

## Risk factors for being a victim of online grooming in adolescents

Konstanze Schoeps<sup>1</sup>, Montserrat Peris Hernández<sup>2</sup>, Maite Garaigordobil<sup>2</sup>, and Inmaculada Montoya-Castilla<sup>1</sup>  
<sup>1</sup> Universitat de València, and <sup>2</sup> Universidad del País Vasco

### Abstract

**Background:** The risk of child grooming has spread exponentially with the massive access of adolescents to social networks and the internet. The aim of the study was to examine the personal factors (body self-esteem and disinhibition) and erotic-sexual factors (sexual initiation strategies and erotic-pornographic sexting) that predict grooming. **Method:** The sample was comprised of 1,200 adolescents aged between 12 and 16 years ( $M = 14.54$ ,  $SD = 1.17$ ; 50.83% girls). A cross-sectional design with self-report data was used and structural equation modeling (SEM) with mediation analysis was performed. **Results:** The results indicated two paths explaining child grooming: 1) physical attractiveness and disinhibition are indirectly associated with grooming through erotic sexting and direct sexual initiation strategies; both of which partially mediate this relationship; 2) disinhibited behavior has an indirect impact on grooming; pornographic sexting and coercive strategies acting as mediators. The semi-partial mediation model explains 54% of the variance of grooming. **Conclusions:** These findings highlight the urgent need to implement prevention programs considering these attitudes and behaviors that function as precursors of victimization and the risk of falling into pedophile networks.

**Keywords:** Grooming, sexting, disinhibition, body self-esteem, mediation, adolescents, online harassment.

### Resumen

**Factores de riesgo de ser víctima de online grooming en adolescentes.** **Antecedentes:** el riesgo de grooming se ha propagado exponencialmente con el acceso masivo de los adolescentes a las redes sociales y al Internet. El objetivo del estudio fue conocer los factores personales (autoestima corporal y desinhibición) y los factores erótico-sexuales (estrategias de avance sexual y sexting erótico-pornográfico) que predicen el grooming. **Método:** los participantes fueron 1.200 adolescentes entre 12 y 16 años ( $M = 14.54$ ,  $DT = 1.17$ , 50.83 % chicas). Se utilizó un diseño transversal con datos de auto-informes y se aplicó un modelo de ecuaciones estructurales (SEM) con análisis de mediación. **Resultados:** los resultados indican dos vías para explicar el grooming: 1) el atractivo físico y la desinhibición influyen en el grooming de forma indirecta a través del sexting erótico y las estrategias de avance sexual directas que median parcialmente esta relación; 2) la conducta desinhibida tiene un impacto indirecto sobre el grooming, actuando como mediadores el sexting pornográfico y las estrategias de coerción. El modelo de mediación explica un 54 % de la varianza del grooming. **Conclusiones:** estos resultados nos alertan de la necesidad de implementar programas preventivos considerando estas actitudes y conductas, que funcionan como factores de riesgo de la victimización y de caer en redes pedófilas.

**Palabras clave:** grooming, sexting, desinhibición, autoestima corporal, mediación, adolescentes, acoso online.

The increasing use of information and communication technologies (ICT) and the massive access to social network services (SNS) in twenty-first century society have been transforming social interactions over the past decades. ICTs such as the internet are the ideal platform for pedophile networks to contact minors anonymously and involve them in situations that threaten their sexual indemnity. Child sexual harassment has spread exponentially, for instance exchanging erotic images by webcam, which can later be used for blackmail. Such online risk activities, including sexting, grooming or child prostitution, are a serious concern among parents, educators and mental health professionals (Graciela, Estefenon, & Eisenstein, 2015).

Child grooming refers to a relationship based on trust between a minor and an adult who uses ICTs to solicit and exploit young people

for sexual purposes in a systematic manner (Wachs, Wolf, & Pan, 2012). It often commences with inappropriate sexual behaviour such as sending erotic images or nudity online that increases the likelihood of future sexual abuse (Quayle, Allegro, Hutton, Sheath, & Lööf, 2014). The harassment procedure varies, but usually includes the following phases: a) the adult establishes an emotional bond with the minor; b) gradually obtains their personal and contact information; c) the abuser convinces the minor to undress or perform sexual acts by friendly seduction, flattery, sending gifts, etc.; d) when the victim trusts the abuser, they become more explicit in their intentions, sending pornographic material, asking about their sexual experiences and preferences (McFarlane, Bull, & Reitmeijer, 2000); e) finally, they propose to meet the minor in person, but if they refuse, the abuser might turn to harassment or blackmail. This process may last only minutes, some days, several months or even years (Kopecký & Szotkowski, 2017).

The term *sexting* is a neologism composed of *sex*, which means sexual expressiveness, and *texting*, which refers to sending texts and commenting on photographs or conversations in the SNS, especially through smartphones that have incorporated video-

cameras (Cruz & Soriano, 2014). These pictures show attitudes and recreate erotic situations through posing, clothing, etc. The sexual intensity of such self-portraits and online posts varies from a slightly seductive nuance to a sexually explicit expression. Agustina & Gómez-Durán (2016) differentiate between two types of sexting, *hard* and *soft*, depending on the level of eroticism and/or nudity of the images, which imply new important legal challenges (Gassó, Fernández-Cruz, Montiel, Martín-Fumadó, & Agustina, 2019). In this study the photographs and online posts have been determined erotic sexting and pornographic sexting. Erotic sexting implies a sensual, insinuating, erotic and sexy content, with the aim of causing physical attraction by seduction, arousing desire and being provocative. Pornographic sexting, though, involves publishing photographs with total or partial nudity, being denominated by the adolescents themselves as pornography (Gewirtz-Meydan, Mitchell, & Rothman, 2018).

