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**Concise Report: Teenage sexting on the rise? Results of a cohort study using a  
weighted-sample of adolescents**

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**Running head** : Sexting cohort study

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**Summary text for the online Table of Contents**

Although studies seem to indicate that the prevalence of sexting has increased over time, there are no cohort studies that compare historic prevalence rates among similar groups of teenagers. Using data from a weighted sample of adolescents in Belgium, this study found that sexting prevalence increased between 2015 and 2017, even when accounting for smartphone ownership. The results suggest that factors outside of smartphone ownership may contribute to the increase in sexting behavior and highlight the need of the development of age-appropriate sexting education.



24 cohort. The sexting prevalence rates also significantly increased between cohorts when  
25 taking into account students who owned a smartphone. Furthermore, engagement in sexting  
26 was associated with being older, and no gender differences were found. In the second cohort,  
27 36.8% of youth who had send a sext were identifiable in those images. There were no  
28 differences between cohorts.

## 29 **Discussion**

30 The results indicate that other factors next to smartphone ownership may be associated with  
31 an increase in sexting prevalence. The findings also highlight the need for the development  
32 of age-appropriate sexting educational materials.

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## Introduction

Sexting, herein defined as the sending of self-made sexually explicit images, between adolescents is a normal part of their sexual exploration that may come with serious risks and health consequences, especially for victims of nonconsensual sexting (1, 2). To the best of our knowledge, there are to date no published cohort studies that track sexting behavior among similar groups of adolescents over time. Especially as sexting tends to increase with age (3), longitudinal studies among the same group of respondents are unable to fully capture evolutions in sexting behavior over time. Evidence of differences in sexting behavior between similar cohorts of adolescents within the same age-group (12-18 years old) is lacking.

Using two datasets of a biennial study on adolescents' media use, this concise report aims to address this gap in the research. At both time points of the study, the surveys included 1) a measure on sending of sexting images, and, for those involved in sexting, 2) a measure on whether they were identifiable in these sexting images. Being unrecognizable in sexting images can potentially minimize the risks for bullying and reputational damage when a sexting image is forwarded without permission (4). Based on these two measures, our study has the two research aims. The first aim (RQ1) is to compare the sexting prevalence and correlates of youth in 2015 and 2017. The second aim (RQ2) is to investigate the risk mitigation behaviors (i.e., being unrecognizable in images) of youth who engage in sexting and to assess how their behaviors differ between the two time points. This exploratory study allows us to get a better understanding of potential shifts in sexting behavior between the two time points, and provides unique descriptive results that could further guide educational efforts.

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## Methods

### *Procedures*

60 The two datasets stem from a broader biennial study that focuses on media ownership  
61 and media usage of teenagers in the Dutch-speaking community of Belgium. The data for  
62 **cohort 1 (C1)** were collected in October and November 2015 among 3.291 students from  
63 11 secondary schools. After data cleaning, 2.663 valid responses remained. For **cohort 2**  
64 **(C2)**, data were collected in October and November 2017 among 3.480 students from 10  
65 secondary schools. After data cleaning, 2.681 valid responses remained. For both cohorts,  
66 the survey was conducted during class hours, by means of an online questionnaire. Students  
67 were allowed to skip questions. The survey was conducted in collaboration with Mediaraven,  
68 an NGO that focuses on the positive use of digital media through media literacy education.  
69 Prior to the survey, the respondents received the contact information of this organization in  
70 case that they wanted additional information about the study or felt the need to talk about its  
71 content.

72

### *Measures*

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#### *Demographics*

76 We asked the respondents to indicate their gender (C1:  $n = 1311$  girls, 49.2% girls;  
77 C2:  $n = 983$  girls, 49.1% girls), age (respondents were between 11 and 21 years old) ( $M_{C1} =$   
78 14.81 years old,  $SD_{C1} = 1.94$ ;  $M_{C2} = 14.94$ ,  $SD_{C2} = 1.85$ ), and smartphone ownership (C1:  $n$   
79 = 2453, 92.1% owned a smartphone; C2:  $n = 1906$ , 95.3%). Additionally they were asked  
80 which school track of the Belgian educational system they were enrolled in, and their grade  
81 (7<sup>th</sup> through 12<sup>th</sup> grade). The latter two variables were used for weighing the sample (see  
82 below).

83

#### *Sexting measures*

84

85 Sexting was measured by a single item question: “How often did you make a sexually  
86 explicit picture of yourself in the past two months and send it to someone else?” The four  
87 response options ranged from 1 = *never* to 4 = *multiple times*. Both measures were  
88 dichotomized to 0 = *has not engaged in sexting* and 1 = *has engaged in sexting in the past 2*  
89 *months*. The use of dichotomous variables is in line with other sexting studies given that on  
90 average the behaviors do not occur often (5,6).

