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Onset Trajectories of Sexting and other Sexual Behaviors across High School: A Longitudinal Growth Mixture Modeling Approach

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Abstract

Sexting is receiving substantial scholarly attention and is now considered commonplace in adolescence. Little is known, however, about the normative contexts and the development of adolescent sexting behavior, including the initiation of sexting in relation to other sexual behaviors. In this study, we used growth mixture modeling to identify classes of onset trajectories for sexual behaviors across high school. Participants included 429 high school students (54% female) who completed annual assessments of sexual behavior over a three year period. We identified four distinct classes: postponement (9%) with no behaviors other than hand-holding and kissing initiated by Grade 11, gradual onset (44%) with sexting and other sexual behaviors emerging incrementally across high school, continuous onset (32%) with sexting and other sexual behaviors within the first three years of high school, early onset (15%) with initiation of sexting and all other sexual behaviors prior to or by the end of Grade 9. Boys were more likely than girls to be members of the postponement versus gradual onset class, while Black students were more likely than White students to be members of the early versus gradual onset class. Sexting behavior appears to be common in adolescence and co-emerges with genital contact behavior across varying trajectories of sexual development. These findings provide the foundation for contextualizing sexting within normative sexual development. Further, this information can inform efforts to promote sexual health.

Keywords

adolescents; sexual development; sexting; sexual behavior; trajectories

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INTRODUCTION

Adolescents often initiate and maintain many types of relationships via texting, including dating and sexual relationships (Ito et al., 2009; Nesi, Widman, Choukas-Bradley, & Prinstein, 2016). Sexting is now commonplace during adolescence (Strohmaier, Murphy, & DeMatteo, 2014; Temple et al., 2012) and has been the focus of increasing media attention across the world. Accordingly, research on sexting has burgeoned. Much of the public and scientific discourse about sexting has centered on its legality, deviance, and associated risk behaviors (Angelides, 2013; Korenis & Billick, 2014; Van Ouytsel, Walrave, Ponnet, & Heirman, 2015). In contrast, we know relatively little about sexting from a developmental perspective, and there are few longitudinal studies on the topic. Given that smart phones and related technology have become ubiquitous fixtures in adolescents' relationships, it seems important to embed our understanding of electronic communication, including sexting, within the broader context of romantic and sexual development. Toward this end, the current longitudinal study examines the onset of sexting in relation to that of other sexual behaviors while also considering individual differences in sexual behavior development.

Definition and Prevalence of Sexting During Adolescence

Prevalence rates of sexting among adolescents vary widely depending on how sexting is defined (e.g., sending versus receiving a sexually explicit text versus a nude photo), study sample demographics (e.g., age, race, gender), and the sampling technique used (e.g., convenience versus random sample; Barrense-Dias, Berchtold, Surís, & Akre, 2017; Klettke, Hallford, & Mellor, 2014). In this study, we use a definition of sexting derived from focus groups of middle and high school students—sending sexually explicit messages, images, or videos to a romantic partner. Although other studies have used more restrictive, legalistic definitions of sexting such as the transfer of completely or seminude images, our definition is consistent with scholars' calls for a comprehensive and youth-defined operationalization (Temple & Choi, 2014).

A recent meta-analysis indicates that prevalence rates of sexting among 10–19 year olds are roughly equivalent whether sexting is defined as sending sexually explicit texts or photos (10.2%) or sending completely or seminude images (11.96%; Klettke, et al., 2014). Regardless of how sexting is defined, what seems consistent across cross-sectional studies is that older teens sext more than younger teens, with rates of sexting by young adulthood reaching 53.31% (Barrense-Dias et al., 2017; Drake, Price, & Maziarz, 2012; Klettke et al., 2014; Madigan, Ly, Rash, Van Ouytsel, & Temple, 2018). Further, the prevalence rate of sexting continues to increase over time (Madigan et al., 2018). Collectively, these data point to age-related increases in sexting behavior and underscore the need to understand how sexting is incorporated within adolescent romantic and sexual development.

Sexual Risk versus Sex-Positive Perspectives on Sexual Behavior and Sexting

Sexual and romantic development are key tasks of adolescent development shaped by multiple systems, such as biological maturation, sociocultural influences, and interpersonal relationships with parents and peers (Collins, 2003; Furman, Brown, & Feiring, 1999). Typically, romantic and sexual development overlap, as sexual behaviors generally occur

within romantic relationships (Furman & Shaffer, 2011; Manning, Longmore, & Giordano, 2000). Within this context, two approaches to adolescent sexuality have emerged in the literature: the sexual risk perspective and the sex positive perspective. The risk perspective focuses on understanding and preventing sexual risk behavior, such as teenage pregnancy and sexually transmitted infections, and has been the prevailing approach to the study of adolescent sexuality. Of relevance to the current study is that focusing on risk-potentiated behaviors (i.e., genital contact) overlooks less intimate sexual behaviors that characterize many teens' sexual lives and inform the context in which most genital contact behavior emerges (Horne & Zimmer-Gembeck, 2005; O'Sullivan, Cheng, Harris, & Brooks-Gunn, 2007). Said differently, a narrow focus on genital contact behavior can obfuscate important variability in adolescents' sexual behavior as well as overlook the functions, risks, or rewards associated with various behaviors. In contrast, the sex-positive view of adolescent sexuality acknowledges the risks associated with certain sexual behaviors while also embracing the range of adolescent sexual behaviors and their positive and developmentally appropriate features (Golden, Furman, & Collibee, 2016; Harden, 2014; Tolman & McClelland, 2011).

