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Routine Cell Phone Activity And Exposure To Sext Messages: Extending The Generality Of Routine Activity Theory And Exploring The Etiology Of A Risky Teenage Behavior

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Abstract

Increased cell phone use among adolescents has created new opportunities for deviance and victimization in recent years. One teenage cell phone-based behavior that has received increased attention from a variety of sources including public health researchers, parents, and law enforcement is "sexting" (i.e., a minor receiving sexually explicit photos or videos of another adolescent or adult via cell phone or sending such material to another teenager). Research has revealed that sexting is a risky form of adolescent deviance that is linked with a host of potential negative health consequences (e.g., risky sexual behavior and drug use) and legal ramifications. Despite the importance of the issue, research exploring the risk factors associated with exposure to sexts is virtually nonexistent. Using telephone interview data from a representative sample of adolescents aged 12 to 17 years, the present study applies routine activity theory to explain the receiving of sexts. The results confirm expectations that both exposure-based (e.g., use of a cell phone during school hours) and supervision-based (i.e., school cell phone rules and family cell phone plan) routine cell phone activities are associated with receiving sexts. Overall, the study extends the generality of routine activity theory to teenage sexting, highlights the utility of examining domain-specific routine activity indicators, and offers one of the first theoretically informed analyses concerning the factors associated with adolescent sexting.

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Abstract

Increased cell phone use among adolescents has created new opportunities for deviance and victimization in recent years. One teenage cell phone-based behavior that has received increased attention from a variety of sources including public health researchers, parents, and law enforcement is "sexting" (i.e., a minor receiving sexually explicit photos or videos of another adolescent or adult via cell phone or sending such material to another teenager). Research has revealed that sexting is a risky form of adolescent deviance that is linked with a host of potential negative health consequences (e.g., risky sexual behavior and drug use) and legal ramifications. Despite the importance of the issue, research exploring the risk factors associated with exposure to sexts is virtually nonexistent. Using telephone interview data

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from a representative sample of adolescents aged 12 to 17 years, the present study applies routine activity theory to explain the receiving of sexts. The results confirm expectations that both exposure-based (e.g., use of a cell phone during school hours) and supervision-based (i.e., school cell phone rules and family cell phone plan) routine cell phone activities are associated with receiving sexts. Overall, the study extends the generality of routine activity theory to teenage sexting, highlights the utility of examining domainspecific routine activity indicators, and offers one of the first theoretically informed analyses concerning the factors associated with adolescent sexting.

Keywords

sexting, routine activity, cell phone use, adolescence

Adolescent cell phone use has increased dramatically over the past decade and has become a fixture in the lives of youth. Recent national estimates indicate that 77% of 12- to 17-year-olds own a cell phone and nearly one quarter of adolescents in this age group have a smartphone (i.e., cell phone with internet capabilities; Lenhart, 2012). While cell phones certainly serve important functions in the lives of teenagers, increased usage also creates new opportunities for deviance. One problem stemming from cell phone use that has received considerable national attention from media outlets, law enforcement, pediatricians, public health officials, school administrators, and parents is "sexting" (Benotsch, Snipes, Martin, & Bull, 2013; Hinduja & Patchin, 2010; Mitchell, Finkelhor, Jones, & Wolak, 2012; Wolak, Finkelhor, & Mitchell, 2012).

The term sexting "refers to sending sexual images and sometimes sexual texts via a cell phone and other electronic devices" (Mitchell et al., 2012, p. 14). Sexting has emerged as an important problem because of the legal, social, and health-related consequences it is associated with for adolescents. To be sure, sexting is not simply a form of teenage rebellion or part of "growing up" (Eraker, 2010; Mitchell et al., 2012). Public health research has shown that adolescents who sext are also more likely have depressed or suicidal thoughts and be involved in hazardous health-related behaviors such as risky sexual conduct and alcohol and drug use (Dake, Price, Maziarz, & Ward, 2012; Rice et al., 2012; Temple et al., 2012). National estimates reveal that between 7% and 15% of adolescents report that they have received a nude or nearly nude image of another teen via cell phone (Lenhart, 2009; Mitchell et al., 2012), whereas about 4% of teens admit to sending such photos (Lenhart, 2009). These rates are nontrivial and, by some accounts, may

underestimate the problem (Strassberg, McKinnon, Sustaita, & Rullo, 2013). Yet, relatively little research has explored the phenomenon.

To date, most empirical research focuses on the prevalence of sexting among teenagers (Lenhart, 2009; Mitchell et al., 2012). Much less attention has been devoted toward understanding the etiology of sexting (see, Lee, Moak, & Walker, 2013). This is particularly true of the risk factors associated with receiving sexually explicit pictures or videos via a cell phone. When exploring this behavior, it is important to recognize that many youth receive unwanted sexts but a portion of teens are willing participants in the exchange of the material (Ringrose, Gill, Livingstone, & Harvey, 2012). Regardless of whether a sext is wanted or unwanted, many state statutes treat the distribution of sexually oriented pictures/videos of anyone under the age of 18 as a criminal offense (Gillespie, 2011; Leary, 2010). Oftentimes, this subjects teenagers to child pornography laws, but a recent legal trend is to handle sexting as a status offense (Sherman, 2011; Szymialis, 2010). From a legal perspective, it is plausible to consider teens who receive sexual images/videos via cell phone as victims, but this label is difficult to apply to teens who willingly receive sexts.¹ In any event, both consensual and nonconsensual sexting is appropriately categorized as socially deviant because a majority of teens do not send or receive sexts (Mitchell et al., 2012) and most states have some type of legal statute used to deter the behavior (Leary, 2010). The nonconsensual reception of sexts would not only involve exposure to deviant behavior but could also be classified as a form of victimization. Whether viewed as socially deviant and/or a form of victimization, the factors associated with exposure to sext messages can be examined through the lens of deviance/victimization theories derived from the larger criminological literature.

Routine activity theory and the lifestyle perspective (Cohen & Felson, 1979; Hindelang, Gottfredson, & Garofalo, 1978) are the dominant frameworks used by social scientists interested in understanding risk factors of victimization. Simply put, the likelihood of personal victimization increases when motivated offenders and suitable targets converge in the absence of capable guardianship (Felson, 1987; Felson & Boba, 2010). The framework has been used to explain exposure to several technology-based outcomes such as fraud targeting and victimization (Holtfreter, Reisig, & Pratt, 2008; Pratt, Holtfreter, & Reisig, 2010), identity theft (Reyns, 2013), cyberbullying (Hinduja & Patchin, 2008; Marcum, Higgins, Freiburger, & Ricketts, 2012), and online harassment (Holt & Bossler, 2008; Marcum, Higgins, & Ricketts, 2010; Marcum, Ricketts, & Higgins, 2010). The extension of routine activity theory beyond direct-contact, predatory victimization increases our understanding of remote criminal victimization or other forms of deviance and helps inform policies directed at combating such problems (see Pratt et al., 2010; Reyns, 2013). As such, routine activity theory is a useful starting point for uncovering factors that increase teenagers' risk of receiving sexts.

To that end, the present study extends the generality of routine activity theory to the context of sext exposure. This theoretical model will provide insight into the causal mechanisms that may underlie exposure to sexts and help guide prevention strategies (Clarke, 1995). Specifically, the current study uses a nationally representative sample of adolescents aged 12 to 17 years to accomplish three objectives. First, we discuss the theoretical connection between teenagers' routine cell phone activities and their risk of exposure to sexually explicit images via cell phone. Second, we develop a series of domain-specific routine activity indicators that have a theoretically informed connection with sexting. Finally, we use multivariate regression models to test the applicability of routine activity theory to sext exposure. The overarching goal of this study is to begin a criminological dialogue centered on understanding the risk factors associated with sexting given the important implications the behavior may have on teenager's lives.

