

# Sexting Behaviors and Cyber Pornography Addiction Among Adolescents: the Moderating Role of Alcohol Consumption

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**Abstract** Sexting is defined as the exchange of provocative or sexually explicit content via smartphone, Internet, or social networks. Previous studies found a relationship between cyber pornography and sexting. The present study aimed to investigate the relationships between sexting, cyber pornography, and alcohol consumption. Previous evidence underlined the disinhibitory effect of alcohol on sexual responsiveness. Therefore, the possible moderating role of alcohol consumption was investigated in the relationship between cyber pornography addiction and sexting. The Sexting Behaviors Questionnaire, the Alcohol Use Disorders Identification Test, and the Cyber Pornography Use Inventory were administered to 610 adolescents (63 % females; mean age = 16.8). Boys reported significantly more sexting, alcohol consumption, and cyber pornography addiction than girls. As expected, sexting was robustly correlated with alcohol consumption and cyber pornography. In line with these expectations, we found that the relationship between cyber pornography and sexting was moderated by different level of alcohol consumption. In those who reported low levels of alcohol consumption, the relationship between cyber pornography and sexting was not significant. On the contrary, in those who reported high alcohol consumption, this relationship was stronger and significant. Thus, the results suggest that alcohol restraint could rep-

resent a protective factor against engaging in sexting, even in the presence of high cyber pornography addiction.

**Keywords** Sexting · Cyber pornography · Alcohol use · Adolescence · Moderation analysis

Over the last several years, sexting has become increasingly popular among adolescents. The word “sexting,” which entered the *Oxford Dictionary* in 2011, is a neologism that merges the word “sex” and “texting” and can be defined as the exchange of provocative or sexually explicit content (text messages, photos, and/or videos) via smartphone, Internet, or social networks (Chalfen 2009). Studies about the prevalence of sexting behaviors among adolescents have shown inconsistent results due to different measures and definitions of sexting. One of the most popular reports in the USA—a survey conducted by the National Campaign to Prevent Teen and Unplanned Pregnancy and CosmoGirl.com (2008)—observed that 20 % of teens and 33 % of young adults have sent or posted nude/seminude pictures or videos of themselves. A recent report published by the Pew Research Center (2014) found that sexting (defined as “receiving, sending, or forwarding sexually suggestive photos or videos via cell phones”) is more popular among those aged 18 to 24: This proportion of adolescents and young adults who reported to have received sexts jumped to 44 % in 2014, from the low point of 26 % in the 2012 (Pew Research 2012). In Italy, where the present study was conducted, a similar survey run by Eurispes and Telefono Azzurro (2012) found that 26 % of adolescents have received sexts (defined as “receiving or sending sexually suggestive messages, photos, or videos”) and 12 % have sent sexts. In only 1 year, these percentages had almost doubled, compared to a previous study conducted in 2011 (Eurispes & Telefono Azzurro 2011). This result can

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be partially explained by the rapid spread of smartphones within Italian society.

Many authors have revealed similar findings regarding sexting patterns. For instance, sexting behaviors are more frequently reported by adolescents and young adults (Dake et al. 2012; Kopecký 2012; Strassberg et al. 2013; Temple et al. 2012). Therefore, the literature suggests that sexting could continue to increase in popularity, as technology will become increasingly available among teenagers (Samimi and Alderson 2014).

Sexting should not always be considered as a problematic behavior as it could also represent a normal expression of sexuality among young people, as suggested by Levine (2013). In fact, according to this author, some studies found that sexting was not related to psychological distress (Hudson 2011; O'Sullivan 2014; Temple et al. 2014). On the contrary, many other investigations underlined the relationship between sexting and problematic behaviors: Sexting was found to correlate with impulsive personality traits like sensation seeking and negative urgency (Dir et al. 2013a) and aggressive behaviors such as dating violence or online victimization (Dake et al. 2012; Drouin et al. 2015; Gamez-Guadix et al. 2015; Morelli et al. 2016a). In line with these results, other authors found that sexting behaviors are strongly associated with several risky behaviors, like high-risk sexual behaviors, alcohol and substance use (Benotsch et al. 2013; Dake et al. 2012; Ferguson 2011; Temple et al. 2014). In particular, several studies found that sexting and alcohol consumption are significantly related (Benotsch et al. 2013; Bonomi et al. 2013; Dake et al. 2012; Dir et al. 2013a; Temple et al. 2012, 2014). Dir et al. (2013a) found that sexting is a mediator in the relationship between alcohol consumption and sexual hookups. They also observed that both sexting and alcohol use were predicted by the personality traits of sensation seeking and negative urgency. A recent review underlined that risky sexual behaviors are more frequent among adolescents exposed to cyber pornography (Owens et al. 2012). Regarding adolescents, Brown and L'Engle (2009) found that exposure to sexually explicit content in the media could affect sexual habits and attitudes. As suggested by Brown and L'Engle (2009), sexual socialization theory (Aubrey et al. 2003) and social learning theory (Bandura 1986, 2001) could account for this relationship. Provocative and sexualized models proposed by the media affect the building of behavioral scripts of how males and females are supposed to be, and to behave, in a sexual context. In line with this perspective, recent studies from the USA (Crimmins and Seigfried-Spellar 2014) and Europe (Van Ouytsel et al. 2014) confirmed that cyber pornography is strongly associated with sexting behaviors. Specifically, Crimmins and Seigfried-Spellar (2014) reported that young adults who use adult pornography are four times more likely to engage in sexting. Nevertheless, a recent study found no direct relationship between exposure to Internet

pornography and sexual self-presentation on social media among adolescents, suggesting that there could be some factors that affect this link (Vandenbosch et al. 2015). In line with this evidence, and due to inconsistent results found in the scientific literature, we aimed to investigate the relationship between cyber pornography addiction and sexting, also considering the disinhibitory effect of alcohol use on sexual responsiveness that has received significant attention in the past years (Justus et al. 2000). Several studies showed that alcohol intoxication can lead to more risky sexual behaviors (MacDonald et al. 1998) and this has been explained by the role of alcohol in decreasing the capacity to inhibit sexual responses (Wilson and Niaura 1984). These patterns of results were found both in global association studies (i.e., measuring habitual alcohol consumption) and in situational association studies (i.e., measuring alcohol consumption during sexual activities) (Leigh and Stall 1993), suggesting that there could be an underlying relationship between alcohol consumption and risky sexual behaviors. Thus, in line with this perspective, we hypothesized that the relationship between cyber pornography addiction and sexting can be moderated by the level of alcohol consumption.

