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ABSTRACT

Little attention has been given to empirically-tested theoretical frameworks of adolescents' risk for cybergrooming victimization. To this end, we have applied the Routine Activity Theory to investigate whether exposure to motivated offenders (PC/laptop ownership and Internet access in the own bedroom), capable guardianship (parental mediation strategies of Internet use), and target suitability (adolescents' online disclosure of private information) predict cybergrooming victimization among adolescents. Using data from a cross-sectional survey of 5,938 adolescents from Germany, India, South Korea, Spain, Thailand, and the U.S. ranging in age from 12 to 18 ($M=14.77$, $SD=1.60$), we have found that PC/laptop ownership and Internet access in the own bedroom, parental mediation, and online disclosure are directly associated with cybergrooming victimization. While instructive parental mediation is negatively related with online disclosure and cybergrooming victimization, restrictive mediation is positively related to both. In addition, online disclosure partially mediated the relationship between parental mediation and cybergrooming victimization. The analyses confirm the usefulness of applying the Routine Activity Theory to cybergrooming. Moreover, the present study highlights the need for prevention programs with lessons on age-appropriate ICT use and access, to educate parents on using instructive strategies of Internet mediation, and inform adolescents to avoid disclosing too much private information online. The Routine Activity Theory might function as a theoretical framework for these programs.

Keywords: Cybergrooming; parental mediation; restrictive mediation, instructive mediation
Cross-national research; cybervictimization; online disclosure

A Routine Activity Approach to Understand Cybergrooming among Adolescents from Six Countries

1 Introduction

Information and communication technologies (ICT) have become a relevant tool for adolescents' sexual self-exploration and self-representation, to reinforce existing relationships or establish new ones, and to access sexual health information.¹ However, the implementation of ICT in adolescents' sexual socialization presents not only opportunities but also challenges. A sexual online risk of particular concern is cybergrooming. Cybergrooming can be defined as establishing a trust-based relationship between minors and (usually) adults using ICT to systematically solicit and exploit the minors for sexual purposes.² There is a paucity of research that applies theoretical frameworks to understand adolescents' risk for cybergrooming victimization.³ To fill this gap, the present study applies the Routine Activity Theory (RAT)⁴ as a theoretical framework to explain cybergrooming victimization by considering exposure to motivated offenders (PC/laptop ownership and Internet access in the own bedroom), capable guardianship (parental mediation strategies of Internet use), and target suitability (adolescents' online disclosure of private information). The results might help to understand this understudied online risk from a theoretical point of view. Findings can also be used to develop theory-driven prevention programs capable of protecting adolescents from experiencing cybergrooming and urging parents to use effective mediation strategies.

Routine Activities Theory as Theoretical Framework for Cybergrooming Victimization

Since RAT was developed by Cohen and Felson⁴ in 1979 to explain conditions that are favorable for deviance and crime in the offline world, it has been extended to understand cybercrime, such as online identity theft, cyberstalking, online harassment, sexual online solicitation, cyberbullying, and malware infection in the last couple of years.⁵⁻¹¹ According to RAT, the following three essential elements must converge for a crime to occur.⁴

Exposure to motivated perpetrators. RAT theorists have hypothesized that the exposure to motivated perpetrators increases risk of victimization which is the first element of the RAT.⁴ For crimes taking place in the online world, exposure to motivated online perpetrators has been operationalized; for example, the amount of time spent online, access to, and usage of ICT (i.e., social networking sites, instant messenger) are associated with cybervictimization.^{5-8,12} Regarding cybergrooming, several authors stated that the online world is a particular suitable place for cybergroomer to prey upon minors because it is easy for cybergroomers to access information about their victims which they can use for manipulation and rapport building whilst maintaining relative anonymity.¹³⁻¹⁵ There is also some evidence that access to and use of ICT are related to cybergrooming victimization.¹⁶⁻¹⁸ Thus, in the present study, it is hypothesized that owning a PC/laptop and having Internet access in one's own bedroom exposes adolescents to motivated cybergroomers.

