



## Full length article

## Sexting: Adaptation of sexual behavior to modern technologies

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## ABSTRACT

This is the first research that aim to analyze the practice of *Sexting* in Portugal. The goals of this study included comparing the differences between the *Sexting* dimensions and independent factors (gender, age, literacy qualifications, profession, residence, marital status, existence of a stable relationship, most used media, place of frequent use of the media, most commonly used technological device, security perception of communication technology, number of text messages sent per day, recipients of text messages) and corroborating the existence of correlations between the *Sexting* dimensions. The study sample consisted of 301 individuals aged between 18 and 52 years (158 adults and 143 young adults) and included both females (169) and males (132). The instruments used included a translated and adapted version of the Sex and Tech Survey, created by The National Campaign to Prevent Teen and Unplanned Pregnancy, and the elaboration of 7 social and demographic questions and 6 questions about media consumption and daily technology use. The results showed that environment exposure was higher in males as well as in the group of individuals of both sexes who sent approximately 76–90 written messages per day. By contrast, positive emotions and the development of greater interest in *Sexting* were higher in women. Positive emotions were higher in young adults, students of both sexes and unemployed persons.

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## 1. Introduction

People use mobile phones for a variety of purposes: making calls, sending messages, and recording and sharing images, files and multimedia (Lenhart, 2009; Lenhart, Ling, Campbell, & Purcell, 2010). Some of this content is sexual in nature (Carvalho & Gomes, 2003). Lenhart (2009) found that mobile phones and messaging can influence the social and sexual lives of teenagers and young adults.

There is an increase in research aimed at identifying the relationship between modern technologies, romantic relationships (Drouin & Landgraff, 2012; Weisskirch & Delevi, 2011) and sexual behaviors (Gordon-Messer, Bauermeister, Grodzinski, & Zimmerman, 2013; McDaniel & Drouin, 2015; National Campaign to Prevent Teen and Unplanned Pregnancy – NCPTUP, 2008; Weisskirch & Delevi, 2011).

The term “*Sexting*” (“sex” + “texting,” which includes sending photos) is used to denote the exchange of messages containing

sexual content via short message service (SMS). Sexting is limited to the dissemination of photos or videos produced by users with their phones or other technological devices without any suggestion or coercion by others (San-José et al., 2011) using the internet and or text messages as the means for the dissemination of the intended sexual (Ferguson, 2011). For NCPTUP (2008) researchers, the practice of sending and publishing nude or partially nude photos has existed for the past ten years and is becoming more frequent as teenagers become adults.

In Weisskirch and Delevi's (2011) opinion, sexting should be understood as one step in the process of seduction for the establishment of a relationship or an enjoyable way of starting conversations in a relationship. The authors argued that sexting can be used as a strategy to preserve a romantic connection or capture the interest of a romantic partner for people with high levels of anxiety. When this type of message sharing occurs at the beginning of a relationship, it can be seen as a strategy for obtaining a response from the other person. According to Gordon-Messer et al. (2013), *sexting* can be an expression of the results of interactions between romantic partners. The practice of this sexual behavior can be explained by the fact that young people are more creative and receptive to many uses of technology (Gordon-Messer et al., 2013;

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Ostrager, 2010). This behavior might be perceived differently by both senders and receivers of the messages. In the literature different aspects are referred namely attitudes (positive versus negative) and emotional responses (positive versus negative). Another aspect is perception that this practice might increase or decrease the sexual interest of those involved.

The NCPTUP (2008) conducted a study with 1280 US citizens — 653 adolescents between the ages of 13 and 19 years and 627 young adults between the ages of 20 and 26 years — and found that 20% of adolescents and 33% of young adults had sent or posted pictures or videos of themselves partially or totally nude. The authors found that sexually suggestive messages (text, mail or instant messages) were more frequent than sexually suggestive images, with 39% of adolescents and 59% of young adults having sent this type of content and 48% and 64%, respectively, having received these types of messages. It was revealed that most teens (71% of girls and 67% of boys) and young adults (83% of women and 75% of men) sent, shared or posted such sexual content with their partners. Adolescents (21% girls and 39% of boys) and young adults (21% of women and 30% of men) showed lower levels of such activity, and it was observed that a small group sent or posted such content for those whom they had met only online (15% of adolescents in general, 15% of women and 23% of men). Similar results were found in a study by Lenhart (2010), which was conducted in the United States with a sample of 2252 people, in which 31% of young adults (aged 18–29 years) and 17% of adults (aged 30–49 years) said that they had received messages with sexual content from someone they knew, but only 13% of young adults and 5% of adults reported having sent such messages.

