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Sexting and Behavioral Health in First-time Justice-Involved Adolescents

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Declaration of interests

☐ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Abstract

Objective(s): We examined the prevalence of sexting, related motivations, demographics, and association with behavioral health problems among justice-involved adolescents.

Hypotheses: We hypothesized positive associations between sexting and sexual risk, substance use, delinquency, and mental health problems.

Methods: Participants were 307 community-supervised justice-involved adolescents with a first-time offense (M_{age} =14.50 years, 44.6% female) and their caregivers. Adolescents answered questions on technology use and sexting by sending, receiving, or forwarding sexually suggestive text messages and images (pictures or videos). They also completed measures of recent (past 4-month) sexual activity, unprotected sex, cigarette, alcohol, marijuana, and other drug use, and delinquency; current trauma symptoms, internalizing problems, and adaptive functioning.

Results: Prevalence of sexting were 37.7% (lifetime overall; 17.0% sent texts; 17.4% sent images) and 29.5% (past-year overall; 12.8% sent texts; 13.6% sent images). Sexts were commonly sent as presents to partners, in response to sexts received, or to have fun. “Sexters” were older than “non-sexters” and more likely to identify as lesbian, gay, bisexual, or questioning. Past-year sexting was significantly associated with recent sexual activity; unprotected sex; alcohol use and days of use; marijuana and other drug use; delinquency and variety of delinquent acts; and elevated trauma symptoms and internalizing problems.

Conclusions: Sexting is prevalent among adolescents with a first-time offense and co-occurs with multiple behavioral health needs. Intervention for this population may be informed by routinely assessing sexting in community settings. Familiarity with local reporting laws could help clinicians navigate the legal implications of sexting among adolescents with existing justice-system involvement.

Keywords

Delinquency; Juvenile Justice; Mental Health; Sexting; Sexual Behavior; Substance Use

1. Introduction

Digital technology has transformed how youth interact with one another. In 2018, 95% of teens in the United States had smartphone access and 94% went online daily (Anderson & Jiang, 2018). Texting is a preferred mode of communication; 90% of United States teens with cellphone access exchange texts using a cell phone service or other social media or messaging applications (Lenhart et al., 2015). Advances in mobile messaging have fostered the growth in “sexting,” defined in this study as the electronic transmission of sexually explicit messages via text, pictures, or video; these messages are referred to “sexts.”

1.1 Youth Sexting: A Growing Public Health Concern with Potential Legal Consequences

Scientific literature regarding sexting is emerging. Definitions of sexting vary widely, as do prevalence estimates of sexting among adolescents (range 0.9%–73.5%) (Barrense-Dias, Berchtold, Suris, & Akre, 2017; Yoder, Hansen, & Precht, 2018). An influential meta-analysis of 39 studies including 110,380 youth found that 14.8% of youth sent a sext, 27.4% received a sext, 12.0% forwarded a sext without consent, and 8.4% reported their sext forwarded without consent (Madigan, Ly, Rash, Van Ouytsel, & Temple, 2018). Another more recent meta-analysis (Molla-Esparza, Losilla, &, Lòpez-Gonzáles, 2020) of 79 studies including 184,695 participants reported similar prevalence rates (14% sent, 31% received, and 7% forwarded sexts).

Physicians and health professionals may consider sexting relatively harmless, developmentally appropriate adolescent sexual behavior (Judge, 2012)—perhaps safer than *physical* sexual behavior, which can lead to sexually transmitted infections (STIs), HIV, or unwanted pregnancy. However, there are concerns about whether sexting may lead to physical sexual behavior and the associated risks. Importantly, the potentially permanent nature of digital messages and their ease of widespread distribution may lead to a host of harmful consequences among youth (Judge, 2012; S. Friedman, Sorrentino, & J. Friedman, 2017). For example, sexts have been forwarded to third parties without consent from the youth who produced the sext, triggering emotional distress, harassment, and even suicide in some cases (Judge, 2012; Friedman et al., 2017). Additionally, research suggests that many young people are not aware of the legal consequences of sexting as a minor (Strohmeier, Murphy, and DeMatteo, 2014). Certain types of sexting between minors (e.g., exchanging sexually explicit images) violate child pornography laws in some jurisdictions, resulting in legal charges and long-term negative sequelae for some adolescents (Judge, 2012; Friedman et al., 2017).

1.2 Sexting in Justice-involved Adolescents

Although minors who sext are often not prosecuted (Wolak, Finkelhor, & Mitchell, 2012), sexting may result in serious legal consequences for youth with existing justice system involvement. Moreover, justice-involved youth experience higher rates of mental health disorders, substance use, and risky sexual behaviors (Abram, Teplin, McClelland, & Dulcan, 2003; McClelland, Elkington, Teplin, & Abram, 2004; Romero et al., 2013). Sexting may cooccur with these behavioral health problems or even exacerbate them and perpetuate the legal involvement of these youth. Therefore, it is critical to examine sexting among justice-involved youth and to understand how sexting may be related to the behavioral health of these youth—especially early in the youths' justice involvement and in the course of any behavioral health disorders, when intervention would likely have the greatest impact.

In one of very few studies of youth at first point of justice contact, half of the youth (mean age 14.5 years) had already used substances, 40% were sexually active, and a third had been diagnosed with a mental health disorder (Tolou-Shams et al., 2019). Moreover, those who used substances and engaged in sexual risk behavior had higher levels of emotional problems and delinquent behaviors, and this association was stronger among girls than boys.

Given high behavioral health need in these youth, time of first offense would be an ideal time for assessment and intervention, which may be informed by youth sexting behavior.

We are aware of only two published studies of sexting among justice-involved adolescents, and both studies sampled only boys (with mean age of 16 to 17 years). The first study included adolescent boys from a juvenile correlational facility (Fix, Falligant, Alexander, & Burkhart, 2019). The authors found that among boys with adjudicated nonsexual offenses, roughly 70% had sent sexual pictures on their cellphone, and roughly 30% had done so via other media (i.e., email, internet messaging); these rates were roughly twice that of boys with adjudicated sexual offenses. The second study found similarly high rates of sending sexts (21% - 73.5%) in a sample of boys with adjudicated offenses, most of whom resided in a juvenile correctional facility (Yoder et al., 2018). These rates of sexting appear to be higher than that reported in Madigan and colleagues' (2008) meta-analysis (14.8%), which included studies with mostly general or school-based adolescent samples. Another study (Houck et al., 2014) of nonjustice-involved youth with emotional or behavioral difficulties also reported a prevalence rate of sending sexts (22.4%) that appears to be higher than that in general or school-based populations. These findings of sexting prevalence among vulnerable youth populations are consistent with the idea that sexting may be a risk marker of behavioral health problems and may be used to inform intervention. However, more research is needed on sexting and behavioral health correlates in justice-involved adolescents, particularly among those supervised in the community (e.g., on probation), who make up nearly 80% of all justice-involved youth (Furdella & Puzzanchera, 2015), among younger adolescents early in their justice involvement, and among girls, whose pathways into the justice system (e.g., Conrad, Placella, Tolou-Shams, Rizzo, & Brown, 2014) and whose behavioral needs (Tolou-Shams et al., 2019) differ from boys in important ways.