Given that sexting involves sending photographs, videos, screenshots, etc., the person that *posts* these pictures probably responds to a certain body image that meets the current beauty standards. For women, that means to be thin, and for men, this implies to be muscular. These standards may lead to retouching their self-portraits, showing themselves with the body image that they would like to have, which is the foundation of their body self-esteem (Maganto & Peris, 2013). Body satisfaction refers to the cognitive aspect of body self-esteem, aesthetics or beauty, while body attraction includes the emotional, attractive and seductive aspect of such self-esteem (Peris, Maganto, & Garaigordobil, 2016). Adolescents' body image is strongly influenced by the social media (Kim & Chock, 2015). Studies indicate that SNS users have greater body dissatisfaction and lower physical self-esteem due to social comparisons and comments from other users (Vaquero, Alacid, Muyor, & López-Miñarro, 2013). Girls are especially vulnerable, because their body self-esteem is affected by the aesthetic body model broadcasted by the SNS (Maganto, Garaigordobil, & Kortabarria, 2017).

Another factor that may be related to sexting is disinhibited personality, which involves different behavioral traits such as sensation seeking and impulsivity (Zuckerman, Eysenck, & Eysenck, 1978). Sensation seeking can be conceptualized as the need to experience new, varied and complex situations in order to achieve an optimal level of activation. Impulsivity, though, refers to the behavior based on rapid decision-making and action which reflects a deficiency of planning and carelessness (Zuckerman, 2007). In this study, both sensation seeking and impulsivity are conceived as dimensions of a general behavioral disinhibition trait (Magida, MacLean, & Colder, 2007). Disinhibited adolescents use the SNS to socialize and post original pictures almost uncontrollable and unaware of the impact of their *clicks*. This disinhibited personality trait is common among adolescents and it is linked to poor emotional regulation and lack of control (Van Royen, Poels, & Vandebosch, 2016). The desire to connect is related to the act of opening new pages, entering social networks, inspecting profiles, all happening very fast and without thinking about why they are doing it and whom they may harm (Stanley et al., 2016). Furthermore, young people who are seeking high-risk activities are more motivated to perform sexting because it makes them feel good (Delevi & Weisskirch, 2013). Hence, disinhibition traits may be associated with sexting and grooming behavior (Peris, 2017), which is one of the main interests of the present study.

Regarding adolescents' sexual activities, sexting may precede and elicit sexual relations. Although sexting consists of activities that are carried out in a virtual network, such activities involve sexual and exhibitionist components (Jeffrey, 2015). The study of sexual behavior, such as the sexual advancement strategies (SAS) that adolescents utilize in their relationships, may explain the frequency and type of sexting. There are three different kinds of such strategies: a) direct strategies, which express spontaneous skills and attitudes for inviting sexual intercourse; b) indirect strategies, which *suggest* include seduction and insinuation to achieve the response to sexual desire; and 3) coercive strategies, which aim to attain sexual relations with pressure, coercion and by forcing the partner (Román, 2009).

Sexting has been shown to be associated with behavioral disinhibition traits such as personal and sexual disinhibition (Perkins, Becker, Tehee, & Mackelprang, 2013). Specifically, Houck et al. (2014) observed that engaging in sexual behaviors was a predictor of sexting in adolescents. *Similarly*, Clancy, Klettke, and Hallford (2019) studied sext dissemination, the distribution of received pictures with sexual content over the internet, and their association with sexual behavior, personal attitudes and personality traits. Their findings indicate that being sexually active and normalising the act of sexting can predict engaging in virtual and physical sexual activity.

Body self-esteem, disinhibition and the use of SAS (direct, indirect and coercive) are positively related to sexting (Peris, 2017). Thus, adolescents with higher body self-esteem, send more erotic and pornographic pictures, indicating that the more attractive and satisfied they feel the more they engage in sexting. *Similarly*, sexting, both erotic and pornographic, is associated with disinhibited personality, especially erotic sexting. Furthermore, adolescents who send erotic posts use direct and indirect strategies more often, while coercive strategies are more common among adolescents, who send pornographic pictures.