Ferguson (2011) conducted an investigation on *sexting* with 207 primarily Hispanic college students aged 16–25 years. The results showed that 20.5% of the participants had sent erotic content or completely nude images of themselves at least once, whereas 34.5% of the participants stated that they had received erotic photos from other people at least once. It was found that most participants use *sexting* as a mutually consenting activity and perceive *sexting* to be an exciting part of their sex lives; *sexting* behaviors were also related positively to sexual satisfaction and positive attitudes about sex. In the authors' opinion, *sexting* was more common among women who enjoyed an open or uncomplicated practice of sexual behavior.

To explain how texting and *sexting* practices were related to the establishment of romantic relationships, Drouin and Landgraff (2012) studied a sample of 744 North American college students (233 males and 511 females aged 18–36 years). The results showed that 67% of the participants sent sexually explicit text messages to their romantic partners and that 54% of the participants sent sexually explicit images or videos. Although most individuals often sent ordinary text messages to their partners, one-third of the sample participants reported at least occasionally exchanging sexual messages with their mates. According to the authors, factors such as age and relationship duration may contribute to the messaging frequency, verifying that older couples and people with longer relationships experience a lower message exchange frequency.

To assess compliance in a young adult population (18–24 years), Gordon-Messer et al. (2013) surveyed 3447 young American adults. The results showed that 57% of participants did not practice *sexting*, 28.2% sent and received sexually explicit content, 12.6% only received sexually explicit content and 2% only sent sexually explicit content. The authors found that men were more likely than women to only receive such messages. The authors also found that those who only received sexual content in messages were 3 times more likely to initiate sexual activity and individuals who sent and received these messages were 14 times more likely to engage in

sexual activity than those who did not participate in *sexting*. They found that *sexting* is a reciprocal behavior, with 66% of sample reporting having sent and received messages with sexual content. Similar results were obtained by Weisskirch and Delevi (2011), who concluded that individuals in a romantic relationship are more likely to send and receive sexual content and initiate sexual activity than those who were not in a relationship.

These investigations show that *sexting* is perceived to be a type of common sexual behavior between young adults and adults in a romantic relationship. However, Levine (2013) underlines that more research on this topic is required and that it is important to consider certain legal issues including those regarding legal age and the consent of all people involved. Other studies (Ferguson, 2011; Gordon-Messer et al., 2013) seek to assess the relationship between *sexting* and risk behaviors and found that there is no association between these two variables.

Technology updates and the continuous use of mobile media may have facilitated a continuous connection between people. The technical capabilities of individuals is important in generating new sexual behaviors such as *sexting*, especially among younger people because they have a greater tendency to use modern technology and devices; this tendency also depends on the creativity levels of individuals.

In this research, it is theorized that a large percentage of young adults engage in *sexting* similarly to young adults of other countries (Drouin & Landgraff, 2012; Ferguson, 2011; Gordon-Messer et al., 2013; Lenhart, 2010; NCPTUP, 2008; Weisskirch & Delevi, 2011).

The main goal of this study is to describe the practice of *sexting* in Portugal; previous studies have been performed outside Portugal, but there are no studies in Portugal on this subject. Thus, this study is the first of its kind in Portugal, as it examines a new sexual behavior associated with the use of modern technology. The specific goals of this study consist of a comparison of statistically significant differences between *sexting* dimensions with respect to i) sex, ii) age, iii) qualifications, iv) job, v) residence, vi) civil status, vii) the existence of a stable romantic relationship, viii) most commonly used media, ix) location of frequent use of media, x) most commonly used technological device, xi) security perceptions in communication technology, xii) number of text messages sent per day, and xiii) text message destination, as well as a verification of correlations between the *sexting* dimensions.

## 2. Method

This research is an exploratory pilot study with a quantitative, nomothetic (Butterworth-Heinemann, 2005, p32) character and a cross-sectional design.

The sample was collected via the Internet through an online questionnaire. This questionnaire included a brief and clear explanation of the main subject of the study. Following the recommendations of Drouin and Landgraff (2012); Gordon-Messer et al. (2013), NCPTUP (2008), Weisskirch and Delevi (2011) the questionnaires were available for a period of two months. Researchers had no direct impact on the recruitment of subjects. In this case, samples tend to be constructed on the basis on the suggestions that eventually friends made or based on large dissemination that tends to occur due to the posting on social networks.

### 2.1. Participants

Table 1 shows the descriptive data from the sample.