1.3 Sociodemographic Correlates of Youth Sexting

Prior research has examined associations of sexting with sociodemographic characteristics (Klettke, Hallford, & Mellor, 2014; Kosenko, Luurs, & Binder, 2017). Studies consistently showed that sexting was more common among adolescents who were older or identified as lesbian, gay, bisexual, or questioning (LGBQ) (Rice et al., 2012; Rice et al., 2014; Rice et al., 2018; Ybarra & Mitchell, 2014). Several studies have also indicated that sexting was more common among African American (Dake, Price, Maziarz, & Ward, 2012; Rice et al., 2014; Rice et al., 2012) or Hispanic (Houck et al., 2014; Rice et al., 2018; Ybarra & Mitchell, 2014) youth. There are mixed findings about whether sexting is more common among girls or boys. Some studies have found that girls were more likely than boys to send sexual images of themselves (Houck et al., 2014; Ybarra & Mitchell, 2014). Other studies have found the opposite (Van Ouytsel, Van Gool, Ponnet, & Walrave, 2014). However, some studies that found that boys were more likely to report sexting, included sending sexual texts (Rice et al., 2014) or receiving and forwarding sexts (Dake et al., 2012). The remaining studies have reported equal rates of sending sexts among boys and girls (Rice et al., 2012; Temple et al., 2012).

1.4 Behavioral Health Correlates of Youth Sexting

Multiple studies show that youth who sext were more likely to engage in sexual activity (Dake et al., 2012; Houck et al., 2014; Rice et al., 2012, 2014; Temple et al., 2012; Ybarra & Mitchell, 2014). Many studies have also documented an association between risky sexual behaviors, including having multiple sexual partners, engaging in unprotected sex, and using substances before sex (Dake et al., 2012; Rice et al., 2014, 2018; Temple et al., 2012; Ybarra & Mitchell, 2014).

However, far fewer studies have examined the relationship between sexting and behavioral health problems other than sexual activity or risk behavior among adolescents. Among these studies, sexting was associated with use of substances including alcohol, marijuana, and cigarettes (Dake et al., 2012; Temple et al., 2014; Ybarra & Mitchell, 2014). Relatedly, youth sexting was associated with sensation seeking (Van Ouytsel et al., 2014), impulsivity (Temple et al., 2014), associating with deviant peers (Ricketts, Maloney, Marcum, & Higgins, 2015), and delinquent behavior (Lee, Moak, & Walker, 2013). In addition, several studies have linked sexting with internalizing problems including depression (Dake et al., 2012; Van Ouytsel et al., 2014; Ybarra & Mitchell, 2012), low self-esteem (Ybarra & Mitchell, 2014), and suicidality (Dake et al., 2012), but others have not (Temple et al., 2014).

In sum, the evidence shows a link between youth sexting and risky sexual behavior, with a few studies showing that this link extends to risky non-sexual behaviors (e.g., substance use, delinquent behavior) and emotional problems as well. Of note, the majority of these studies have examined the association between lifetime sexting and lifetime engagement in risk behaviors or current emotional states, which does not allow investigation of whether sexting and risk behaviors or emotional distress occurred in close temporal proximity, or whether one preceded the other.

1.5 Youth Motivations for Sexting and Relationship Context

Furthermore, published reports of adolescents' motivations of sexting are scarce (Englander & McCoy, 2018). Available research indicates that adolescents commonly sent sexts to romantic partners as a way to flirt and maintain intimacy within existing relationships (Burén & Lunde, 2018; Lippman & Campbell, 2014; Van Ouytsel, Van Gool, Walrave, Ponnet, & Peeters, 2017). However, these same studies have also indicated that girls often received sexts from strangers they encounter online and have felt pressured to send sexts. Another study of justice-involved adolescent boys found that sending sexts to friends and acquaintances was commonly motivated by negative emotions, whereas sending sexts to dating or sexual partners was not, in a sample (Yoder et al., 2018). More research is needed to understand the variety of reasons that motivate adolescents to sext, especially among justice-involved girls.

Interestingly, a few studies have highlighted a potential moderating role for relationship context in the association between sexting and behavioral health, which could offer insight into youths' motivations for sexting and the contexts in which sexting may be maladaptive. Specifically, one study found that sexting outside a romantic relationship, but not within

one, was associated with substance use during last sexual intercourse and lifetime sexual contact (Van Ouytsel, Walrave, Lu, Temple, & Ponnet, 2018). However, the authors reported that substance use and risky sexual behaviors were similarly elevated among adolescents who reported sexting, regardless of relationship context. Another study documented a higher likelihood of engaging in dating violence among justice-involved boys who more frequently reported sexting outside a dating or sexual relationship, but not within one (Yoder et al., 2018).

1.6 Current Study

Among a sample of justice-involved youth with a first-time offense comprising roughly equal proportions of boys and girls, we examined (a) the lifetime and past-year prevalence of sexting, including by content (i.e. text v. pictures/videos) and modes of transmission (i.e., sending v. receiving v. forwarding), (b) motivations for sending sexts, (c) sociodemographic characteristics related to sexting, and (d) concurrent associations of past-year sexting and recent behavioral health problems—risky sexual behavior, substance use, delinquency, and mental health problems including trauma symptoms, internalizing problems, and adaptive functioning. Based on prior research, we hypothesized that sexting would be positively associated with behavioral health problems, controlling for demographics associated with sexting. If our hypothesis is supported, then sexting may be considered a risk marker for a constellation of co-occurring behavioral health problems among youth with a first-time offense, which may serve to identify a subgroup of this vulnerable population with a pronounced need of multi-component interventions.

2. Methods

2.1 Participants and Procedures

Participants were enrolled in Project EPICC (Epidemiological Project Involving Children in the Court), a longitudinal study of justice-involved youth with a first-time offense. Juveniles aged 12–18 years and their caregivers were recruited from a large northeastern United States family court. Participants were sampled to include roughly equal proportions of males and females with status offenses (i.e., acts prohibited for minors) and delinquent offenses (i.e., criminal acts). Exclusion criteria included repeat offending, cognitive impairment, and caregiver inability/unwillingness to participate or not living with the youth.

Families were mailed research flyers with the notification letter for the youth's court appointment date. At the court appointment, trained research assistants screened prospective participants for eligibility. Of 2,660 justice-involved youth with an open petition for a first-time offense during the recruitment period, 1,578 were eligible, and 424 consented to participation. Baseline assessment was completed by 423 youth and 4-month follow-up assessment was completed by 311 youth. The 307 youth (72.4% of consented families) who completed the 4month follow-up measure of technology use and sexting were selected for the present study.

Informed consent with caregivers, assent to participate from the youth, and follow-up assessments occurred in participants' home, private community space, or in the research

lab. To ensure confidentiality and to maximize privacy, we informed participants that a Certificate of Confidentiality was obtained. All procedures were approved by the institutional review boards of the primary investigator's university and collaborating institutions. Details about participant recruitment and sampling are reported elsewhere (Tolou-Shams et al., 2019).

2.2 Measures

Youth self-report measures were completed at baseline (demographics) and 4-month follow-up (remaining measures) using Audio Computer Assisted Self-Interview (ACASI) administered in English via a tablet to youth. This computerized assessment has demonstrated good reliability for youth self-report (Romer et al., 1997),

2.2.1 Demographics—Youth reported their age in years. They indicated their sex as male, female, or other; this variable was dichotomized for analyses (male v. female; because only two participants selected "other," they were excluded from analyses involving this variable). Youth were asked to select their racial background by selecting one or more of the following groups: American Indian, Asian, Black/African/Haitian, Native Hawaiian/other Pacific Islander, White, Mixed/Multiracial, and Other; and to indicate whether they were of Hispanic/Latinx ethnicity. They also selected the option that best matched their sexual orientation from heterosexual (straight), homosexual (gay, lesbian, queer), bisexual, undecided (questioning), or other; this variable was dichotomized for analyses (straight v. LGBQ). Type of offense was coded as status (i.e., acts prohibited for minors such as truancy and underage alcohol use) or delinquent (i.e., criminal acts such as shoplifting, disorderly conduct, assault, breaking and entering, larceny) based on the description of each youth's charge on the court petition.