Sexting

As one of the most significant technological advancements over the past several decades, cell phones have improved individuals' lives in many ways. Similar to other technological changes, however, cell phones have created new avenues for victimization and deviance among adolescents. Sexting has surfaced as a form of teenage deviance that often takes place on a cell phone (Mattey & Diliberto, 2013; Mitchell et al., 2012). Although the term sexting can include sexual texts or messaging on social media platforms, most concern surrounds the transmission of sexual images/videos of minors via cell phone given the ease of dissemination and frequency of cell phone use among adolescents (Mitchell et al., 2012; Rice et al., 2012; Strassberg et al., 2013; Temple et al., 2012; Wolak et al., 2012). The actual nature of sexting can involve behaviors such as an adolescent sending a nude picture/video of him/ herself or forwarding such material of another minor via cell phone to another individual (Leary, 2010).

Research has demonstrated that sexting is experienced by enough adolescents to be taken seriously by parents, school personnel, doctors, law enforcement, and researchers. In a recent nationally representative telephone survey of more than 1,500 youth aged 10 to 17, Mitchell and colleagues (2012) reported that 7% of adolescents had received a sexually oriented image on their cell phone but had not appeared in or created such images in the 12 months leading up to the study. Importantly, only 3% of adolescents who received a sext forwarded it to another person. These results are important because they demonstrate that a meaningful percentage of the teenage population has received a sext, but a majority of these individuals do not redistribute the images to other youth. As a result, sext receivers appear to be a group of individuals worthy of continued research attention to determine the factors associated with exposure to such material.

Strassberg and associates (2013) recently challenged Mitchell and colleagues' (2012) results as underestimating the prevalence of sexting. Strassberg et al. used a sample of high school students from a private school in the southwestern United States to show that almost 40% of respondents had received a sexually explicit image via cell phone. It is important to note that differences in prevalence rates often stem from variation in methodological rigor or definitions of sexting. Nevertheless, studies typically suggest that between 15% and 30% of teenagers report they have received a sexually explicit image of another teen via mobile device (Lenhart, 2009, 2012; Rice et al., 2012; Temple et al., 2012).

Exposure to sexting does not appear to be evenly distrusted across demographic characteristics, but the evidence is mixed. For example, Mitchell and associates' (2012) data revealed that females (56%) and teens between the ages of 16 and 17 (55%) were more likely to have received a sext compared with their counterparts. Although they did not distinguish between adolescents who sent or received sexts, Dake et al. (2012) used a sample of nearly 1,300 middle and high school students to demonstrate that sexting involvement was more common among older adolescents (i.e., 16 to 18 year olds). With respect to race, Mitchell and associates' analysis demonstrated that White teenagers were significantly more likely to report involvement in sexting compared with African American youth, but the opposite relationship was observed by Dake et al. (2012). In addition, Peskin et al. (2013) surveyed a group of 10th graders and found that Black and White males and females reported similar levels of receiving sexts, whereas Hispanic females reported the least amount. Clearly, more research is needed to fully appreciate the nature of sexting involvement, but the extant evidence clearly suggests that not all teenagers are at equal risk to receive sexually explicit images on their cell phones.

Adolescent Sexting and Related Consequences

Sexting has been the topic of research attention by legal (Leary, 2010; Ostrager, 2010), pediatric (Mitchell et al., 2012; Wolak et al., 2012), and psychology (Judge, 2012; Peskin et al., 2013) scholars given the potential consequences associated with the behavior. Sexting among teenagers has

been viewed as unacceptable by a large enough segment of the public that most states have activated the criminal justice system in efforts to deter the behavior. Leary (2010), for example, insists that sexting represents the production of child pornography (see also, Judge, 2012; Levick & Moon, 2010; McBeth, 2010; Ostrager, 2010).² In many instances, teenagers who send sexually oriented images/videos of minors to other youth can be charged with violating child pornography laws (Leary, 2010; Sherman, 2011; Szymialis, 2010). Various states, however, have moved toward handling sexting cases with status offense statutes because adolescents involved in the behavior are oftentimes simply exploring their sexuality through electronic means or sending sexts to willing recipients (e.g., a boyfriend or girlfriend; Sherman, 2011; Szymialis, 2010). The circumstances of a given situation (e.g., willing or unwilling recipient) tend to guide the amount of law applied to adolescent sexters. At any rate, potential legal consequences await teenagers who send sexts to other adolescents and unwilling recipients of sexts can be viewed as crime victims.3

Sexting is also associated with important social consequences for teenagers. For one, sexting may create a permanent electronic record of the sexual image/video of a teen. The likelihood of losing control of such images and allowing unintended people (e.g., classmates, school staff, or parents) to view the material is increased by the ease of dissemination (e.g., via cell phone or other electronic means). In addition, the permanent electronic record makes it possible for future college administrators or employers to access the images (Mitchell et al., 2012; Wolak et al., 2012). These consequences are important because such material may be used to judge the character of an individual (e.g., they may be viewed as sexually promiscuous or lacking sound judgment). The potential social consequences apply to both consensual and nonconsensual sexting participants. For example, youth who receive unsolicited sexts may experience negative reactions if parents, classmates, school administrators, or employers happen upon the material. The negative social consequences associated with sexting highlight the fact that it is viewed as socially deviant by the broader society and may adversely affect an individual beyond the teenage years (Mitchell et al., 2012).

Most importantly, sexting has been shown to be associated with numerous adverse health-related behaviors. Research has revealed that adolescents involved in sexting are significantly more likely to be sexually active and engage in oral and anal sex compared with their counterparts (Dake et al., 2012; Rice et al., 2012). Public health studies have shown that teenagers who send or receive sexts are more likely to participate in risky sexual activities such as having multiple sexual partners, using alcohol or drugs before intercourse, having unprotected sex, and not using birth control (Dake et al., 2012;

Ferguson, 2011; Rice et al., 2012; Temple et al., 2012). Sexting is also related to public health outcomes that reach beyond risky sexual behavior. Dake and colleagues (2012) recently demonstrated that sexting-involved teens are more likely to report alcohol use, binge drinking, smoking marijuana, and cigarette use. These same adolescents were also more likely to indicate that they had been forced to have sex, been assaulted by a boyfriend/girlfriend, been cyberbullied, felt depressed, and contemplated suicide (Dake et al., 2012). Benotsch and associates (2013) report findings that suggests similar risky behaviors extend to young adults who send and/or receive sexts. These folks are more likely to have unprotected sex, report multiple sexual partners, and be diagnosed with a sexually transmitted infection. Furthermore, young people involved in sexting are significantly more likely to use alcohol, marijuana, ecstasy, cocaine, and "other" recreational narcotics (Benotsch et al., 2013).

It is important to note two issues with respect to this discussion. First, the connection between sexting and adverse health behaviors is not causal. Rather, this research simply shows that teens who more frequently sext are also more likely to be involved in the aforementioned behaviors. Sexting involvement is, therefore, best seen as a risk factor associated with these negative outcomes rather than a cause of them. In addition, it is worthy of note that the extant research has not accounted for the potential confounding influence of self-control on the sexting–risky behavior relationship (this topic is discussed in more detail later).⁴ In any event, the literature provides ample evidence that sexting is associated with risky health-related behaviors. Faced with this reality, sexting is no longer simply a by-product of "teenagers being teenagers." The behavior is part of a larger public health concern for adolescents.