Absence of Capable Guardians. A second element of RAT is guardianship that includes the use of protective activities to reduce the risk of cybervictimization and refers to actions or people whose presence would discourage a crime.⁴ Past research has operationalized guardianship directly or by proxy in different ways, such as filtering/ blocking software, lack of ICT skills, friends who commit online deviance, and computer location.⁵⁻⁸ The current study addresses guardianship by considering parents' mediation of Internet use. Parental mediation of adolescents' Internet use can be defined as the regulatory strategies that parents use to maximize benefits and minimize their children's online risks.¹⁹ Parents employ various parental mediation strategies to manage their children's Internet use. Two contrasting forms of parental mediation of children's Internet use are often distinguished: restrictive mediation and instructive mediation.²⁰⁻²⁵ Instructive mediation involves parents who openly discuss and explain undesirable facets of ICT use, inform their children about which information to share online, show interest in the websites their children regularly visit, recommend safe online spaces, and are available for questions. This type of parental

mediation involves the education of young people about online risks, like cybervictimization, and strategies for how children can reduce exposure to online risks.^{19,21,24,26} Another form is restrictive mediation which is characterized by regulating children's ICT use through restricting the websites visited through software, monitoring online messages, or checking profiles on social networking sites. Unlike instructive mediation, restrictive mediation does not include the active participation of the child in establishing online safety rules because these rules are set by the parents alone.^{21,23–25} Adolescence is a period where identity and sexuality are experimented with and boundaries are explored.²⁷ Hence, setting rules for young people, such as applying restrictive mediation, in this developmental period may result in rule adverse behaviors. Indeed, adolescents who tend to seek out new experiences, including online experiences, may be more likely to receive sexual messages and they might report being less upset by these messages because engaging in those experiences enables them to learn, gauge, and regulate with whom and what kind of exchange is taking place.²⁸ Whilst restrictive mediation is likely to restrict adolescents in building resilience and coping abilities, instructive mediation is likely to support the development of these abilities.

Some studies support the idea that instructive mediation can help reduce adolescents' risk of cybervictimization and restrictive mediation increases the likelihood for risky online behavior.^{21,24,25} Yet, other studies showed that both instructive and restrictive mediation can be protective against adolescents' exposure to online risks.^{19,22} In research on cyberbullying, it was found that both restrictive and instructive mediation decreased the risk of victimization, whilst children's self-reported harm from being victimized was greater when restrictive mediation and less when instructive mediation had taken place. Further, instructive mediation increased children's active coping strategies, such as, deleting messages and blocking the sender.²⁹ To date, no study, however, has investigated the association between parental mediation and cybergrooming victimization.

A Suitable Target. A third element of RAT is a suitable target which has been operationalized in past research by, for example, lack of online privacy setting, risky online activities (i.e., talking with strangers online), or posting online private information.^{5-7,10,12} In the present study, target suitability is operationalized by adolescents' online disclosure of private information. When communicating and interacting online, adolescents differ in the extent that they are willing to share private information (i.e., using the real name, posting intimate photos publicly) which is referred to as online disclosure. Adolescents who are more willing to share personal information might be at a higher risk of becoming cybergroomed than the ones who have more reservations toward sharing private information because private information can give access to the victim and might help for rapport building and manipulation of the victim.^{13,30} A few studies have shown associations between online disclosure and adolescents exposure to online risks, such as cyberbullying and sexual online victimization.^{23,31,32} Online disclosure, however, might not only be associated with cybergrooming but also with parental mediation of Internet use. Some research has found that instructive parental mediation decreased privacy-related online risks while restrictive mediation increased such risks.^{24,33} Thus, online disclosure might function not only as a correlate of cybergrooming victimization but also as a mediator in the relationship between parental mediation of Internet use and cybergrooming victimization.

The Current Study

A strong argument can be made for a relationship among ICT use, parental mediation of internet use, online disclosure, and cybergrooming victimization. No published study to date has empirically tested these associations in one study. Considering the RAT, the present study fills a gap in the literature by examining whether ICT access (exposure to motivated perpetrators), parental mediation of Internet use (capable guardians) and online disclosure (target suitability) are related to adolescents' risk of cybergrooming victimization. Based on the previous literature, and consistent with the RAT, we hypothesized that:

Hypothesis 1 (H1). PC/laptop ownership and having Internet access in one's own bedroom will predict cybergrooming victimization (exposure to motivated offenders).

Hypothesis 2 (H2). Parental mediation will be directly associated with cybergrooming victimization (capable guardians).

Hypothesis 3 (H3). Online disclosure of private information will be directly related to cybergrooming victimization (target suitability).