This study used 13 independent variables (sex — male and female; age — young adults and adults; qualifications — high school and higher education; work status; iii) residence; iv) marital status; v) most commonly used media; vi) place where the media is most

**Table 1**  
Sample characterization.

	N	%
Sex		
Male	132	(43.9)
Female	169	(56.1)
Age		
Young adults (18–24 years)	158	(52.5)
Adults (25–52 years)	143	(47.5)
Academic Qualifications		
High school	70	(23.3)
Superior qualifications	231	(76.7)
Job		
Student- unemployed	137	(45.5)
Employed/student and employed	164	(54.5)
Residence		
Urban or city	184	(61.1)
Rural or small city	117	(38.9)
Marital status		
Single	264	(87.7)
Married	37	(12.3)
Stable relationship		
Yes	176	(58.5)
No	125	(41.5)
Most commonly used media		
Internet	286	(95.0)
Television and Radio	15	(5.0)
Place where the media is most often used		
Home	226	(75.1)
Workplace	48	(15.9)
Outdoors/public spaces	27	(9.0)
Most commonly used technological device		
Computer/laptop	155	(51.5)
Tablet	15	(5.0)
Mobile phone/Smartphone	131	(43.5)
Secure technological communication		
Yes	188	(62.5)
No	113	(37.5)
Number of text messages sent per day		
1–15	124	(41.2)
16–30	72	(23.9)
31–45	35	(11.6)
46–60	29	(9.6)
61–75	9	(3.0)
76–90	7	(2.3)
91–105	7	(2.3)
106–120	5	(1.7)
>120	13	(4.3)
Text message recipient		
Boyfriend/Girlfriend	130	(43.2)
Friends	131	(43.5)
Family members	13	(4.3)
Co-workers	15	(5.0)
Other	12	(4.0)

commonly used; vii) most commonly used technological device; viii) secure technological communication; ix) number of text messages sent per; x) message recipient and 7 dependent variables (environment exposure, positive attitude, negative attitude, positive emotions, negative emotions, high interest, and low interest).

The project was approved by the scientific and ethical committee of the University that anchored the study. Before answering the questions, all subjects had to declare their understanding about the confidentiality procedures and their freedom to abandon the study.

## 2.2. Instruments

Data were collected through self-administered questionnaires. To understand the samples dynamics in terms of various factors, the instrument included 12 social and demographic questions and 9 questions on the use of media and technology on a daily basis (see

**Table 1).**

To collect data on *sexting*, a translated adaptation of the Sex and Tech Inquiry created by NCPTUP (2008) was used. As a result of the translation, adaptation and validation of this questionnaire, through an exploratory factor analysis and consequent confirmatory factor analysis, to be published independently from the present study, only five questions from the original instrument (e.g., “What is your opinion of the practice of sending sexually suggestive messages or photos/videos with partially or totally nude images of yourself?”; “What emotions would you currently feel if you received sexually suggestive text messages, photos or videos with partial or total nudity?”) were used. The two possible response formats were yes/no responses and Likert scale scores [(1) not common; (2) not very common; (3) fairly common and (4) very common; and (1) I strongly disagree; (2) I disagree slightly; (3) I neither disagree nor agree; (4) I agree slightly; (5) I strongly agree].

## 2.3. Statistical analysis

We conducted a descriptive analysis of the sample by calculating the relative frequency (%), which allowed for a global sample classification and the calculation of central and dispersion tendency indicators, the mean (M) and standard deviation (SD). To assess the internal consistency and viability of the questionnaire items, we used *Cronbach's alpha*.

Factorial analyses were performed to extract the dependent variables: environment exposure (“Send sexual messages to someone”, “Send sexually suggestive photos or videos of yourself to someone”), positive attitude (“sassy”, “exciting”), negative attitude (“ridiculous”, “dangerous”), positive emotions (“entertained/funny”, “happy”), negative emotions (“upset”, “disappointed”), higher interest (“Interested in going out on a date with the person who sent the message, photo or video”) and lower interest (“Low interest in interacting with the person who sent the message, photo or video.”). In this procedure, the related items were pooled, which enabled a set of variable formation that is correlated significantly to provide an effective analysis of data (Dancey & Reidy, 2006).