Routine Activity and Receiving Sexts

The sexting literature is useful for painting a picture of the prevalence and health, social, and legal consequences of such behavior. However, existing research is largely atheoretical, thereby limiting our understanding of the etiology of sexting. Lee et al. (2013) recently tested the applicability of self-control, social control, and social learning theories in explaining sending sexts among a sample of over 1,600 South Korean teens. Their analyses revealed that peer pressure had the strongest influence on sext behavior. Lee and colleagues' study is influential because it is the first to explore the criminological theory–sexting relationship and they strongly advocate for continued research in the area. We build on their research in the present study by drawing upon the victimization literature that is grounded in routine activity

theory and situational crime prevention to help explain why some individuals have greater risk of exposure to sexts (Clarke, 1995; Cohen & Felson, 1979; Hindelang et al., 1978).

Cohen and Felson's (1979) routine activity theory posited that macrolevel changes in people's daily routines explain changes in crime rates by influencing the frequency with which motivated offenders and ineffectively guarded targets converge in time and space. Routine activity theory has emerged over the past several decades as the dominant theoretical framework guiding individual-level victimization research (Clarke, 1999; Felson, 1987; Felson & Boba, 2010). Assuming a constant supply of motivated offenders, the theory speaks to the types of activities and situations that increase exposure to victimization and other risky behaviors.

Theoretically informed routine activity and lifestyle indicators⁵ can generally be grouped into one of two categories—exposure or supervision. Research by Kennedy and Forde (1990) revealed that variation in everyday activities such as the frequency at which people go to work, movies, restaurants, and sporting events is associated with victimization risk. Simply, more activity away from home increases exposure to would-be offenders and creates greater risk of property and violent victimization. Recent research has also demonstrated that violent crime victimization risk is greater for individuals who are more enmeshed in deviant lifestyles revolving around risky activities such as prostitution, drug use, and gang membership (Schreck, Stewart, & Fisher, 2006; Schreck, Wright, & Miller, 2002; Stewart, Elifson, & Sterk, 2004; Taylor, Peterson, Esbensen, & Freng, 2007). Thus, the evidence indicates that both mundane daily routines and risky lifestyles increase relative exposure to motivated offenders thereby partially accounting for differential victimization risk.

Opportunities for victimization also arise out of situations with deficient social controls (i.e., lack of guardianship). This second group of routine activity indicators is guided by Osgood, Wilson, O'Malley, Bachman, and Johnston's (1996) expansion of the theory as a general framework of deviant behavior. Primarily aiming to explain juvenile delinquency, Osgood et al. proposed that activities that take place away from authority figure supervision are most conducive to crime/deviance. To them, parents are the most meaningful guardians of adolescents' behavior but teachers, supervisors, law enforcement, and the like are all capable of exerting social control in response to deviance (see Osgood et al., 1996, p. 640). Routines and lifestyles that are associated with lesser parental (or other authority figure) supervision are most favorable to victimization. Schreck et al. (2002), for example, showed that teenagers who more frequently socialize with friends away from direct parental supervision are significantly more likely to become victims of

violent crime. Lack of supervision of adolescent activities increases victimization risk because it reduces guardianship (i.e., physical protection) and increases target suitability (i.e., individuals are not guarded and are perceived as easier targets by motivated offenders).

Routine activity studies typically attempt to explain direct-contact, street victimization (see Pratt et al., 2010; Reyns, 2013). Cohen and Felson (1979) foreshadowed, however, that new forms of criminal victimization and deviance will emerge with corresponding technological advances. Cell phone use among teenagers has represented one such technological advancement. New forms of deviance, such as sexting, have been ushered in by the increased legitimate use of cell phones. Such deviance is unique from street crime because it does not involve direct contact between an "offender" and "target." This does not mean that routine activity theory does not apply to "crimes at a distance" such as sexting. On the contrary, Eck and Clarke (2003, p. 34) argue that the framework applies to such forms of deviance and risky behaviors as long as a potential target and motivated offender are "part of the same geographically dispersed network."

This logic has been applied by a growing literature that uses routine activity theory to explain technology-related victimization. Remote victimization often occurs when would-be offenders and suitable targets intersect within "unguarded systems or networks" such as the Internet (Reyns, 2013, p. 221). Hinduja and Patchin (2008), for example, revealed that the amount of time a teen spends online is positively associated with cyberbullying victimization. This finding supports routine activity theory by demonstrating that relative online exposure increases the risk of being cyberbullied (see also, Holt & Bossler, 2008). Related research has shown that the types of activities one engages in online can influence victimization risk. For example, using chat rooms, instant messaging programs, and social media increase exposure to motivated offenders thereby creating situations conducive to online harassment (Marcum, 2008; Marcum, Higgins, & Ricketts, 2010; Marcum, Ricketts, & Higgins, 2010). Likewise, risky online behaviors that diminish guardianship, such as regularly making personal information available online, elevates online harassment risk (Bossler & Holt, 2009; Bossler, Holt, & May, 2012). Such activity reduces guardianship over sensitive, personal information that can be used by would-be harassers. Similar findings have been shown in the context of online fraud targeting. For example, routines such as the amount of time one spends on the Internet (Pratt et al., 2010) and remote purchasing activity (e.g., online and telephone purchases; Holtfreter et al., 2008) are positively related to online fraud targeting. As such, both exposurebased (i.e., time online) and supervision-based (e.g., remote purchasing) routine activities predict remote fraud targeting (see also, Meldrum & Clark,

2013; Pyrooz, Decker, & Moule, 2013, for examples of similar connections with deviance and criminal activity).

Three important ideas can be gathered from this line of research. First, routine activity theory is a useful framework for understanding experience with remote forms of deviance/victimization. Second, both exposure and supervision routine activity indicators are significantly associated with a wide range of technology-based offenses. Third, the key to using routine activity theory to explain such outcomes is that the measures must be domain specific. Quite simply, only routines that are somehow related to the outcome in question will predict its occurrence. For example, the frequency with which one leaves home—a routine activity indicator often used in street-crime research—should not be related to remote victimization outcomes such as online harassment or fraud targeting. However, a domain-specific indicator such as "time spent online" has a theoretical connection with such remote types of victimization.

The above research can guide a discussion of the connection between routine activity theory and exposure to sext messages.⁶ For one, sexting is a behavior that occurs at a distance (i.e., it is a remote form of deviance) through a potentially unguarded network (i.e., a cell phone) that allows the convergence in time and space of suitable targets and motivated offenders. In this way, sexting is theoretically similar to remote behaviors such as cyberbullying and online consumer fraud. Specific routine cell phone activities should increase teenagers' vulnerability to sexting. From an exposure standpoint, the frequency with which a teen uses his or her phone and the context in which it is used are theoretically meaningful. Consistent with previous research, yet remaining domain specific, frequency of talking or texting on a cell phone and using a cell phone during school hours are examples of the types of routine activities that may differentially expose adolescents to a greater number of "motivated sext offenders" (see Dake et al., 2012).