Hypothesis 4 (H4). Parental mediation will be indirectly associated with cybergrooming victimization via greater online disclosure.

2 Methods

Participants

Participants for this study included 5,938 adolescents (49.8% female) between the ages of 12 and 18 ($M_{\text{age}}=14.77$; $SD=1.60$) from Germany ($n=1,489$, $M_{\text{age}}=14.21$; $SD=1.22$, 50.3% female), India ($n=1,121$, $M_{\text{age}}=15.37$; $SD=1.56$, 45% female), South Korea ($n=756$, $M_{\text{age}}=14.73$; $SD=1.22$, 49.8% female), Spain ($n=1,018$, $M_{\text{age}}=14.29$; $SD=1.63$, 51.7% girls), Thailand ($n=716$, $M_{\text{age}}=15.68$; $SD=1.69$, 52.8% female), and the U.S. ($n=847$, $M_{\text{age}}=14.79$; $SD=1.79$, 50.7% female). Overall, 78.7% of participants reported living with two parents or legal guardians and 22% reported not speaking the language of their resident country at home. Other sample characteristics are described in more detail elsewhere.³⁴

Measures

Cybergrooming victimization. For measuring cybergrooming victimization we used a scale developed by Bergmann and Baier.³⁵ This questionnaire included two subscales. The first five-item subscale measured sexualized conversation (i.e., ...*wanted to talk with you about sexual matters*) and the second subscale consisted of four items and reflected requests for sexual material (i.e., ...*wanted naked pictures of you*). All items were rated on a scale of *never* (=0) to *very frequently* (=4). Cronbach's alphas were .84 for sexualizes communication subscale and .82 for request for sexual requests subscale. Table S1 in the Online Supplement

provides coefficient alpha by country. The results obtained in a confirmatory factor analysis (CFA) revealed an acceptable fit: CFI=.98.; TLI=0.98; SRMR=0.28; RMSEA=0.07.

Exposure to motivated offender. To measure adolescents' exposure to motivated offenders we incorporated two items: *Do you personally own a PC/laptop?* and *Can you access the internet from your bedroom?* Items were answered with *no* (0) and *yes* (1).

Lack of capable guardianship. The parental mediation of Internet use questionnaire was used to measure this element of RAT by asking adolescents how much they agree or disagree that their parents are involved in their Internet use.²⁶ The questionnaire included two subscales: restrictive mediation (5 items; e.g., *My parents check my Facebook, WhatsApp or other profiles on other networks*) and instructive mediation (4 items; e.g., *My parents show me how to use the Internet and warn me about its risks*). All items were rated on a scale of *completely disagree* (=0) to *completely agree* (=4). Cronbach's alphas were .82 for restrictive mediation and .82 for instructive mediation. The results obtained in the CFA revealed an acceptable fit: CFI=.97.; TLI=0.96; SRMR=0.03; RMSEA=0.05.

Target suitability. For this element of RAT, the adolescents' private information disclosure was measured by the following four items: *On the Internet, I make my locations public; ...make my mobile phone number public; ...write my accurate home address; and ...post my intimate photos.*³¹ All items were rated on a scale of *never* (=0) to *very frequently* (=4). Cronbach's alpha was .87. The results obtained in the CFA revealed an acceptable fit: CFI=0.99.; TLI=0.98; SRMR=0.01; RMSEA=0.08.

Control variables. Adolescents' age, sex (male versus female), migration background (whether themselves, their mother or father were born in another country), and parental composition (whether they lived with both parents *or* one parent) were used as control variables.

Procedure

In all countries, approval was obtained by the researchers' Institutional Review Board from their respective university and/or educational authorities. Helsinki ethics protocol was followed throughout the conduction of this study.³⁶ To recruit schools, research personnel contacted school principals through emails or calls to discuss the aims of the study and how adolescents could participate. After the classroom announcements, parental permission slips were sent home with adolescents for them to give to their parent(s) or guardian(s). Parental permission slips were then returned to adolescents' classrooms. Data were collected at adolescents' schools during regular school hours. The translation procedure was uniformly regulated. Translation of the original instrument into the target language and then back-translation by another person who had not seen the original questionnaires. The new translation was compared with the original instrument.³⁷