Research on sexting mirrors these larger tensions between sexual risk and sex-positive views of adolescent sexuality. To date, sexting researchers have largely embraced a risk perspective, with the majority of studies focusing on its legal and health ramifications (Döring, 2014; Van Ouytsel et al., 2015). For example, cross-sectional data link sexting with depressive symptoms, lower self-esteem, conduct problems, emotion dysregulation, and substance use (Kerstens & Stol, 2014; Šev íková, 2016, Temple et al., 2012; Van Ouytsel et al., 2015; Ybarra & Mitchell, 2014). Research on romantic and sexual relationship outcomes has yielded mixed findings. Some studies link sexting with early sexual debut, sexual risk behavior, sexual coercion, and dating cyber-aggression (Choi, Van Ouytsel, & Temple, 2016; Rice et al., 2014; Van Ouytsel, Ponnet, & Walrave, 2016), while others, including a recent meta-analysis, find no or weak associations (Ferguson, 2011; Gordon-Messer, Bauermeister, Grodzinski, & Zimmerman, 2013; Kosenko, Luurs, & Binder, 2017). Such varied findings suggest that the risks of sexting may not be uniform across adolescents and point to the need to for more contextualized, nuanced, understandings of sexting behavior. Additionally, the potential risks of sexting may sometimes appear overstated relative to base rates. Of the adolescents who report sexting, the majority report no negative consequences (Strohmaier et al., 2014). Approximately 8% reported that it led to "humiliation/tarnished reputation," 5% reported getting in trouble with parents, 1% reported getting in trouble at school, 3% endorsed unwanted dissemination of shared photos, and .6% reported being bullied as a result of sexting (Strohmaier et al., 2014; Thomas, 2009).

Research approaching sexting as a normative behavior that manifests in the context of adolescent sexual development is needed to more fully understand its emergence, functions and risks. Studies of contextual factors, such as age, gender, relational context, and general online behavior have begun to shed light on when and for whom sexting may be risky (Davis, Powell, Gordon, & Kershaw, 2016). Other researchers have identified functional opportunities associated with consensual sexting. In adult romantic relationships, sexting has been related to relationship satisfaction (Drouin, Coupe, & Temple, 2017; Parker, Blackburn, Perry, Hawks, & Hawks, 2013). For adolescents, sexting may also serve to express desire,

pleasure, affection, and trust (Döring, 2014; Ferguson, 2011; Simpson, 2013). It might also be a tool for identity exploration or the assertion of sexual agency, two important developmental tasks in adolescence (Angelides, 2013; Karaian, 2012; Simpson, 2013). To summarize, sexting appears to be a normative behavior with some level of risk. We propose that a more holistic view of adolescents' sexting is needed to understand its place in development and to identify the contexts in which it poses risk to adolescent well-being.

Sexting within the Development of Other Sexual Behaviors

A first step to understanding sexting in the broader context of sexual development is to examine it in relation to other sexual behaviors. For many youth, the emergence of sexual behavior typically proceeds in a linear fashion that moves from embracing and kissing, to fondling and touching genitals, and later to more intimate behaviors, including sexual intercourse (de Graaf, Vanwesenbeeck, Meijer, Woertman, & Meeus, 2009; Lam, Shi, Ho, Stewart, & Fan, 2002). Although this is the most common trajectory, some differences have been noted between racial/ethnic groups, where ethnic minority and less educated youth were more likely to follow a nonlinear trajectory (de Graaf et al., 2009; Smith & Udry, 1985).

Several studies link sexting to engagement in genital contact behaviors (Drake et al., 2012; Gordon-Messer et al., 2013; Klettke et al., 2014; Kosenko et al., 2015). For example, Temple and Choi (2014) reported that sending a sext message was predictive of engagement in sexual intercourse within the following 12 months and hypothesized that sexting might act as a gateway for proximal sexual activities. Despite the importance of non-genital contact behaviors in adolescent sexual development (Horne & Zimmer-Gembeck, 2005; O'Sullivan et al., 2007), studies of sexting that include the full range of adolescents' sexual behaviors (e.g., handholding, kissing) are largely absent. One exception is a cross-sectional study of at-risk seventh graders by Houck and colleagues (2014) where sexting was related to a range of sexual behaviors, including handholding and kissing. However, we know of no studies that examined the emergence of sexting alongside that of a full range of sexual behaviors. Indeed, we know of no longitudinal studies that index trajectories of emergence for the range of middle adolescents' sexual behavior (i.e., handholding to intercourse). Accordingly, it is unclear whether increases in rates of sexting parallel increases in other sexual behaviors over time or whether sexting unfolds the same way for all youth regardless of their sexual development trajectory. Situating sexting in the course of sexual development is critical for identifying individual differences in timing and pace that may be important to understanding its potential benefits, functions, and risks.