Parental supervision of teenagers' cell usage such as limiting talk/text time, monitoring cell contents, and paying cell bills as part of a family plan may help insulate teens from sexting by providing more guardianship over cell activities (Dake et al., 2012). Of course, it is not expected that all potential offenders will be familiar with this cell phone guardianship. Rather, adolescents who are aware their parents monitor cell activities (e.g., by looking at texts or checking media usage on monthly bill statements) may be less likely to place themselves in situations or relationships where another teen would deem it appropriate to sext. Similarly, school rules clearly prohibiting the use of cell phones during school hours may reduce teenagers' experience with sexting. This type of cell phone supervision should reduce the risk of sexting by providing fewer hours during the day in which motivated offenders and suitable targets can intersect on cell networks. While the routine activity/lifestyle literature has been influential over recent years in increasing our understanding of street-level and remote victimization, the framework has yet to be applied to sexting. Moreover, empirical research exploring the correlates of sext exposure is virtually nonexistent. The present study attempts to fill these voids.

The Present Study

The purpose of the current study is to extend routine activity theory to the context of sexting and to shed light on the daily activities that increase teenagers' risk of receiving sexually explicit images through their cell phones. We draw on the broader routine activity/lifestyle literature and specific studies that apply the framework to remote forms of victimization to assess the influence of exposure-based and supervision-based routine activity indicators on receiving sexts. The data used in the current study allow us to measure domain-specific routine cell activities and test their relationship with sexting, net of individual characteristics. The findings extend the reach of routine activity theory and build upon the sexting literature. The results also offer evidence-based recommendations to parents, schools, or other relevant actors who wish to curb sexting among adolescents.

Methods

Data

Data for the current study come from a telephone survey among a nationally representative sample of 800 teenagers (12-17 years of age) and their parents in the 48 contiguous United States with access to either a landline or cell phone (see Lenhart, 2009, p. 11, for a detail description of data and methodology). The survey focused on teenage cell phone use (including experience with sexting) and was conducted by Princeton Survey Research International (PSRI) on behalf of the Pew Research Center. Two subsamples—a landline sample (n = 544) and a cell sample (n = 256)—were used to represent the target population and all numbers were selected using probability sampling (Lenhart, 2009). A seven call-back rule was used by PSRI and calls were made at various times of the day and week to increase the chances of contacting a respondent. During survey administration, PSRI interviewers first determined whether a randomly dialed number had any 12- to 17-year-olds living in the household. Homes without a teenage resident were deemed ineligible and cell numbers were excluded from the sample if the potential

respondent was not in a "safe place to talk" (e.g., while driving; Lenhart, 2009, p. 12). For households that met the eligibility criteria, the interview commenced with either the mother or father (or guardian) of the teenager. Mainly demographic information and knowledge of their teenagers' cell use was captured in the parent version of the survey. Upon completion of the parent interview, the survey was administered to the teen (randomly selected in the event more than one teenager lived in the household). Data were only retained by the Pew Research Center if both the parent and teen interview were completed. About 10% of the numbers contacted in both the landline and cell subsamples meet the eligibility criteria. This resulted in an overall response rate of 47%, which is consistent with recent telephone survey research (Chang & Krosnick, 2009).

Given the focus of the current study, we restricted the sample for analyses to the 625 teenagers (and corresponding parent interviews) who had a cellular telephone. Sample weights provided in the data set by the Pew Research Center are used in all analyses to approximate characteristics of the national population of teenagers 12 to 17 years old. The sample was weighted using parent (sex, age, education, race, ethnicity, and region) and teen (gender and age) demographic characteristics (see Lenhart, 2009, for a more detail on weighting).

Dependent Variable

The definition of sexting is complicated by the nuanced social and legal components of the behavior. For instance, receiving sexually oriented media is not necessarily an unwanted experience for some teenagers. It is important to remember, however, that all participants in the current study were between 12 and 17 years of age. We could classify teens who have received a sexual photo or video via mobile device as victims. However, as outlined earlier, it would be difficult to apply this label in all situations (e.g., willing recipients of sexts).⁷ Accordingly, we labeled the dependent variable *received sext* to capture teen's experience with this behavior. Respondents were asked a single question: "Have you ever received a sexually suggestive nude or nearly nude photo or video of someone else you know on your cell phone?" (1 = yes). The item is consistent with that used in previous studies (see, for example, Mitchell et al., 2012; Rice et al., 2012). Nearly 17% of teenagers in this sample indicated that they have received a sext message.

Independent Variables

Exposure-based routine cell phone activities. Domain-specific routines (i.e., related to cell phone use) should be more strongly related to the risk of

receiving sexts than global indicators of general daily activities. Numerous "routine cell phone activity" measures were used to test the applicability of routine activity theory to sexting. First, teenage respondents' exposure to motivated offenders as suitable targets was assessed with a series of questions that tapped into the frequency and form of cell phone usage. Teens were asked, "On an average day, about how many phone calls do you make and receive on your cell phone?" (number daily calls). The item was treated as a count ranging from 1 to 10 or more. Similarly, participants' texting frequency was assessed by asking them "On an average day, about how many text messages do you send and receive on your cell phone?" (range = 1 to 51 or more; number daily texts). Teenagers in this sample reported an average of 5.037 (SD = 3.504) calls and 35.315 (SD = 19.448) texts during the typical day. It was also important to explore whether frequency of calls and texts with particular peers was associated with sext experience. Accordingly, respondents were asked how often they talk and text with their friends (frequency talk friends, frequency text friends) and boyfriend/girlfriend (frequency talk BF/GF, frequency text BF/ *GF*) on an average day (0 = never/does not apply, 1 = less often, 2 = a few timesa week, 3 = at least once a day, and 4 = several times a day).

Frequency of cell phone use is a reasonable indicator of exposure to potential motivated offenders, but research has shown that the specific form of routine activity can be important in predicting experience with deviant outcomes (see, for example, Anderson & Hughes, 2009; Holtfreter et al., 2008). As such, several questions were asked of the respondents inquiring about their use of a mobile device for media-related activities. Teens were asked four questions pertaining to how often, if ever, they use their cell phone to send or receive email, pictures, or instant messages or use their cell to access social networking sites (e.g., Facebook and Twitter). Each item was measured using a 5-point Likert-type scale (0 = never/cannot do that on cell, 1 =less often, 2 = a few times a week, 3 = at least once a day, and 4 = severaltimes a day). Principal components analysis (PCA) with varimax rotation revealed that the items loaded onto a single construct ($\lambda = 1.992$, all loadings >.620). Therefore, *cell media use* is operationalized as an additive scale with higher scores indicating greater use of a cell phone for media-related activities (Cronbach's $\alpha = .648$, mean inter-item r = .327).

Cell phone use during school hours has increasingly become a problem over the past several years (Redmayne, Smith, & Abramson, 2011). Four questions were used to assess teens' cell use at school. Respondents were asked how often do you "take your cell phone to school" (0 = never, 1 = less often, 2 = at least several times a week, and 3 = every school day), "have your cell phone turned on at school," "make or receive a call on your cell phone during class," and "send or receive a text message during class" (0 = never, 1

= less often, 2 = at least several times a week, 3 = at least once a day, and 4 = several times a day). All items coalesced into a single component (λ = 2.037, all loadings > .533). Accordingly, school cell use is operationalized as an additive index with higher scores indicating more frequent cell use at school (Cronbach's α = .636, mean inter-item *r* = .330).

