimental to a positive development in adolescence. This study demonstrated that cybergrooming should be considered as one of these online risks for adolescents.

The purpose of this study was to investigate cybergrooming and to expand the empirical evidence of its extent and nature. This objective was realized by 2,162 self-reports of adolescents aged between 11 and 19 years old from Germany, the Netherlands, USA, and Thailand. Hence, this study is one of the first investigating cybergrooming, its extent, and nature, in a cross-national sample considering Western and Southeast Asian differences in victims.

Concerning our first research aim, to investigate the frequency rates of cybergrooming, we found nearly one in five participants (18.5%) reported that they had at least once contact with a person who tried to sexually online solicit them. This result is comparable to Wachs et al. (2012), who found with the same research instrument, but a different sample, 21.4% of participants reported contact with a cybergroomer at least once.

With respect to our first research question, we found the frequency rates of contact with a cybergroomer varied between 36.5% in Thailand, 12.6% in the USA, 10.2% in Germany, and 7.4% in the Netherlands. Consequently, our data indicated that participants in Western nations exhibited a clearly lower risk for cybergrooming victimization compared with Southeast Asian participants. These differences might be explained by socioeconomic and cultural differences, less parental monitoring of adolescents' online activities, and missing sensitivity for sexual aggressions that are conducted online (Cook et al., 2012; Michelet, 2003). There is also some evidence that Thai parents need to improve sexual risk communication with their children (Sridawruang, Pfeil, & Crozier, 2010).

The data showed that in the total sample girls were more likely to have had contact with a cybergroomer compared with boys (22.3% vs. 14%), based on the total sample. This result is largely in line with previous research (Baumgartner et al., 2010; Gámez-Guadix et al., 2015; Jones et al., 2012; Wachs et al., 2012). However, a more detailed analysis revealed some interesting differences between Western and Southeast Asian adolescents. While Western girls showed higher risk to become a victim of cybergrooming compared with Western boys (14.0% vs. 6.1%), in Southeast Asian adolescents no such difference was found, but boys' rates were slightly higher than the one of girls (40.4% vs. 34.7%). There is some previous work that has shown that Asian boys are more likely to be involved in sexual child abuse compared with Asian girls, including sexual online solicitation (Chan, Yan, Brownridge, & Ip, 2013; Finkelhor, Lannen, & Quayle, 2011). Furthermore, no age differences were found in the present study between participants who had contact with a cybergroomer and participants who had not, within the age range of the present study, namely 11 to 19 of age.

Regarding our second research question, to investigate reported sex and age of the cybergroomer, we found support for previous research that cybergroomers are not a homogenous group but more likely male and older than their targeted victim (Elliott & Ashfield, 2011; Whittle et al., 2013a; Whittle et al., 2014). In line with Finkelhor, Mitchell, and Wolak (2000), we found that around three quarters of the perpetrators were male and one quarter female. More specifically, we found girls reporting more often sexual solicitation by male perpetrators and boys reporting more often victimization through a female perpetrator. It might be that the reports of boys were biased. Male victims might be ashamed of being cybergroomed by a male perpetrator and therefore they report that the perpetrator was female and not male. More research on this issue is recommended.

While in all nations of the current study participants reported most often cybergrooming through a male perpetrator, further analysis revealed some specific country differences: German participants reported less often being cybergroomed by a female perpetrator and Dutch adolescents reported more often not knowing the sex of the perpetrator.

Whereas in 91% of the cases the adolescents reported to know the sex of the perpetrators, only in 51% the same was true for the age. This result is also in line with previous research on sexual online perpetration that more often the sex as the age of the perpetrator is clearly known to the victim (Finkelhor et al., 2000). The only differences between male and female victims regarding the age of the cybergroomer were that more boys than girls reported being sexually online solicited by a younger person. Regarding nationalities, American participants were more likely contacted by older and younger cybergroomers, Thai participants reported more often not knowing the age and less often cybergrooming by same aged perpetrators. While in the three Western nations participants reported most often being cybergroomed by an older person, Southeast Asian participants reported most often not knowing the age of the cybergroomer followed by reporting that the cybergroomer was older.

Concerning our third research question, to analyze the associations between cybergrooming victimization, cyberbullying victimization, and self-esteem, we found some support for both hypotheses. Cyberbullying victimization was associated with cybergrooming victimization what was also observed before (Averdijk et al., 2011; Wachs et al., 2012; Wachs et al., 2015). In addition, our data confirmed initial research that showed significant associations between cybergrooming victimization and self-esteem (Whittle et al., 2014). We found also support for the second hypothesis that cyberbullying victimization is associated with decreased self-esteem that in turn predicts higher likelihood of cybergrooming victimization. Although this indirect effect was small in magnitude, it is one of the first explanatory factors for the relationship between cybergrooming victimization and cyberbullying victimization investigated so far. Next, the study findings are discussed in more detail regarding their implications for practice and future research.

