

Sexting, Age and Digital Vulnerabilities

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ABSTRACT

Despite popular misconception, it is not only young people that are sharing nude pictures and videos. There are a number of studies targeted towards the younger generation about their sexting, but few on older age-groups. In general, younger people take more risk than older people, and some seem to care less about possible negative consequences. For this study we commissioned a market research company to collect data from a national population, with a representative sample from 16 to 69 years old, in total 1071 citizens. We used binary logistic regression for the analysis of responses, a method that can be used to predict a categorical dependent variable – in our case whether a person has been sexting the last 12 months or not. In the study we included the following independent variables: gender, education, self-efficacy; the cognitive reflection test (CRT) to distinguish between a intuitive versus analytical decision style; Machiavellianism, to distinguish a personality trait characterized by manipulateness and deceitfulness; willingness to share personal data, and finally whether the citizens had experience of ID-theft or credit-card misuse within the previous 12 months. Our results show that the ID-theft/credit-card variable was a significant predictor of sexting for the age-groups 16-29, 30-39 and 50-69 years old. For youngest group, the manipulateness and deceitfulness trait is also a predictor, whereas for the oldest group, the intuitive decision style and a high willingness to share personal data are also significant predictors.

Keywords: Sexting, Digital vulnerability, Personal traits, The cognitive reflection test, Willingness to share personal data

INTRODUCTION

Sexting involves the sharing of nude images of others, or of oneself alone, or together with others (Reyns 2014). Barrense-Dias et al. (2017) distinguish between passive and active sexting, but there is no clear definition of the two, whilst Dodaj and Sesar (2020) identified four forms of sexting: relational, reactive, forced and violent. Dir et al.'s (2013) results showed that higher frequency of sexting was positively related to impulsive behaviour (sensation seeking and negative urgency). Machimbarrena et al. (2018) have shown many potential negative consequences. Although sexting can be a means of flirting or enhancing a sexual relationship it can highlight potential vulnerabilities to victimisation (Cooper, 2016). March and Wagstaff (2017) included the “dark triad” of Machiavellianism, narcissism, and psychopathy in their study of sexting.

While many studies of sexting are only about social and psychological vulnerabilities, our study includes two personality traits, and the willingness to share personal data and financial vulnerability such as ID-theft. Individuals that have experienced ID-theft, debit or credit-card misuse might share some similarities with those who engage in sexting. A question that intrigues us relates to whether a person who has recently been sexting is more likely to experience ID-theft or credit-card misuse or vice versa. We have used a survey to investigate this phenomenon. While some respondents will give socially desirable answers, others are not concerned by the information they reveal. Studies on the survey's method (Krosnick, 1991; MacKenzie and Podsakoff, 2012) show that we cannot always assume honest and correct answers. For the questions about ID-theft and credit-card misuse, we asked the respondents to tell us about what happened to them. Most of the respondents did give us the additional information of the incidents. We therefore believe that the answers to this question is reasonably accurate. For the other questions, the personal trait and the sexting vs has not-been-sexting questions, we do not have additional information that can be used to evaluate level of honesty. In general, this type of survey is used for statistical purposes, such as those carried out by Eurostat (European Union, 2017).

For this paper we formulated two research questions: to what extent can sexting be predicted by intuitiveness, the willingness to share personal data, experience of ID-theft or credit-card misuse, or demographical variables? Secondly, which of these variables are the best predictors, if any, of sexting?

A NATIONAL SURVEY ABOUT ONLINE BEHAVIOUR

Professional market research companies recruit individuals that can participate in surveys. Sometimes market research companies use the term 'panels' to indicate that the company has a database with contact information. Our participants were members of a large national panel of Norwegian citizens. For each survey, panel-members with demographic characteristics similar to the actual population are invited to participate. Often, for Norway, the size of the sample is set to approximately 1000 to get a representative sample. It does not mean that the results are accurate or represent a good prediction every time, but over time with this sample size and method of recruiting respondents, reliable results can be assumed.

We commissioned the market research company Norstar AS to collect data from the Norwegian national population, with a representative sample aged from 16 to 69 years old, in total 1071 citizens. To characterise our participants, we present their demographic profile in Table 1 and Table 2 for the four age-groups that we use in our analysis. The demographic profile our participants are:

Table 1. Gender and the age profile of the participants.

	16-29 years N = 201	30-39 years N = 281	40-49 years N = 200	50-69 years N = 389
Male (N = 514)	40%	48%	48%	52%
Female (N = 557)	60%	52%	52%	48%

Table 2. Educational profile of the participants.