## Aims and Hypotheses of the Study

The first purpose of our study was to investigate how sexting behaviors were distributed among Italian adolescents, by studying gender and age differences. Specifically, building upon evidence from previous studies (AP-MTV 2009; Cox 2009; National Campaign to Prevent Teen and Unplanned Pregnancy and CosmoGirl.com 2008; Strassberg et al. 2013; Strohmaier et al. 2014), we expected that receiving sexts would be more frequently reported than sending sexts (Dir et al. 2013b) and that sexting behaviors increase with age (Dake et al. 2012; Lenhart 2009; Strassberg et al. 2013; Temple et al. 2012). Further, we investigated the relationship between sexting behaviors and other risky behaviors, specifically cyber pornography addiction and alcohol consumption. In particular, we hypothesized that sexting behaviors were positively related to alcohol consumption (Benotsch et al. 2013; Dake et al. 2012; Dir et al. 2013a; Temple et al. 2014) and to cyber pornography addiction (Crimmins and Seigfried-Spellar 2014; Van Ouytsel et al. 2014). Many studies have underlined gender differences in risky behaviors among adolescents (for a review, see Dir et al. 2014). Teen boys generally show more impulsivity traits and engage more often in multiple risky sexual behaviors than girls (Bongers et al. 2003; Eysenck et al. 1984; Grunbaum et al. 2002, 2004; Kotchick et al. 2001; Newman and Zimmerman 2000; Romer and Hennessy 2007). Therefore, we expected that the three risky behaviors considered in the present study (i.e., sexting behaviors, alcohol consumption, and cyber pornography addiction)

were practiced more by boys than girls. Regarding gender differences in sexting behaviors, since the evidence appears inconsistent (Cox 2009; Dir et al. 2013b; Gordon-Messer et al. 2013; Strassberg et al. 2013; AP-MTV 2009), we explored how receiving, sending, and posting sexts may be different for boys and girls. Finally, we tested the possible moderating role of alcohol consumption in the relationship between cyber pornography addiction and sexting behavior, because literature showed a disinhibitory effect of alcohol consumption on sexual responsiveness (Justus et al. 2000; MacDonald et al. 1998; Wilson and Niaura 1984). In this sense, it is plausible to expect that alcohol consumption would facilitate a link between cyber pornography and sexting. In other terms, the association between cyber pornography and sexting behavior would be moderated by alcohol consumption levels (see Fig. 1). Therefore, we expected that, at higher levels of cyber pornography addiction, those who have higher alcohol consumption would show more sexting behaviors as compared to those that have a lower alcohol consumption. In fact, at lower levels of alcohol consumption, we expected that cyber pornography addiction would be less associated with sexting behaviors. To our knowledge, this hypothesis has never been tested before.

## Method

### Participants and Procedure

The participants were 610 adolescents aged 13 to 20 years ( $M_{age} = 16.8$ ;  $SD_{age} = 1.63$ ; 385 females, 63.1 %). Data were collected by a paper and pencil questionnaire. Participants were recruited from Italian public schools and universities. Written informed consent was obtained by parents on behalf of minor participants. Adult participants were asked to provide a written consent to participate to the study. The majority of participants lived with both parents (78.9 %), or with only one parent (14 %). The parents' educational levels were as follows: 34.7 % of fathers and 28.4 % of mothers had a middle school degree, 44.7 % of fathers and 51.4 % of mothers had a high school degree, and 20.4 % of fathers and 20.3 % of mothers had a university degree or post-university education. This study and its procedure for data collection were approved by the Ethics Committee of the Department of Dynamic and Clinical Psychology of Sapienza University of Rome.

## Measures

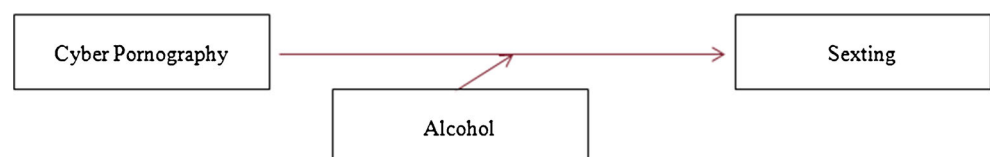
**Sociodemographic Data** The participants were initially asked about some personal data, as well as family composition and further information about sociodemographics.

**Sexting Behaviors** Sexting behaviors were assessed through the Sexting Behaviors Questionnaire (SBQ; Morelli et al. 2016b), an instrument inspired by the Sexting Behaviors Scale (Dir 2012). The scale was composed of 29 items that evaluated the frequency of different sexting behaviors on a five-point Likert scale, from 1 (*never*) to 5 (*frequently or daily*). Sexting was defined as the exchange of provocative or sexually suggestive messages, pictures, or videos via smartphone, Internet, or social networks (a sample item is “How often have you received provocative or sexually suggestive pictures, messages or videos over the Internet (i.e., Facebook, e-mail, Myspace)?”). The strength of this scale is the deeper assessment of the three subdimensions of sexting: receiving, sending, and publicly posting. For a more detailed description of the scale, see Morelli et al. (2016b). The scale reached a Cronbach alpha of 0.92. The three subdimensions showed good reliability as well: the receiving subscale exhibited a Cronbach alpha of 0.85, with the sending subscale showing 0.84 and the posting subscale showing 0.94.