The skewness and kurtosis coefficients for dependent variables were calculated to perform the univariate analysis, assuming the normality of the sample distribution for some of the dependent variables (environment exposure, positive attitude and negative attitude) because values were within the range of  $\pm 1$ . Thereafter, a multivariate analysis of variance was performed, followed by a one-way variance analysis to assess the differences between these dependent variables and several independent variables. For the remaining dependent variables (positive emotions, negative emotions, high interest and low interest) that did not have a normal distribution of data, non-parametric analyses were used, which allowed for the determination of the differences between the dependent and independent variables.

A *partial eta-squared* ( $\eta_p^2$ ) was used to measure the effect size between the groups using the following classification: small ( $>0.01$ ), moderate ( $>0.06$ ) and high ( $>0.14$ ) (Watson, 2015). The Pearson correlation coefficient square ( $r^2$ ) is a standard measure that allows for the assessment of the effect size observed between variables within  $\pm 1$  (Field, 2009). For the Pearson correlation coefficient square, we used the following classification: small effect ( $\pm 0.010$ ), moderate effect ( $\pm 0.059$ ) and high effect ( $\pm 0.138$ ) (Becker, 2015). All statistical analyses were performed using SPSS software (21.0 version).

## 3. Results

Table 2 shows the descriptive statistics (mean and standard deviation), the univariate normality measures (skewness and

**Table 2**

Mean, standard deviation, skewness and kurtosis values and *Cronbach's alpha* for the *Sexting* variables.

<i>Sexting</i>	M ± SD	Skewness	Kurtosis	$\alpha$
Environment exposure	6.568 ± 1.608	1.118	0.964	0.552
Positive attitude	18.465 ± 4.768	0.104	1.128	0.793
Negative attitude	15.030 ± 6.276	0.531	−0.162	0.897
Positive emotions	9.229 ± 2.235	0.045	−1.554	0.866
Negative emotions	11.561 ± 0.987	−2.949	9.526	0.761
High interest	0.239 ± 0.914	−0.492	−1.628	0.878
Low interest	3.821 ± 0.543	−2.873	6.644	0.887

kurtosis) and the *Cronbach's alpha* of the *sexting* dimensions: environment exposure, positive attitude and negative attitude. Through the *alpha* value analysis, we found that the internal consistency of the sample data was satisfactory for 'environment exposure', 'positive attitude' and 'negative emotions'. *Cronbach* values ranged from .552 to 0.897. The only critical value was obtained in variable "environment exposure", all other scores were greater than 0.70. Based on the skewness and kurtosis values, it was found that the distribution was normal for 'environment exposure', 'positive attitude' and 'negative attitude' because values were within the  $\pm 1$  interval. For the remaining variables, based on [Marôco's \(2014\)](#) advanced criteria, we were able to use parametric statistical procedures; however, we opted for a more conservative path and used non-parametric statistics.

In the MANOVA multivariate analysis for gender, no statistically significant differences were observed ( $F_{(3, 297)} = 2.248$ ,  $p = 0.083$ , *Wilks'  $\lambda$*  = 0.978). Regarding environment exposure, positive attitude and negative attitude, a small effect was observed ( $\eta_p^2 = 0.022$ ).

The univariate analysis showed statistically significant results for environment exposure ( $p = 0.030$ ) with a small effect ( $\eta_p^2 = 0.016$ ) in a 95% IC from 6410 to 6,776, and the men showed the highest results ( $M = 6.795$ ) (see [Table 3](#)).

It was not possible to guarantee a normal distribution for 'positive emotions', 'negative emotions', 'high interest' or 'low interest' in the sample, so a non-parametric analysis was used for these variables. A non-parametric analysis was performed using the Mann-Whitney test, which showed statistically significant results for positive emotions ( $p < 0.001$ ) and high interest ( $p < 0.001$ ), and the women showed higher results ( $MR = 166.46$  and  $MR = 165.81$ ) (see [Table 4](#)).

In the multivariate analysis no statistically significant differences between the young adult and adult groups in relation to environment exposure, positive attitude or negative attitude ( $F_{(3, 297)} = 0.613$ ,  $p = 0.607$ , *Wilks'  $\lambda$*  = 0.994) were found, and no effect ( $\eta_p^2 = 0.006$ ) was determined. The univariate analysis showed no statistically significant results.

The non-parametric analysis showed statistically significant results for positive emotions ( $p = 0.001$ ), and the young adult group had higher results ( $MR = 166.92$ ) (see [Table 5](#)).

The multivariate analysis showed no statistically significant differences by qualification for high school and higher

**Table 3**

Means (M), standard deviation (SD) and univariate effects of environment exposure, positive attitude and negative attitude by gender.