Supervision-based routine cell phone activities. More frequent parental supervision of children's activities serves to inhibit their exposure to motivated offenders or, at least, make them less suitable targets (Osgood & Anderson, 2004; Osgood et al., 1996). The present study used domain-specific parental supervision questions to gauge the degree to which parents monitor their teenagers' cell phone activities. Specifically, parent respondents were read the following list of statements and asked whether they have engaged in such supervision of their children's phones: "limit the times of day when your child can use the phone," "ever take away your child's phone as punishment," and "look at the contents of your child's cell phone." All items were measured dichotomously (1 = yes). PCA with varimax rotation revealed that the items loaded onto one component ($\lambda = 1.637$, all loadings > .675). Therefore, a three-item additive parental cell supervision scale was constructed (Cronbach's $\alpha = .581$, mean inter-item r = .317). Respondent teenagers also answered two questions about how frequently they talk and text with their parents (frequency talk parents, frequency text parents; 0 = never/does not apply, 1 = less often, 2 = a few times a week, 3 = at least once a day, and 4 = several times a day). Another parental supervision routine activity measure-family cell plan-is a dichotomous variable coded "1" if the teenage respondent's cell phone is part of a family plan contract and "0" otherwise (e.g., pay as you go, separate contract). Teens with cell phones covered under family plans may be subjected to closer parental/guardian supervision of cell use and content.

Schools have been forced during recent years to adopt rules pertaining to student cell phone use during school hours (Redmayne et al., 2011). While intended to minimize student distractions, stricter school supervision of cell use should also provide the ancillary benefit of increased guardianship against sexting. *School cell supervision* was captured by asking the teenage respondents the following question:

Thinking now about the rules at your school, are you allowed to have a cell phone at school all times, or are you allowed to have a cell phone but not in class, or are you not allowed to have a cell phone at school at any time.

The item was treated as an ordered categorical variable (range = 1 to 3) with higher scores indicating stricter school cell supervision.

Personal characteristics. Several personal characteristics were held constant to obtain unbiased estimates of our theoretical variables of interest. Research has demonstrated that unstructured socializing with friends is one of the strongest routine activity predictors of general offending and victimization (Maimon & Browning, 2010; Osgood et al., 1996; Svensson & Oberwittler, 2010). Therefore, it was important to include *socialize with friends* as a control variable in all multivariate models. This variable was captured by asking the teenage respondents the following question: "Thinking about communicating with people, how often do you spend time with people in person, doing social activities outside of school" (0 = never, 1 = less than once a week, 2 = at least once a week, 3 = several times a week, and 4 = every day). More precise estimates of the effects of specific cell phone routine activities on sexting can be obtained by controlling for this global routine activity measure.

Research has also provided clear evidence that informal social controls are significantly associated with deviant outcomes (see, for example, Schreck et al., 2006) and sexting behavior (Lee et al., 2013). *Social bond* was measured with the following question: "How many people do you know who you feel very close to and with whom you are frequently in contact to discuss various things, including your personal issues and feelings?" The item is treated as a continuous measure ranging from 0 to 11.

Teenager demographic control variables typically linked with victimization risk were also included in all predictive models (Pratt et al., 2010; Turanovic & Pratt, 2012). These variables include *male* (1 = yes), *age* (in years), *ethnic minority* (1 = yes), and *racial minority* (1 = yes).⁸ Socioeconomic status (SES) is a two-item additive index created by summing parent's reported education level (1 = *eighth grade* to 7 = *post-graduate/professional* school) and family income (1 = *less than* \$10,000 to 9 = \$150,000 or more). Descriptive statistics for all variables used in the multivariate models are presented in Table 1.

Analytic strategy. The analyses proceed in a series of multivariate models estimated with binary logistic regression given the dichotomous coding of the dependent variable. The models investigate the independent and simultaneous effects of personal factors and exposure-based and supervision-based routine cell phone activity measures on the likelihood of receiving sexts.

Results

Logistic Regression Models

Logistic regression is used as the analytic technique for all models presented in Table 2.⁹ Prior research has mainly examined the demographic

Variable	М	SD
Received sext $(0 = no, = ves)$	0.166	
Number daily calls (range = 1 to 10 or more)	5.037	3.504
Number daily texts (range = $1 \text{ to } 51 \text{ or more}$)	35.315	19.448
Frequency talk friends ($0 = never/does not apply to 4 = several times a day$)	2.635	1.209
Frequency text friends $(0 = never/does not apply to 4 = several times a day)$	3.481	1.014
Frequency talk BF/GF (0 = never/does not apply to 4 = several times a day)	1.731	1.740
Frequency text BF/GF ($0 = never/does not apply to$ 4 = several times a day)	2.046	1.860
Cell media use (range = 0 to 15)	2.860	3.253
School cell use (range = 1 to 12)	7.582	3.466
Parental cell supervision (range = 0 to 3)	1.826	1.076
Frequency talk parents ($0 = never/does not apply to 4 = several times a day$)	2.767	1.085
Frequency text parents (0 = never/does not apply to 4 = several times a day)	2.096	1.447
Family cell plan ($0 = no$, $1 = yes$)	0.729	
School cell supervision (range = 1 to 3)	1.980	0.572
Male $(0 = no, 1 = yes)$	0.515	_
Age (teenage respondent age in years)	14.790	1.652
Ethnic minority $(0 = no, 1 = yes)$	0.159	—
Racial minority $(0 = no, 1 = yes)$	0.217	—
Socioeconomic status (range = 2 to 16)	10.202	3.526
Socialize with friends (range = 0 to 4)	2.753	1.151
Social bond (range = 0 to 11)	4.822	2.955

Table 1. Descriptive Statistics and Coding for Variables.

Note. BF = boyfriend; GF = girlfriend.

characteristics associated with sexting risk (Mitchell et al., 2012; Peskin et al., 2013). To provide a baseline understanding of which teenagers in this sample are most likely to have sexually oriented photos/videos sent to them via cell phone, "received sext" is regressed on the demographic and control variables in Model 1. The control variables provide a moderate predictive model ($\chi^2 = 73.562$, p < .01; Nagelkerke $R^2 = .209$), and several interesting findings emerge from the first equation. For starters, males have an equal probability of sext exposure as females and ethnic minorities are no more likely than Whites to experience sexting (Peskin et al., 2013). While previous