	Primary or secondary education	Bachelor degree (or equivalent)	Higher degree (Master or higher)
19-29 years, N = 201			
Male	80%	16%	4%
Female	70%	18%	12%
30-39 years, N = 281			
Male	47%	25%	28%
Female	27%	32%	42%
40-49 years, N = 200			
Male	47%	26%	27%
Female	30%	31%	39%
50-69 years, N = 389			
Male	47%	27%	27%
Female	39%	32%	29%

The survey was filled in by the respondent on either a PC, a tablet or a mobile phone. For this study our response variable is whether the citizen has shared nude pictures or videos of themselves or of others, or both them and others. This method is a self-reported measurement, therefore we cannot test whether or not the respondents are actually telling the truth. In general, for large scale survey by market research companies we assume that data is reliable. For some, and we speculate that it could be the case for individuals in the oldest age-groups, this type of behaviour is not socially acceptable and, in many cases, criminal behaviour.

THE MEASUREMENTS IN THE STUDY

The respondents answered questions about whether they personally had experienced ID-theft or credit-card misuse within the last 12 months. Individual Machiavellianism was measured with the trimmed MACH-IV (Rauthmann, 2013; Christie & Geis, 1970) a 5-item Likert scale where participants respond to statements such as “Anyone who completely trusts anyone is asking for trouble”. For self-efficacy, we used 3 items from the Psychological Capital Questionnaire (Luthans, Youssef et al., 2007). For ID-theft and credit-card misuse, the questions were identical to the questions used in surveys by the national bureau of statistics in Norway and the Eurostat-survey on European attitudes toward cyber security.

The Cognitive Reflection Test (Frederick, 2005) has IQ-type questions with either a correct or an incorrect answer. It can be used to assess

participants thinking styles, described as intuitive versus analytical. In the survey, the respondents were asked to answer four numerical CRT-questions, three drawn from Frederick (2005) and a question about the number of pupils in a class (Toplak, 2014). Furthermore, we include a consent-test (Tjostheim and Waterworth, 2020), which is a behavioural measure concerning disclosure of personal data and demographics. In the consent test, we asked the participants to give us access to all their personal data that the market research company already had in their database, as such access is not otherwise allowed under the contract agreed between the panel members and the market research company. Although some respondents gave consent, we did not actually receive the data from the marker research company, but a yes-answer indicates a high willingness to share personal data.

Table 3. Descriptive statistics of the variables and measurements (N = 1071).

	Min	Max	Mean	SD	Skewness	Kurtosis
Gender, Male-female	1	2	1.52	0.500	-0.08	-1.997
Education	1	3	1.82	0.835	0.373	-1.468
Data-disclosure (binary)	1	2	1.67	0.470	-0.735	-1.462
Sharing nudes (binary)	1	2	1.12	0.327	2.322	3.398
ID-theft, Credit-card misuse (binary)	1	2	1.15	0.361	1.919	1.686
CRT	1	4	1.48	1.053	0.198	-1.003
Self-efficacy	1	3	2.11	0.842	-0.209	-1.559
Machiavellianism	1	5	2.37	1.051	0.714	0.095

Table 3 shows descriptive statistics of all 8 variables. Kurtosis indicates the extent to which a distribution of scores is relatively flat or relatively peaked. Skewness indicates the extent to which scores have a tendency toward the upper or lower end of a distribution. There is a skewness problem if the result is greater than ± 2.0 , which is the case for the variable 'sharing nudes', where both skewness and kurtosis are peaked. In total, across all age-groups, 12% reported that they had sexted in one form or other. This means that it a small group, and in our analysis it is used as the dependent variable, and not together with other independent variables. The following table shows the percentages.

Table 4. Percentages that have shared nude pictures or videos - the four age-groups.

	16-29 years	30-39 years	40-49 years	50-69 years
Male	24%	15%	16%	6%
Female	23%	12%	14%	2%
All	23%	14%	15%	4%

Table 4 shows that there are differences between three of the four age-groups. For the intervals 30–39 and 40–49, there is no difference. An argument for analysing age-groups separately and not all age-groups together, is differences in sharing-frequency between the groups.

The Analysis With Binary Logistics

Binary logistic regression is a form of regression analysis. The dependent variable is a dichotomy variable coded as 0 or 1. The independent variables can be of any type, for instance continuous and categorical variables. The four age-group intervals are analysed as separate models.