**Alcohol Consumption** Alcohol consumption was assessed with the Alcohol Use Disorders Identification Test (AUDIT) (Babor et al. 2001). This scale was developed by the World Health Organization to evaluate alcohol-related problems and the possible risk for individual health. The scale assesses the amount and frequency of drinking, the alcohol addiction, and the problems related to alcohol abuse. In our scale, the participants had to rate eight items on a five-point scale, ranging from 0 (*never*) to 4 (*frequently or daily*). A total score for alcohol consumption based on these items was used in this study. In this sample, the scale reached a Cronbach alpha of 0.76.

**Cyber Pornography Addiction** The perceived addiction to cyber pornography was assessed through the nine-item short form of the Cyber Pornography Use Inventory (CPUI-9; Grubbs et al. 2013). Cyber pornography was defined as any sexually explicit material whose primary purpose is to cause a sexual arousal (McManus 1986) researched via the use of the Internet (Owens et al. 2012). This scale evaluated the perceived cyber pornography addiction, taking into account three dimensions: perceived compulsivity (a sample item is “I

**Fig. 1** Tested moderation model



believe I am addicted to Internet pornography”), access efforts (a sample item is “At times, I try to arrange my schedule so that I will be able to be alone to view pornography”), and emotional distress (a sample item is “I feel ashamed after viewing pornography online”). This scale was rated on a seven-point Likert scale from 1 (*disagree*) to 7 (*agree*). In this study, the total score of cyber pornography addiction was used and the scale exhibited a Cronbach alpha of 0.80.

**Data Analysis**

We initially measured the frequencies of sexting behaviors for the total score and the three subdimensions: receiving, sending, and posting. Afterward, the correlations between age, total sexting behaviors score, the three subdimensions of sexting (i.e., receiving, sending and posting), alcohol consumption, and cyber pornography addiction were computed.

A multivariate analysis of covariance (MANCOVA) was performed to test for gender differences in cyber pornography addiction, alcohol consumption, and sexting behaviors, controlling for age (introduced as a covariate). Likewise, a MANCOVA was also performed to assess gender differences in the three sexting dimensions (i.e., receiving, sending, and posting), controlling for age. The use of multivariate analysis of variance and covariance is strongly recommended where there are several dependent measures, since it protects against inflated type I error stemming from multiple tests of related dependent measures (Tabachnick and Fidell 2013).

Finally, a moderation regression analysis was performed, following the suggestions of Aiken and West (1991). In order to have a complete standardized solution, all of the variables were standardized in advance (*z*-scores). Afterward, the standardized scores of cyber pornography addiction and alcohol consumption were multiplied to form the interaction term. The moderation effect was then tested in different steps using hierarchical regression analysis. In the first step, sociodemographic variables such as gender and age were included as covariates. In the second step, cyber pornography addiction and alcohol consumption were regressed on the criterion. In the third step, the interaction term (i.e., cyber pornography addiction × alcohol consumption) was included in the regression equation.

**Results**

**Descriptive Analyses**

We initially wanted to analyze the occurrence of sexting behavior among our participants. Regarding sexting behaviors, 487 participants (79.8 %) reported to have exchanged sexts (received, sent, or posted) at least once. Regarding the three subdimensions of sexting, 471 participants (77.2 %) reported

to have received a sext at least once and 334 participants (54.8 %) reported to have sent a sext at least once, while 52 participants (8.5 %) declared to have posted a sext at least once on social networks.

**Correlations Between Age, Sexting, Alcohol Consumption, and Cyber Pornography Addiction**

The correlations among age, sexting behaviors, alcohol consumption, and cyber pornography addiction are reported in Table 1. Age was not correlated with cyber pornography addiction; however, it was positively but modestly correlated with sexting and alcohol consumption. Sexting was significantly and robustly correlated with alcohol consumption and cyber pornography addiction, which were also moderately but significantly related to each other.

The correlations among the subdimensions of sexting and age, alcohol consumption, and cyber pornography addiction are reported in Table 2. Receiving and sending sexts were significantly, although modestly, correlated with age. Receiving, sending, and posting were all substantially related to both alcohol consumption and cyber pornography addiction (*r<sub>s</sub>* between 0.22 and 0.34).

**Gender Differences Between Sexting, Alcohol Consumption, and Cyber Pornography Addiction**

In order to test the gender differences in sexting, alcohol consumption, and cyber pornography addiction, a MANCOVA was applied, with gender as the between-group variable; sexting, alcohol consumption, and cyber pornography addiction as dependent variables, and age as the covariate (see Table 3). The multivariate effect was significant, *Wilks’s lambda*=0.89, *F*(3, 605)=25.55, *p*=0.000, showing an overall significant effect of gender on the dependent variables. Moreover, age was a significant covariate, *Wilks’s lambda*=0.94, *F*(3, 605)=13.75, *p*=0.000. In fact, as noted

**Table 1** Intercorrelations among age, sexting total score, alcohol consumption, and cyber pornography addiction (*n* = 610)

	1	2	3	4	M	SD
1. Age	1				16.78	1.63
2. Sexting total score	0.15**	1			1.26	0.35
3. Alcohol consumption	0.23**	0.34**	1		3.74 <sup>a</sup>	3.94
4. Cyber pornography addiction	-0.03	0.36**	0.13**	1	1.38	0.70

\**p* < 0.05; \*\**p* < 0.01

<sup>a</sup>The mean of our sample, when converted in standard AUDIT score, corresponded to a score of 4.67, indicating a low-risk level of alcohol consumption. Participants who reached a score of 1 standard deviation above the mean, corresponded to a standard AUDIT score of 9.6, indicating a risky or hazardous level of alcohol consumption