Variables	Model I	Model 2	Model 3	Model 4	Model 5
	b (SE) [OR]	b (SE) [OR]	b (SE) [OR]	b (SE) [OR]	b (SE) [OR]
Male	0.062 (.256)	-0.173 (.323)	0.006 (.303)	-0.199 (.297)	-0.009 (.386)
	[1.064]	[0.841]	[1.006]	[0.819]	[0.991]
Age	0.579** (.096)	0.582** (.126)	0.387** (.114)	0.518** (.114)	0.521** (.153)
0	[1.785]	[1.790]	[1.472]	[1.678]	[1.684]
Ethnic minority	-0.386 (.367)	0.329 (.440)	0.152 (.420)	-0.228 (.431)	0.523 (.566)
	[0.679]	[1.390]	[1.164]	[0.796]	[1.688]
Racial minority	0.965** (.294)	1.433** (.398)	1.139** (.363)	1.186** (.349)	1.394** (.480)
,	[2.626]	[4.19Ì]	[3.122]	[3.275]	[4.033]
Socioeconomic	-0.077* (.039)	-0.098* (.050)	-0.077† (.046)	-0.051 (.046)	-0.165** (.063)
status	[0.925]	[0.907]	[0.926]	[0.950]	[0.848]
Socialize with	0.257* (.121)	0.280 (.175)	0.376* (.170)	0.329* (.155)	0.256 (.222)
friends	[1.293]	[1.323]	[1.454]	[1.390]	[1.292]
Social bond	-0.030 (.046)	-0.023 (.058)	-0.025 (.052)	-0.104† (.055)	-0.094 (.067)
	[0.971]	[0.978]	[0.975]	[0.90]	[0.910]
Exposure routine of	cell activities				
Number daily	_	0.015 (.053)	_		-0.049 (.062)
calls		[1.015]			[0.952]
Number daily	_	0.032* (.013)	_	_	0.020 (.014)
texts		[1.033]			[1.020]
Frequency talk	_	-0.186 (.176)	_	_	-0.105 (.210)
friends		[0.830]			[0.90]
Frequency text	_	-0.125 (.251)	_	_	0.723† (.383)
friends		[0.882]			[2.060]
Frequency talk	_	0.694** (.163)	_	_	0.408* (.178)
BF/GF		[2.002]			[1.505]
Frequency text	_	-0.121 (.150)	_	_	0.181 (.171)
BF/GF		[0.886]			[1.198]
Cell media use	_		0.091* (.043)	_	0.028 (.056)
			[1.095]		[1.028]
School cell use			0.230** (.056)	_	0.256** (.070)
			[1.258]		[1.292]
Supervision routine	e cell activities				
Parental cell	_	_	_	0.089 (.141)	0.091 (.188)
supervision				[1.093]	[1.095]
Frequency talk	_	_	_	0.353* (.163)	0.082 (.230)
parents				[1.424]	[1.085]
Frequency text	_	_	_	-0.080 (.110)	-0.068 (.145)
parents				[0.923]	[0.935]
Family cell plan	_	_	_	-0.933** (.337)	-0.915* (.438)
, pian				[0.393]	[0.40Ì]
School cell	_	_	_	-0.657* (.271)	-1.049** (.373)
supervision				[0.519]	[0.350]

Table 2. The Effects of Routine Cell Phone Activities on Receiving a SextMessage.

(continued)

	Model I	Model 2	Model 3	Model 4	Model 5
	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)
Variables	[OR]	[OR]	[OR]	[OR]	[OR]
Constant Model v ²	-10.569**	-12.401**	-10.435**	-8.884** 94.022**	-13.161**
Nagelkerke R ²	.209	.423	.303	.284	.514

Table 2. (continued)

Note. All models are estimated with logistic regression. Entries are unstandardized partial regression coefficients (b), standard errors in parentheses (SE), and odds ratios in brackets [OR]. BF = boyfriend; GF = girlfriend. †p < .10. *p < .05. **p < .01.

research suggests that females may be more likely to receive sexts (Mitchell et al., 2012), there is no gender difference among this sample of teens in a multivariate context. Consistent with prior findings, older teenagers have a greater chance of receiving a sext (b = .579, p < .01; Dake et al., 2012; Mitchell et al., 2012). The positive age relationship may simply reflect an exposure effect (i.e., as one ages, the chances of having ever received a sext increases) or may be the result of increased interest in sexuality. Future research is needed to determine why older teens experience more sexting. In addition, racial minorities are about 160% more likely to receive sexts compared with Whites (b = .956, p < .01), and SES is negatively associated with sext risk (b = -.077, p < .05). Among this national sample of teens, it appears that Whites and adolescents from more affluent families have lower risk of experiencing sexting (Peskin et al., 2013). Finally, the more frequently teenagers socialized with their friends in person, the greater their odds of receiving sexts (b = .257, p < .05). This finding is interesting because it demonstrates that a general routine activity indicator-socializing with friends-is predictive of a technology-based form of deviance (see Lee et al., 2013). At first glance, this suggests that general routine activities may partially explain specific crime-related outcomes (Osgood et al., 1996). Further analysis that controls for specific routine activity indicators is needed prior to reaching more definitive conclusions.

Model 2 incorporates several exposure-based routine cell activities into the logistic equation. First, we see that routine activities clearly have something to offer in terms of predictive strength (Nagelkerke $R^2 = .423$). The results demonstrate that two routine cell activities seem to increase relative exposure to sexts. For one, the number of text messages teenagers send/ receive during an average day is positively associated with sexting (b = .032, p < .05). Thus, for every additional text a teen sends/receives, his or her risk

of receiving a sext increases by 3%. This finding suggests that texting frequently exposes adolescents to more individuals motivated to sext. Second, the frequency with which respondent teens talk with their boyfriend or girlfriend on a cell is positively related to sexting (b = .694, p < .01). This is an important, albeit not necessarily surprising, finding. Teenagers' odds of receiving sexually explicit images on their cells increase by over 100% with every unit increase in the "frequency talk BF/GF" scale. This is important because such behavior may be associated with or lead to couples engaging in risky sexual activities (e.g., unprotected sex), using alcohol or drugs, and future negative social consequences (Benotsch et al., 2013; Ferguson, 2011; Leary, 2010; Rice et al., 2012; Temple et al., 2012). It is also revealing to note that frequency of texting with one's significant other is not associated with sexting. Thus, frequently talking with a boyfriend or girlfriend seems to provide more opportunities (or motivation) to sext whereas texting alone does not. Finally, it is important to note that socializing with friends was reduced to statistical insignificance once the exposure-based routine cell activities were included in the model. This finding demonstrates that the relationship between socializing with friends and sexting is confounded by the number of texts teens send/receive and the frequency with which they talk to their boyfriends or girlfriends.

The third model in Table 2 delves deeper into the effects of exposurebased routine activity measures on sexting risk. Consistent with previous technology-based victimization research (Marcum, 2008; Marcum, Higgins, & Ricketts, 2010; Marcum, Ricketts, & Higgins, 2010), the results reveal that, net of control variables, teenagers who more frequently use their phone for media-related purposes (e.g., social networking, email; b = .091, p < .05) or during school hours (b = .230, p < .01) are at increased risk to receive sexts. These routines appear to increase exposure to motivated sexters.

Beyond relative exposure, supervision-based routine activities have consistently been shown to be significant predictors of various forms of victimization (Bossler & Holt, 2009; Osgood et al., 1996). Model 4 examines whether domain-specific supervision-based cell routine activities are capable of predicting risk of receiving sexts. Three of the five measures incorporated into this equation reached statistical significance. Counter to expectations, the degree to which parents supervise their children's cell phone behaviors is unrelated to sexting risk. This finding runs counter to street-crime routine activity research and possible explanations for this relationship will be explored in greater detail below. The frequency with which teenagers talk with their parents on a cell is *positively* associated with receiving sexts (b = .353, p < .05). This counterintuitive finding may simply be the result of not accounting for overall frequency of cell phone use in this step of the analysis. Consistent with expectations, family cell plan is negatively related to sext exposure (b = -.933, p < .01). Teenagers who have a cell phone that is associated with a family plan are about 60% less likely to receive sexts than adolescents who have their own separate plan. Family cell phone contract plans may offer parents more supervision over their children's cell phone activities and, therefore, more guardianship against teens receiving sexts. Finally, school cell supervision is negatively related with sexting risk (b = -.657, p < .05). Teenagers who attend schools that do not allow cell phones to be used during school hours have about 48% lower odds of receiving a sext compared with schools that allow students to use cell phones. This suggests that school cell use rules can serve as an important guardian against sexting.