2.2.2 Technology Use and Sexting Behavior—We modified a measure of technology use and sexting used in previous research (Houck et al., 2014; Rice et al., 2012; The National Campaign to Prevent Teen and Unplanned Pregnancy, 2008). Youth reported: 1) number of hours per day using computers and smartphones; 2) whether they had ever *sent* a sexually suggestive text message (defined as written personal texts, emails, IMs, etc. and not those you might receive from a stranger, like spam), or a nude or semi-nude picture/video of him/herself to someone; 3) past-year frequency of sexting; 4) their motivations for sending sexts by selecting all that apply from 10 options (see Fig. 2); 5) whether they had *received* a sexually suggestive text message or picture/video of another person; and 6) *shared* it with (i.e., forwarded it to) someone it was not originally meant for.

2.2.3 Youth Sexual Risk and Substance Use—Using the Adolescent Risk Behavior Assessment (ARBA; Donenberg, Emerson, Bryant, Wilson, & Weber-Shifrin 2001), youth were asked about recent (past-4-month) sexual behaviors and substance use, including: 1) sexual activity and condom use the last time they had sex (yes/no), and 2) use of cigarettes, alcohol, marijuana, and other illicit drugs and non-medical use of prescription drugs (yes/no and number of days of use in the past 4 months). Because only a small proportion of youth reported any use of cigarettes (15.0%) or of other illicit drugs (8.2%), the present study analyzed only the dichotomized measures (yes/no) for these substances,

Larger proportions of youth reported using alcohol (28.1%) and marijuana (38.8%), but the majority did not. Thus both the dichotomized measures (yes/no) and the frequency count measures were analyzed to examine whether youth used these substances, and how much they used, respectively.

2.2.4 Delinquency—Using the National Youth Survey of Self-Reported Delinquency (NYS-SRD; Elliott, Huizinga, & Ageton 1985), youth answered how many of 23 possible categories of delinquent acts (yes/no) they committed in the past 4 months (after which they have already been adjudicated for their initial offence that brought them into this study cohort). The published subscale contains 24 items that sum up to form a general delinquency score, however, due to an error in the survey-administration software, one item was inadvertently omitted ("Have you had sexual intercourse with a person who was not your serious partner when involved in a relationship?") and therefore the range of possible scores was 0 to 23 in the present study. Because the majority of youth reported no delinquent acts in the past 4 months, we analyzed both the general delinquency score as well as a dichotomized version of this measure (yes/no) to examine the extent of delinquent acts as well as whether youth engaged in any delinquent acts as all. In addition, we computed two dichotomized measures (yes/no) of whether youth engaged in any property-related acts using a subset of 8 items (e.g., "Have you stolen (or tried to steal) a motor vehicle, such as a car or motorcycle?", "Have you knowingly bought, stole, or held stolen goods (or tried to do any of these things)?") and any violent or violence-related acts using a subset of 9 items (e.g., "Have you been involved in gang fights?", "Have you carried a hidden weapon other than a plain pocket knife?"). We did not compute a sum score for property-related and violent acts because small proportions of youth endorsed these items (10.9% and 15.1% respectively).

2.2.5 Mental Health—Trauma symptoms were measured using the National Stressful Events Survey PTSD Short Scale (NSESSS; Richard et al., 2014). Youth reported the extent to which they were bothered by nine symptoms related to stressful events in the past week on a 5-point Likert scale. Youth who denied having experienced a stressful event received no score and were excluded from trauma symptom analyses. Youth also completed the Behavior Assessment Scale for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 2004) containing 176 true/false or Likert-type scale items on mental health and adaptive functioning. We used the Internalizing Problems and Personal Adjustment composite scales; higher scores reflected more severe inwardly directed distress (e.g., depression, anxiety) and more adaptive functioning (e.g., better relationships with parents, higher self-esteem), respectively. Internal consistency ratings for BASC-2 composite scales range from 0.84–0.95 (Reynolds & Kamphaus, 2004; Rescorla, 2009). We utilized the BASC-2 *L* and *V* validity indices to flag response profiles with excessively positive self-description or with an unusually large number of nonsensical items endorsed. Both distributions of trauma symptoms scores and internalizing problems scores showed strong positive skew, therefore, we dichotomized each measure to indicate reporting being at least moderately (≥2) bothered by trauma symptoms and reporting clinically high levels of internalizing problems (T-score≥70), respectively. The distribution of adaptive functioning scores did not depart substantially from normality, however, all other behavioral health problems are

dichotomous or have dichotomized measures. To facilitate comparison across outcomes, we also dichotomized this scale to indicate clinically low levels of adaptive functioning (T-score≤30).

2.3 Data Analysis

We created participant subgroups based on sexting status. Adolescents who endorsed engaging in at least one mode/content of sexting ever, and in the past year, were classified as “lifetime sexters” and “past-year sexters” respectively. Those who denied engaging in all modes/content of sexting ever, and in the past year, were classified as “lifetime non-sexters” and “past-year non-sexters” respectively. Those who responded “don’t know” or “don’t want to answer” on any mode/content of sexting and denied all other sexting behaviors were classified as having “unknown” sexting status for the relevant timeframe.

Then we conducted descriptive analyses of the prevalence of sexting, related motivations, and demographic characteristics of our overall sample and for these subgroups. We used t-tests and chi-square tests to compare the subgroups on continuous (e.g., age) and categorical (e.g., sex) characteristics respectively.

For the sexting–behavioral health problem associations, we conducted analyses only with past-year sexting to approximate the past-4-month timeframe of the outcomes. We conducted binary logistic regression analyses for all dichotomous outcomes and fit generalized linear models with negative binomial distribution and log link function.for the count outcomes (number of days of alcohol and of marijuana use, and general delinquency score). For each analysis, we entered past-year sexting as the predictor and controlled for demographic characteristics on which there was a significant difference between past-year sexters and non-sexters. We followed-up each logistic regression analysis with the Hosmer-Lemeshow goodness-of-fit test and the Box-Tidwell approach to test the linearity of the logit assumption (Hosmer, 2000). Age was not linearly related to the log odds of condom non-use at last sex, thus we dichotomized age (15–18 v. 12–14 years) for that outcome; for all other dichotomous outcomes, age met the linearity assumption and was analyzed as a continuous variable. For each count outcome, the variance was much larger than the mean at each level of the predictor, and the 95% confidence interval for the dispersion coefficient did not include zero, indicating over-dispersion of the data and that the negative binomial model was appropriate. We found no other assumption violations or fit issues.

We used two-sided hypothesis tests ($\alpha = .05$) for all analyses, conducted using SPSS Version 25 (IBM Corp). The datasets generated and/or analyzed during the current study, related methods, and code are not publicly available but are available from the corresponding author on reasonable request.