**Table 2** Intercorrelations among age, sexting subdimensions, alcohol consumption, and cyber pornography addiction ( $n = 610$ )

	1	2	3	4	5	6	M	SD
1. Age	1						16.78	1.63
2. Receiving sexts	0.14**	1					1.45	0.53
3. Sending sexts	0.16**	0.77**	1				1.20	0.32
4. Posting sexts	0.02	0.42**	0.56**	1			1.05	0.28
5. Alcohol consumption	0.23**	0.33**	0.29**	0.22**	1		3.74	3.94
6. Cyber pornography addiction	-0.03	0.30**	0.34**	0.32**	0.13**	1	1.38	0.70

\* $p < 0.05$ ; \*\* $p < 0.01$

in Table 1, there was a positive correlation of age with sexting and alcohol consumption. However, the MANCOVA showed that the multivariate effect of gender also remains significant when controlling for age.

In order to interpret the effect of gender, a set of univariate ANOVAs were conducted for each of the dependent variables (see Table 3 for the means and standard deviations). Male participants showed a significantly higher mean than female regarding sexting behaviors,  $F(1, 609) = 47.71, p = 0.000$ , alcohol consumption,  $F(1, 609) = 7.68, p = 0.006$ , and cyber pornography addiction,  $F(1, 609) = 52.74, p = 0.000$ .

Since the variables (sexting, alcohol consumption, and cyber pornography addiction) were not normally distributed, we also tested for gender differences employing nonparametric statistical analyses, in particular males and females distributions were compared using the Mann–Whitney  $U$  test. As reported in Table 4, results were confirmed as males and females were significantly different in each variable.

### Gender Differences Between the Three Subdimensions of Sexting: Receiving, Sending, and Posting Sexts

A MANCOVA was applied to test the gender differences between three sexting subdimensions (i.e., receiving, sending, and posting sexts), with gender as the between-group variable; age as the covariate; and receiving, sending, and posting sexts as the dependent variables (see Table 5). The multivariate effect was significant,  $Wilks's\ lambda = 0.92, F(3, 605) = 18.37, p = 0.000$ , showing an overall significant effect of gender on the dependent variables, when controlling for age, which was a significant covariate,  $Wilks's\ lambda = 0.97,$

**Table 3** Means of sexting, alcohol consumption, and cyber pornography addiction in function of gender (standard deviations between brackets)

Dependent variables	Males $M (SD)$	Females $M (SD)$
Sexting total score	1.38 (0.45)	1.19 (0.24)
Alcohol consumption	4.33 (4.37)	3.39 (3.62)
Cyber pornography addiction	1.64 (0.80)	1.23 (0.59)

$n = 610$

$F(3, 605) = 6.61, p = 0.000$ . In order to interpret the direction of this effect, a set of univariate ANOVAs were conducted for each of the dependent variables (see Table 5 for the means and standard deviations). Males showed a significantly higher mean than females for receiving sexts,  $F(1, 609) = 55.08, p = 0.000$ , sending sexts,  $F(1, 609) = 32.73, p = 0.000$ , and posting sexts,  $F(1, 609) = 11.66, p = 0.001$ .

As reported above, these variables were also not normally distributed. Thus, we conducted nonparametric statistical analyses in order to test for gender differences: male and female distributions on sexting subdimensions were compared using the Mann–Whitney  $U$  test. As shown in Table 4, results were confirmed as males and females were significantly different in each variable.

### Moderating Effect of Alcohol Consumption in the Relationship Between Cyber Pornography Addiction and Sexting Behaviors

Regarding moderation analysis, a hierarchic regression analysis was conducted following the previously described procedure. Alcohol consumption was expected to amplify the effect of cyber pornography addiction on sexting, controlling for sociodemographic variables such as gender and age. The sociodemographic variables were entered in the first step as covariates. Altogether, they accounted for 9.3 % of the variance,  $R = 0.31, p = 0.000$ . Gender emerged as significant predictor,  $B = -.55, p = 0.000$ , with males

**Table 4** Test of Mann–Whitney  $U$  for gender differences

Dependent variables	Mann–Whitney $U$	$z$
Sexting total score	29,895.00	-6.42**
Receiving sexts	29,602.00	-6.58**
Sending sexts	33,404.50	-4.96**
Posting sexts	39,339.00	-3.90**
Alcohol consumption	38,073.50	-2.51*
Cyber pornography addiction	24,391.50	-10.15**

\* $p < 0.05$ ; \*\* $p < 0.01$

reporting more sexting, as did age,  $B=0.14$ ,  $p=0.000$ , with older participants reporting more sexting.

In the second step, in which cyber pornography addiction and alcohol consumption were added to the equation, 24.6 % of the variance was accounted for,  $R=0.50$ , with a significant increment of 15.3 % in the explained variance,  $\Delta F(2, 605)=61.20$ ,  $p=0.000$ . Both cyber pornography addiction,  $B=0.28$ ,  $p=0.000$ , and alcohol consumption,  $B=0.26$ ,  $p=0.000$ , were significant predictors of sexting. Finally, in the third step, the interaction term between cyber pornography addiction and alcohol consumption was added to the model. The interaction was significant,  $B=0.14$ ,  $p=0.000$ , adding a significant 3.8 % to the explained variance,  $\Delta F(1, 604)=31.91$ ,  $p=0.000$ . Overall, the final model explained 28.3 % of the variance,  $R=0.53$ ,  $p=0.000$ . Full statistics of the final model (third step) are reported in Table 6. Both cyber pornography addiction and alcohol consumption were still significant predictors of sexting. More interestingly, the interaction term between cyber pornography addiction and alcohol consumption was significant, suggesting a moderating effect of alcohol consumption on sexting, as hypothesized (Table 6).<sup>1</sup>