Body self-esteem, disinhibition, SAS as well as sexting are factors that have an important impact on grooming (Cruz & Soriano, 2014). For instance, sexually disinhibited behaviors may be considered precursors of grooming (Bennet & O'Donohue, 2014). Furthermore, disinhibited adolescents who use direct and coercive sexual strategies and engage in pornographic sexting more often, are more likely to suffer from grooming (Wachs et al., 2012). *Similarly*, the relationship between sexting and grooming has been previously well-established (Gámez-Guadix & Mateos-Pérez, 2019). Wood, Barter, Stanley, Aghatie, and Larkins (2015) studied sexting behaviors from the age of 12, showing that adolescents who reported victimization in their relationships were those who had sent more *sex* posts than those who had not. Undoubtedly, sexting is a new trend among adolescents (Morelli, Bianchi, Biaocco, Pezzuti, & Chirumbolo, 2016) with an increasing risk of multiple online victimization (Montiel, Carbonell, & Pereda, 2016), ignoring the fact that their picture might be captured by pornographic networks (Ioannou, Synnott, Reynolds, & Pearson, 2018). In summary, previous studies point out the positive relationship between sexting and grooming, inferring that the more minors engage in sexting the greater the risk of grooming (Gámez-Guadix & Mateos-Pérez, 2019).

The main objective of the present study was to determine the risk factors of grooming. Studies on online harassment in adolescents are still scarce. Therefore, in this study we analyzed the impact of personal factors (body self-esteem and disinhibition)

and erotic-sexual factors (SAS and erotic-pornographic sexting) on grooming in adolescence. Three hypotheses were established, which are represented in Figure 1:

1) Body self-esteem and disinhibition will be positively associated with sexting and SAS, expecting a stronger association with disinhibition; 2) erotic sexting will be more associated with direct SAS, while pornographic sexting will be more related to coercive SAS; and 3) erotic-sexual variables will have a positive impact on grooming, expecting direct SAS and erotic sexting to have a greater impact.

Method

Participants

According to the Basque Institute of Statistics (eustat), in 2015-2016 the population of secondary school students was 148040. As we chose a confidence level of 95% and a margin of error of 3%, the representative sample size would be 1,060 participants. In this study, a total of 1,200 participants were selected from 16 schools in the Basque Country using the simple random probability sampling method. Students aged between 12 and 16 years ( $M = 14.54$ ,  $SD = 1.17$ ), 610 (50.83%) were girls and 590 (49.17%) were boys. This age range covers the 4-year period of compulsory secondary education (E.S.O.) in Spain with the sample distributed as following: 253 (21.08%) in 1<sup>st</sup> year; 286 (23.83%) in 2<sup>nd</sup> year; 366 (30.50%) in 3<sup>rd</sup> year; and 295 (24.58%) in 4<sup>th</sup> year.

Instruments

The Grooming Scale (Peris & Maganto, 2018) is composed of 13 items that are scored on a 4-point Likert scale from 1 (*never or nothing*) to 4 (*always or a lot*). The scale assesses situations of exhibitionism by personal desire or at the request of adults, and explicit grooming behaviors (e.g. “Have you had conversations over webcam with you or the other person being in underwear?”). Peris

and Maganto (2018) reported satisfactory psychometric properties ( $\alpha = .86$ ). In order to replicate these results, a confirmatory factorial analysis (CFA) was performed. The model fit indices of the unifactorial model were appropriate:  $\chi^2 (65) = 994.19$ ,  $p < .001$ , CFI = .91, TLI = .90. Furthermore, the reliability was satisfactory: Cronbach’s  $\alpha = .86$ ; average variance extracted (AVE) = .61, composite reliability coefficient (CFC) = .95.

The Sexting Scale (Peris & Maganto, 2018) is a 13-item measurement that assesses erotic sexting (9 items; e.g. “I publish pictures of myself in social networks where I look erotic, provocative, insinuating.”) and pornographic sexting (4 items; e.g. “I send pictures to my friends where I am in underwear, with the lower torso naked, etc.”). Participants were asked to indicate on a 4-point Likert scale how often they post erotic messages/pictures online (1 = *never or nothing* and 4 = *always or very much*). The original scale (Peris & Maganto, 2018) offers good psychometric properties, which was also the case in the present study: erotic sexting ( $\alpha = .89$ ; AVE = .41; CFC = .86), and pornographic sexting ( $\alpha = .80$ ; AVE = .24; CFC = .56). The bifactorial structure of the scale was confirmed with CFA, obtaining excellent model fit indices:  $\chi^2 (64) = 903.51$ ,  $p < .001$ , CFI = .97, TLI = .96.

The Body Self-Esteem Scale (EAC, Peris et al., 2016) comprises 26 items assessing two aspects of body self-esteem. The first 20 items are devoted to the cognitive dimension of body self-esteem (body satisfaction; e.g. “I am happy with my mouth, chest, hips, ~~butt~~, etc.”), the last six items refer to the emotional aspect of body self-esteem (body attraction; e.g. “I consider myself physically interesting, socially charming, sexy, attractive, etc.”). The items are scored on a 10-point Likert scale from 1 (*very dissatisfied*) to 10 (*very satisfied*). Adding the scores of each item and dividing them by the number of items calculate the total score. Both subscales range from 1 to 10. Peris et al. (2016) report good reliability for the scale in a Spanish sample. The bifactorial structure, proposed by the authors, was tested. Therefore, CFA was carried out, eliminating eleven items with low saturation ( $< .40$ ), which provided a satisfactory fit with the data:  $\chi^2 (89) = 663.51$ ,  $p < .001$ ,