2.4 Analyses of Possible Bias Due to Missing Data

To address possible bias due to missing data, we examined whether exclusion from this study due to (a) non-completion of the technology use and sexting behavior measure, (b) missing responses on key sexting variables, and (c) flagged BASC-2 profiles were associated with demographic characteristics or outcomes using t-tests and chi-square tests. Analyses show some differences between youth included in analyses and those excluded due to

missing data or validity issues. Compared to the 307 youth included in this study, the 127 youth excluded due to non-completion of the technology use and sexting measure were more likely to be Black, African, or Haitian, less likely to be White, and more likely to have committed a delinquent offense (see Supplement Table S1). Compared to youth with known sexting status, those with unknown lifetime sexting status were more likely to have committed a delinquent offense; those with unknown past-year sexting status spent significantly less time using the computer (see Supplement Table S2). Thus, youth excluded from this study and analyses involving lifetime sexting were on average charged with more severe first-time offenses. Of the 307 BASC-2 response profiles, 38 (12.4%) were flagged for falling in the "extreme caution" range on either the *L*- or *V*-index. The flagged profiles were associated with a lower proportion of mixed race youth, a lower proportion of youth with moderate or higher level of trauma symptoms, less time spent on the phone, fewer days of alcohol use, and fewer days of marijuana use (see Supplement Table S3). Because the flagged profiles were not associated with sexting, their exclusion is unlikely to substantively change associations between sexting and BASC-2 outcomes, thus we took the conservative approach of excluding them from BASC-2 analyses.

3. Results

3.1 Prevalence

Lifetime prevalence of sexting involving any content or mode of transmission was 37.7%; past-year prevalence was 29.5%. For sending a sext, lifetime and past-year prevalence were 24.7% and 19.2%, respectively. Fig. 1 shows lifetime and past-year sexting prevalence broken down by content and transmission mode.

3.2 Motivation

Among the youth who reported sending sexts, the most common motivations were: 1) "as a sexy present" for a romantic partner; 2) in response to a sext received, and 3) "to be fun/flirtatious". Pressure to send sexts was endorsed by a relatively small proportion of youth. Fig. 2 lists percentages and other motivations.

3.3 Demographics

Table 1 displays sociodemographic characteristics for the full sample and compares differences between sexters and non-sexters. Sexters were significantly older than non-sexters, both for lifetime and past-year timeframe. A larger proportion of past-year sexters had LGBQ status compared to past-year non-sexters. In addition, lifetime sexters spent significantly more time on the phone than lifetime non-sexters. There were no other significant demographic differences between sexters and non-sexters.

3.4 Association with Behavioral Health Problems

Table 2 shows descriptive statistics of the 15 behavioral health problems assessed for past-year sexters and non-sexters. Because past-year sexters and non-sexters differed significantly in age and LGBQ status, we controlled for these characteristics in models examining the association between past-year sexting and each outcome. Fig. 3 depicts odds ratios for

dichotomous outcomes and incidence rate ratios for count outcomes and associated 95% confidence intervals.

3.4.1 Sexual Risk—Past-year sexting was significantly associated with both sexual risk outcomes. Compared to non-sexters, past-year sexters had higher odds of sexual activity (*n*=268, OR=3.07 [1.71, 5.50]) and condom non-use at last sex (*n*=266, OR=2.16 [1.12, 4.16]) in the past 4 months.

3.4.2 Substance Use—Past-year sexting was significantly associated with the use of several substances. Compared to non-sexters, past-year sexters had higher odds of using alcohol (*n*=271, OR=3.98 [2.15, 7.34]), marijuana (*n*=271, OR=2.01 [1.11, 3.65]), and other drugs (*n*=270, OR=2.62 [1.05, 6.51]) in the past 4 months. Moreover, past-year sexters had a higher incidence rate of days of alcohol use (*n*=270, IRR=5.50 [1.81, 16.77]). Past-year sexting was not associated with recent cigarette use (*n*=271, OR=1.14 [0.54, 2.38]) or with days of marijuana use (*n*=265, IRR=1.22 [0.52, 2.87].

3.4.3 Delinquency—Past-year sexting was significantly associated with all four measures of delinquency. Compared to non-sexters, past-year sexters had higher odds of engaging in any delinquent behavior (*n*=268, OR=3.61 [1.96, 6.64]), as well as specifically in property-related acts (*n*=261, OR=2.95 [1.28, 6.85], and in violent acts (*n*=266, OR=3.00 [1.42, 6.31] in the past 4 months. Furthermore, past-year sexters had a higher general delinquency score (i.e., higher incidence rate of categories of delinquent behavior (n=268, IRR=0.87 [0.40, 1.89]).

3.4.4 Mental Health—Past-year sexting was significantly associated with some mental health outcomes. Compared to non-sexters, past-year sexters had higher odds of experiencing trauma symptoms at the moderate level or higher (*n*=227, OR=2.45 [1.04, 5.78]) and clinical-range internalizing problems (*n*=228, OR=2.53 [1.09, 5.89]). Past-year sexting was not associated with adaptive functioning (*n*=231, OR=1.18 [0.47, 2.95]).

4. Discussion

To our knowledge, this is one of very few studies examining sexting in a vulnerable youth population and the first to do so with community-supervised youth with a first-time offense, as well as with justice-involved girls. Sexting is common in this sample of justice-involved youth with a first-time offense comprising roughly equal proportions of boys and girls: more than one-third of youth, regardless of gender, reported having ever sent, received, or forwarded a sexually suggestive text message or image. Roughly 25% reported ever having sent a sext—substantially higher than the 15% prevalence estimated by a meta-analysis of mostly general or school-based youth samples (Madigan et al., 2018), but lower than the roughly 70% prevalence estimated among two samples of justice-involved adolescent boys mostly recruited from juvenile correctional facilities (Fix et al., 2019; Yoder et al., 2019). The 19% past-year prevalence of sending a sext in this justice-involved youth sample appears comparable to the 22% past-six-month prevalence found in youth with elevated emotional and behavioral difficulties (Houck et al., 2014). Although our study did not compare justice-involved to community youth, our findings are consistent with previous

research indicating that sexting is prevalent among justice-involved and other vulnerable youth, possibly more so than in the general youth population.

These results expand the understanding of sexting to reflect several dimensions; not only did we examine sexting by content type (texts vs. images), we also explored potential motivations for sending sexts and assessed whether these patterns of behavior are different across race/ethnicity, gender, and sexual identities. Justice-involved youth in our sample often reported sexting as part of courtship and to gain social currency within existing relationships. Social pressure appeared to motivate only a minority of youth—though we note that a larger proportion of youth reported sending a sext in response to receiving one, which could be construed as a mild form of peer pressure. These findings are consistent with prior research, which reported that most teens reported sexting as part of desired or established romantic relationships, but that some teens have felt pressured to do so (Burén & Lunde, 2018; Lippman & Campbell, 2014; Van Ouytsel et al., 2017).