Longitudinal, within-person approaches to sexual trajectories allow researchers to index variations in sexual development by identifying distinct groups of adolescents who share similar sexual trajectories. Moving beyond the identification of a modal trajectory of adolescent sexual behavior to indexing commonly occurring patterns is clinically important because different patterns of sexual behavior onset and sequencing may have different health outcomes (Huang, Murphy, & Hser, 2012). In the current study, we used a within-person, longitudinal trajectory approach to examine when adolescent sexting emerges in relation to other sexual behaviors and whether the relative onset of sexting varies between adolescent

sexual trajectories. We also examined sociodemographic predictors of sexual trajectories, as previous research indicates earlier rates of initiation of advanced sexual behaviors for boys and Black youth (Cavazos-Rehg et al., 2009; Feldman, Turner, & Araujo, 1999).

The Present Study

The current longitudinal study aimed to place sexting in the context of adolescent sexual development by assessing variations in the timing of sexting onset and patterns of co-emergence between sexting and other sexual behaviors. To capture the multi-faceted nature of adolescent sexuality, we used growth mixture modeling to identify variations in the onset of a broad range of sexual behaviors and to locate the emergence of sexting within that range of behaviors across developmental trajectories. We expected to find similar rates of sexting and genital contact behaviors but made no a priori assumptions about the onset of sexting relative to other specific sexual behaviors. In addition, we anticipated that sexting would show a similar onset pattern to other genital contact behaviors regardless of individual differences in timing and pace of sexual behavior development. Lastly, we expected that individual differences in sexual development trajectories would vary by adolescent sex and race.

METHOD

Participants

The sample for this research draws from a larger, multi-year longitudinal study evaluating teen dating violence in high school students across six school districts, stratified by community risk factors. Data from three years of the project were examined in this analysis. Community risk was assessed using census and crime data, rates of poverty, unemployment, percent minority, percent rental housing, percent female-headed households, and community violence. These data were subsequently used to develop an index to classify school districts into three tiers or strata of risk level (low, medium, and high community risk). A purposive sampling of school districts representing each level of risk was undertaken until two school districts per strata agreed to participate in the study. The institutional review board at Wayne State University approved all measures used in the study.

Within each school, students were randomly selected to participate, yielding 453 high school students who completed self-administered questionnaires in each of the three years. These adolescents began participation in the longitudinal study in Grade 9. The written questionnaires were completed in a group setting, with students dispersed in large rooms to protect privacy. In each year of the study, a retention rate of above 90% of the participants was achieved through relationship building with school staff and students along with frequent communication to maintain updated participant contact information, providing reminders about upcoming research activities, and offering online survey administration to those who no longer attended a participating school. Small percentages were withdrawn by parents, chose not to participate, or could not be contacted.

For the current study, we excluded students ($n = 24$) without complete onset data for the full range of sexual behaviors included in the growth mixture analysis. The final sample

therefore consisted of 429 students. These participants did not differ demographically from those excluded according to bivariate tests of associations. Approximately 54% of students in the sample were girls. Most participants were White (67%), 16% were Black, and 17% were other students of color. In Grade 9, just over half of the students lived with both of their parents, and 38% of the sample attended schools located in areas of high concentrated disadvantage.

Measures

Sociodemographics—The following sociodemographic variables were included in this study: gender, race, concentrated disadvantage, and whether a student lived with both of their parents in Grade 9. For analytic purposes, race was collapsed into three categories: White, Black, and other students of color. Students were placed into the third category if they identified themselves as Arab American, Asian/Asian American/Pacific Islander, Hispanic/Latino/Chicano/Puerto Rican, Native American, some other race, or more than one race. Concentrated disadvantage is a three category variable (low, medium, and high) based upon publicly available census and crime data, property and violent crime rates, percent below poverty threshold, single parent households, rental housing, and unemployment.

Onset of Sexual Behaviors—Students were asked at each wave whether they had ever engaged in a number of sexual behaviors with a dating or sexual partner. Behaviors included holding hands, kissing, being mostly or completely undressed, sexting (sending sexual messages or pictures), having oral sex, and having sexual intercourse (vaginal or anal). A dichotomous variable indicating lifetime incidence for each behavior (0 = no; 1 = yes) was constructed at each wave. If a student reported a lifetime incidence for a behavior in Wave 1, that incidence was logically carried forward into Waves 2 and 3. If lifetime incidence for a behavior was first reported in Wave 2, the incidence was likewise carried forward into Wave 3.