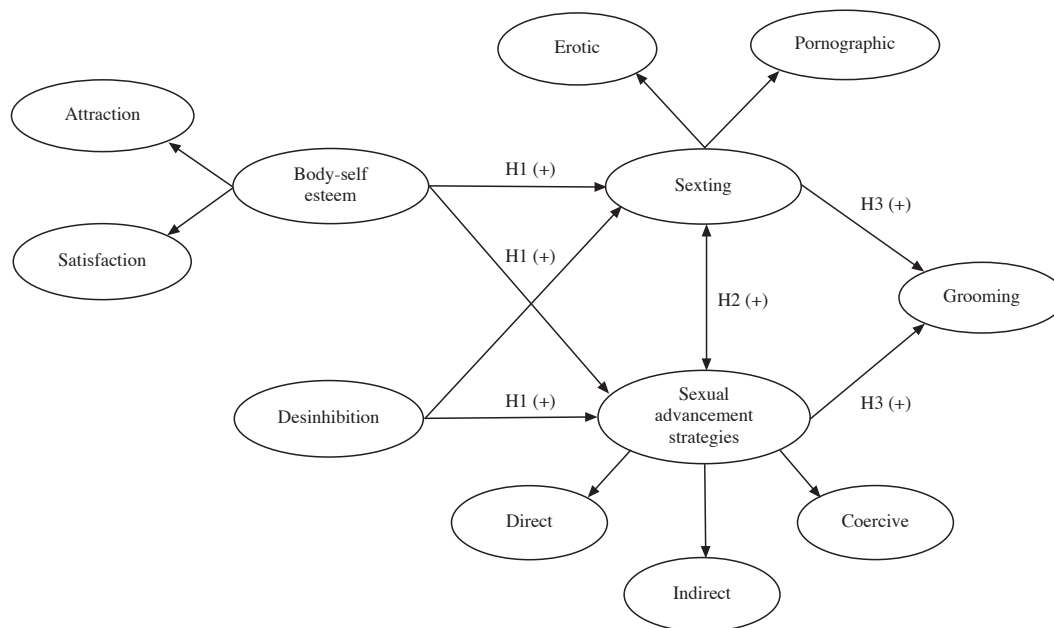


Figure 1. Theoretical research model

CFI = .91, TLI = .90, RMSEA = .07. The reliability indices based on the sample from this study were excellent: body satisfaction ( $\alpha = .91$ ; AVE = .51; CFC = .97), body attraction ( $\alpha = .88$ ; AVE = .67; CFC = .89).

The Sexual Advancement Strategies Questionnaire (SAS, Román, 2009) assesses three types of the most commonly used SAS among adolescents and young people: direct, indirect and coercive strategies. All 22 items are scored on a 5-point Likert scale from 1 (*never*) to 5 (*more than 10 times*). The reliability indices provided by Peris (2017) were adequate. CFA was performed, indicating satisfactory model fit indices:  $\chi^2(167) = 973.79$ ,  $p < .001$ , CFI = .97, TLI = .96, RMSEA = .06, which confirms the original three-factors structure. The questionnaire showed good reliability in this study: direct SAS ( $\alpha = .90$ ; AVE = .71; CFC = .98), indirect SAS ( $\alpha = .78$ ; AVE = .59; CFC = .85), and coercive SAS ( $\alpha = .83$ ; AVE = .71; CFC = .97).

Disinhibition was assessed using the Sensation Search Scale (EBS-Q, Zuckerman et al., 1978; Spanish adaptation: Pérez & Torrubia, 1986). The scale consists of 40 items that the participant answers affirmatively (1) or negatively (0). From the 4 subscales with 10 items each, only the subscale of disinhibition has been selected because its content is most related to risk behavior and sexual harassment. Pérez and Torrubia (1986) reported good reliability for this scale ( $\alpha$  between .73 and .76), which was also found in this study:  $\alpha = .72$ , AVE = .28, and CFC = .79. Before conducting CFA, all items have been reviewed carefully and those items, which propose inappropriate behaviors for adolescents have been eliminated. The data fit the reviewed model satisfactorily:  $\chi^2(9) = 55.64$ ,  $p < .001$ , CFI = .96, TLI = .94, RMSEA = .06.

### Procedure

The data were collected according to the standards of the Declaration of Helsinki (World Medical Association, 2013), with the approval of the Ethics Committee for Research with Human Beings of the University of the Basque Country. Permits and written informed consents were requested from the school principals, parents and legal guardians, as well as from the students. Participants were informed about the purpose of the study before the application of the questionnaires; the sincerity and confidentiality of their responses were stressed. The students received no financial or academic compensation for their participation in the study. The assessment was carried out in the classrooms during school hours with a duration time of approximately 55 minutes. They all reported daily use of the internet and SNS.