Consistent with previous studies (Barrense-Dias et al., 2017; Rice et al., 2018; Rice et al., 2012; Ybarra & Mitchell, 2014) sexters in our justice-involved adolescent sample were older, more likely to identify as LGBQ, and spent more time on the phone. Also consistent with extant research on sexting and behavioral health among adolescents (Barrense-Dias et al., 2017; Dake et al., 2012; Houck et al., 2014; Temple et al., 2014; Temple et al., 2012; Van Ouytsel et al., 2014; Ybarra & Mitchell, 2014), we found that past-year sexters were more likely to engage in health risk behaviors, including more frequent alcohol use,,recent use of marijuana and other drugs, and unprotected sex, and to experience clinical-level internalizing problems. Moreover, past-year sexters were more likely to engage in recent delinquent acts, including property-related acts and violent acts, as well as a wider variety of delinquent acts. Delinquency has been rarely examined in relation to sexting in extant research, and is important to consider not only in the healthcare context but also with respect to legal involvement. Continued delinquent behavior during community supervision could lead to further entrenchment in the juvenile justice system. It is also noteworthy that past-year sexters were more likely to experience elevated trauma symptoms. Trauma exposure is high (79%) in this sample of community-supervised justice-involved youth with a first-time offense (Tolou-Shams et al., 2019), comparable to rates among detained youth (93%; Abram et al., 2004). Yet we still found an association between sexting and moderate-level trauma symptoms. Our finding is consistent with prior research on justice-involved boys; those who sexted were more likely to have experienced early adversity or physical abuse (Yoder et al., 2018). Our findings provide evidence that past-year sexting functions as a risk marker of multiple co-occurring health risk behaviors and mental health problems even within an adolescent population with elevated rates of such behaviors and problems.

4.1 Limitations

Our findings cannot establish whether sexting is a risk factor for behavioral health problems, as the cross-sectional design precludes examining the temporal order of whether sexting preceded or followed behavioral health problems. Additionally, the past-year timeframe of the sexting measure was not contemporaneous with measures of psychopathology (current) and other risk behaviors (past 4 months). However, the assessment of past-year sexting in

relation to current or recent behavioral health problems goes a step beyond studies that examined these variables on a lifetime basis in supporting the temporal proximity between sexting and behavioral health. Our participants were first-time offenders participating in a diversion program from a northeast United States jurisdiction. Hence, our results may not generalize to youth with repeated offenses, those who were detained, or those from other jurisdictions. Missing data due to non-completion of the sexting and technology use measure, insufficient data to determine sexting status, and exclusion of mental health profiles flagged for possible problems with validity also limits findings. Results may have been biased due to some differences between participants included and those excluded from analyses. For example, a larger proportion of youth charged with delinquent offenses, relative to those charged with status offenses, were excluded from our analyses. Given research documenting very high rates of sexting in justice-involved adolescents residing in correctional facilities (Fix et al., 2019; Yoder et al., 2019), who presumably were adjudicated for more severe offenses compared to the community-supervised youth in the present study, our study may have underestimated the prevalence of sexting among justice-involved youth. Moreover, the dichotomized lifetime and past-year sexting variables did not offer insight into the frequency at which youth sexted, thus youth who sexted often were not differentiated from those who sexted rarely. We did not examine having one's sexts forwarded without consent—an inherently coercive type of sexting more likely to produce distress. Finally, sexting and other risky behaviors may be underreported despite our efforts to assure participants of confidentiality.

4.2 Clinical and Legal Implications

Sexting appears to indicate greater needs in multiple behavioral health domains among justice-involved youth with a first-time offense. Thus, sexting-related items have the potential to improve the ability of health screens to identify justice-involved youth who need clinical services. If future research demonstrates good sensitivity, specificity, and predictive validity of questions about sexting and related risk behaviors, these questions could be incorporated into routine adolescent wellness checks and intake assessments. Pediatricians, family practitioners, mental health providers, and community clinicians should consider discussing with families sexting and related adolescent behaviors, including substance use, sexual behavior, cyberbullying/victimization, as well as family policy around social media use, parent monitoring, and legal implications (Costello & Ramo, 2017; Friedman et al., 2017; Judge, 2012). Such discussions are particularly important with sexual minority youth, who are more likely to engage in sexting and other risky sexual behaviors (Centers for Disease Control and Prevention, 2018; Hirschtritt, Dauria, Marshall, & Tolou-Sham, 2018). The higher prevalence of sexting and risky sexual behavior among sexual minority youth may stem from stigma- and trauma-related stress (Link & Phelan, 2006). Alternatively, sexting may serve as an outlet for sexual exploration among sexual minority youth who wish to avoid potential social disapproval from peers and family members (Van Ouytsel et al., 2018). Because most justice-involved youth are community-supervised, the majority of these youth seek standard pediatric primary care and other healthcare services outside the justice system (Barnert, Perry, & Morris, 2016). Therefore, healthcare and settings may be ideal for identifying risk and coordinating care for this population. Schools can also educate youth and parents about responsible digital citizenship and about negative consequences that can

arise from sexting. Indeed, the school environment may exert greater influence on adolescent behavior than the healthcare system (Liljenquist & Coker, 2018).

Health screens with sexting-related items, if demonstrated to have good psychometric properties, also have the promise of informing more targeted clinical services for youth with early involvement in the justice system, particularly with regard to multi-component, gender-responsive, and trauma-informed interventions. As a risk marker of multiple co-occurring behavioral health problems, assessing sexting among justice-involved youth with a first-time offense may help to identify those who would benefit optimally from receiving a treatment that can address several of these problems. Notably, Multidimensional Family Therapy (MDFT; Liddle, 2017) is an evidence-based treatment for adolescent substance use that has also shown positive effects on emotional problems and delinquent behavior, and a recent version incorporating HIV/sexually transmitted infection prevention has also demonstrated reduction in risky sexual behavior in an incarcerated sample comprising mostly (82%) boys (Rowe et al., 2016). Treatment Foster Care Oregon (TFCO; Buchanan & Chamberlain, 2017) is another evidence-based treatment for delinquency among youth placed with trained foster parents as an alternative to out-ofhome placement (e.g., group home); it has also been shown to reduce substance use in boys and girls, as well as depression, suicidal ideation, and pregnancy in girls. Both treatments appear to be promising options for youth with a first-time offense and multiple behavioral health needs if they can be adapted to be offered at the first point of justice contact. The critical time point also presents an opportunity to provide early intervention for trauma. Given that over half (62%) of justice-involved youth reported first trauma exposure within the first 5 years of life and that every year after that into adolescence, 50% of youth reported continued or new trauma exposure (Dierkhising,et al., 2013), it is critical to treat existing trauma symptoms, or to prevent future trauma exposure and resulting trauma symptoms early. Trauma intervention may not only address clinical needs, but also prevent further legal involvement given that prior victimization (i.e., due to documented abuse, neglect, or crime) has been linked with recidivism in another study of early justice-involved adolescents (Wylie & Rufino, 2018). Although we found no sex differences in sexting, a gender-responsive approach would likely be most beneficial given prior research documenting higher rates of dating violence among justice-involved boys who frequently sexted outside a dating or sexual relationship (Yoder et al., 2018), as well as higher rates of sexual abuse among justice-involved girls, which predicts recidivism in girls but not in boys (Conrad et al., 2014).

However, the clinical utility of assessing sexting among adolescents needs to be balanced with knowledge of the laws relating to sexting among minors and mandated reporting requirements. Due to potential violation of child pornography laws, adolescents may inadvertently incriminate themselves by reporting sexting behavior. Although the risk of prosecution is low when minors sext in the absence of adults or aggravating factors such as malicious intent or abusive behavior (Wolak et al., 2012), adolescents with existing involvement in the juvenile justice system would have good reason to minimize these risks. Knowledge of the legal consequence of underage sexting among minors may have a possible deterrent effect on sexting behavior, as suggested by a study documenting lower rates of sexting behavior among young people with such knowledge (Strohmaier et al., 2014). Clinicians and other professionals in health and legal systems could be faced with the

dilemma of whether to ask justice-involved youths about sexting behavior. Clinicians may be bound by therapist-client confidentiality, but many justice-involved youths may not be successfully linked to clinical services. A long-term solution to this dilemma would involve public health and legal systems coordinating policies and procedures to screen for sexting (and other health-related behaviors that could be illicit e.g., substance use, gun possession as a suicide risk factor)--in ways that will facilitate early linkage to services while avoiding adverse legal consequences for justice-involved youth.