91 Those who had engaged in sexting, were asked whether they were typically  
92 recognizable or unrecognizable in the sexually explicit picture(s) that they had sent of  
93 themselves. Respondents were able to pick two options: 1 = *recognizable* or 2 =  
94 *unrecognizable (e.g., a blurry picture, or a picture without your head)*.

#### 95 96 *Data analysis*

97 Data were analyzed using SPSS v.25 (IBM Corp., Amrook, NJ). To optimize the  
98 external validity of the sample, sample quota were set on gender, cycle of the Belgian  
99 educational system and school track, based on statistics of the Education Department of the  
100 Flemish Government. To further improve the representativeness of the sample, a weighing  
101 factor, based on the three parameters described above, was implemented on the data set,  
102 resulting in a weighted sample respectively of 2.663 and 2.000 respondents.

103 Chi-square tests were used to compare the dichotomized variables across cohorts,  
104 and for continuous variables a *t*-test was used to compare means. In order to assess the  
105 correlates of sexting within each cohort individually, we used logistic regression analysis in  
106 which all variables were entered simultaneously. Missing cases on the variables were  
107 handled using list wise deletion.

## 108 **Results**

### 109 *The sending of sexting images over time*



110 Table 1 shows the prevalence rates of sexting and the other demographic variables.  
111 In total, 8.3% of the respondents in the first cohort sent a self-made sexually explicit image  
112 in the 2 months prior to the study, compared to 12.1% in the second cohort. The difference  
113 between the two cohorts is statistically significant ( $\chi^2(1)=17.84, p=.00$ ), meaning that more  
114 youth had engaged in sexting in 2017 than 2015.

115 With respect to gender, there were no significant differences between boys and girls  
116 for the sending of sexting images between the two cohorts separately. There were also no  
117 significant gender differences among youth who had engaged in sexting between cohorts.

118 There were no significant differences between the mean ages of the adolescents who  
119 had engaged in sexting in the first cohort and the second cohort. Within both cohorts  
120 individually, engagement in sexting was associated with being older (cohort 1: OR: 1.30;  
121 95% CI: 1.21-1.40; cohort 2: OR: 1.41; 95% CI: 1.31-1.53).

122 When conducting the analysis among youth who indicated that they owned  
123 smartphone (i.e., excluding youth who do not own a smartphone), there was a significant  
124 difference in the prevalence rates of sexting across cohorts ( $\chi^2(1)=14.12, p=.00$ ). Among  
125 individual cohorts sexting there were no significant associations between engagement in  
126 sexting and smartphone ownership.

127  
128 *Risk-mitigation behaviors among youth who engage in sexting*

129 Among those who had engaged in sexting, we assessed whether they were  
130 recognizable in their sexts. Among the first cohort, 40.4% of respondents confirmed they  
131 were identifiable in their sexting pictures, compared to 36.8% of youth in the second cohort.  
132 There was no statistical difference between the two cohorts. In the first cohort, there was a  
133 statistical gender difference with girls being more likely to send anonymous pictures than

134 boys (OR: 2.28; 95% CI: 1.27-4.01). In the second cohort, this gender difference was not  
135 significant. There were no significant differences between being recognizable in the sexting  
136 images, gender, age and smartphone ownership between individual time points and across  
137 cohorts.

## 138 **Discussion**

139  
140 As one of the first cohort studies on sexting, this concise report contributes to the  
141 literature by providing a unique descriptive snapshot of sexting at two time points using the  
142 same measures to capture sexting behavior among a weighted sample of youth. The results  
143 of our study indicate that the prevalence rates of sexting have increased between 2015 and  
144 2017. One potential explanation for this finding could be the increase in smartphone  
145 ownership among youth<sup>3</sup>, which provides adolescents with a private device to create and  
146 share sexting images, often with little parental supervision(7). However, when comparing  
147 the prevalence rates between youth who indicated that they owned a smartphone in 2015 and  
148 2017, sexting rates were still significantly higher between cohorts. This might indicate that  
149 other factors than an increase in smartphone ownership might also be contributing to the  
150 increased prevalence rates of sexting. Although speculative, potential explanations may be  
151 shifting attitudes and social norms towards sexting. Another explanation could be that  
152 respondents feel increasingly comfortable to report their involvement in the behavior<sup>3</sup>.  
153 Future studies could track adolescents' attitudes towards sexting behavior over time to assess  
154 whether sexting is becoming more normalized(8). In general, clinicians and educators should  
155 be aware that sexting has been on the rise during the time period of our study, future studies  
156 will tell if sexting rates continue to increase.