In order to interpret the direction of the interaction, a slope examination was conducted by plotting the predicted values of sexting as a function of cyber pornography addiction and two different levels of alcohol consumption (see Fig. 2): low (i.e., one standard deviation below the mean) and high (i.e., one standard deviation above the mean; in our sample, it would correspond to AUDIT score of 9.6 that indicates a risky or hazardous alcohol consumption). There was a positive relationship between cyber pornography addiction and sexting,  $B=0.38$ ,  $p=0.000$  in those that reported a high alcohol consumption, whereas the impact of cyber pornography addiction on sexting decreased dramatically in those that reported a low alcohol consumption,  $B=0.10$ , *n.s.* Thus, it appears that alcohol consumption amplifies and facilitates the relationship between cyber pornography addiction and sexting, whereas on the other hand, alcohol restraint moderates the impact of cyber pornography addiction on sexting.

<sup>1</sup> In regression analysis, a common method to address the nonnormality distribution of variables is to apply linear transformations, such as logarithmic or square root transformations when appropriate (see Tabachnick and Fidell 2013). Logarithmic transformation was used as regards cyber pornography and sexting, while a square root transformation was used for AUDIT (since AUDIT scores include zero as value therefore a logarithmic transformation would not be appropriate). The patterns of results of regression moderation analysis did not change substantially. The main effects of cyber pornography,  $B=0.21$ ,  $p=0.000$ , and alcohol,  $B=0.25$ ,  $p=0.000$ , although slightly reduced, remained significant. More interestingly, also the interaction term remained statistically significant,  $B=0.09$ ,  $p=0.000$ , although slightly reduced.

**Table 5** Means of the three dimensions of sexting: receiving, sending, and posting (standard deviations between brackets)

Dependent variables	Males $M$ ( $SD$ )	Females $M$ ( $SD$ )
Receiving sexts	1.65 (0.66)	1.34 (0.39)
Sending sexts	1.29 (0.41)	1.14 (0.24)
Posting sexts	1.10 (0.43)	1.02 (0.11)

$n=610$

## Discussion

In the past decade, technology has altered the ways in which adolescents and young adults communicate and interact with their peers: Sexting is one of these new types of communication. The majority of studies reveal that sexting has been found to be prevalent among adolescents and young adults (AP-MTV 2009; Temple et al. 2012). Therefore, we aimed to evaluate the incidence of sexting in a sample of Italian adolescents. Our results showed a high frequency of sexting behaviors: 77.2 % of the participants reported to have received a sext at least once, 54.8 % to have sent a sext at least once, while 8.5 % declared to have posted a sext at least once on social networks. A previous study on adolescents in Italy (Eurispes & Telefono Azzurro 2012) found that 26 % of the participants received sexts and 12 % sent sexts. However, the prevalence found in 2012 had almost doubled compared to the prevalence found only 1 year before (Eurispes & Telefono Azzurro 2011). Finally, our results were similar to those of previous studies conducted in Italy (Morelli et al. 2016b) and to studies that employed the Sexting Behaviors Scale (Dir et al. 2013b), from which our instrument was inspired.

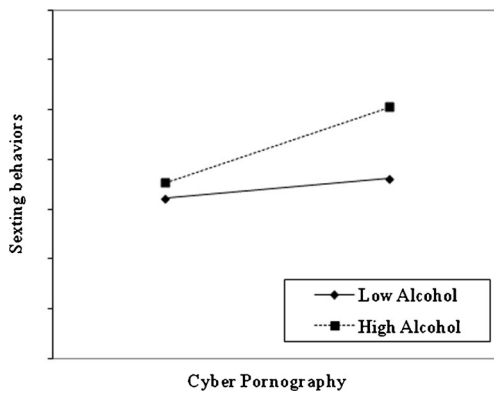
As we hypothesized, gender differences were found for the three sexting subdimensions (i.e., receiving, sending, and posting sexts): Males were more likely to send, receive, and post sexts. These results may be explained by referring to the Italian cultural context. Previous studies found that Italian male adolescents are more likely than females to report that

**Table 6** Regression moderation analysis (step 3)

Predictors	Sexting behaviors
	$B$
Age	0.10*
Gender	-0.36**
Cyber pornography addiction	0.24**
Alcohol consumption	0.22**
Pornography $\times$ alcohol	0.14**
$R^2$	0.28

Gender was coded as 0 = males and 1 = females

\* $p < 0.01$ ; \*\* $p < 0.001$



**Fig. 2** The moderating effect of alcohol consumption in the relationship between cyber pornography and sexting

they find erotic materials enjoyable and arousing, and reported stronger positive expectancies about receiving sexts (Eurispes & Telefono Azzurro 2012).

Consistent with previous studies exploring the correlations between risky behaviors and sexting (Dir et al. 2013a), our study provided information pertaining to the relationships between cyber pornography addiction, alcohol consumption, and sexting. Nevertheless, results from the moderation analysis suggested that the relationship between cyber pornography addiction and sexting is stronger in those who have a high alcohol consumption. Conversely, alcohol restraint could represent a protective factor against engaging in sexting even in the presence of high cyber pornography addiction. Therefore, we suggest that the tendency to reenact the contents viewed in cyber pornography sites appear to be facilitated by the disinhibition effect of alcohol consumption. To our knowledge, this hypothesis was never been tested before and is in need of support among different age groups and cultural contexts. However, our results suggest that cyber pornography is not a predictor of sexting per se, because its relationship with sexting becomes weak in those who have a lower alcohol consumption. Thus, these results could be explained by the presence of a factor underlying all assessed dimensions (i.e., cyber pornography, alcohol, and sexting): as suggested by Krueger et al. (2005), there could be a common ethiological pattern for externalizing behaviors that involves both antisocial behaviors, substance use, and personality traits. Future research should investigate the relationship between cyber pornography and sexting in line with this perspective. Furthermore, our study may have research implications beyond clinical implications. Results could shed light on how to investigate sexting predictors and suggest that researchers should be careful in studying sexting antecedents. There seem to be other possible factors that condition (moderate) the relationship between these antecedents and sexting. In fact, the literature had shown inconsistent results regarding the link between cyber pornography and sexting (Crimmins and Seigfried-Spellar 2014; Vandenbosch et al. 2015; Van

Ouytsel et al. 2014). To our knowledge, this is one of the first studies that investigated not only the linear relationships but also the interaction effects between the antecedents of sexting. This could also help to precisely identify factors that lead to sexting and to project more effective prevention programs.