Until then, those who work with adolescents are well advised to familiarize themselves with laws in their jurisdiction and to inform their young clients of these laws, so they are equipped to navigate the legal implications of assessing sexting. The Cyberbullying Research Center (https://cyberbullying.org/sexting-laws) maintains a website on U.S. state-specific laws pertaining to sexting, as well as whether those laws specifically address minors who send or receive sexts. The Cyber Civil Rights Initiative website (https://www.cybercivilrights.org/revenge-porn-laws) summarizes information on U.S. state laws that relate specifically to non-consensual pornography, which includes the forwarding of nude or semi-nude images without the consent of the individuals in those images, noting the role of minors and adults where applicable. More information on sexting-related laws in the U.S., Australia, Canada, England, New Zealand, and South Africa are available elsewhere (O'Connor, Drouin, Yergens, & Newsham, 2017). Thus, careful consideration of legal factors as they relate to promoting screening and intervention for sexting and associated risk is warranted.

4.3 Future Directions

Youth-reported motivations suggest that sexting is one aspect of healthy adolescent relationships, however, sexting in this sample was associated with internalizing problems and trauma. Qualitative research can increase insight into why justice-involved youth sext and the role of trauma/victimization history and concurrent distress.

Researchers should also examine whether sexting prospectively predicts, and is predicted by, worse behavioral health problems. The temporal sequence of sexting in relation to maladaptive behavioral health could inform prevention efforts, but few studies have examined longitudinal relationships between sexting and adolescent behavioral health, and none in justice-involved youth. One study found that asking for a sext or being asked for one predicted sexual activity a year later (albeit not risky sexual behavior), and this relationship was mediated by active sexting behavior during the earlier assessment, leading the authors to conclude that sexting may serve as a "gateway," or indicate readiness, to engage in sexual behavior (Temple & Choi, 2014). Another study found that depression symptoms prospectively predicted the frequency of sending sexts at one-year follow-up (Gámez-Guadix & de Santisteban, 2018). If replicated in future research, these findings would be consistent with sexting as a risk marker but not risk factor of behavioral health problems.

Additionally, advancement in mobile technologies have introduced rigorous methods of measuring sexting behavior. Smartphones can be programmed to prompt adolescent reports of sexting as they naturally occur in everyday environments and to sense the frequency

of sexts (e.g., by detecting sexually suggestive content). These ecological momentary assessment and digital phenotyping (Onnela & Rauch, 2016) methods can minimize memory and social desirability biases and obtain rich details of sexting behavior (e.g., when, where, with whom, and in what context sexting occurs). Moreover, these methods can offer a microlevel perspective into the moment-by-moment sequence of symptoms, emotions, cognitions, and risk behaviors that precede and follow sexting. Clearly, ethical and privacy-related challenges need to be navigated successfully for these methods to be used.

Finally, research is needed on how best to assess and address sexting among adolescents, and whether doing so will have any impact on adolescent behavioral health outcomes. A lack of research on how adults communicate with adolescents about sexting and related risks and consequences has been noted (Van Ouytsel et al., 2018).

Conclusions

There is a burgeoning literature on sexting among youth, but this literature is focused on investigations of prevalence and association with sociodemographic characteristics and sexual behavior among general and school-based youth populations. Little is known about sexting among justice-involved youth, especially of girls and those under community supervision, other behavioral health correlates of sexting, and why youth sext. This study addresses some of these gaps by reporting on sexting prevalence, motivations, and associations with demographic characteristics and behavioral health problems among community-supervised adolescents with a first-time offense. Sexting was fairly prevalent and co-occurred with multiple behavioral health problems even in this sample of vulnerable adolescents with elevated rates of health risk behaviors and mental health problems, suggesting that sexting may be one of many co-occurring risky behaviors among justice-involved adolescents. Pediatric and community mental health settings should consider screening for sexting and related risk behaviors to inform and tailor services to vulnerable youth. Clinicians and schools can provide education about adverse behavioral health and legal consequences that may result from sexting. Future research is needed to contextualize sexting behavior in relation to internalizing distress in juvenile justice youth, to determine whether sexting prospectively predicts behavioral health outcomes and vice versa, to measure sexting behavior using scientifically rigorous and technologically advanced methods, and to determine effective ways of screening for and addressing sexting among youths, particularly those with existing legal involvement.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Over one-third of first-time justice-involved adolescents reported sexting.
- Past-year sexting was associated with engaging in unprotected sex, delinquent acts, and substance use.
- Past-year sexting was associated with elevated trauma and internalizing symptoms.
- Assessing sexting could inform intervention, but local laws should be considered.

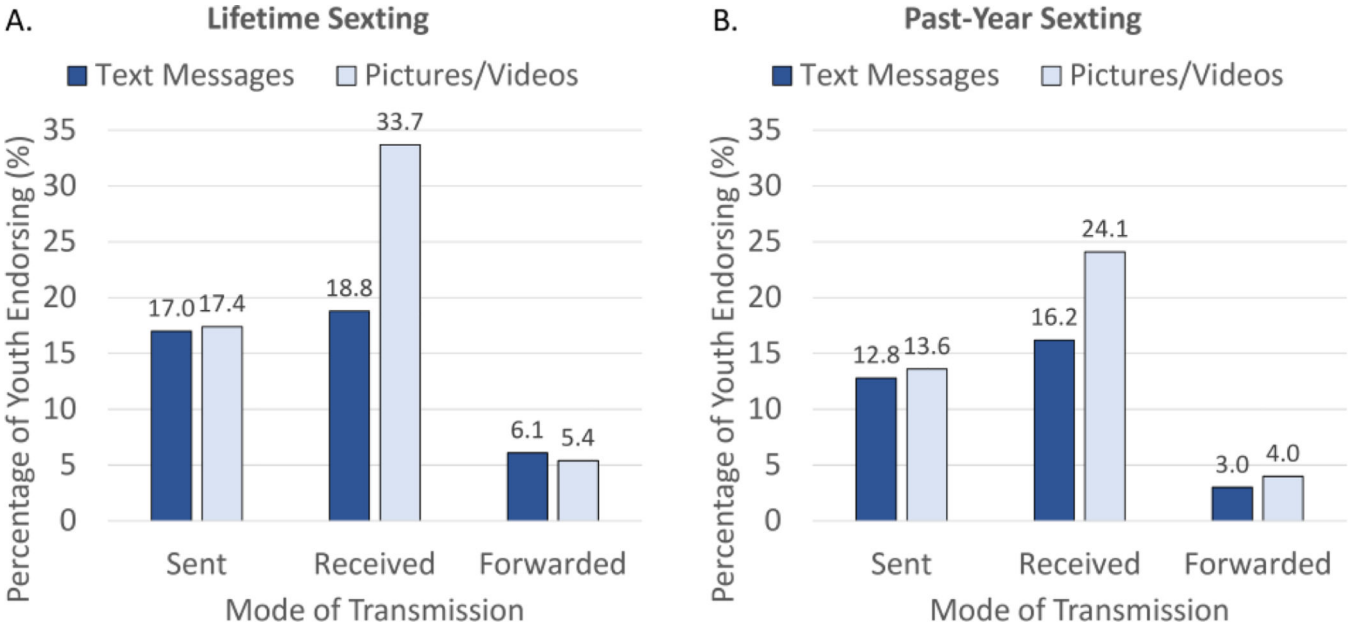

Figure 1.
Prevalence of lifetime and past-year sexting broken down by content and transmission mode.