Data Analyses

Correlations, means, and standard deviations were performed for all variables using SPSS. Mediation analysis based on a structural equation modeling was conducted using *Mplus* 8.3 software³⁸ to test the study's hypotheses. Weighted least squares mean and variance-adjusted (WLSMV) estimation was used because items on the cybergrooming questionnaire were ordinal and non-normally distributed.³⁹ To compute the estimates and significance of the indirect effects bootstrapping procedure with 5,000 re-samples was used. The fit of the model was examined by considering the following indices: Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR).⁴⁰ To account for the multilevel structure of the data (i.e., adolescents nested within countries) standard errors were corrected by using the complex sampling option in *Mplus*.⁴⁰ Missing data were dealt with using full information maximum likelihood estimation under the missing at random assumption.⁴¹ Analyses controlled for adolescents' age, sex, migration background, and parental composition.

3 Results

Descriptive statistics and bivariate correlations between the main study variables in the total sample are summarized in Table 1. Table S2 in the Online Supplement provides correlations and descriptive statistics among main study variables by country.

The SEM showed in Figure 1 had an adequate model fit, $\chi^2=406.75$ $df=294$, $p < .001$, CFI=.94, TLI=0.93, RMSEA=0.01, SRMR =0.06; standardized factor loadings ranged between 0.61 to 0.92. Having a PC/laptop had a positive effect on the sexualized communication ($\hat{\beta}=0.08$, $p < .001$) and the sexual requests subscales ($\hat{\beta}=0.07$, $p < .001$). Having Internet access in the one's own bedroom had a positive effect on the sexualized communication ($\hat{\beta}=0.13$, $p < .001$) and the sexual requests subscales ($\hat{\beta}=0.14$, $p=.003$).

Instructive parental mediation had a negative effect on the sexualized communication ($\hat{\beta}=-0.25$, $p < .001$) and sexual requests subscales ($\hat{\beta}=-0.38$, $p < .001$). Restrictive parental mediation had a positive effect on the sexualized communication ($\hat{\beta}=0.15$, $p=.034$) and sexual request subscales ($\hat{\beta}=0.28$, $p < .001$). Online disclosure had a positive effect on the sexualized communication ($\hat{\beta}=0.30$, $p < .001$) and sexual requests subscales ($\hat{\beta}=0.36$, $p < .001$). Furthermore, instructive parental mediation had a negative effect ($\hat{\beta}=-0.47$, $p < .001$) and restrictive parental mediation a positive effect on online disclosure ($\hat{\beta}=0.85$, $p < .001$).

The indirect effect of instructive parental mediation of Internet use on the sexual communication ($\hat{\beta}=-0.23$; $CI_{95\%}=[-0.28, -0.19]$) and the sexual requests subscales ($\hat{\beta}=-0.22$, $CI_{95\%}=[-0.27, -0.18]$) via online disclosure were significant. The indirect effect of restrictive parental mediation of Internet use on the sexual communication ($\hat{\beta}=0.39$, $CI_{95\%}=[0.33, 0.45]$) and the sexual request subscales ($\hat{\beta}=0.37$, $95\% CI_{95\%}=[0.31, 0.44]$) via online disclosure were significant. The proposed model explained 21% of variance in the conversation about personal issues subscale ($R^2=.21$), 28% of variance in the request for sexual material subscale ($R^2=.29$), and 31% of variance in the online disclosure scale ($R^2=.31$).

4 Discussion

The goal of the present study was to apply the RAT to the understanding of cybergrooming victimization among adolescents from six countries. Regarding exposure to motivated offenders, the present study showed a positive relationship between PC/laptop use and Internet access in the bedroom (H1). This finding is in line with past research that showed ICT use and access were related to cybergrooming.¹⁶⁻¹⁸ Since this element of RAT has been measured in the present study in a relatively general manner, it is not surprising that the effects were small. Future research should include more specific variables (i.e., use of online flirting sites, adult chatrooms) to investigate this element.