The final equation in Table 2-Model 5-examines the simultaneous influence of the exposure and supervision-based routine cell activities on receiving sexts. This allows us to determine whether relative exposure or lack of guardianship better account for sexting experience. Several important findings emerge that are worthy of discussion. First, the fully specified model displays relatively strong predictive strength (Nagelkerke $R^2 = .514$). Second, net of personal factors and supervision-based cell routine activities, frequency of talking with one's boyfriend/girlfriend (b = .408, p < .05) and school cell use (b = .256, p < .01), are associated with sexting risk. Teenagers who more frequently talk with their significant others on their cell are more likely to receive sexts compared with similarly situated adolescents without a boyfriend/girlfriend or those who talk less frequently with that person. Likewise, regular cell use at school exposes teenagers to higher odds of receiving sexts compared with their counterparts who do not use their cell during school hours. With respect to the supervision-based indicators, family cell plan (b = -.915, p < .01) and school cell supervision (b = -1.049, p < .01) remained statistical significant predictors of sext reception after controlling for exposure-based routine cell activities. Teenagers with family cell plans and stricter school cell phone rules have 60% and 65% lower odds of receiving sexts, respectively, compared with their counterparts. Consistent with the broader routine activity literature, guardianship imposed by parents and school authorities over cell phone use substantially reduces teenagers' chances of receiving sexually explicit photos/videos on their cells even after considering relative exposure to risk (e.g., frequency of cell use). Finally, regardless of differences in routine cell activities, males are more likely than females (b = .521, p < .01) and racial minorities more likely than Whites (b = 1.394, p < .01) to receive sexts (Dake et al., 2012). Teenagers whose parents are from higher SES are also less likely to experience sexting (b = -.165, p < .01).

Discussion

Changes in routine activities related to technology use create new opportunities for victimization and deviance (Cohen & Felson, 1979; Pratt et al., 2010; Reyns, 2013). Sexting is a risky teenage behavior that has increased in prevalence during recent years. Importantly, Lenhart's (2009) focus group data demonstrate that many adolescents downplay sexting as a normal, frequent teenage behavior. For instance, with respect to the prevalence and seriousness of sexting, one teenage girl responded, "yea, it happens a lot, my friends do it all the time, but it's not a big deal" (Lenhart, 2009, p. 9). The problem, however, is that involvement in sexting can have important consequences on teens' lives. Recent research has revealed that teens who send and/or receive sexually explicit photos or videos of themselves or other adolescents they know are at a significantly greater risk for numerous negative health-related consequences. These youth are more likely to be sexually active, participate in risky sexual activities, use alcohol and drugs, and have depressed or suicidal thoughts (Dake et al., 2012; Ferguson, 2011; Rice et al., 2012; Temple et al., 2012). Many jurisdictions also classify sexting pictures/videos of adolescents a criminal offense and, therefore, present potential legal ramifications for sexting-involved teenagers (Leary, 2010). Given the potential consequences of sexting involvement, the purpose of this article was to use routine activity theory to provide one of the first theoretically informed analyses of sext message exposure. The analyses lead to four main conclusions.

To begin, the results provide evidence that routine activity theory generalizes to the context of sexting among adolescents. This finding confirms previous research that shows routine activity theory extends beyond the explanation of street-level, direct-contact victimization and deviance to the domain of technology-based outcomes that occur at a distance (Pratt et al., 2010; Reyns, 2013). As a result, our study builds upon the routine activity and sexting literatures in several ways. First, the analyses demonstrate that both exposure-based and supervision-based routine cell activities are associated with receiving sexts. Second, and relatedly, the findings underscore the importance of exploring domain-specific routine activity indicators when attempting to explain specific forms of victimization or deviance (see Holtfreter et al., 2008; Pratt et al., 2010). Regression results showed that a traditional routine activity indicator of violent and property victimization (i.e., socializing with friends; Forde & Kennedy, 1997; Franklin, Franklin, Nobles, & Kercher, 2012; Mustaine & Tewksbury, 1998) was unrelated to sext exposure once routine cell activities were taken into consideration. Thus, appreciating the specific types of routine activities associated with the particular behavior under consideration will provide a clearer understanding of the outcome. Taken together, the findings also improve our understanding of the etiology of sexting by demonstrating that specific routine cell activities help explain why teenagers are more or less likely to receive sexts.

In particular, routine activity research has demonstrated for some time now that relative exposure to potential motivated offenders produces situations conducive to victimization and deviance. Frequently leaving home for entertainment purposes, for example, exposes a person to more offenders than if one were to simply stay at home (Schreck et al., 2002), and more time spent online increases vulnerability to a host of cyber-related offenses (Hinduja & Patchin, 2008). In the context of cell phone use, these data suggest that frequently talking with significant others and using a cell phone during school hours exposes adolescents to more opportunities for sexting to take place. From a theoretical standpoint, these findings are interesting because it would be reasonable to assume that teenagers who more frequently use text messaging would be at increased risk for receiving sexts given the nature of sexting (i.e., it takes place through messaging pictures or videos on cells). However, the data from this study demonstrate that the relationship between texting and sexting appears strong but is only significant at the p =.10 level. Therefore, exposure to motivated sexters and situations conducive to the behavior appears to be guided more by the frequency with which teens talk with significant others and use their cells during school hours.

Research has also shown routine activities that lack supervision are conducive to many forms of victimization including technology-based crimes (Marcum, Higgins, & Ricketts, 2010; Marcum, Ricketts, & Higgins, 2010). Our results support prior studies and extend the scope of supervision-based routine activities to the realm of sexting. Two supervision routine cell activities were significantly associated with receiving sexts among this sample. The analyses demonstrated that teenagers who have a cell phone that is part of a "family plan" are less likely to receive sexually explicit photos or videos on their mobile device compared with teens with separate cell contracts (or prepaid phones/plans). Consistent with routine activity theory, family cell plans are a supervision-based routine activity that afford parents closer guardianship over their children's mobile phone activities. In addition, teenagers who reported that their school has strict cell phone rules were less likely to have received sexts. Schools that prohibit students from using cell phones not only reduce relative exposure to motivated sext offenders but also provide closer guardianship over deviant behaviors that may take place via cell phone. It is also worthy to note that our measure of parental cell supervision was not associated with sexting. We caution readers on this result, however, because this does not necessarily imply that parents should not supervise their children's cell use. Perhaps our measure of parental cell supervision reflects authoritarian parenting practices (Baumrind, 1966, 1996) more than effective

parental guardianship consistent with routine activity theory (Osgood et al., 1996). Future research is required to determine what type of parental supervision is needed to inhibit teenagers' involvement in sexting.

Second, the theoretical contributions advanced by our study lead to several practical implications consistent with routine activity theory and situational crime prevention (see Clarke, 1995; Felson & Boba, 2010). On the whole, the results indicate that parents (or guardians) and schools can play the most significant role in minimizing teenagers' sexting behavior. Parents and schools would be wise to monitor both texting and speech activity on adolescent's cell phones to increase guardianship and reduce the chances of sexting involvement. Maintaining some level of supervision over an adolescent's cell use may be as simple as ensuring it is part of a "family plan." The results of this study cannot speak directly to why teens with family plans have less exposure to sexting, but it appears that it increases guardianship. Future analyses should explore this in greater detail to uncover more specific sext prevention strategies. Along similar lines, schools should take cell phone rules and regulations seriously. Often schools implement mobile phone use restrictions to ensure distraction-free learning environments. The current analyses show that strict cell phone use rules may also produce a diffusion of benefits whereby teenagers are guarded from sexting (see, for example, Weisburd et al., 2006). Parents, other family members, teachers, and school administrators may also wish to be active messengers of the potential consequences of sexting. Educating youth on the health, social, and possible legal ramifications associated with sexting may help teenagers take preventative measures from becoming involved in the behavior.