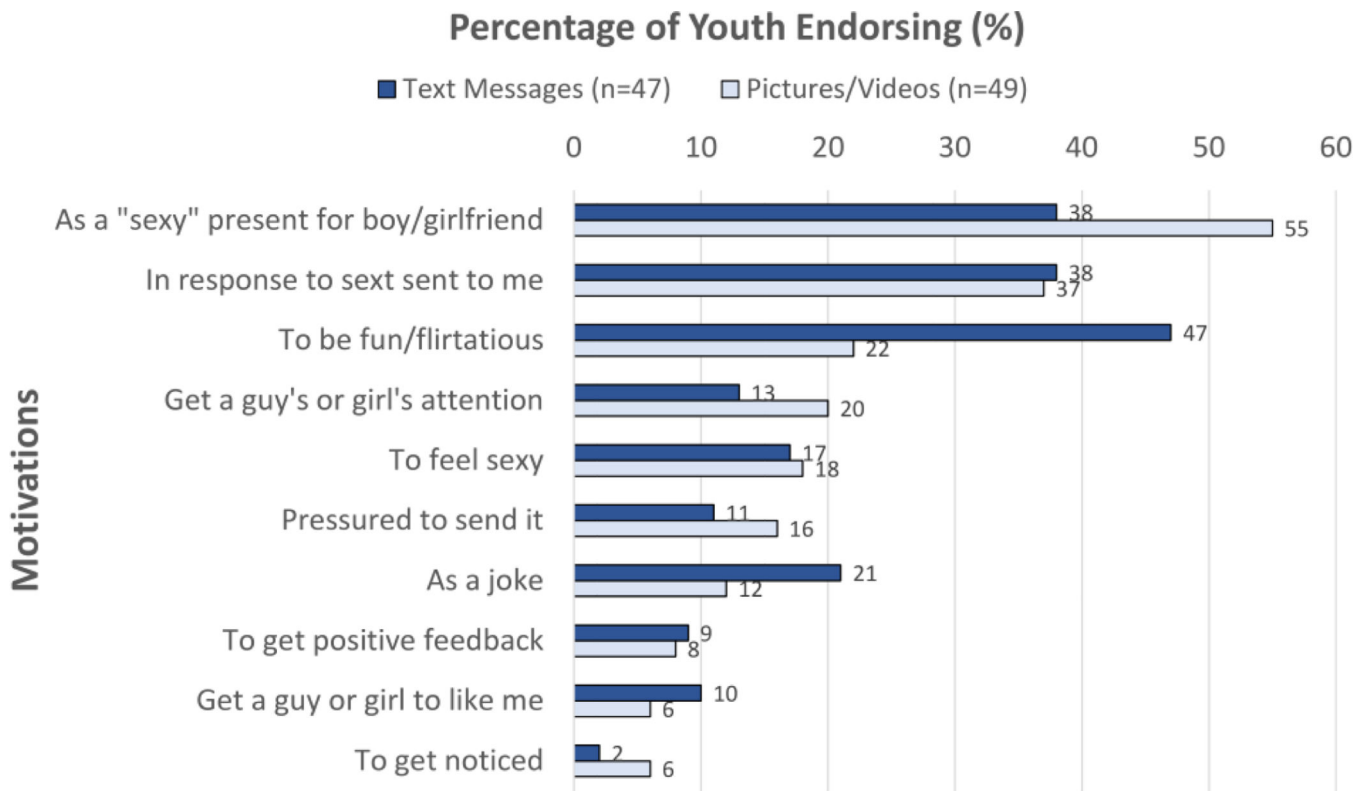

Figure 2.
Youth motivations for sending sexts

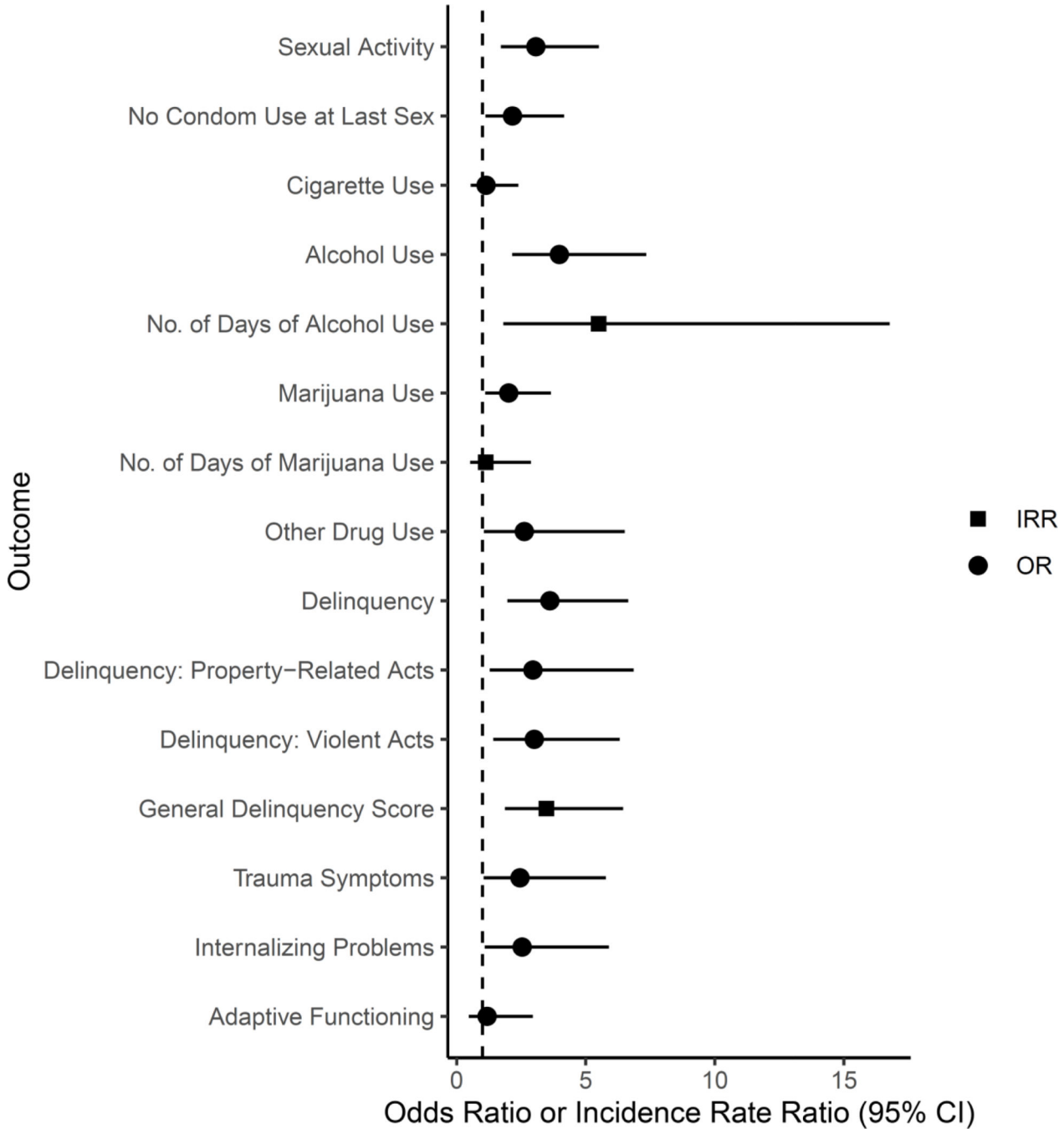

Figure 3.