<i>Sexting</i>	<i>Sex</i>		<i>F</i>	<i>p</i>	$\eta_p^2$
	Male	Female			
	M ± SD	M ± SD			
Environment exposure	6.795 ± 1.777	6.390 ± 1.444	4.758	0.030	0.016
Positive attitude	19.015 ± 4.755	18.035 ± 4.748	3.151	0.077	0.010
Negative attitude	14.811 ± 6.480	15.201 ± 6.126	0.286	0.593	0.001

**Table 4**

Mean rank and effects for positive emotions, negative emotions, high interest and low interest by gender.

<i>Sexting</i>	<i>Sex</i>		<i>Z</i>	<i>p</i>
	Male	Female		
	Mean Rank	Mean Rank		
Positive emotions	131.20	166.46	−3.562	0.001
Negative emotions	156.33	146.83	−1.253	0.210
High interest	132.03	165.81	−3.773	0.001
Low interest	152.29	149.99	−0.426	0.670

**Table 5**

Mean rank and effects for positive emotions, negative emotions, high interest and low interest by age.

<i>Sexting</i>	<i>Age</i>		<i>Z</i>	<i>P</i>
	Young adults	Adults		
	Mean Rank	Mean Rank		
Positive emotions	166.92	133.41	−3.407	0.001
Negative emotions	147.07	155.34	−1.097	0.272
High interest	156.54	144.87	−1.312	0.190
Low interest	150.57	151.47	−0.167	0.867

qualifications ( $F_{(3, 297)} = 1.500$ ,  $p = 0.215$ , *Wilks'  $\lambda$*  = 0.985) with regard to environment exposure, positive attitudes and negative attitudes, showing a small effect ( $\eta_p^2 = 0.015$ ). The univariate analysis revealed no statistically significant results.

The non-parametric analysis did not show statistically significant results for *sexting* variables ( $p > 0.05$ ) when considering the qualifications variable (see [Table 6](#)).

The MANOVA showed statistically significant differences between of students/unemployed, employed/students or employed and students group ( $F_{(3, 297)} = 1.456$ ,  $p = 0.227$ , *Wilks'  $\lambda$*  = 0.986) in relation to environment exposure, positive attitudes and negative attitudes, and a small effect ( $\eta_p^2 = 0.014$ ) was observed. The univariate analysis showed no statistically significant results.

The non-parametric analysis showed statistically significant results for positive emotions ( $p = 0.006$ ) in the students or unemployed group ( $MR = 165.78$ ) (see [Table 7](#)).

The multivariate analysis showed no statistically significant

**Table 6**

Mean rank and positive emotions, negative emotions, high interest and low interest effect by qualifications.

<i>Sexting</i>	<i>Qualifications</i>		<i>Z</i>	<i>p</i>
	High school	Higher qualifications		
	Mean Rank	Mean Rank		
Positive emotions	164.82	146.81	−1.549	0.121
Negative emotions	142.39	153.61	−1.260	0.208
High interest	149.51	151.45	−0.184	0.854
Low interest	145.24	152.74	−1.182	0.237



**Table 7**

Mean ranks by profession and sexting variables.

Sexting	Profession		Z	p
	Student/unemployed	Student/employed or student and employed		
	Mean Rank	Mean Rank		
Positive emotions	165.78	138.65	−2.751	0.006
Negative emotions	149.85	151.96	−0.280	0.779
High interest	158.59	144.66	−1.561	0.118
Low interest	152.59	149.67	−0.544	0.587

differences in the residence variable analysis, which examined the urban or city and rural or small town groups ( $F_{(3, 297)} = 1.356$ ,  $p = 0.256$ , Wilks'  $\lambda = 0.986$ ) in relation to environment exposure, positive attitudes and negative attitudes, and a small effect ( $\eta_p^2 = 0.014$ ). The univariate analysis revealed that there were no statistically significant results.

The non-parametric analysis did not show any statistically significant results for the sexting variables ( $p > 0.05$ ) when considering the residence variable.

The multivariate analysis showed no statistically significant differences in the marital status variable analysis, which examined the single and married groups ( $F_{(3, 297)} = 1.317$ ,  $p = 0.269$ , Wilks'  $\lambda = 0.987$ ) in relation to environment exposure, positive attitudes and negative attitudes, and a small effect ( $\eta_p^2 = 0.013$ ). The univariate analysis showed no statistically significant results.

The non-parametric analysis showed no statistically significant results for the sexting variables ( $p > 0.05$ ) when considering the participants' marital status.