We first report the four models' statistical summaries that include the Hosmer-Lemeshow test (Archer et al., 2007) with the threshold criteria of > 0.05 . The Hosmer-Lemeshow test is often used as a goodness of fit test.

Table 5. Model summaries, the final model for each of the four age-groups.

Age-group 16–29 years - Model 1 summary			
-2 Log likelihood		Cox and Snell R square	Nagelkerke R square
Step 5	208.210	0.51	0.076
Hosmer and Lemeshow Test			
Chi-square		df	Sig.
Step 5	2.990	4	0.560
Age-group 30–39 years - Model 2 summary			
-2 Log likelihood		Cox and Snell R square	Nagelkerke R square
Step 6	213.327	0.22	0.041
Hosmer and Lemeshow Test			
Chi-square		df	Sig.
Step 6	0.926	4	0.921
Age-group 40–49 years - Model 3 summary			
-2 Log likelihood		Cox and Snell R square	Nagelkerke R square
Step 7	158.856	0.033	0.059
Hosmer and Lemeshow Test			
Chi-square		df	Sig.
Step 7	0.618	1	0.432
Age-group 50–69 years - Model 4 summary			
-2 Log likelihood		Cox and Snell R square	Nagelkerke R square
Step 5	110.464	0.057	0.198
Hosmer and Lemeshow Test			
Chi-square		df	Sig.
Step 5	4.724	7	0.694

The Wald statistic (Hosmer and Lemeshow, 1989) is used to identify the significant variables in each of the four models. This is the square of the t-statistic and gives equivalent results for a single parameter. It can be used to test the significance of particular predictors in a statistical model. We chose

backward Wald for selecting how independent variables are entered into the analysis. With backward Wald, all the predictor variables chosen are added into the model, and those variables that do not (significantly) predict anything on the dependent measure are removed, one by one, from the model.

In Table 6 we present step 1 in the binary logistic regression analyses that includes all independent variables.

Table 6. Descriptive statistics of the variables and measurements in step 1.

Variable code:	Beta est.	SE	Wald	df	Sign.	Exp (B)
Gender: Female = 0, Male = 1						
Age 16–29	–0.035	0.369	0.009	1	0.924	0.966
Age 30–39	0.059	0.384	0.492	1	0.483	0.857
Age 40–49	0.077	0.440	0.031	1	0.861	1.080
Age 50–69	1.066	0.679	2.468	1	0.116	2.904
Education: three levels (primary, bachelor, master)						
Age 16–29	–0.046	0.310	0.022	1	0.881	0.955
Age 30–39	–0.154	0.220	0.492	1	0.483	0.857
Age 40–49	–0.897	0.311	8.326	1	0.004	0.408
Age 50–69	0.219	0.351	0.390	1	0.532	1.245
Data-disclosure (consent): No = 0, Yes = 1						
Age 16–29	0.124	0.359	0.120	1	0.729	1.132
Age 30–39	0.321	0.380	0.715	1	0.086	0.273
Age 40–49	0.653	0.443	2.174	1	0.140	1.921
Age 50–69	1.179	0.559	4.459	1	0.035	3.252
ID-theft and/or Credit-card misuse: No = 0, Yes = 1						
Age 16–29	0.837	0.417	4.032	1	0.045	2.309
Age 30–39	–1.300	0.758	2.941	1	0.086	0.273
Age 40–49	0.094	0.530	0.032	1	0.859	1.099
Age 50–69	1.894	0.588	10.379	1	0.001	6.644
CRT: all wrong, one correct, two correct, three correct, all four correct						
Age 16–29	0.276	0.157	3.093	1	0.79	1.318
Age 30–39	–0.108	0.185	0.339	1	0.560	0.898
Age 40–49	0.128	0.221	0.338	1	0.561	1.137
Age 50–69	0.694	0.295	5.526	1	0.019	2.002
Self-efficacy, low, medium, high						
Age 16–29	–0.200	0.210	0.913	1	0.339	0.819
Age 30–39	0.263	0.223	1.391	1	0.238	1.300
Age 40–49	0.191	0.254	0.563	1	0.453	1.210
Age 50–69	–0.181	0.323	0.312	1	0.587	0.835
Machiavellianism, from low to high, 1 to 5						
Age 16–29	0.276	0.157	3.093	1	0.079	1.318
Age 30–39	0.198	0.150	1.732	1	0.188	1.219
Age 40–49	–0.266	0.172	2.407	1	0.121	0.766
Age 50–69	–0.101	0.295	0.116	1	0.733	0.904

In reviewing the numbers in step 1, a high Wald-score is an indication of the final model, of what can be expected. In the final step, only the significant predictors (<0.1) remain.