Analyses

Growth mixture modeling was conducted using MPlus 7.4 (Connell & Frye, 2006; Muthén & Muthén, 2011). Models were run using within-person data from each wave to determine classes (i.e., groups) of students based on age trajectories of onset for the determined sexual and intimate behaviors. A series of models were then run with class specifications ranging from one to five to assess for variations in onset trajectories within the sample.

The optimal model was determined using the following quantitative diagnostics: the Akaike information criteria (AIC; Akaike, 1987); Bayesian information criteria (BIC; Kass & Raftery, 1995); bootstrap likelihood ratio test (BLRT; McCutcheon, 1987; McLachlan & Peel, 2000); and entropy. The AIC and BIC provide information about the best fitting and most parsimonious models, with smaller values indicating better fit (Schwarz, 1978). The BLRT uses a bootstrap resampling method to quantify the likelihood of describing the data better with one fewer class and was assessed using a p -value of .05. Entropy describes the degree to which the latent classes are clearly distinguishable and estimatable using class probabilities for each variable (Muthén et al., 2002). Class probabilities closer to one signify more accurate classifications.

Following model selection, students were assigned to a class based on most likely membership, and a multinomial logistic regression model was fit to assess for differences between classes based on sociodemographics. It should be noted that class assignment sorts individuals into relatively homogenous groups from a heterogeneous sample, but small within-group variation may remain with respect to onset of certain sexual behaviors. All data cleaning and multinomial regression analyses were conducted using the statistical programming language R, version 3.3.0 (R Core Team, 2016).

RESULTS

Descriptive Statistics

When measured in Grade 9, 24% of students reported at least one prior incidence of sexting. That percentage increased to 37% in Grade 10 and then to 50% of students when measured in Grade 11. Lifetime incidence rates by grade for sexting and other sexual behaviors are shown in Figure 1.

Growth Mixture Modeling

The four-class model was determined to best fit the data based on quantitative diagnostics and an assessment of theoretical validity (see Table 1). The AIC and adjusted BIC (aBIC) were lowest for the four-class model, and the BLRT for the five-class model was not significant, indicating that moving from a four- to a five-class model would not improve model fit.

Figure 2 shows the trajectories of onset for sexting and other sexual behaviors for each of the four identified classes. Members of Class 1 (gradual onset) accounted for 43% of the sample. Within this group, the lifetime incidence of handholding and kissing was relatively high and steadily increased between Grade 9 and 11. The onset of sexting coincided with the onset of oral sex and sexual intercourse, and each of these behaviors gradually co-emerged in Grade 10 with slight upticks by Grade 11. Members of Class 2 (continuous onset) comprised 33% of the sample. While nearly all of these students had held hands and kissed by Grade 9, lifetime incidence rates for sexting, getting undressed, oral sex, and sexual intercourse at Grade 9 ranged between 20% and 25%. By Grade 11, however, lifetime incidence for all sexual behaviors was above 80% within this class, with sexting following a similar course to that of undressing, oral sex, and sexual intercourse. Approximately 13% of students were placed into Class 3 (early onset) that was characterized by universal initiation of all behaviors by Grade 10. The remaining 11% of students made up Class 4 (postponement). There was no lifetime incidence of any sexual behavior reported in this group across the first three years of high school except for a small subgroup initiating handholding in Grade 11.

Multinomial logistic regression results

Table 2 shows the results predicting class membership from student demographics. The gradual onset class was used as the reference group in the multinomial logistic regression model, as it was the most populous. Boys were three times more likely than girls to belong to the postponement versus the gradual onset class (*OR*, 3.19; 95% *CI*, 1.60–6.36). Black

students were over 2.5 times more likely than White students to belong to the early versus gradual onset class (*OR*, 2.71; 95% *CI*, 1.11–6.67). The associations between concentrated disadvantage and onset class as well as those between two-parent household and onset class were not significant.

DISCUSSION

The current study sought to broaden our understanding of sexting in three primary ways. First, this study provides, to our knowledge, the first longitudinal investigation of the prevalence of sexting and other sexual behaviors across the high school years. Second, we examined sexting initiation within the broader context of emergent sexual behaviors ranging from hand holding to sexual intercourse without assumptions of risk. Non-genital sexual behaviors are important to examine from a developmental lens but have been largely neglected in the sexting literature (Beadnell et al., 2005; Haydon, Herring, Prinstein, & Halpern, 2012; Vasilenko, Kugler, Butera, & Lanza, 2015). Third, we used within-person analyses to examine the onset of sexual behaviors across different sexual trajectories and examined sociodemographic predictors of these trajectories.

Examining sexting within the context of other emergent sexual behaviors sheds light on some of the developmental features of sexting. Consistent with findings from prior cross-sectional studies (e.g., Klettke et al., 2014), we found that the prevalence of sexting increased over adolescence, with 50% of the adolescents having sexted by Grade 11. Furthermore, when looking across all teens, the pattern of the increase and rate of sexting during high school was similar to that for undressing and genital contact behaviors.