The multivariate analysis found no statistically significant differences when the existence of a stable relationship was analyzed ( $F_{(3, 297)} = 0.518$ ,  $p = 0.670$ , Wilks'  $\lambda = 0.995$ ) in relation to environment exposure, positive attitudes and negative attitudes, and no effect ( $\eta_p^2 = 0.005$ ) was found. The univariate analysis revealed that there were no statistically significant results.

The non-parametric analysis did not show statistically significant results for the sexting variables ( $p > 0.05$ ) when considering the existence of a stable relationship.

The multivariate analysis showed no statistically significant differences in the most commonly used media variable analysis involving the internet and television/radio groups ( $F_{(3, 297)} = 0.327$ ,  $p = 0.806$ , Wilks'  $\lambda = 0.997$ ) in relation to environment exposure, positive attitudes and negative attitudes, and no effect was observed ( $\eta_p^2 = 0.003$ ). The univariate analysis showed no statistically significant results.

The non-parametric analysis showed no statistically significant results for the sexting variables ( $p > 0.05$ ) when considering the most commonly used media among participants.

The multivariate analysis showed no statistically significant results when considering the places where participants used media, which involved the home, workplace and the outside and public spaces groups ( $F_{(6, 592)} = 0.685$ ,  $p = 0.662$ , Wilks'  $\lambda = 0.986$ ) in relation to the dependent variables of environment exposure, positive attitude and negative attitude. No effect was found ( $\eta_p^2 = 0.007$ ). The univariate analysis revealed no statistically significant results.

A non-parametric analysis was performed using the Kruskal-Wallis test, and no statistically significant results for sexting variables ( $p > 0.05$ ) were found in relation to the place where participants used the media.

The multivariate analysis showed no statistically significant differences when considering the most commonly used technological device variable, which included the computer/laptop, tablet/iPad and mobile phone/smartphone groups ( $F_{(6, 592)} = 0.687$ ,

$p = 0.660$ , Wilks'  $\lambda = 0.986$ ) in relation to environment exposure, positive attitudes and negative attitudes. No effect was found ( $\eta_p^2 = 0.007$ ). The univariate analysis (ANOVA) showed no statistically significant results.

The non-parametric test found no statistically significant results for the sexting variables ( $p > 0.05$ ) when they were analyzed with the most commonly used technological device in the sample.

The multivariate analysis showed no statistically significant differences in technological communication security perception variable ( $F_{(3, 297)} = 1.751$ ,  $p = 0.157$ , Wilks'  $\lambda = 0.983$ ) in relation to environment exposure, positive attitudes and negative attitudes. A small effect ( $\eta_p^2 = 0.017$ ) was observed. The univariate analysis showed no statistically significant results.

The non-parametric analysis showed no statistically significant results for the sexting variables ( $p > 0.05$ ) when considering the technological communication security perception variable.

The multivariate analysis showed no statistically significant differences when considering the number of text messages sent per day ( $F_{(24, 842)} = 1.210$ ,  $p = 0.224$ , Wilks'  $\lambda = 0.906$ ) in relation to the dependent variables of environment exposure, positive attitudes and negative attitudes. A small effect ( $\eta_p^2 = 0.032$ ) was observed. The univariate analysis shows statistically significant results for environment exposure ( $p = 0.034$ ) with a small effect ( $\eta_p^2 = 0.055$ ) in CI 95% 6686–7289. The group of participants who send approximately 76–90 text messages per day achieved the highest results ( $M = 7.714$ ) (see Table 8).

The non-parametric analysis showed statistically significant results for positive emotions ( $p = 0.048$ ), and the group of participants who send approximately 61–75 text messages per day achieved the highest scores ( $MR = 180.67$ ) (see Table 9).

The multivariate analysis showed no statistically significant differences between the groups (text message destination) of boyfriends/girlfriends, friends, family, co-workers and other ( $F_{(12, 778)} = 0.818$ ,  $p = 0.632$ , Wilks'  $\lambda = 0.967$ ) in relation to certain dependent variables (environment exposure, positive attitude and negative attitude). A small effect size ( $\eta_p^2 = 0.011$ ) was shown. The univariate analysis revealed no statistically significant results.

The non-parametric analysis showed no statistically significant results for the sexting variables ( $p > 0.05$ ) when considering the text message destination.