### Limitations and Future Research

There were important limitations to our study. First, we used a convenience sample and we did not consider how social class or ethnicity might interrelate with sexting behaviors. Second, the study was conducted in Italy, and these findings may not apply to adolescents living in other countries. Third, there was a possible effect of social desirability, as there always is when data are collected using self-report questionnaires. Additionally, using qualitative methods to further analyze the ways in which sexting behavior is placed in a context of adolescent impulsivity, sensation seeking, and problematic alcohol and drug abuse would also be of interest. Moreover, it would be useful to study the direct and indirect effects of sexting on adolescents' development and provide suggestions for future policies and research.

Even if sexting could be considered a normal expression of sexuality among adolescents (Dake et al. 2012; Levine 2013), some characteristics of sexting—such as the mass dissemination of explicit images, cyberbullying, social humiliation, psychological distress, and legal issues—require significant preventive interventions through law enforcement and education for adolescents, parents, and educators, as previously suggested by Martinez-Prather and Vandiver (2014). In particular, it is critical to understand the beliefs, attitudes, and risky behaviors associated with sexting and, consequently, to provide adequate sexual education to adolescents. In Italy, negative attitudes toward sexual education persist; hence, prevention programs should be developed to deconstruct stereotypes regarding sexuality during adolescence. It is our hope that this paper will contribute to the scientific understanding and promotion of psychological well-being for adolescents.