Third, several demographic characteristics are associated with sexting even after accounting for the theoretical variables of interest. Consistent with previous research reporting demographic profiles (Dake et al., 2012; Mitchell et al., 2012), older teenagers and racial minorities are more likely to receive sexts than their counterparts. Also, socioeconomic status background was shown to be negatively associated with sext exposure. Technology-based victimization studies have shown that demographic effects are sometimes mediated by routine activity indicators (see, for example, Pratt et al., 2010). The routine cell activities used in this study do not fully account for demographic differences in sexting involvement. The task for future research is to determine whether other theoretical frameworks can assist in explaining why certain teenagers are more likely to receive sexts. Perhaps those individuals most likely to receive sexually explicit photos/videos via cell are those with lower levels of self-control (Gottfredson & Hirschi, 1990) because they place themselves in situations where sexting is more likely and ignore the potential consequences of such behavior (see, for example, Holtfreter et al., 2008;

Reisig, Pratt, & Holtfreter, 2009; Schreck, 1999). Consistent with social learning theory (Akers, 2009), it is a possibility that individuals who receive sexts are part of friendship networks that also send and/or receive sexts. Future work can move the literature forward by exploring the roles of self-control, differential association, and related theoretical constructs on sexting behavior (see, Lee et al., 2013).

Finally, the current study is not without limitations. Perhaps most importantly, the data used in the analyses come from a cross-sectional survey. Longitudinal studies are needed before causal interpretations of the effects of routine cell activities on sexting can be achieved. Nevertheless, there is little reason to believe that the relationships observed in this study operate in a different causal sequence. Also, there was insufficient data to examine the "victim–offender overlap" in this study. Research has shown that remote criminal offenders and victims are often the same individuals (Holtfreter, Reisig, Piquero, & Piquero, 2010). An analysis that examines whether those who report receiving sexts are also those who are more likely to send sexts would not be misplaced. More broadly, analyses similar to those conducted in this study need to explore the etiology of sext "offending" (Lee et al., 2013). Does routine activity theory help explain why adolescents *send* sexually explicit photos or videos to other teenagers?

In the end, the current study provides empirical evidence that broadens the scope of routine activity theory while informing our understanding of the risk factors associated with sext exposure. The findings suggest that the correlates of sexting differ from general criminal victimization, but the underlying causal process of both outcomes appears to be similar-routine activities account for experience with both direct contact and remote forms of victimization and deviance (see Pratt et al., 2010). Adolescent sexting behavior is not typically a topic that many criminologists would find terribly interesting. However, the discussion and results of this study demonstrate the importance of criminological inquire into understudied forms of deviance. Not only do such analyses test the limits of criminological theories but they also provide useful ways of dealing with important social problems. For example, the present study's findings highlight the potential utility of criminological theory in understanding the relationship between teenage sexting behavior and other risky health-related outcomes. Gottfredson and Hirschi's (1990) selfcontrol theory may help demonstrate that teens who participate in sexting are also more likely to be involved in dangerous sexual and drug-related behaviors because both activities share common characteristics-they are risky, short-sighted, and immediately gratifying. Therefore, sexting itself may not necessarily be a cause of other health-related behaviors, but both activities may be a function of low self-control. For now, sexting is a behavior with far-reaching implications for youth, and routine activity theory offers one piece of the puzzle for understanding and dealing with the issue.

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Notes

- 1. The authors thank the anonymous reviewers for their comments pertaining to emerging trends in sexting legislation.
- In the United States, child pornography is defined as sexually explicit pictures or films involving youth under the age of 18 (Gillespie, 2011). More specifically, 18 U.S.C. § 2252 states that individuals can be charged with possession or production of child pornography if they "receive, transport, ship, distribute, or possess child pornography knowingly" (Harvard Law Review, 2009, p. 2208).
- 3. Research by Wolak, Finkelhor, and Mitchell (2012) reveals that law enforcement takes youth sexting seriously. They estimated that between 2008 and 2009, U.S. law enforcement handled nearly 3,500 cases of youth-produced sexual images, many of which involved distribution via cell phone. Thirty-six percent of cases that involved only minors resulted in an arrest, whereas 18% of cases that involved only youth and no aggravating circumstances (e.g., minor engaged in nonconsensual or abusive behavior in the image) lead to an arrest.
- 4. We thank the anonymous reviewers for suggesting this flaw in previous research.
- Routine activity theory and Hindelang and colleagues' (1978) lifestyle theory have considerable overlap when applied to victimization. For this reason, many scholars use the terms "routine activities" and "lifestyles" synonymously or in unison (Holt & Bossler, 2008; Pratt, Holtfreter, & Reisig, 2010; Reyns, 2013).
- 6. The legal status of adolescent sexting behavior begs the question of whether teens who receive sexually explicit images of other youth can be classified as victims. For instance, no legal statutes necessarily prohibit the transmission of sexual images between consenting adults and a sext recipient would only be considered a victim if she/he received the message unwillingly. Conversely, paralleling the logic of many statutory rape laws, statutes relevant to adolescent sexting convey the message that minors cannot give consent to receiving sexually explicit images/videos on their cell phone. In this way, the age status

of adolescents may allow them to be viewed as victims when they receive sexts irrespective of whether they are willing participants in the exchange of such material. Routine activity theory should certainly have something to say about this outcome when viewed as a form of victimization. On the other hand, however, applying the victim label to teens who willingly receive sext messages would be akin to treating individuals who solicit prostitutes as crime victims (we thank an anonymous reviewer for this analogy). Therefore, treating all sext receivers as victims may be slightly off base. Teens who unwillingly receive sexts could certainly be classified as victims but using the term victimization to cover all sext receivers may falsely label willing participants in the behavior. The legal discussion over sexting among adolescents is sure to continue into the near future as will debates over how sext-involved teens should be classified by researchers. Based on the current state of the literature, we have elected to refrain from using the term victimization to describe sext receivers in this study. It is important to note, however, the potential legal and social consequences of engaging in sexting and the health-related behaviors it is associated with clearly demonstrate that the reception of sext messages among adolescents is a socially deviant and risky outcome. Accordingly, routine activity theory offers an appropriate framework to understand the risk factors associated with exposure to sexts (whether viewed as a deviant outcome or a form of criminal victimization).

- 7. Using the term "victim" to describe teenagers who have received a sext message would be appropriate if we could measure whether the sext was unsolicited (i.e., unwanted). Unfortunately, we do not have this information in the current data.
- 8. Ethnicity and race were assessed in the parent-based interview.
- Zero-order correlations (available upon request from the lead author) provide 9 useful model diagnostic information regarding whether multicollinearity is a problem within the multivariate models. Importantly, none of the correlations between the independent variables used in the analyses exceed an absolute value of .550, which is below the .700 threshold commonly used to indicate harmful collinearity (Tabachnick & Fidell, 2007). Additional diagnostic tests obtained from supplemental ordinary least squares regression analyses (Menard, 2002) revealed that all variance inflation factors fell below the 5 threshold (O'Brien, 2007) and all condition indices below the threshold of 30 (Belsley, Kuh, & Welsch, 1980; Mason & Perreault, 1991) used to identify harmful collinearity. In short, these diagnostics provide clear evidence that multicollinearity does not bias parameter estimates derived from the regression models featured in Table 2. As an anonymous reviewer suggested, it is important to note that all effect sizes should be interpreted with the appropriate level of caution (readers are encouraged to consult Menard, 2002).

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