157 The prevalence rates shown in Table 1, seem to indicate that sexting becomes  
158 increasingly prevalent from the age of 14 years old, which stresses the need for educational

159 efforts on sexting as early as middle school. These findings also highlight the need for the  
160 development of age-appropriate sexting educational materials for this age group. When  
161 comparing cohorts, we found no differences in the average age of youth who are sexting,  
162 indicating that youth did not start sexting at a younger age between 2015 and 2017.

163         With regard to risk mitigation behaviors, both datasets showed that a majority of  
164 youth practices ‘safer sexting’ by sending pictures in which they are not identifiable.  
165 However, in the latest dataset 36.8% of youth indicated that they sent identifiable images,  
166 indicating that a considerable amount of teenagers do not engage in this specific safer sexting  
167 practice. In the first cohort boys were more likely than girls to send pictures in which they  
168 are identifiable, this could be potentially explained by previous qualitative research that  
169 found that boys tend to overall receive less negative reputational consequences with regard  
170 to sexting than girls(9). Boys might perceive themselves as less in need of protection than  
171 girls.

172         Certain limitations should be kept in mind when interpreting the results presented in  
173 this concise report. First, although the data are weighted, both datasets are based on a  
174 convenience sample of youth. Second, given that our study was part of a larger questionnaire,  
175 we were only able to include a limited set of sexting behaviors. Future cohort studies are  
176 warranted to track a wider range of sexting (e.g., forwarding, receiving and asking sexting  
177 images), sexting attitudes, risk mitigation behaviors and the context in which sexting took  
178 place.

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Characteristic	2015				2017				X <sup>2</sup> /t-value across waves sending sexts	X <sup>2</sup> /t-value across waves recognizable
	Sent a sext	OR [95% CI]	Recognizable in sext	OR [95% CI]	Sent a sext	OR [95% CI]	Recognizable in sext	OR [95% CI]		
<b>Overall prevalence</b>	219 (8.3%)		84 (40.4%)		240 (12.1%)		87 (37.3%)		17.841 ( $p < .000$ )***	.51 ( $p = .48$ )
<b>Gender</b>	.76 [.57-1.01]		2.28 [1.27-4.01]**		.91 [.69-1.21]		1.57 [.91-2.70]			
Male ( <i>ref</i> )	125 (9.3%)		57 (49.1%)		129 (12.8%)		53 (42.4%)		7.01 ( $p = .01$ )**	1.10 ( $p = .29$ )
Female	94 (7.3%)		27 (29.3%)		111 (11.4%)		34 (31.5%)		11.35 ( $p = .001$ )**	.11 ( $p = .74$ )
<b>Age (mean)</b>	15.73 (1.85)	1.30 [1.21-1.40]***	15.62 (1.79)	1.06 [.91-1.25]	15.97 (1.71)	1.41 [1.31-1.53]***	15.88 (1.68)	1.05 [.90-1.23]	444.90 ( $p = .143$ )	-.95 ( $p = .29$ )
<b>Age</b>										
11	0 (0.0%)		0 (0.0%)		0 (0.0%)		0 (0.0%)			
12	15 (3.9%)		6 (46.2%)		6 (3.3%)		0 (0.0%)			
13	13 (3.3%)		5 (45.5%)		15 (4.0%)		10 (71.4%)			
14	32 (7.7%)		20 (74.1%)		21 (8.0%)		12 (57.1%)			
15	29 (7.2%)		17 (56.7%)		50 (13.7%)		31 (66.0%)			
16	47 (11.0%)		26 (57.8%)		54 (14.6%)		33 (61.1%)			
17	44 (11.3%)		23 (53.5%)		57 (21.0%)		34 (63.0%)			
18	29 (18.7%)		18 (62.1%)		21 (19.4%)		13 (59.1%)			
19	10 (20.0%)		10 (100.0%)		11 (27.5%)		7 (63.6%)			
20	0 (0.0%)		0 (0.0%)		2 (28.6%)		1 (100.0%)			
21	0 (0.0%)		0 (0.0%)		3 (100.0%)		3 (100.0%)			
<b>Smartphone ownership</b>	1.87 [.95-3.70]		2.73 [.66-11.35]		1.05 [.51-2.13]		1.93 [.50-7.48]			
Yes	210 (8.7%)		78 (39.2%)		230 (12.2%)		82 (36.6%)		14.12 ( $p < .000$ )***	.30 (.58)
No ( <i>ref</i> )	9 (4.3%)		6 (66.7%)		9 (9.8%)		5 (55.6%)		3.32 ( $p = 0.68$ )	.32 ( $p = .63$ )

209 Table 1: Prevalence rates and demographic characteristics of the sending of sexting images and being recognizable in sexting images in 2015 and 2017

210 \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .