

Sexually Explicit Cell Phone Messaging Associated With Sexual Risk Among Adolescents

AUTHORS: Eric Rice, PhD,^a Harmony Rhoades, PhD,^a Hailey Winetrobe, MPH,^a Monica Sanchez, MA,^b Jorge Montoya, PhD,^c Aaron Plant, MPH,^c and Timothy Kordic, MA^d

^aSchool of Social Work, University of Southern California, Los Angeles, California; ^bDepartment of Psychology, Clark University, Worcester, Massachusetts; ^cSentient Research, Los Angeles, California; and ^dLos Angeles Unified School District, Los Angeles, California

KEY WORDS

sexual risk behavior, adolescents, HIV, sexting, technology

ABBREVIATIONS

CI—confidence interval

LAUSD—Los Angeles Unified School District

LGBTQ—lesbian, gay, bisexual, transgender, questioning/unsure

OR—odds ratio

STIs—sexually transmitted infections

YRBS—Youth Risk Behavior Survey

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Address correspondence to Eric Rice, PhD, School of Social Work, University of Southern California, 1149 South Hill St, Suite 360, Los Angeles, CA 90015. E-mail: ericr@usc.edu

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WHAT'S KNOWN ON THIS SUBJECT: Sending and receiving sexually explicit picture and text messages via cell phone (ie, "sexting") among adolescents is publicized as a societal and public health concern, yet it is unknown whether sexting is associated with physical sexual activity or sexual risk behavior.



WHAT THIS STUDY ADDS: This study is the first to examine sexting among a probability sample of adolescents and found that sexting is associated with sexual activity, sexual risk behavior, and knowing other person(s) who have sent a sext.

abstract

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OBJECTIVES: Sexting (sending/receiving sexually explicit texts and images via cell phone) may be associated with sexual health consequences among adolescents. However, to date, no published data from a probability-based sample has examined associations between sexting and sexual activity.

METHODS: A probability sample of 1839 students was collected alongside the 2011 Youth Risk Behavior Survey in Los Angeles high schools. Logistic regressions were used to assess the correlates of sexting behavior and associations between sexting and sexual risk-taking.

RESULTS: Fifteen percent of adolescents with cell phone access reported sexting, and 54% reported knowing someone who had sent a sext. Adolescents whose peers sexted were more likely to sext themselves (odds ratio [OR] = 16.87, 95% confidence interval [CI]: 9.62–29.59). Adolescents who themselves sexted were more likely to report being sexually active (OR = 7.17, 95% CI: 5.01–10.25). Nonheterosexual students were more likely to report sexting (OR = 2.74, 95% CI: 1.86–4.04), sexual activity (OR = 1.52, 95% CI: 1.07–2.15), and unprotected sex at last sexual encounter (OR = 1.84, 95% CI: 1.17–2.89).

CONCLUSIONS: Sexting, rather than functioning as an alternative to "real world" sexual risk behavior, appears to be part of a cluster of risky sexual behaviors among adolescents. We recommend that clinicians discuss sexting as an adolescent-friendly way of engaging patients in conversations about sexual activity, prevention of sexually transmitted infections, and unwanted pregnancy. We further recommend that discussion about sexting and its associated risk behavior be included in school-based sexual health curricula. *Pediatrics* 2012;130:667–673

“Sexting,” which refers to the sending or receiving of sexually explicit material (including written messages and images) via cell phone, is a relatively new phenomenon that has received increased attention in recent years, as instances of sexting are publicized and associated with a variety of legal and social/behavioral consequences.¹⁻⁴ The authors of a recent nationally representative study suggest that the outcry over sexting is unnecessary, as they found only 2.5% of 10- to 17-year-olds reported sending sexually explicit photos.⁵ However, sexting cannot be discounted as a potentially risky behavior solely on the basis of being a relatively low probability event. Very little is known about the possible health consequences related to sexting among adolescents. In a study of young Hispanic women at a university in the southern United States, engaging in sexting was related to unprotected sex.⁶ To fully understand the potential negative consequences of sexting, it is necessary to know whether sexting is associated with physical sexual behavior that may put young people at risk for HIV, other sexually transmitted infections (STIs), and/or unwanted pregnancy. Data that include youth of varying gender, racial/ethnic background, and sexuality is critical to answering these questions.

There has been variation across studies as to the operational definition of sexting, resulting in discrepancies in reported rates of sexting behavior, in addition to differences driven by study design and target population. In some studies the focus was on the sending of nude or semi-nude photos and videos, in others it was the sending of sexually explicit text messages, whereas others included both. A 2009 nationally representative survey found that 4% of 12- to 17-year-olds who owned their own cell phone reported sending a nude or nearly nude photograph or video of

themselves, whereas 15% reported receiving such a photograph or video of someone they knew.² Among high school students surveyed in the Northeastern United States, 15% had received sexts containing nude photos and 32% knew someone who had participated in this type of sexting.⁷ In a sample of teenagers surveyed on the Internet in 2008, 20% of teenagers reported sending nude or seminude photographs of themselves, and 39% reported sending sexually suggestive text, E-mail, or instant messages.⁸

Although the exchange of sexually explicit content is not a new phenomenon, technological advances have expanded the availability of this material and weakened restrictions on access to such content (ie, age verification). Sexts differ from other types of sexually explicit material because of the ease with which an individual can create and widely distribute material via portable digital devices. Particularly problematic is the ability of persons under the age of consent to create and receive such materials, given the widespread use of cell phones and other portable digital devices among the “Facebook generation.”⁹ Moreover, this activity can result in charges of child pornography, even if the picture-senders are <18 years of age.¹⁰ Sexting may be particularly detrimental for adolescent populations because of the likelihood that sexually explicit material will be quickly shared throughout young people’s technologically active social groups.^{4,11}

Sexting may be another means of adolescents exploring their sexuality, engaging in sexual experimentation, identity and self-development, and determining his or her moral and sexual values.^{3,11,12} Sexting itself does not pose a direct risk for transmission of STIs or unwanted pregnancy, and could, in fact, be considered a “safe” alternative to actual sexual behavior, if sexting behavior remained strictly

“online” and was not associated with physical sex risk behavior. Some adolescents perceive that sexting is a safer substitute to real life sexual activity,² but others suggest that sexting may be viewed as a future expectation for engaging in sexual intercourse.⁸

Much of the research on sexting has focused on the sending and receiving of sexually explicit images and texts via cell phone. Few studies have collected data on the perceptions of peer engagement in such practices. Yet, decades of school-based research on adolescents have repeatedly demonstrated that adolescents’ perceptions of the norms and values of their peers are strongly associated with their risk-taking and antisocial behaviors.¹³⁻¹⁸ It is important that we examine not only the rates of sexting, but that we understand how such behaviors are tied to adolescents’ perceptions of the sexting behaviors of their peers or other persons whom they know.

This study examined both the correlates of sexting (including perceived peer and others’ sexting behavior) and the association of sexting with physical sexual risk behavior among a representative probability sample of high school students. To the best of our knowledge, no previous research has examined whether sexting is associated with physical sexual behavior or sexual risk-taking in a representative probability sample of adolescents across genders, racial/ethnic groups, and sexual orientations.

METHODS

We distributed a supplemental questionnaire in conjunction with the 2011 administration of the Centers for Disease Control and Prevention’s Youth Risk Behavior Survey (YRBS) in the Los Angeles Unified School District (LAUSD) high schools. The supplemental study was approved by the LAUSD Health Education Programs, as is required by the Cooperative Agreement with the Centers for Disease Control and

Prevention, Division of Adolescent School Health. The data analysis was granted an exemption from review by the University of Southern California Institutional Review Board.

The YRBS at LAUSD is conducted in 2 steps. First, schools within the district are selected with a probability proportional to their student enrollment. Second, classes within schools are selected with equal probability. All students in grades 9 through 12 are eligible, including those in special education classes or who have low English-language proficiency. Of the 2425 LAUSD students sampled for the YRBS, 2105 completed the YRBS (87%); of those, 1853 completed the supplemental questionnaire (88%), with a response rate of 76% of the overall sample (1853 of the 2425). Students older than 18 were removed from our analyses, yielding a final sample of 1839 students. Data were weighted with respect to race/ethnicity to reflect the demographic distribution of students attending LAUSD. The sample demographic profile is presented in Table 1.

Measures

It is important to note that the supplemental questionnaire and the YRBS could not be linked, as both questionnaires were anonymous and did not include identifiers. As such, we asked students to answer demographic questions a second time, including age, race/ethnicity, and gender (see Table 1). LAUSD has a disproportionate racial/ethnic minority student population, and being a large, urban school district, it was important to investigate potential racial disparities with health behaviors. Students self-reported their race/ethnicity with the following question and subsequent response options: "What race or ethnic background do you most closely identify with? (Check all that apply): (1) American Indian or Alaska Native, (2) Asian, (3) Black or African American, (4) Hispanic/Latino, (5)

TABLE 1 Individual Characteristics and Cell Phone Use of Los Angeles Unified School District High School Students, Los Angeles, CA, 2011 ($N = 1839$)

	Weighted %	Unweighted n
What is your sex?		
Female	48.14	901
Male	51.86	925
Missing		13
What race or ethnic background do you most closely identify with?		
American Indian or Alaska Native	0.29	18
Asian	3.82	96
Black/African American	11.75	80
Latino/Hispanic	71.52	1315
Native Hawaiian or Other Pacific Islander	2.65	35
White	8.75	103
Multiple races/Ethnicity	1.23	126
Missing		66
How old are you?		
12	0.10	3
13	0.81	15
14	26.29	499
15	32.77	585
16	21.75	390
17	14.88	272
18	3.39	64
Missing		11
What do you consider your sexual orientation?		
Homosexual (Gay or Lesbian)	1.90	27
Bisexual	7.00	117
Heterosexual (Straight)	86.97	1578
Transgender	0.54	8
Questioning/ Unsure	3.58	59
Missing		50

Native Hawaiian or other Pacific Islander, (6) White." Sexual orientation was assessed with the following item: "What do you consider your sexual orientation? (Please choose the best answer for you): (1) Homosexual (Gay or Lesbian), (2) Bisexual, (3) Heterosexual (Straight), (4) Transgender, (5) Questioning/Unsure." A subsequent dichotomous variable that contrasts heterosexual to lesbian, gay, bisexual, transgender, or questioning/unsure (LGBTQ) students was created by collapsing all nonheterosexual responses. The exact wording of items regarding cell phone access, peer or other

persons' sexting behavior, personal sexting behavior, and sexual risk behaviors are reported in Table 2.

Statistical Analysis

Three logistic regression models were conducted with SAS 9.2 (SAS Institute, Inc, Cary, NC) to assess associations with personal sexting, history of sexual activity, and unprotected sex at last sexual encounter. The first 2 models were restricted to the subsample of adolescents who reported having any access to a cell phone ($n = 1714$; individual model n s are lower, because of missing cases within the independent variables). The first model assesses associations with demographics, peers'/other persons' sexting behavior, and personal sexting behavior. Because only 12 students who reported sexting also reported not knowing peers/other persons who sext, peer/other person sexting was dropped from subsequent models in favor of retaining personal sexting. The second model thus assesses the associations among demographics, personal sexting behavior, and lifetime history of sexual intercourse (ie, ever having had oral, vaginal, or anal sex). The third model is restricted to adolescents with cell phone access who reported ever having had sex ($n = 616$ after the exclusion of missing cases), and examines associations among demographics, personal sexting, and unprotected sex at last intercourse.

RESULTS

Descriptive Statistics

The overall sample ($n = 1839$) was 52% male, mostly Latino/Hispanic (72%), followed by Black/African American (12%), and white (9%). Most (96%) were between 14- and 17-years-old, most (87%) identified as heterosexual, and nearly 75% reported owning a cell phone and using it every day. More than 15% of respondents with cell phones reported ever sending a "sexually

TABLE 2 Cell Phone Use and Sexual Behaviors of Los Angeles Unified School District High School Students, Los Angeles, CA, 2011 (*N* = 1839)