### Data analysis

Data is analyzed in four steps: (a) confirmatory factorial analysis (CFA) with the maximum likelihood (MLR) estimator for continuous data and the weighted least square mean and variance adjusted (WLSMV) estimator for ordinal data, to ensure that the instruments are suitable for the sample under study; (b) analysis of the reliability of the instruments, using the Cronbach alpha coefficient ( $\alpha$ ), average variance extracted (AVE), composite reliability coefficient (CFC); (c) analysis of Pearson's bivariate correlations between the variables of interest, and (d) models of structural equations (SEM) with mediation analysis. To assess how the data fit the proposed models, five main indices recommended

by the literature are used: the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residuals (SRMR), and the Robust Chi-Square Test of Model Fit  $\chi^2$  (Kline, 2016). The statistical package Mplus 8 (Muthén & Muthén, 2017) is used to estimate the structural models with the WLSMV estimator for non-normal data (MacKinnon, 2008). Furthermore, SEM with successive mediating effects are estimated (Figure 2). In the first unrestricted model, the mediation is assumed to be partial. This is, the model includes direct effects from body self-esteem and disinhibition to sexual advancement strategies and grooming, as well as from erotic and pornographic sexting to grooming. In addition, indirect paths from personal variables (body self-esteem and disinhibition) to grooming through erotic-sexual variables (SAS and sexting) are estimated. In the second semi-restricted model, a semi-partial mediation model was applied, which considers no direct relations between the exogenous factors (body self-esteem and disinhibition) and the final result (grooming). The third fully-restricted model suggests a total mediation since all the effects of personal variables on grooming are indirect through erotic-sexual variables. Mplus code for Chi-Square Difference Tests was used to compare the subsequent mediation models in order to find the most parsimonious model with the best fitting solution (Bryant & Satorra, 2012). The procedure of handling the missing data within the structural models is carried out by means of full information maximum likelihood (FIML). The results of the study are presented following the standards proposed by the American Association of Psychology (APA) for quantitative research in psychology (Appelbaum et al., 2018)

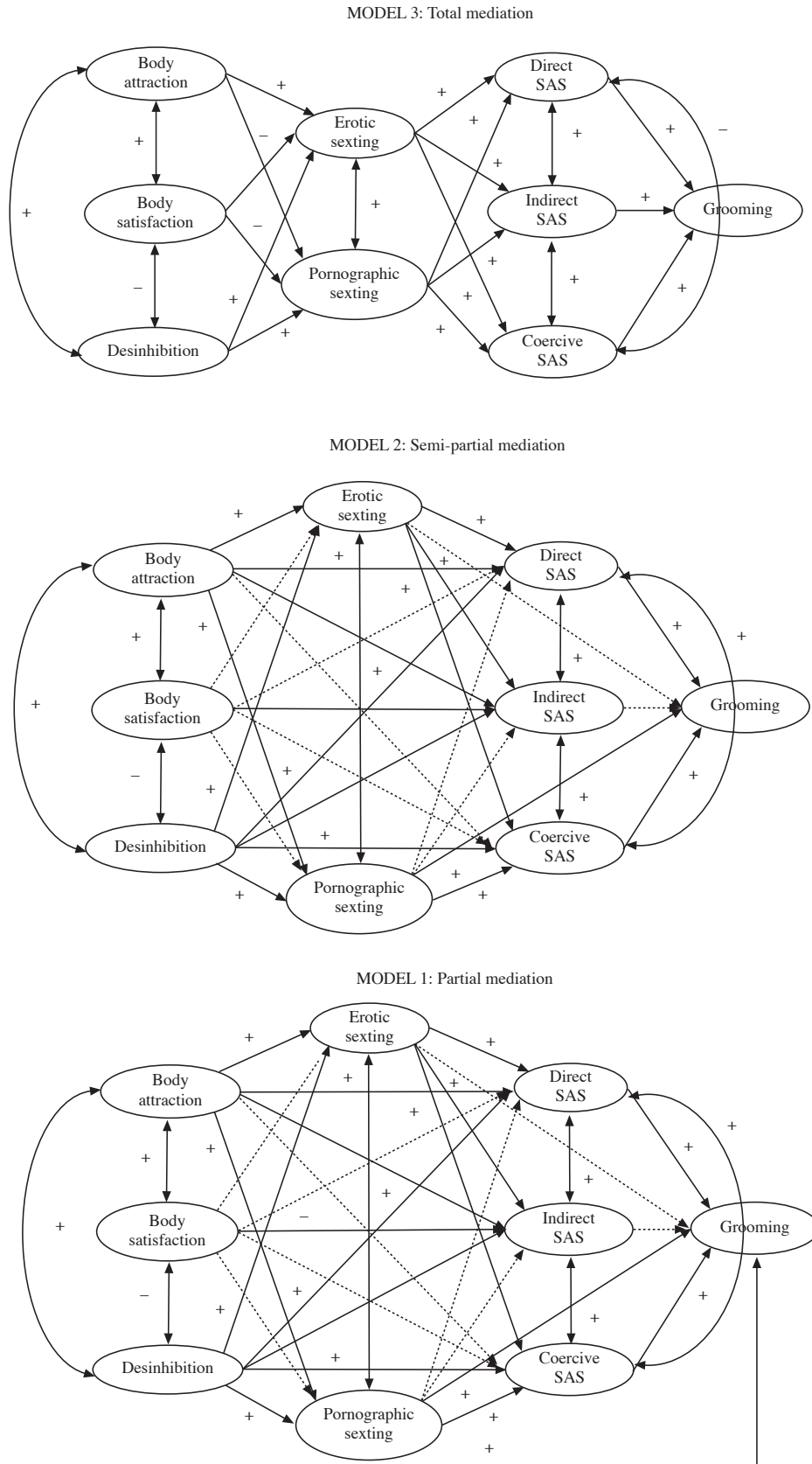
### Results

#### *Associations between the variables of interest*

Descriptive statistics for asymmetry and kurtosis (Table 1) were within an acceptable range of  $\pm 2$ , indicating normal distribution of variables (Gravetter & Wallnau, 2014), except for pornographic sexting and coercive SAS. According to the results presented in Table 2, grooming is statistically significant related to all personal and erotic-sexual variables, and these relationships are positive, except for body satisfaction. In terms of body self-esteem, physical attractiveness and body satisfaction are positively and significantly related. The positive relationships between physical attractiveness and all the variables studied should also be highlighted, while body satisfaction appears positive and significantly associated with erotic sexting and negatively and to a lesser extent with disinhibition. As for erotic-sexual variables, positive relations are observed between erotic-pornographic sexting and all SAS (direct, indirect and coercive strategies).