### Compliance with Ethical Standards

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

**Conflict of Interest** The authors declare that they have no conflict of interest.

## References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks: Sage.
- AP-MTV. (2009). *A thin line: 2009 APMTV digital abuse study*. Retrieved from [http://www.athinline.org/MTV-AP\\_Digital\\_Abuse\\_Study\\_Full.pdf](http://www.athinline.org/MTV-AP_Digital_Abuse_Study_Full.pdf).
- Aubrey, J., Harrison, K., Kramer, L., & Yellin, J. (2003). Variety vs. timing: gender differences in college students' sexual expectations as predicted by exposure to sexually oriented television. *Communication Research*, 30(4), 432–460. doi:10.1177/0093650203253365.
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The alcohol use disorders identification test. Guidelines for use in primary care* (2nd ed.). Geneva: World Health Organization. Retrieved from <http://pftp.paho.org/Public/NMH/Alcohol/Cartagena/ArticulosUSB/AuditBro-3.pdf>.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs: PrenticeHall.
- Bandura, A. (2001). Social cognitive theory: an agentic perspective. *Annual Review of Psychology*, 52(1), 1–26. doi:10.1146/annurev.psych.52.1.1.
- Benotsch, E. G., Snipes, D. J., Martin, A. M., & Bull, S. S. (2013). Sexting, substance use, and sexual risk behavior in young adults. *Journal of Adolescent Health*, 52(3), 307–313. doi:10.1016/j.jadohealth.2012.06.011.
- Bongers, I. L., Koot, H. M., Van der Ende, J., & Verhulst, F. C. (2003). The normative development of child and adolescent problem behavior. *Journal of Abnormal Psychology*, 112(2), 179–192. doi:10.1037/0021-843X.112.2.179.
- Bonomi, A. E., Anderson, M. L., Nemeth, J., Rivara, F. P., & Buettner, C. (2013). History of dating violence and the association with late adolescent health. *BMC Public Health*, 13(1), 1–12. doi:10.1089/jwh.2006.0239.
- Brown, J. D., & L'Engle, K. L. (2009). X-rated sexual attitudes and behaviors associated with US early adolescents' exposure to sexually explicit media. *Communication Research*, 36(1), 129–151. doi:10.1177/0093650208326465.
- Chalfen, R. (2009). 'It's only a picture': sexting, 'smutty' snapshots and felony charges. *Visual Studies*, 24(3), 258–268. doi:10.1080/14725860903309203.
- Cox Communications (2009). *Teen online and wireless safety survey: Cyberbullying, sexting, and parental controls*. Retrieved from <http://www.scribd.com/doc/20023365/2009-Cox-Teen-Online-Wireless-Safety-Survey-Cyberbullying-Sexting-and-Parental-Controls>.
- Crimmins, D. M., & Seigfried-Spellar, K. C. (2014). Peer attachment, sexual experiences, and risky online behaviors as predictors of sexting behaviors among undergraduate students. *Computers in Human Behavior*, 32, 268–275. doi:10.1016/j.chb.2013.12.012.
- Dake, J. A., Price, D. H., Maziarz, L., & Ward, B. (2012). Prevalence and correlates of sexting behaviour in adolescents. *American Journal of Sexuality Education*, 7, 1–15. doi:10.1080/15546128.2012.650959.
- Dir, A. L. (2012). *Understanding sexting behaviors, sexting expectancies, and the role of sensation seeking in sexting behaviors* (Master's thesis, Purdue University). Retrieved from [https://scholarworks.iupui.edu/bitstream/handle/1805/3358/defense\\_manuscript\\_formatted\\_final.pdf?sequence=3](https://scholarworks.iupui.edu/bitstream/handle/1805/3358/defense_manuscript_formatted_final.pdf?sequence=3).
- Dir, A. L., Coskunpinar, A., Steiner, J. L., & Cyders, M. A. (2013b). Understanding differences in sexting behaviors across gender, relationship status, and sexual identity, and the role of expectancies in sexting. *Cyberpsychology, Behavior and Social Networking*, 16(8), 568–574. doi:10.1089/cyber.2012.0545.
- Dir, A. L., Cyders, M. A., & Coskunpinar, A. (2013a). From the bar to the bed via mobile phone: a first test of the role of problematic alcohol use, sexting, and impulsivity-related traits in sexual hookups. *Computers in Human Behavior*, 29(4), 1664–1670. doi:10.1016/j.chb.2013.01.039.
- Dir, A. L., Coskunpinar, A., & Cyders, M. A. (2014). A meta-analytic review of the relationship between adolescent risky sexual behavior and impulsivity and risky sexual behavior across gender, age, and race. *Clinical Psychology Review*, 34(7), 551–562. doi:10.1016/j.cpr.2014.08.004.
- Drouin, M., Ross, J., & Tobin, E. (2015). Sexting: a new, digital vehicle for intimate partner aggression? *Computers in Human Behavior*, 50(1), 197–204. doi:10.1016/j.chb.2015.04.001.
- Eurispes & Telefono Azzurro (2011). *Indagine conoscitiva sulla condizione dell'infanzia e dell'adolescenza in Italia* [Explorative investigation about Italian condition of infancy and adolescence]. Retrieved from [http://www.osservatoriopedofilia.gov.it/dpo/resources/cms/documents/sintesi\\_indagine\\_telefono\\_azzurroeurispes\\_2011.pdf](http://www.osservatoriopedofilia.gov.it/dpo/resources/cms/documents/sintesi_indagine_telefono_azzurroeurispes_2011.pdf).
- Eurispes & Telefono Azzurro (2012). *Indagine conoscitiva sulla condizione dell'infanzia e dell'adolescenza in Italia* [Explorative investigation about Italian condition of infancy and adolescence]. Retrieved from [http://www.azzurro.it/sites/default/files/SintesiIndagine conoscitiva Infanzia Adolescenza 2012\\_1.pdf](http://www.azzurro.it/sites/default/files/SintesiIndagine%20conoscitiva%20Infanzia%20Adolescenza%2012_1.pdf).
- Eysenck, S. B., Easting, G., & Pearson, P. R. (1984). Age norms for impulsiveness, venturesomeness and empathy in children. *Personality and Individual Differences*, 5(3), 315–321. doi:10.1016/0191-8869(84)90070-9.
- Ferguson, C. J. (2011). Sexting behaviors among young Hispanic women: incidence and association with other high-risk sexual behaviors. *Psychiatric Quarterly*, 82(3), 239–243. doi:10.1007/s11226-010-9165-8.
- Gamez-Guadix, M., Almendros, C., Borrajo, E., & Calvete, E. (2015). Prevalence and association of sexting and online sexual victimization among Spanish adults. *Sexuality Research and Social Policy*, 12(2), 145–154. doi:10.1007/s13178-015-0186-9.
- Gordon-Messer, D., Bauermeister, J. A., Grodzinski, A., & Zimmerman, M. (2013). Sexting among young adults. *Journal of Adolescent Health*, 52(3), 301–306. doi:10.1016/j.jadohealth.2012.05.013.
- Grubbs, J. B., Volk, F., Exline, J. J., & Pargament, K. I. (2013). Internet pornography use: perceived addiction, psychological distress, and the validation of a brief measure. *Journal of Sex & Marital Therapy*, 41(1), 83–106. doi:10.1080/0092623X.2013.842192.
- Grunbaum, J. A., Kann, L., Kinchen, S. A., Williams, B., Ross, J. G., Lowry, R., & Kolbe, L. (2002). Youth risk behavior surveillance—United States, 2001. *The Journal of School Health*, 72(8), 313–28. doi:10.1111/j.1746-1561.2002.tb07917.x.
- Grunbaum, J. A., Kann, L., Kinchen, S., Ross, J., Hawkins, J., Lowry, R., Harris, W. A., McManus, T., Chyen, D., & Collins, J. (2004). Youth risk behavior surveillance—United States, 2003. *Morbidity and Mortality Weekly Report*, 53(2), 1–96. <http://www.cdc.gov/mmwr/PDF/ss/ss5302.pdf>.
- Hudson, H. K. (2011). Factors affecting sexting behaviours among selected undergraduate students. Unpublished doctoral thesis, Southern University Illinois Carbondale, Illinois, United States. Retrieved from [http://www.ehs.siu.edu/her/\\_common/documents/prospectus/prospectus\\_1/hudson-prospectus.pdf](http://www.ehs.siu.edu/her/_common/documents/prospectus/prospectus_1/hudson-prospectus.pdf).
- Justus, A. N., Finn, P. R., & Steinmetz, J. E. (2000). The influence of traits of disinhibition on the association between alcohol use and risky sexual behavior. *Alcoholism: Clinical and Experimental Research*, 24(7), 1028–1035. doi:10.1111/j.1530-0277.2000.tb04646.x.
- Kopecký, K. (2012). Sexting among Czech preadolescents and adolescents. *The New Educational Review*, 28(2), 39–48.