Within-person growth mixture modeling revealed four patterns of emergent sexual behavior. The largest group included 43% of students who followed a pattern characterized by high incidence of hand holding and kissing that steadily increased between Grade 9 and 11. For this group, the onset of sexting coincided with the onset of undressing, oral sex, and sexual intercourse, and each of these behaviors gradually co-emerged in Grade 10 with more having engaged in these by Grade 11. About one third of the students fell into another group whose sexual development was characterized by more rapid increases in co-emerging sexting, undressing, and intercourse between Grade 9 and 11, with steadily high rates of handholding and kissing. Trajectories characterized by early initiation (13% of students) or postponement (11% of students) were less typical.

These four patterns of sexual behavior initiation are consistent with developmental research characterizing sexual development as a linear progression of sexual behavior in which kissing and handholding typically preceded genital contact behaviors (de Graaf et al., 2009). Our longitudinal trajectory analyses added to this literature by documenting individual differences in the onset and rate of adolescents' sexual behavior. Other published trajectory analyses also support the presence of individual differences in sexual development (e.g., Haydon, Herring, & Halpern, 2012; Vasilenko et al., 2015). Unlike these studies, which focused on genital contact behaviors and associated risk behaviors as predictors of sexual problems (e.g., sexually transmitted infections), our analyses sought to identify sexual trajectories from a full range of sexual behavior initiation without assumptions of risk in

order to more holistically understand patterns of sexual behavior initiation over the high school years. Additional research is needed to examine sexual trajectories as predictors of potential positive outcomes (e.g., sexual self-concept, successful conflict negotiation, sexual satisfaction, well-being, life satisfaction) as well as adverse outcomes such as substance use, risky sexual behaviors, and sexually transmitted infections.

Few demographic differences emerged between the sexual trajectory groups. Consistent with prior research, Black students were more likely than White students to be in the early initiators group (Cavazos-Rehg et al., 2009; Vasilenko et al., 2015). Unexpectedly, boys were more likely than girls to be in the postponement versus gradual development group. This finding may initially appear at odds with studies documenting that boys are more likely than girls to be in groups characterized by early initiation of sexual intercourse or risky sexual behaviors (e.g., Cavazos-Rehg et al., 2009; Vasilenko et al., 2015). However, when considered from a holistic or sex-positive approach, the findings are complementary. That is, among adolescents engaging in genital contact behavior boys may be more prone to risk-related behavior and, among the small number of youth who postpone sexual behavior, there are more boys than girls. Gender differences in pubertal development offer one explanation for the higher proportion of boys in the postponement versus gradual group. Boys' pubertal timing lags somewhat behind that of girls and later timing is associated with slower tempo for boys but not girls (Marceau, Ram, Houts, Grimm, & Susman, 2011). Thus, there may be more boys than girls whose later physical development translates into comparatively later motivation and opportunity for romantic and sexual experience (Baumeister, 2000; Forbes & Dahl, 2010; Marceau et al., 2011). Whereas research has connected pubertal development to early initiation of genital contact behavior, additional work is needed to examine the role of pubertal timing within the broader context of sexual development.

Across all trajectory groups, sexting tended to co-emerge with genital contact behaviors. This finding suggests that sexting is a salient facet of sexual behavior in adolescence that is likely to co-emerge with genital contact behaviors regardless of individual differences in the timing or pace of emergent sexual behaviors. That roughly half of the adolescents in our sample reported sexting by Grade 11 also supports a view of sexting as a normative type of communication between sexual partners in adolescence (Döring, 2014). This developmental view of sexting, which links sexting to the onset of genital contact behavior, raises questions about the degree to which sexting, as opposed to genital contact behavior, is associated with some of the risks found in the sexting literature. Many of the risks associated with sexting have also been linked to sexual debut (e.g., alcohol use, sexual risk behavior, psychological distress; James, Ellis, Schlomer, & Garber, 2012; Ma et al., 2009; Zimmer-Gembeck & Helfand, 2008). Thus, longitudinal studies are needed to understand the extent to which sexting uniquely contributes to the onset, level, or persistence of these outcomes. In so doing, researchers will need to ascertain the timing of sexting in relation to genital contact behaviors. Because we asked about the initiation of sexual behaviors by age in years, we were unable to discern the temporal order of sexual behaviors that occurred within the same year. Additional studies are needed to clarify whether sexting tends to precede or follow genital contact behavior as well as whether sexting affects the likelihood or nature of genital contact behaviors. If sexting typically is initiated before genital contact behaviors, it could be an important point of intervention. In this case, the early emergence of sexting might be a

particular point of concern, as it may signal precocious sexual behaviors that have been linked to psychosocial and sexual health problems (James et al., 2012; Ma et al., 2009; Zimmer-Gembeck & Helfand, 2008).