	Weighted %	Unweighted <i>n</i>
Pick the sentence that best describes your cell phone access:		
I have my own cell phone and use it every day	74.94	1357
I have my own cell phone, but no minutes	3.55	62
I share a cell phone with a friend	0.81	15
I don't have my own cell phone, but I can borrow one from a friend or other people	15.54	280
I don't have a cell phone and I cannot borrow one	5.16	99
Missing		26
Do you know anyone who has sent a sexually explicit message or photo of themselves by cell phone?		
No	46.31	843
Yes	53.69	933
Missing		63
Have you ever sent a sexually explicit message or photo of yourself by cell phone? (Restricted to participants who have access to a cell phone; <i>n</i> = 1714)		
No	84.56	1426
Yes	15.44	228
Missing		60
Have you ever had sexual intercourse (vaginal, anal, or oral sex)? (Restricted to participants who have access to a cell phone; <i>n</i> = 1714)		
No	58.77	1003
Yes	41.23	660
Missing		51
The last time you had sexual intercourse, did you or your partner use a condom? (Restricted to sexually active participants who have access to a cell phone; <i>n</i> = 660)		
No	36.27	238
Yes	63.73	417
Missing		5

explicit message or photo” of themselves by cell phone, whereas 54% of the total sample reported knowing someone who has ever sent a sext. Fewer than half of respondents with cell phones (41%) had ever had vaginal, anal, or oral sex, and 64% of those respondents used a condom the last time they had sex (Tables 1 and 2).

Correlates of Sexting

In the first model regarding individual sexting behavior, older (odds ratio [OR] = 1.17; 95% confidence interval [CI]: 1.02–1.33) and African American (OR = 2.75; 95% CI: 1.86–4.06) students were more likely to send sexually explicit text messages or photographs, as were LGBTQ adolescents (OR = 2.74; 95% CI: 1.86–4.04). Students who knew someone who had sent a sext were nearly 17 times more likely to have sent a sext

themselves, compared with those students who did not know someone who sexted (OR = 16.87; 95% CI: 9.62–29.59) (Table 3).

Sexting, Sexual Activity, and Unprotected Sex

Models 2 and 3 examine the correlates of being sexually active and, among those who are sexually active, having had unprotected sex at the last sexual encounter. Older students were more likely to have had sex (OR = 1.65; 95% CI: 1.49–1.82), and to have had unprotected sex at last sexual encounter (OR = 1.18; 95% CI: 1.02–1.36). Boys were more likely to have had sex (OR = 1.74, 95% CI: 1.39–2.19) and less likely to have had unprotected sex (OR = 0.54; 95% CI: 0.38–0.76). LGBTQ students were more likely to both have had sex (OR = 1.52; 95% CI: 1.07–2.15), and to

have had unprotected sex at last sexual encounter (OR = 1.84; 95% CI: 1.17–2.89). Participants who had sent sexually explicit cell phone messages or photos were statistically significantly more likely to have ever engaged in sexual intercourse (OR = 7.17; 95% CI: 5.01–10.25), and exhibited a trend toward unprotected sex during their last sexual encounter (OR = 1.41; 95% CI: 0.97–2.04) (Table 3).

DISCUSSION

There are several important results to emerge from this study. First, among the students with access to a cell phone (*N* = 1714), 15% reported sexting. This percentage is comparable to recent work that also included the sending and receiving of explicit text messages in the operational definition of sexting.⁷ However, this result is contrary to recent work that focused on the sending and receiving of naked photos.⁵ Percentage disparities most likely reflect differences in sexting definitions and sample ages. Our study defined sexting as images or text messages, rather than just images, and included ages 12 to 18 (versus 10–17 in the nationally representative study, which found lower rates of sexting).⁵ Moreover, our sample is of high school students in the LAUSD system, and urban youth in Southern California may be different from youth in other regions of the country, or youth from suburban or rural settings.

Second, more than half of the students reported knowing at least 1 person whom they know who engaged in sexting. This rate is somewhat higher than was found in other work⁷; although the findings rely on perceptions of peer behavior and not necessarily observed behavior. Additionally, knowing someone who sexted was strongly associated with an individual's own sexting behavior. Sexting thus falls in line with many other health-related behaviors in which adolescents who engage in such

TABLE 3 Logistic Regressions of Sexting Behaviors: Cell Phone Using LAUSD High School Students Los Angeles, CA, 2011

	Personal Sexting <i>n</i> = 1578			Sexually Active <i>n</i> = 1536			Unprotected Sex at Last Intercourse <i>n</i> = 616		
	OR	95% CI		OR	95% CI		OR	95% CI	
Age	1.17	1.02	1.33 **	1.65	1.49	1.82 ***	1.18	1.02	1.36 **
Male	1.28	0.94	1.74	1.74	1.39	2.19 ***	0.54	0.38	0.76 **
Race/Ethnicity (Hispanic/ Latino = 0)									
Black/African American	2.75	1.86	4.06 ***	1.11	0.76	1.63	1.08	0.66	1.78
White	1.44	0.86	2.39	0.91	0.61	1.36	1.20	0.67	2.16
Other race/ethnicity	1.55	0.89	2.71	0.58	0.37	0.90 **	1.02	0.50	2.06
Sexuality (LGBTQ = 1)	2.74	1.86	4.04 ***	1.52	1.07	2.15 **	1.84	1.17	2.89 ***
Know someone who sexts (Yes = 1)	16.87	9.62	29.59 ***						
Personal sexting (Yes = 1)				7.17	5.01	10.25 ***	1.41	0.97	2.04 *
−2 Log	1356.30			2084.08			833.43		
Pseudo R-Square	0.16			0.18			0.05		

* *P* < .10.** *P* < .05.*** *P* < .01.

behaviors typically report that their peers do so as well.^{13–18} Because adolescent behavior is strongly tied to the perceptions of normative behavior among their peers, these findings suggest that sexting, and associated sexual risk behavior, may be fueled by the perception that sexting is normative.

Third, and most importantly, these data reveal that sexting is associated with physical sexual risk taking. Unlike work that has suggested that sexting is a low-risk, or healthy alternative to sexual risk taking,^{2,11,12} we find that there is a clustering of sexual risk behaviors, which includes sexting. Sexting was statistically significantly associated with sexual activity and showed a near-significant trend with reports of unsafe sex (ie, not using a condom at last intercourse). Moreover, certain populations of adolescents were more likely to sext in this study, including Black/African American and LGBTQ students. The findings with respect to LGBTQ students are particularly alarming as these youth are more likely to be involved in sexting, to be sexually active, and to engage in unsafe sex and thus are at increased risk for the transmission of HIV and other STIs.

Limitations

As with any study, there are several limitations. Because of the causality limitations inherent in cross-sectional studies, we are unable to conclude that sending sexts causes one to engage in sexual activity or engage in unsafe sex practices. The examination of the correlates of sexting is limited because we did not explore the reasons for sexting; doing so might shed light on the causal relationship between sexting and sexual risk behavior. As with all self-reported data, there is the possibility of both under- and overreporting of sexting and risk behaviors. However, because this was an anonymous questionnaire, social desirability biases may have been reduced. Furthermore, we did not delineate between sending text-based versus picture-based sexts, and we are unable to determine if there are differences in associated behaviors between these 2 types of messages. We did not define “sexually explicit” content; as such, respondents may have had varying interpretations of what constitutes sexually explicit images or messages. We also did not differentiate between specific types of sexual activity (ie, oral versus

anal/vaginal sex), which may vary widely among adolescents. We asked only about the sending of sexts, and receipt of sexts might be associated with dissimilar factors. Further, as previously mentioned, these findings may not be generalizable to other school populations. Despite these limitations, this study finds an important association between sexting, sexual activity, and a trend toward unprotected sex in this population.

Implications

As this is a cross-sectional study with a sample of Los Angeles adolescents, research is needed with national samples of adolescents and through prospective studies. Diary studies measuring adolescent sexting (ie, frequency, with whom, picture versus text, and so forth) and sexual behavior (ie, frequency, with whom, type of sex, condom use, and so forth) may help determine causation between sexting and sexual risk behavior. Furthermore, clarifications of “sexually explicit” and differentiations between sending and receiving sexts should be assessed in future studies.