#### *Predicting grooming*

The first model of partial mediation, including both direct and indirect effects, is tested and acceptable model fit indices is obtained:  $\chi^2(2108) = 4766.38$ ,  $p < .05$ , CFI = .94, TLI = .94, RMSEA = .03, WRMR = .160. The second model of semi-partial mediation, which assumes less direct effects than the first model, is applied and fits the data better  $\chi^2(2111) = 4751.17$ ,  $p < .05$ , CFI = .94, TLI = .94, RMSEA = .03, WRMR = .161. This semi-partial mediation model is compared to the less restricted partial



**Figure 2.** Tested structural models: Partial mediation (1), semi-partial mediation (2) and total mediation (3). Note. Continuous pathways are significant at  $p < .01$ , dotted pathways are not significant. The relationships of the factors with their indicators have not been drawn for simplicity

**Table 1**  
Descriptive statistics

	Range	M (SD)	Skewness (SE)	Kurtosis (SE)
Body satisfaction	1 - 10	6.76 (1.33)	-0.25 (0.07)	0.02 (0.14)
Body attraction	1 - 10	6.18 (1.66)	-0.41 (0.07)	0.01 (0.14)
Desinhibition	10 - 20	14.35 (2.31)	0.07 (0.07)	-0.61 (0.14)
Erotic sexting	9 - 36	17.16 (5.42)	0.58 (0.07)	0.04 (0.14)
Pornographic sexting	4 - 16	4.62 (1.51)	3.73 (0.07)	17.21 (0.14)
Direct SAS	9 - 45	21.05 (9.18)	0.71 (0.07)	-0.40 (0.14)
Indirect SAS	7 - 35	15.72 (6.45)	0.63 (0.07)	-0.31 (0.14)
Coercive SAS	7 - 35	8.18 (2.87)	3.92 (0.07)	19.70 (0.14)
Grooming	13 - 52	17.25 (5.30)	2.19 (0.07)	6.21 (0.14)

Note: M = Mean. SD = Standard deviation. SE = Standard error. SAS = Sexual advancement strategies  
\*  $p < .05$ ; \*\*  $p < .01$

**Table 2**  
Bivariate correlations among variables

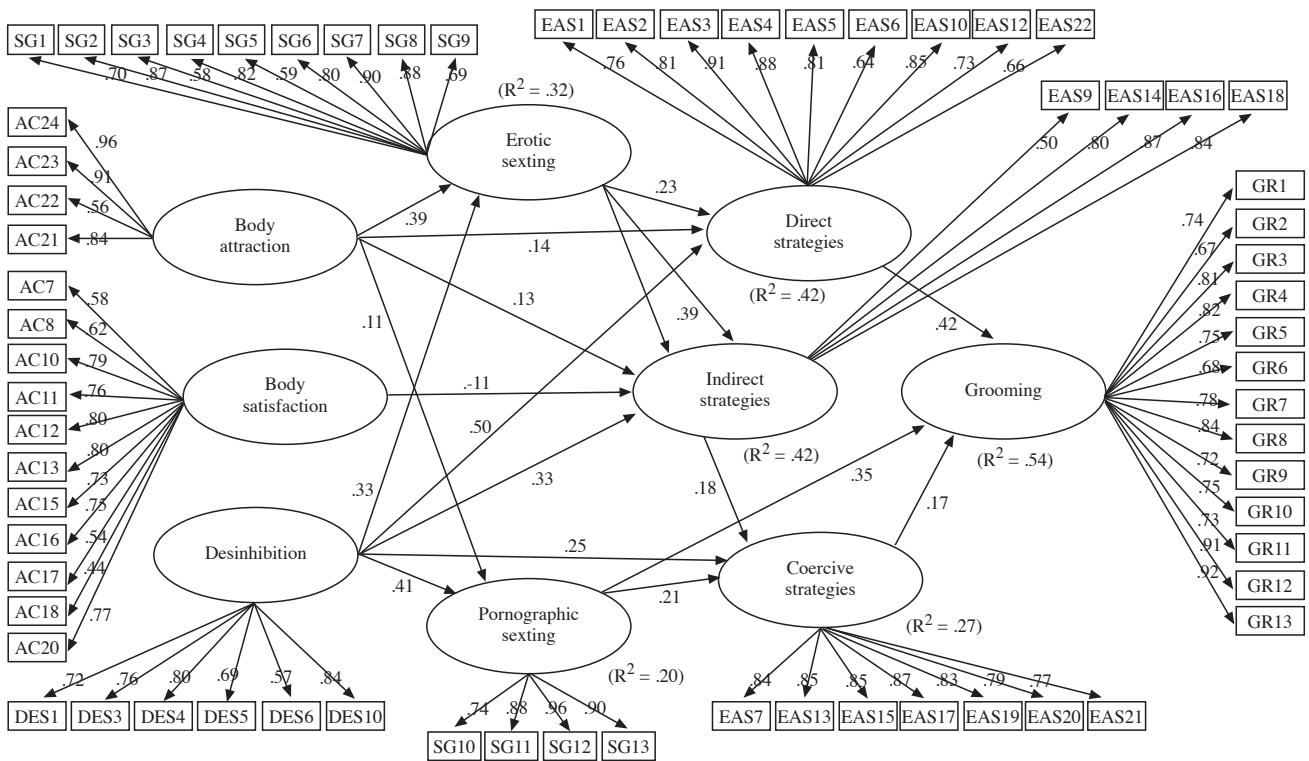
	1	2	3	4	5	6	7	8	9
1. Body satisfaction	-								
2. Body attraction	.71**	-							
3. Desinhibition	-.09*	.15**	-						
4. Erotic sexting	.23**	.47**	.39**	-					
5. Pornographic sexting	.04	.18**	.41**	.53**	-				
6. Direct SAS	.04	.26**	.58**	.45**	.34**	-			
7. Indirect SAS	.04	.30**	.52**	.55**	.38**	.82**	-		
8. coercive SAS	.04	.16**	.40**	.39**	.45**	.50**	.57**	-	
9. Grooming	.02	.23**	.53**	.48**	.49**	.60**	.58**	.53**	-