The Pearson correlation coefficient was used to assess the presence and types of significant relationships between the sexting variables. A positive and statistically significant relationship between environment exposure and positive attitude ( $p = 0.002$ ) was found with close to a null effect ( $r^2 = 0.03$ ). A positive and statistically significant relationship between environment exposure and negative attitudes ( $p < 0.001$ ;  $r^2 = 0.10$ ), positive emotions ( $p < 0.001$ ;  $r^2 = 0.09$ ) and high interest ( $p < 0.001$ ;  $r^2 = 0.08$ ) was found. All of these variables showed a moderate effect.

#### 4. Discussion

This study primarily aimed to ascertain the sexting practice in

**Table 8**

Means (M), standard deviation (SD) and univariate effects of dependent variables (environment exposure, positive attitudes and negative attitudes) by the number of text messages sent per day.

	Sexting		
	Environment exposure M $\pm$ SD	Positive attitudes M $\pm$ SD	Negative attitudes M $\pm$ SD
No messages per day			
1–15	6.258 $\pm$ 1.592	18.492 $\pm$ 5.057	16.048 $\pm$ 6.842
16–30	6.528 $\pm$ 1.661	18.250 $\pm$ 4.459	14.472 $\pm$ 4.627
31–45	6.656 $\pm$ 1.301	17.857 $\pm$ 5.483	14.200 $\pm$ 6.906
46–60	6.931 $\pm$ 4.486	20.000 $\pm$ 4.140	13.931 $\pm$ 7.151
61–75	6.444 $\pm$ 1.236	18.667 $\pm$ 5.099	15.556 $\pm$ 6.187
76–90	7.714 $\pm$ 1.604	19.143 $\pm$ 3.579	10.286 $\pm$ 3.592
91–105	7.571 $\pm$ 1.618	18.143 $\pm$ 2.968	14.429 $\pm$ 4.036
106–120	7.600 $\pm$ 1.949	16.600 $\pm$ 5.177	16.000 $\pm$ 8.718
>120	7.154 $\pm$ 1.994	18.000 $\pm$ 4.163	15.231 $\pm$ 5.183
F	2.116	0.594	1.206
p	0.034	0.783	0.295
$\eta_p^2$	0.055	0.016	0.032

**Table 9**

Mean rank and the effects of sexting variables and the number of text messages sent per day.

	Sexting			
	Positive emotions		Negative emotions	
	Mean Rank	Mean Rank	High interest	Low interest
No messages per day				
1–15	162.38	156.27	157.67	151.08
16–30	152.53	154.52	156.51	156.87
31–45	154.44	137.80	137.26	141.26
56–60	119.95	150.21	127.64	146.66
61–75	180.67	157.39	186.67	167.00
76–90	107.07	148.79	115.93	144.79
91–105	167.29	187.50	187.50	167.00
106–120	56.20	100.30	82.90	167.00
>120	149.08	115.15	146.73	131.12
$\chi^2$	15.634	11.676	13.966	7.915
p	0.048	0.166	0.083	0.442

Portugal. More specifically, the present study aimed to verify the differences between *sexting* dimensions and dependent variables — including gender, age, qualifications, profession, residence, marital status, existence of a stable relationship, most commonly used media, place where the media was most commonly used, most commonly used technological device, technological communication security, the number of text messages sent per day and text message destination — to determine whether the dimensions of *sexting* correlate.

Generally, the proposed goals have been achieved. The multivariate analysis showed that there were no statistically significant differences between the independent and dependent variables (environment exposure, positive attitude and negative attitude).

The results of other studies corroborate this finding, including the results of [Weisskirch and Delevi \(2011\)](#), in which no statistically significant differences were found between relationship status and *sexting*. Participants who were in relationships sent a higher number of sexually suggestive text messages than single participants. It was also found that those who were in committed relationships sent more messages proposing sexual activity to their partner ([Weisskirch & Delevi, 2011](#)).

In our research, no significant differences were found between the *sexting* dimensions by age. Similar results were found by [Gordon-Messer et al. \(2013\)](#), although they observed differences in *sexting* practice by gender: they found that men were more likely than women to receive sexually suggestive messages. However, Gordon-Messer et al. did not determine the differences between men and women who did not engage in *sexting* or those who sent and received erotic or sexual messages. In [Drouin and Landgraff's](#)

(2012) study, no differences in sex, age or marital status were seen in terms of sending sexually suggestive messages or images. Finally, [Lenhart's \(2010\)](#) study showed no significant differences in sending sexually suggestive messages between adults by gender; however, the author confirmed that men were more likely to receive such messages than women. Although the results did not show any significant differences by marital status, Lenhart argued that marital status influences *sexting* behavior, arguing that married people send and receive a lower number of sexually suggestive messages than people who cohabitate with partners, people who are divorced, separated people and single people.