- Kotchick, B. A., Shaffer, A., Miller, K. S., & Forehand, R. (2001). Adolescent sexual risk behavior: a multi-system perspective. *Clinical Psychology Review, 21*(4), 493–519. doi:10.1016/S0272-7358(99)00070-7.
- Krueger, R. F., Markon, K. E., Patrick, C. J., & Iacono, W. G. (2005). Externalizing psychopathology in adulthood: a dimensional-spectrum conceptualization and its implications for DSM-V. *Journal of Abnormal Psychology, 114*(4), 537–550. doi:10.1037/0021-843X.114.4.537.
- Leigh, B. C., & Stall, R. (1993). Substance use and risky sexual behavior for exposure to HIV: issues in methodology, interpretation, and prevention. *American Psychologist, 48*(10), 1035.
- Lenhart, A. (2009). *Teens and sexting*. Washington, DC: Pew Research Center. Retrieved from <http://pewinternet.org/Reports/2009/Teens-and-Sexting.aspx>.
- Levine, D. (2013). Sexting: a terrifying health risk ... or the new normal for young adults? *Journal of Adolescent Health, 52*(3), 257–258. doi:10.1016/j.jadohealth.2013.01.003.
- MacDonald, T. K., Zanna, M. P., & Fong, G. T. (1998). Alcohol and intentions to engage in risky health-related behaviors: Experimental evidence for a causal relationship. In J. G. Adair (Ed.), *Advances in psychological science (vol. 1)* (pp. 407–428). Hove: Psychology Press.
- Martinez-Prather, K., & Vandiver, D. M. (2014). Sexting among teenagers in the united states: a retrospective analysis of identifying motivating factors, potential targets, and the role of a capable guardian. *International Journal of Cyber Criminology, 8*(1), 21–35.
- McManus, M. (1986). *Final report of the Attorney General's Commission on Pornography*. Nashville: Rutledge Hill Press.
- Morelli, M., Bianchi, D., Baiocco, R., Pezzuti, L., & Chirumbolo, A. (2016a). Not-allowed sharing of sexts and dating violence from the perpetrator's perspective: the moderation role of sexism. *Computers in Human Behaviors, 56*, 163–169. doi:10.1016/j.chb.2015.11.047.
- Morelli, M., Bianchi, D., Baiocco, R., Pezzuti, L., & Chirumbolo, A. (2016b). Sexting, psychological distress and dating violence among adolescents and young adults. *Psicothema, 28*(2), 137–142. doi:10.7334/psicothema2015.193.
- National Campaign to Prevent Teen and Unplanned Pregnancy & CosmoGirl.com (2008). *Sex and tech*. Retrieved from [http://thenationalcampaign.org/sites/default/files/resource-primary-download/sex\\_and\\_tech\\_summary.pdf](http://thenationalcampaign.org/sites/default/files/resource-primary-download/sex_and_tech_summary.pdf).
- Newman, P. A., & Zimmerman, M. A. (2000). Gender differences in HIV-related sexual risk behavior among urban African American youth: a multivariate approach. *AIDS Education and Prevention, 12*(4), 308–325.
- O'Sullivan, L. F. (2014). Linking online sexual activities to health outcomes among teens. *New Directions for Child and Adolescent Development, 144*, 37–51. doi:10.1002/cad.20059.
- Owens, E. W., Behun, R. J., Manning, J. C., & Reid, R. C. (2012). The impact of Internet pornography on adolescents: a review of the research. *Sexual Addiction & Compulsivity, 19*(1-2), 99–122. doi:10.1080/10720162.2012.660431.
- Pew Research Center (2012). *The Best (and Worst) of Mobile Connectivity*. Retrieved from <http://www.pewinternet.org/2012/11/30/part-v-cell-phone-usage/>.
- Pew Research Center (2014). *Couples, the Internet, and Social Media*. Retrieved from <http://pewinternet.org/Reports/2014/Couples-and-the-internet.aspx>.
- Romer, D., & Hennessy, M. (2007). A biosocial-affect model of adolescent sensation seeking: the role of affect evaluation and peer-group influence in adolescent drug use. *Prevention Science, 8*(2), 89–102. doi:10.1007/s1121-007-0064-7.
- Samimi, P., & Alderson, K. G. (2014). Sexting among undergraduate students. *Computers in Human Behavior, 31*, 230–241. doi:10.1016/j.chb.2013.10.027.
- Strassberg, D. S., McKinnon, R. K., Sustaita, M. A., & Rullo, J. (2013). Sexting by high school students: an exploratory and descriptive study. *Archives of Sexual Behavior, 42*(1), 15–21. doi:10.1007/s10508-012-9969-8.
- Strohmaier, H., Murphy, M., & DeMatteo, D. (2014). Youth sexting: prevalence rates, driving motivations, and the deterrent effect of legal consequences. *Sexuality Research and Social Policy, 11*(3), 245–255. doi:10.1007/s13178-014-0162-9.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics*. Boston: Pearson.
- Temple, J. R., Paul, J. A., van den Berg, P., Le, V. D., McElhany, A., & Temple, B. W. (2012). Teen sexting and its association with sexual behaviors. *Archives of Pediatrics & Adolescent Medicine, 166*(9), 828–833. doi:10.1001/archpediatrics.2012.835.
- Temple, J. R., Le, V. D., van den Berg, P., Ling, Y., Paul, J. A., & Temple, B. W. (2014). Brief report: teen sexting and psychosocial health. *Journal of Adolescence, 37*(1), 33–36. doi:10.1016/j.adolescence.2013.10.008.
- Van Ouytsel, J., Ponnet, K., & Walrave, M. (2014). The associations between adolescents' consumption of pornography and music videos and their sexting behavior. *Cyberpsychology, Behavior and Social Networking, 17*(12), 772–778. doi:10.1089/cyber.2014.0365.
- Vandenbosch, L., van Oosten, J. M., & Peter, J. (2015). The relationship between sexual content on mass media and social media: a longitudinal study. *Cyberpsychology, Behavior and Social Networking*. doi:10.1089/cyber.2015.0197.
- Wilson, G. T., & Niaura, R. (1984). Alcohol and the disinhibition of sexual responsiveness. *Journal of Studies on Alcohol and Drugs, 45*(3), 219–224.