Note: SAS = Sexual advancement strategies  
\*  $p < .05$ ; \*\*  $p < .01$

mediation model by means of Chi square difference test ( $\chi^2 (3) = 12.53, p = .057$ ). The non-significant  $p$ -value indicates that the semi-partial model is favored to the partial mediation. The third model of total mediation, including only indirect effects, is tested, but the fit of the model does not improve:  $\chi^2 (2122) = 5215.89, p < .05, CFI = .93, TLI = .93, RMSEA = .04, WRMR = .177$ . This time, the difference test is used to compare the semi-partial with the most restricted total mediation model and the test reaches significance ( $\chi^2 (11) = 178.78, p < .001$ ), which means that the full mediation model fits the data worse than the semi-partial model. Finally, on the semi-partial mediation model of best fit the paths that are not statistically significant are eliminated, in order to

generate a more parsimonious model, which leads to a good fit of the model to the data:  $\chi^2 (2119) = 4650.05, p < .05, CFI = .94, TLI = .94, RMSEA = .03, WRMR = .162$ .

As Figure 3 shows, the saturations of the indicators for all factors are high (>.50), except in body satisfaction where there is an indicator with a lower value (.44). The results of this model show that the direct effect of erotic-sexual variables (sexting and SAS) and the indirect effect through personal variables (physical attractiveness and disinhibition) explain 54% of the variance of grooming. Body satisfaction shows no indirect effect on grooming.



**Figure 3.** Standardized solution for the tested structural model.

Note: All relationships shown are significant with  $p < .01$ . The correlations between the factors at the same level have not been drawn for simplicity

Other important results are, for instance, that physical attractiveness and disinhibition explain 32% of the variance of erotic sexting and 20% of pornographic sexting. Similarly, 42% of the variance of direct SAS is explained through erotic-pornographic sexting, disinhibition and physical attraction, but not body satisfaction; 42% of the variance of indirect strategies is explained by erotic-pornographic sexting, global body self-esteem and disinhibition; and 27% of the variance of coercive strategies is explained by erotic-pornographic sexting and disinhibition.

## Discussion

The literature evidences the risks of online erotic behaviors, especially grooming (Graciela et al., 2015); therefore it is important to acknowledge their relationship with adolescents' personal factors (body self-esteem and disinhibition) and erotic-sexual factors (sexual advancement strategies and erotic-pornographic sexting). The main objective of this study was to predict grooming behavior based on adolescents' self-esteem and disinhibition, mediated by their use of sexting and sexual advancement strategies (SAS).

The results confirm that physical attractiveness and disinhibition are positively related to erotic-pornographic sexting, while the relationship with body satisfaction was not significant. Thus, disinhibited teenagers with a physically attractive body image send more erotic pictures over SNS. These results are in line with previous studies that indicate that the higher levels of physical attractiveness are associated with increased incidence of sexting (Gassó et al., 2019). However, Vaquero et al. (2013) suggest that the use of SNS is related to more social comparisons between adolescents and lower body satisfaction, which could lead to the conclusion that they would perform less sexting. Maganto and Peris (2013) argue that these peer comparisons rather motivate to adjusting the aesthetic body model, or "retouching" the photographs posted online, but not necessarily a decrease of the act of sexting.

Our results also corroborate those of Stanley et al. (2016) who report that disinhibited adolescents use SNS daringly, clicking and sending erotic pictures without any kind of cognitive or emotional regulation regarding the consequences. Similar results were found by Delevi and Weisskirch (2013), affirming that disinhibited teenagers are impulsive and perform more sexting behavior.