Implications for Practice

The results found in the current study have important implications for practice. Firstly, although the majority of adolescents in this study have never experienced cybergrooming victimization, participants who reported contacts with a cybergroomer at least once were fairly common. For these adolescents it seems to be important to inform about possible online risks and educate them how to use ICT safe and responsible. Secondly, prevention measurement against cybergrooming should not only address girls but also boys, while considering not only male but also female perpetrators. Also, it seems to be important to consider cultural differences in cybergrooming prevention. Further prevention measurements should focus on a broader range of online risks and combine measurements against aggressive and sexual online risks. Thirdly, since the present study revealed that some cybergrooming victims have problems with peers and struggle with themselves, prevention measurements against cybergrooming victimization should focus on improvement of social relationships and empowerment approaches. Schools might play here a special role because they possess the right learning environment for both the development of a strong personality that believes in her or himself but also establishing close social relationships to other peers. More specifically, the present study showed that the improvement of self-esteem might decrease the risk of falling victim to both cybergrooming victimization and cyberbullying victimization simultaneously.

Finally, parents and educators should discuss the potential risk of cybergrooming with adolescents. Hence, they should discuss the issue of sexuality, friendships and healthy romantic relationships online. At the same time, parents and educators should be aware that online contacts of adolescents are in most cases friendship orientated and between individuals from nearly the same age (Wolak, Mitchell, & Finkelhor 2002). Further, online contacts can have a compensation function for adolescents who feel lonely and positive feedback through ICT can improve the self-esteem (Valkenburg et al., 2006). These positive aspects of ICT use should be considered when talking with adolescents about cybergrooming. Finally, parents should also encourage their children to talk to them about anything that makes them feel uncomfortable online as well as offline.

Implications for Future Research

First of all, it seems to be important to develop a validated scale for measuring cybergrooming victimization among adolescents. In order to gain more information about how many adolescents are involved, studies with representative data are needed. Future research would also benefit from including more than one group in research, for example adolescents and their parents, peers, and teachers to gain more information about cybergrooming victimization in a social ecological context. The present study showed that it is worth considering cross-cultural differences. However, more research is needed to understand underlying reasons for the varying gender distribution between Western and Southeast Asian adolescents found in this study. This issue might be important when it comes to the development of intervention and prevention measurements and their cross-cultural validity. Finally, longitudinal studies are needed in order to understand the temporal relationship between cybergrooming victimization and cyberbullying victimization and their risk factors and consequences.

Similarly to the cybergroomers, the victims are also a heterogeneous group. It is reasonable to suggest that not all cybergrooming victims suffer social and psychological vulnerabilities investigated in the current study. Beside the social-psychological vulnerable victim type, there might be further victim types who are well integrated among peers and are self-confident but are seeking for sensations online and therefore get in contact with a cybergroomer. In the same vein, previous research discovered varying cybergrooming strategies that might be adopted according to the type of victim (Gottschalk, 2011). Gaining the adolescents' confidence by offering positive attention, faking friendship, or providing an empathetic response when they discus problems might be the more appropriate strategy when it comes to this social-psychological vulnerable victim type. Further research is needed to identify varying types of cybergrooming victims and their vulnerability for specific cybergrooming strategies in order to develop prevention and intervention measurements.

The present study also shows that it is worth combining research on varying online risks. Since there are relevant overlaps between varying forms of cybervictimization, the study points out the need to investigate cybervictimization in a broader view.

Investigating experiences of abuse among young people is a highly sensitive issue. On the one side, it is often problematic to get the permission from schools, parents and educational authority to investigate this issue. On the other side, any effects of the questioning on the participant must be taken under consideration. For this reason, we decided not to ask directly for experiences and varying kinds of sexual online abuse, but to assess frequency rates of contacts with a cybergroomer.

Finally, it is worth mentioning that in the present study, in 12.5% of the reported cases the perpetrator was the same age (among US participants even 17.9%) as the victim, what raises awareness about peer-to-peer sexual online solicitation, something that has not been adequately investigated.

Limitations and Strengths

This study has several limitations that need to be mentioned. Firstly, due to the cross-sectional nature of the study, caution must be used when establishing causal relationships between the variables. Therefore, it is not possible to confirm the temporal relationship between cybergrooming victimization and cyberbullying victimization and self-esteem. Secondly, although our sample is large, it cannot be considered as representative. In addition, only a relative small number of schools were recruited. Therefore, caution is recommended with the generalization of the results to the entire population of adolescents in each country. Thirdly, all data relied exclusively on self-reports. Therefore, the correlates might be inflated through shared method variance. A multi-informant approach would provide a fuller picture and is recommended for future research. In addition, we relied on single item measurement for the assessment of cybergrooming; future studies should try to include validated scales to overcome problems with single-items measurements (i.e., degree of validity, accuracy, and reliability).

This study also includes a number of strengths: firstly, the study investigated cybergrooming risk factors in a cross-national sample between Western and Southeast Asian adolescents; secondly, sufficiently large samples were available from each country to permit by country comparisons; thirdly, identical and validated instruments were used across study samples; finally, the results of this study provides clear implications for prevention and intervention of cybergrooming victimization.

Conclusions

In summary, although cybergrooming seems to be a common phenomenon among adolescents, most adolescents have never experienced it. We found Western adolescents showed a lower risk

for cybergrooming victimization compared with Southeast Asian participants and female participants only in Western countries but not in the Southeast Asian country were more involved in cybergrooming. This study extends the previous evidence on associations between cybergrooming victimization and cyberbullying victimization by using a cross-national sample and adds to the literature significant associations between cybergrooming victimization and self-esteem. Further, we found a small but significant indirect effect of cyberbullying victimization on cybergrooming victimization via lower self-esteem. The findings suggest that prevention efforts should pay attention to improve interpersonal relationships and psychological health in order to protect adolescents from cybergrooming victimization.

Conflict of Interest

The authors of this article declare no conflict of interest.

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