Viewing sexting as a normative sexual behavior that co-emerges with genital contact behavior suggests that sexting may be an important part of romantic or sexual development and might have some developmental functions. For example, many high school students use technology to discuss sexual health with partners and technology communication about condoms and birth control is associated with more consistent condom use (Widman, Nesi, Choukas-Bradley, & Prinstein, 2014). Sexting could also serve to enhance intimacy or communicate sexual needs and desires to partners, possibly increasing sexual satisfaction. A better understanding of the relative costs and benefits of sexting will require research that attends to its relational context, functions, and motivations. The current results, which shed light on the developmental timing of sexting, cannot speak to whether sexting and genital contact behaviors occurred with the same versus different partners, within serious versus casual relationships, or within same-versus other-sex relationships. Future research should also examine whether there are differences in the timing, prevalence, context, or function of sexting by sexual orientation and religious background.

Implications for Practice

Ultimately, practical guidelines for addressing adolescent sexting require continued research on its developmental features, forms, functions, and risks. The current study takes a step in that direction and our findings suggest that the increasing prevalence of sexting across high school make it unlikely that abstinence only campaigns will significantly impact its incidence or associated risks (Döring, 2014). Instead, sexting may be best addressed in schools through theory-informed and comprehensive sexual education programs shown to be effective in helping youth to postpone the initiation of genital contact behaviors (Kirby, 2008; Lerner & Hawkins, 2016). Additionally, efforts to educate youth on sexting's potential forms, adaptive functions, and risks could be of great benefit. This might include guidelines for safe-sexing, strategies for making autonomous decisions in response to requests for sexts, and education on identifying and responding to pressured or coercive sexting. Minimizing and managing the unwanted dissemination of sexts is also a salient and achievable goal of sexting education. For example, four years following a cell phone safety program that aimed to increase student awareness of risks associated with cell phone use, including sexting, it was shown that sext dissemination decreased from 27% to 12.2% for males and from 21.4% to 7.6% for females (Strassberg, Cann, & Velarde, 2017; Strassberg, McKinnon, Sustaíta, & Rullo, 2013). Incorporating sexting (and comprehensive sex) education into primary and mental health care settings might also benefit adolescents. Within individual care, information about an adolescent's sexting status may provide a marker of genital contact and could be a starting point for individualized care geared toward promoting healthy sexual expression and reducing risk-related behavior.

Limitations and Future Directions

The current study represents an initial step toward a richer understanding of sexting in relation to other sexual behaviors in adolescence. Although this work provides a foundation

for contextualizing sexting, additional research is clearly needed. One area in particular need of attention and consensus is the very definition of sexting, which varies across studies. Consistent with the majority of studies, we defined sexting as the sending of sexual messages without regard to receipt for two reasons: (1) it ensures that youth were active participants (Barrense-Dias et al., 2017), and (2) sending sexts is the more salient component linking sexting to sexual behavior over time (Temple & Choi, 2014). Nonetheless, data indicating that more youth receive than send sexts points to a need to further explore the receipt of sexts in sexting research (Strassberg et al., 2017). In addition, our definition of sexting included sexually explicit texts as well as photos and videos. This definition followed other researchers' recommendations for inclusive, youth-derived characterizations (e.g., Temple & Choi, 2014) but may mask important differences between these forms of sexting, such as their functions, motives, or outcomes. The current findings also cannot speak to potential differences associated with sexting that emerges at teens' initiation or in response to a request. Such differences may be especially important for understanding coercive sexting.

Interpretation of the current findings should also consider that data collection included only self-report questionnaires administered annually in group setting. Sexting is commonly assessed this way; however, social desirability may increase bias to sexual questions in this context. The inclusion of other methodologies, such as ecological momentary assessment or daily dairies, to assess sexting over shorter period of time has been successfully employed with adults (e.g., Smiley et al., 2017) and might greatly enrich knowledge about the definition, frequency, and contexts of sexting.

Conclusion

Although we have much to learn about adolescent sexting, the current study sheds light on how sexting fits into patterns of emerging sexual behavior. Using a person-centered approach, we found that sexting is a normative form of communication for adolescents who engage in genital contact behaviors. This work lays the foundation for future research to identify when sexting signals risk, normative development, or healthy sexuality. Knowledge gained from this study can inform more programmatic research on the contributions of sexting to adolescent development and inform curricula for promoting sexual health and communication. Although known risk factors of sexting should be acknowledged, normativity should be emphasized.