With regard to the relationship between personal factors and adolescents' sexual abilities, physical attractiveness is positively related to direct and indirect SASs for initiating a sexual relationship, while body satisfaction is negatively associated with indirect strategies. Disinhibition has a positive impact on all three types of SAS. These results confirm the hypothesis that disinhibition is more relevant than other personal characteristics, which has been confirmed by previous studies (Jeffrey, 2015). Stressing the direct effect on sexual behaviour, and the indirect effect through erotic sexting on direct strategies, as well as the indirect effect on coercion strategies, with pornographic sexting acting as a mediator.

According to the second hypothesis, erotic sexting was expected to be more associated with the use of direct SASs, while pornographic sexting was expected to be more related to coercive SASs, which was fully verified. Our findings indicate different erotic patterns in adolescents: those who engage in mild sexting, show more seductive and suggestive sexual behaviors, while teenagers who engage in hard sexting, often use blackmail

or physical force in their sexual relationships. The only study that broaches the relationship of erotic and pornographic sexting behaviors with SAS is Peris (2017), due to the novelty of the issue and the lack of research on this very specific association. Agustina and Gómez-Durán (2016) agree that no study has taken into consideration the difference between hard sexting and soft sexting so far, but recognize that the structural characteristics of cyberspace increase the likelihood that SNS users will engage in risk behaviors and may end up being cybervictimised.

Finally, erotic-sexual variables were expected to have a direct and indirect impact on grooming. Our results indicate that erotic sexting does not have a direct effect, but an indirect effect on grooming through the use of direct SAS. In contrast, pornographic sexting has both a direct and indirect effect through coercive strategies on grooming behavior. Seemingly, there are multiple risks and multiple pathways to grooming behaviors: 1) physical attractiveness and disinhibition influence grooming indirectly through erotic sexting and direct SAS that partially mediate this relationship; and 2) disinhibited behavior has an indirect impact on grooming, with pornographic sexting and coercion strategies acting as mediators. Both pathways represent inappropriate behaviors that are usually the early indicators of victimization, following the results obtained by Bennet and O'Donohue (2014). These risk behaviors, especially disinhibition, when mediated by erotic or pornographic sexting, increase the probability of suffering grooming, considering such exhibitionist behaviors elicitors of grooming (Peris, 2017). Thus, disinhibited adolescents, who engage in more direct or coercive sexual contacts, practice more pornographic sexting (Perkins et al., 2013) and consequently suffer more grooming.

The process of grooming requires disinhibited and sexually exhibitionist behavior, such as showing genitals and masturbating in front of the camera, having erotic conversations in underwear with another person, sending and receiving text messages and pictures with insinuating and erotic content. Regarding the specific risk factors of grooming, those include behavioral disinhibition traits and the sexual advancement strategies, sometimes coercive, which may be preceded by the posts of "hard" or pornographic selfies. Understanding these predicting pathways of grooming allows for a more successful intervention (Ioannou et al., 2018).

This study makes a unique contribution to the literature on online grooming by providing evidence regarding the predictive capacity of personal and erotic-pornographic variables. Given that physical attractiveness and disinhibition are predictive variables of online victimization, it seems necessary to consider the promotion of cognitive and socio-emotional self-esteem in addition to body self-esteem. Furthermore, developing emotional regulation capacities in the face of impulsivity and erotic disinhibition might be an excellent prevention strategy. Future studies should investigate whether internet addiction affects erotic risks, as well as whether parental supervision and monitoring of online activities are protective strategies against these risks.

In addition, our findings warn about the need for prevention programs that inform about the negative consequences when sending erotic pictures impulsively and the risk of falling into pedophile networks and victimization. Cyberbullying is sometimes initiated by capturing these pictures, which are later used for mockery and humiliation among peers. It is surprising that teenagers use coercive sexual advancement strategies, which might explain the high number of sexual assaults that we witness on a daily basis. Indeed, sexual education based on

respect, intimacy, and self-care is necessary. Hence, prevention programs should provide specific information to students, parents and teachers about the correct use of SNS and the risks of online sexual behaviors where pornography targets teenagers. Such programs should include the consequences of disinhibition and early sexualization, as well as detailed information on the most common sexual crimes among adolescents. Their agenda should also include the advantages of appropriate, constructive and effective use of social networks and the internet in the different areas of their daily lives. Sexual education should, therefore, be taught all school long and not at a particular moment, but adapted to each age group and developmental stage.

Despite the novelty of the study results, these cannot be interpreted without considering some limitations. First, the data have been obtained in a sample of the Basque Country only and although it is representative for this Autonomous Community, it is not so for the entire Spanish territory. Future research could extend the sample to other national regions and cultural contexts. Second,

the data were collected through self-reports, thus, including objective measures, such as time and frequency of SNS use, is also recommended. Third, the design of the study was cross-sectional, which does not allow assuming cause-effect relationships between the studied variables. Longitudinal data are needed to establish causality relationships. Finally, the statistical analyses used in this study are one possibility among many, and other models capable of contributing new explanations of the grooming process and its predictors can be analyzed. Given the lack of literature on this novel phenomenon, more studies are needed to confirm the hypothetical model proposed here within and outside the socio-cultural context.

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