Odds ratios or incidence rate ratios and 95% confidence intervals of behavioral health problems associated with past-year sexting, covarying age and sexual orientation.

Note. Separate logistic regression models were fitted to estimate the odds ratio for each dichotomous outcome, and separate generalized linear models with negative binomial distribution and log link function were fitted to estimate the incidence rate ratio for each count outcome.

Table 1.

Sociodemographic Characteristics of First-time Justice-Involved Youth by Lifetime and Past-Year Sexting Status

Characteristic	Total Sample (N = 307)	Lifetime Sexting (*n* = 260)			Past Year Sexting (*n* = 278)		
		Yes	No		Yes	No	
	Mean(SD), *n* or *n* (%)	Mean (SD) *n* or *n* (%)	Mean (SD) *n* or *n* (%)	Test Statistic	Mean (SD) *n* or *n* (%)	Mean (SD) *n* or *n* (%)	Test Statistic
Frequency	307 (100.0)	98/260 (37.7)	162/260 (62.3)	—	82/278 (29.5)	196/278 (70.5)	—
Age	14.50 (1.58), 305	15.06 (1.47), 98	14.18 (1.61), 160	$t_{256} = -4.40^{***}$	15.12 (1.46), 82	14.30 (1.60), 194	$t_{274} = -3.98^{***}$
Female[a]	135/303 (44.6)	48/97 (49.5)	70/159 (44.0)	$\chi^2 = 0.72$	39/81 (48.1)	85/193 (44.0)	$\chi^2 = 0.39$
American Indian[b]	28/296 (9.5)	7/96 (7.3)	18/155 (11.6)	$\chi^2 = 1.23$	5/80 (6.3)	21/187 (11.2)	$\chi^2 = 1.58$
Asian[b]	4/296 (1.4)	1/96 (1.1)	2/155 (1.3)	$\chi^2 = 0.03$	1/80 (1.3)	2/187 (1.1)	$\chi^2 = 0.02$
Black/African/Haitian[b]	43/296 (14.5)	17/96 (14.4)	19/155 (12.3)	$\chi^2 = 1.43$	10/80 (12.5)	29/187 (15.5)	$\chi^2 = 0.41$
Native Hawaiian/Pacific Islander[b]	3/296 (1.0)	0/96 (0.0)	2/155 (1.3)	$\chi^2 = 1.25$	0/80 (0.0)	3/187 (1.6)	$\chi^2 = 1.30$
White[b]	148/296 (50.0)	50/96 (52.1)	78/155 (50.3)	$\chi^2 = 0.07$	44/80 (55.0)	91/187 (48.7)	$\chi^2 = 0.90$
Mixed/Multiracial[b]	52/296 (17.6)	21/96 (21.9)	25/155 (16.1)	$\chi^2 = 1.31$	19/80 (23.8)	27/187 (14.4)	$\chi^2 = 3.41$
Other Race[b]	65/296 (22.0)	19/96 (19.8)	35/155 (22.6)	$\chi^2 = 0.27$	14/80 (17.5)	45/187 (24.1)	$\chi^2 = 1.40$
Latinx	130/301 (43.2)	43/98 (43.9)	69/157 (43.9)	$\chi^2 = 0.00$	33/81 (40.7)	85/191 (44.5)	$\chi^2 = 0.33$
LGBQ[c]	55/299 (18.4)	22/97 (22.7)	27/156 (17.3)	$\chi^2 = 1.11$	21/81 (25.9)	29/190 (15.3)	$\chi^2 = 4.29^{*}$
Delinquent Offense	147/306 (48.0)	48/98 (49.0)	65/161 (40.4)	$\chi^2 = 1.84$	40/82 (48.8)	90/195 (46.2)	$\chi^2 = 0.16$
Computer Use Hours/Week	2.68 (4.36), 291	2.99 (4.58), 93	2.64 (4.44), 152	$t_{243} = -0.59$	2.76 (4.58), 78	2.83 (4.48), 185	$t_{261} = 0.13$
Phone Use Hours/Week	7.96 (7.22), 287	9.63 (7.36), 92	7.34 (6.99), 152	$t_{242} = -2.44^{*}$	9.27 (7.24), 78	7.45 (7.13), 184	$t_{260} = -1.88$

[a]For computation of percentage female, 2 participants who indicated “other sex” and 2 who had missing responses were not included in the total number of participants.

[b]Individuals could select more than one category of race, thus percentages added up across racial categories do not equal 100.

[c]LGBQ = lesbian, gay, bisexual, queer, questioning, other.

*$P<.05$,

***$P<.001$

Table 2.

Behavioral Health Problems of First-time Justice-Involved Youth by Past-Year Sexting Status

Outcome	Past-Year Sexters (n=82)	Past-Year Non-Sexters (n=196)
	Mean(SD), *n* or *n* (%)	Mean(SD), *n* or *n* (%)
Sexual Activity (Yes)	45/81 (55.6)	45/194 (23.2)
No Condom Use at Last Sex (Yes)	23/79 (29.1)	27/194 (13.9)
Cigarette Use (Yes)	15/82 (18.3)	26/196 (13.3)
Alcohol Use (Yes)	44/82 (53.7)	36/196 (18.4)
No. of Days of Alcohol Use	4.52 (13.16), 81	1.95 (11.50), 196
Marijuana Use (Yes)	45/82 (54.9)	62/196 (31.6)
No. of Days of Marijuana Use	23.14 (39.52), 79	12.57 (33.33), 193
Other Drug Use (Yes)	13/81 (16.0)	10/196 (5.1)
Delinquency (Yes)	35/81 (43.2)	31/194 (16.0)
Property-Related Delinquent Acts (Yes)	15/80 (18.8)	12/188 (6.4%)
Violent Delinquent Acts (Yes)	21/81 (25.9)	17/192 (8.9)
General Delinquency Score	1.30 (2.41), 81	0.36 (1.13), 194
Trauma Symptoms[a] (Moderate or Higher Level)	18/70 (25.7)	18/162 (11.1)
Internalizing Problems[b] (Clinically High Level)	16/73 (21.9)	16/162 (9.9)
Adaptive Functioning[b] (Clinically Low Level)	11/72 (15.3)	16/166 (9.6)

[a]The sample size for this outcome is smaller than for the others because 35 youth who denied having ever experienced a stressful event at the same assessment timepoint as the sexting measure received no score and were excluded from trauma symptom analyses.

[b]The sample sizes for these scales from the Behavior Assessment Scale for Children, Second Edition (BASC-2) are smaller than for the other outcomes because 38 participants' BASC-2 response profiles showed excessively positive self-description or an unusually large number of nonsensical items endorsed (i.e., falling in the "extreme caution" range of the the *L*- or *V*-index).