The absence of statistically significant differences between the *sexting* dimensions and independent variables in our sample may be the result of some imbalances found in the sample. However, the reason it seems more plausible to explain the results as being due to the low practice of *sexting* in Portugal may be based on the fact that *sexting* is a new sexual behavior and that the current phase of technological expansion may engender fear of being judged negatively by society. Considering that students in non-committed relationship account for the majority of the sample, it is possible to maintain higher levels of sexual activity. It is possible that *sexting* is a practice that is perceived to be more consensual in foreign countries with more culturally diverse societies, more tolerance towards sexual behavior and with greater technological advances. Other variables, such as insecurity, distrust and the perception of danger associated with sharing erotic or sexual content, may influence this lack of compliance because such content can be stolen by hackers or can be shared with people for whom the content is not designated and can be sent without the permission of the

original sender.

The univariate analysis showed that environment exposure (sending, sharing or posting sexually suggestive text messages or images) was higher in males who sent 76 to 90 messages per day, contradicting Gordon-Messer et al.'s (2013) results, which indicated that men were more likely to be the addressees of messages with sexually suggestive content. These results may demonstrate that Portuguese men take the initiative in the seduction process with regard to sexual initiation and stimulation in an uninhibited way and use technological devices to maintain and increase interest in those to whom they feel attracted.

The non-parametric analysis revealed that positive emotions in relation to receiving sexually suggestive messages were higher in women, young adults and students or unemployed youths. It was also observed that interest in women increased from among individuals who sent sexually suggestive messages. These results suggest that Portuguese women are receptive to these methods of seduction and sexual stimulation and perceive them to be a fun and exciting facet of their sexual lives. The same observation was seen in Ferguson's (2011) study. For this reason, *sexting* is associated with positive emotions when receiving this content, which leads to increased interest in individuals who send this content. The increase in positive emotions in young adults or students/unemployed is in contrast to the results obtained in the investigations above (Drouin & Landgraff, 2012; Ferguson, 2011; Gordon-Messer et al., 2013; Lenhart, 2010; The National Campaign to Prevent Teen and Unwanted pregnancy, 2008; Weisskirch & Delevi, 2011), in which *sexting* was seen as a common sexual behavior among young adults.

The results confirmed that there is a positive relationship and a moderate effect between environment exposure and the variables of negative attitudes, high interest and positive emotions. This relationship shows that the increase in environment exposure caused an increase in negative attitudes toward *sexting*. However, this environment exposure increase also caused an increase in individuals who sent this erotic or sexual content, yielding an increase of positive emotions before receiving this content. These results may show that people appreciate receiving sexually suggestive content, which justifies the increase of positive emotions and interest when they receive these messages or images; however, they may experience feelings of shame or embarrassment before sending or sharing their own proposals, thoughts or sexually suggestive images.

A positive relationship with a small effect between environment exposure and positive attitude was also found. This result was in contrast to the results found in Ferguson's (2011) research, which found that *sexting* was strongly correlated with positive attitudes among young adult women.

## 5. Conclusion

The goals proposed were achieved despite not having shown significant differences in most of the independent variables and *sexting* dimensions. The environment exposure, positive emotions and high interest variables presented significant differences between groups: participants who send approximately 76–90 text messages per day show higher results in environment exposure. Females, young adults and students or unemployed persons showed higher values in positive emotions and high interest when they received sexually suggestive content.

The present research is pioneering and informative because there have been no previous studies in Portugal that address the *sexting* issue. Accordingly, the present research may help initiate further investigations in this area that may include larger and more diverse samples to determine how this sexual behavior manifests in Portugal and the associated contexts and motivations. This study

aimed to explore the relationship between modern technologies and human behavior. The results seem to suggest that other social and human sciences should integrate this topic into their research agenda. It is recommended that these contributions should include describing a new behavior adopted by people using devices (technology) and the evolution of groups and the society in which they operate (sociology), which in turn describes individual thoughts that change and shape the way people relate to one other (social psychology). Because *sexting* is considered a sexual behavior, the inclusion of the sexual aspect contributes to the field of clinical sexology.

## 5.1. Limitations and recommendations

Future studies should overcome some of the limitation of the present study, namely applying questionnaires directly and specifying with greater detail the level of the inclusion and exclusion criteria in order to avoid sample imbalances. For example the following variables should be better controlled: Academic qualifications, Marital status, mostly used media, place where media is used, number of text messages sent per day and text messages recipient per day.

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