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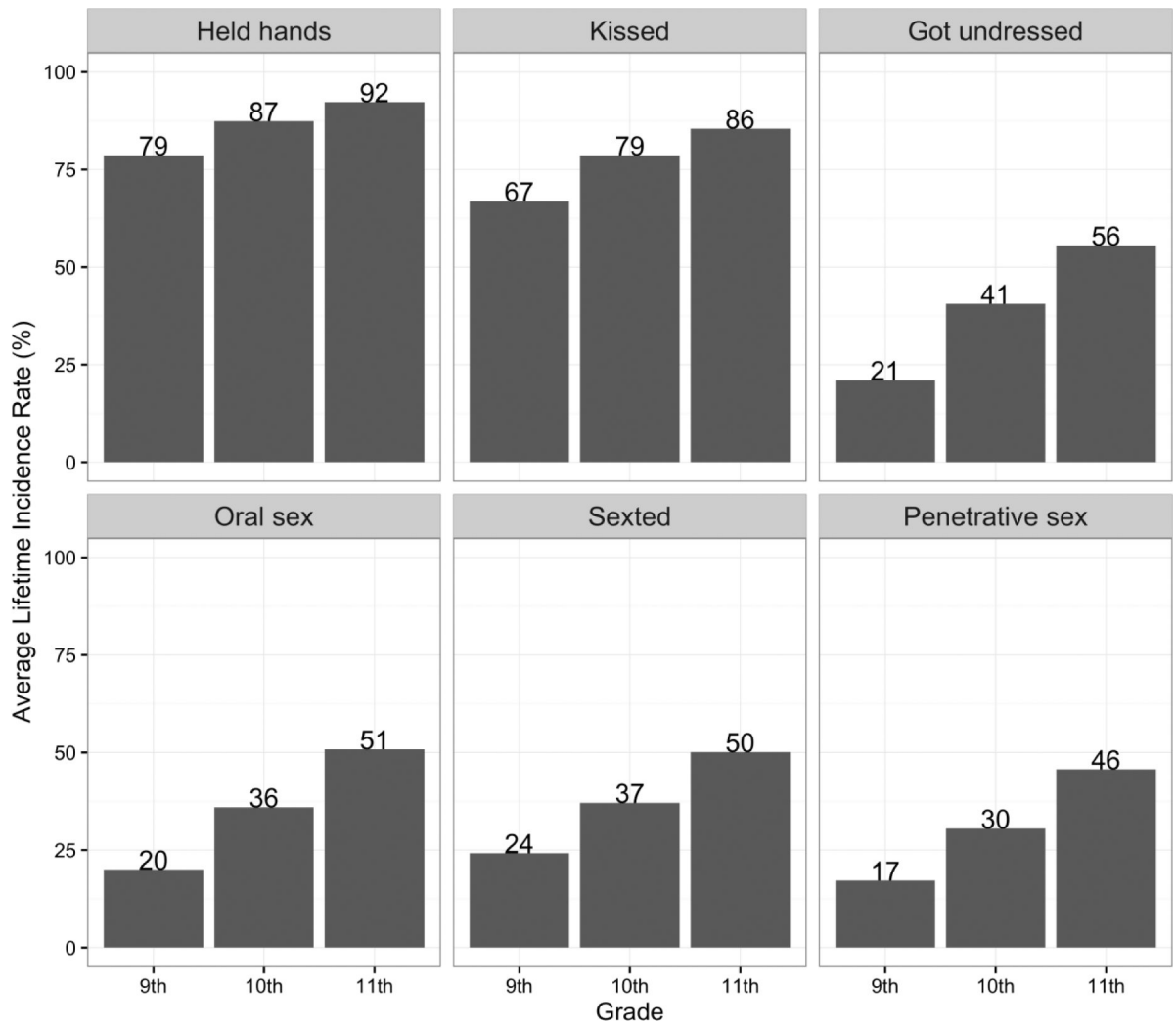