Table 7. Descriptive statistics of the variables and measurements in step 1.

Variable code:	Beta est.	SE	Wald	df	Sign.	Exp (B)
Age 16–29 years						
ID-theft and/or Credit-card misuse: No = 0, Yes = 1	0.857	0.407	4.438	1	0.035	2.356
Machiavellianism, 1 to 5	0.327	0.151	4.681	1	0.031	1.387
Constant	-2.224	0.445	24.959	1	<0.001	1.080
Age 30–39						
ID-theft and/or Credit-card misuse: No = 0, Yes = 1	-1.236	0.750	2.715	1	0.099	0.291
Machiavellianism, 1 to 5	0.236	0.141	2.795	1	0.095	1.266
Constant	-2.426	0.465	27.208	1	<0.001	0.088
Age 40–49 years						
Education: three levels (primary, bachelor, master)	-0.650	0.263	6.108	1	0.013	0.522
Constant	-0.608	0.477	1.626	1	0.202	0.544
Age 50–69 years						
ID-theft and/or Credit-card misuse: No = 0, Yes = 1	1.968	0.574	11.757	1	<0.001	7.154
Data-disclosure (consent): No = 0, Yes = 1	1.233	0.550	5.027	1	0.025	3.433
CRT: all wrong to all correct	0.798	0.286	7.803	1	0.005	2.221
Constant	-5.646	0.818	47.632	1	<0.001	0.004

The final model, shown in Table 6, shows the significant predictors for each of the four age-groups. For the 16–29 age-group, there are two significant predictors, ID-theft & credit-card misuse and Machiavellianism, which is a personality trait characterized by manipulateness and deceitfulness. These same two variables are predictors for the age-group 30–39, but only significant on a 0.1-level. For the age-group 40–49, education is a predictor, indicated by those have studied at a higher education institution and those who have not. A negative Beta reveals that it is those who have not studied at higher education are sexting more frequently. Finally, for the age-group 50–69 years, ID-theft & credit-card misuse together with data-disclosure (high willingness to share) and the CRT are significant predictors.

In binary logistic regression, there is one more result that should be reported. This is the classification table, showing correct and incorrect percentages for the groups ‘has shared nudes’ (coded as 1) and ‘has not shared nudes’ within the last 12 months (coded as 0). The higher the percentage, the better the variables function as predictors.

The youngest (70%) and the oldest (77%) age-groups have acceptable predictions. For the two other age-groups the percentages were lower, 57% and 64%.

In general, we assume that personal traits and decision style are of relevance for online behaviour; what people do, for instance, when no one’s watching. The results from the present study are in accordance with previous studies on impulse behaviour, sensation-seeking and potential vulnerabilities.

Table 8. Classification table - the binary logistics prediction of the two groups.

		Not sexting (numbers)	Sexting (numbers)	Percentage correct
16–29 years	0	119	35	77.3%
	1	25	22	46.8%
				70.1%
30–39 years	0	138	105	56.8%
	1	16	22	57.9%
				56.9%
40–49 years	0	111	60	64.9%
	1	13	16	55.2%
				63.5%
50–69 years	0	288	85	77.2%
	1	4	12	75.0%
				77.1%

The fact that the respondents are drawn from a panel representing a national population aged 16–69, and not only up to 30 years old, is important, and this is a study that can be replicated. Our results show that sexting is not only a phenomenon among young people, but it is more common amongst the younger generation. Of greater importance, the correlation between financial vulnerability and the sharing of graphic nude images indicates that sexting might be even riskier than anticipated.

DISCUSSION

In the present study, with a large data set, self-reported online behavior together with personal traits and willingness to share personal data were assessed as predictors of the tendency towards sexting. Our study showed that ID-theft and credit-card misuse were more common among those that reported that they have been sexting compared to the non-sexting group. The ID-theft/credit-card variable was a significant predictor of sexting for the age-groups 16–29, 30–39 and 50–69 years old. For the youngest group, the manipulateness and deceitfulness trait is also a predictor, whereas for the oldest group, the intuitive decision style and a high willingness to share personal data are also significant predictors.

Our results indicate that personal traits do matter, but these findings were less clear-cut than those for the ID-theft and credit card misuse. In planned future studies, we will examine how and to what extent several personality variables, such as and including intuitiveness, are associated with and can therefore predict hazardous online behaviours such as sexting.

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