Clinician-based, school-based, and cell-phone-based programs targeting adolescents may mitigate the potential negative health consequences of sexting and sexual risk behavior by discussing age-appropriate prevention messages, such as safer sex and using condoms, within the context of adolescent technology use. We recognize that health care professionals have limited time to discuss potential risk behavior. Inquiring about patient involvement in sexting behavior in a nonjudgmental manner may create a lead-in for the patient and clinician to discuss sexual risk behavior. To facilitate discussions of sexual behavior with young people of diverse sexual orientations, we encourage health care professionals to use gender-neutral

language that does not presume heterosexuality when asking about patients' sexual behavior. For patients without a history of sexual activity, clinicians may discuss the role of sexting in future sexual behavior and identify concrete means to practice safer sex. Engaging in such a conversation is applicable for adolescents of all sexual orientations; however, it may be even more important with sexual minority adolescents (LGBTQ), as these individuals are more likely to be engaging in both sexting and sexual risk behavior, yet feel less comfortable disclosing their sexual identity and behavior to providers. We encourage providers to not only connect with LGBTQ youth about sexting, but to also stress the importance of protected sex, given their added vulnerability to STIs and HIV.

Furthermore, depending on the age of the patient, resources may be made available to parents to inform them of the possible negative consequences of sexting and sexual risk behavior and how to best communicate this information with their adolescents. The American Academy of Pediatrics Web page discusses sexting and online

safety (<http://www.aap.org/en-us/about-the-aap/aap-press-room/news-features-and-safety-tips/Pages/Talking-to-Kids-and-Teens-About-Social-Media-and-Sexting.aspx>)⁴ and parents can access resources for discussing safe cell phone use from the National Center for Missing and Exploited Children's NetSmartz program (<http://www.netsmartz.org/CellPhones>).¹⁹ The National Campaign to Prevent Teen and Unplanned Pregnancy also provides tips for parents, including learning about adolescents' Internet and cell phone use, and setting rules about technology behavior. Although research has found that teens whose parents look at their phones were no more or less likely to participate in sexting, adolescents whose parents limited the number of texts they were allowed to send were less likely to sext.²

Public health messages regarding sexting and sexual risk behaviors can also be carried into school-based sexual health education programs. Discussing with students the possible repercussions of sending sexually explicit material, the context of sexting within other sexual behavior (ie, degree of risky behavior), safer sex practices

including condom use, strategies for maintaining healthy relationships, and the importance of safeguarding one's online identity can increase adolescents' understanding of healthy identities and behaviors, while also preventing sexual risk among diverse populations, including racial/ethnic minorities and LGBTQ adolescents. Additionally, emerging sexual health text message programs targeting adolescents (eg, ISIS' SexInfo, Hookup, and REALtalkDC) allow for repeated messages on topics such as HIV/STI testing, safer sex practices, and sexting, to be sent to large numbers of adolescents for low cost. Research suggests that adolescents are receptive to these types of private, interactive, technology-based sexual health information dissemination programs.²⁰ Future iterations may consider presenting individually tailored messages promoting sexual health and means for mitigating risk-taking behavior, including sexting. As new sexual health programs for adolescents are created or updated, sexting should be considered within the context of sexual exploration and sexual risk taking.

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GIVING YOUR GRILL THE BRUSH-OFF MAY NOT BE THE SAFEST THING TO DO:

Summer is a time of sunshine, relaxation, and cooking outdoors. Hotdogs, hamburgers, and steaks are essential components of grilling, an all-American activity. Waiting for the food to cook, I tend not to worry about the grilled food causing any problems. However, an article published in a blog for The New York Times (Healthy Consumer: July 3, 2012) highlights how cleaning your grill before cooking might pose unanticipated health risks. In recent years, several reports have documented case series of diners who presented to the emergency department with acute neck and abdominal pain shortly after eating home barbeque. Imaging studies revealed that the cause of the pain was ingested grill brush bristles that became lodged in the neck, stomach, and intestines. All documented cases so far have involved bristles that became incorporated into the grilled meat. No individuals have died secondary to bristle ingestion, but several have needed uncomfortable invasive procedures to remove the foreign bodies. While emergency room staff are not strangers to individuals ingesting common household objects—keys, rings, and safety pins are among the countless items swallowed and extracted from patients—the dangers of scrubbing a grill with a metal brush before cooking are not well known. No one knows the rate at which these events occur. It is likely that many individuals ingest the bristles and pass them without symptoms. However, for those looking to minimize the risk, the author recommends grillers replace brushes regularly to decrease the risk of loose bristles finding their way into summer meals.

Noted by Leah H. Carr, BS, MS-III