With respect to capable guardianship, we found support for our prediction that parental mediation would be associated with cybergrooming victimization (H2). This relationship was different depending on the form of parental mediation. Adolescents who reported higher instructive mediation were less likely to experience cybergrooming victimization, while adolescents who reported higher restrictive mediation were more likely to experience cybergrooming victimization. These findings are aligned with other research showing that instructive mediation might be more effective to reduce adolescents' online risks exposure compared to restrictive mediation.^{21,24,25} Furthermore, these findings are in contrast to other studies on restrictive mediation suggesting that this strategy protects adolescents from online risks.^{19,22} To explain these differential associations, research suggests that instructive mediation is positively associated with young people's online opportunities, such as learning, communication, participation, and fun, while restrictive mediation is related with fewer opportunities.¹⁹ Adolescents whose parents utilize instructive mediation might cultivate an understanding of risky online behavior and develop more problem-solving abilities and media skills. This assumption is supported by empirical findings that revealed that instructive mediation is associated with lower risk and harm online and more online skills.^{29,42} In contrast, restrictive parental mediation might not allow adolescents to develop a sense for

dangerous online situations and strategies for dealing with these situations, and thus, these adolescents are at greater risk for cybergrooming victimization. Another explanation might be that restrictive mediation of Internet use might be perceived as a threat of freedom by adolescents, increasing their psychological reactance and leading to undesired behavior.³¹

Another interesting finding was that instructive parental mediation was negatively associated with online disclosure but restrictive parental mediation was positively associated with online disclosure. There is research indicating that instructive mediation decreases the willingness of adolescents to share private information online while restrictive mediation increases it.^{24,33} Children whose parents apply instructive mediation and discuss the use of ICT and potential risk might be more likely to internalize and understand safety recommendation regarding the online disclosure of private information compared with children whose parents apply more control-based (restrictive) mediation strategies without mutual discussion. It might also be that instructive mediation increases adolescents' autonomy and heighten privacy concerns because they might feel more responsibility for and control over their actions.^{22,32} These strategies may then support age appropriate resilience and coping.²⁹

In terms of target suitability, we found support for our hypothesis that online disclosure of private information would be directly related with cybergrooming victimization (H3) which is in line with past research on other forms of cybervictimization.^{23,31,32} The findings support the assumption that adolescents who share more private information online are considered suitable targets by the cybergroomer. In sum, consistent with the RAT, the present study showed that cybergrooming victimization should not be understood as a random occurrence but as a result of exposure to the motivated perpetrator, lack of appropriate guardianship, and adolescents' risky online behavior.

Finally, in line with our expectations, we found that the associations between parental mediation and cybergrooming victimization were mediated via online disclosure (H4). This

result indicates that parents might not only influence their children's risk for cybergrooming victimization directly but also indirectly via their potential influence on their children's online behavior. Future studies that apply RAT should not only investigate direct relationships between the theory's three central elements and form of (cyber-)crime but also indirect associations to understand the interplay of these elements in explaining cybercrime.

Limitations and future directions

Although the present study contributes to the literature, there are several limitations. Due to the cross-sectional nature of the present study, temporal ordering between parental mediation, online disclosure, and cybergrooming victimization cannot be determined. Longitudinal research with at least three measurements is needed to further substantiate the mediating relationships tested in the present study. Furthermore, the data were exclusively collected through self-reports. Therefore, the observed relationships might be inflated due to shared method variance. A multi-informant approach could overcome this limitation. Lastly, although our sample is large, it cannot be considered as representative. Thus, findings should be interpreted with this in mind.

Conclusion and Implications

In sum, the present study confirms the general assumptions of RAT and the usefulness of applying its approach to cybergrooming. That is, cybergrooming victimization should not be understood as a random occurrence but by the product of exposure to the motivated perpetrator, lack of appropriate guardianship, and adolescents' risky online behavior. The present study also showed that guardians might not only directly influence the risk for cybervictimization but also indirectly via target suitability. This finding suggests that complex interrelations between three elements of the RAT should be considered in future research.

The present study suggests that prevention programs against cybergrooming need to decrease exposure to potential offenders, establish capable guardianship, and decrease target suitability. These programs should include parents and their children and aim to empower

both for a safe and responsible use of ICT. To decrease exposure to potential perpetrators, it is important to educate parents and children about age-appropriate ICT use and access, so that ICT are used in a responsible, appropriate way. To increase capable guardianship, it is important to raise awareness about the potential for parental mediation of Internet use to reduce children's risk for cybergrooming victimization. Moreover, parents should be trained to choose instructive (i.e., discussing online risks, surfing the web together, establishing online rules together) over restrictive strategies. Adolescents should be educated on how they can decrease their target suitability by increasing awareness for handling private information online.

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