Figure 1.
Lifetime incidence rates of sexual behaviors by grade

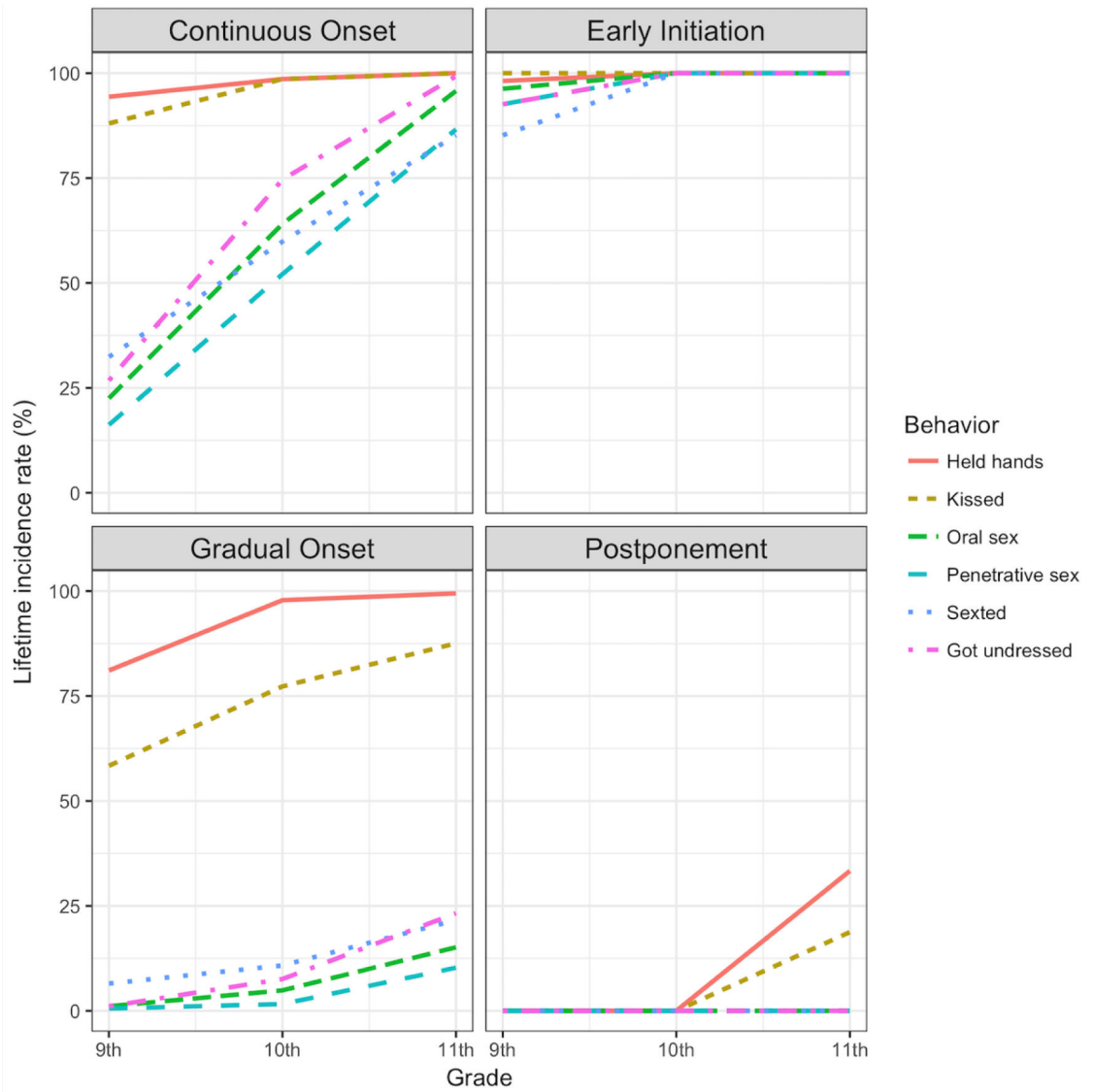


Figure 2.
Lifetime incidence rates by class

Table 1.

Model fit statistics and sexual behavior class membership probabilities

| Number of classes | Model Fit Statistics for all Models | | | | Average Class Membership Probabilities for Selected 4-class Model | | | | |
|-------------------|-------------------------------------|---------|---------|---------|---|-----------------------|----------------------|----------------------------|-------------------------|
| | AIC | Adj BIC | BLRT | Entropy | | Postponement (N = 48) | Early Onset (N = 54) | Continuous Onset (N = 142) | Gradual Onset (N = 185) |
| 1 | 8100 | 8104 | - | - | Postponement | 0.879 | 0.000 | 0.000 | 0.121 |
| 2 | 8077 | 8084 | < 0.001 | 0.842 | Early Onset | 0.000 | 0.940 | 0.060 | 0.000 |
| 3 | 8050 | 8059 | < 0.001 | 0.883 | Continuous Onset | 0.000 | 0.032 | 0.894 | 0.074 |
| 4 | 8012 | 8024 | < 0.001 | 0.861 | Gradual Onset | 0.001 | 0.000 | 0.051 | 0.948 |
| 5 | 8018 | 8033 | 1.00 | 0.723 | | | | | |

^aNote: AIC = Akaike information criteria. Adj BIC = Adjusted Bayesian information criteria. BLRT = bootstrap likelihood ratio test.

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Table 2.

Multinomial logistic regression coefficients

| Covariate | Continuous onset versus Gradual onset OR (95% CI) | Early onset versus Gradual onset OR (95% CI) | Postponement versus Gradual onset OR (95% CI) |
|---------------------------|---|--|---|
| Gender | | | |
| Female | Ref | Ref | Ref |
| Male | 1.03 (0.66–1.62) | 1.45 (0.77–2.73) | 3.19 (1.60–6.36) |
| Race | | | |
| White | Ref | Ref | Ref |
| Black | 1.35 (0.68–2.67) | 2.71 (1.11–6.67) | 0.69 (0.20–2.34) |
| Other students of color | 0.89 (0.47–1.69) | 2.02 (0.89–4.61) | 1.17 (0.46–2.93) |
| Concentrated disadvantage | | | |
| Low | Ref | Ref | Ref |
| Medium | 1.21 (0.64–2.29) | 1.21 (0.48–3.06) | 0.92 (0.37–2.25) |
| High | 0.88 (0.51–1.52) | 0.80 (0.36–1.79) | 0.53 (0.23–1.18) |
| Two parent household | | | |
| No | Ref | Ref | Ref |
| Yes | 0.85 (0.53–1.35) | 0.59 (0.31–1.14) | 0.61 (0.31–1.20) |

^aNote. Ref = reference group. Bold font indicates a significant predictor at $p < .05$.