Online Sexual Experiences Predict Subsequent Sexual Health and Victimization Outcomes Among Female Adolescents: A Latent Class Analysis

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Abstract

Adolescents' online sexual experiences (e.g., pornography use, sexual chatting, sexualized social media use, and nude image exchange) provide a new context for sexual socialization. Traditionally, online sexual experiences are often aggregated averages, which neglect their complexity and fail to identify individual differences in the experience. Moreover, the lack of longitudinal research in this area has failed to determine if these experiences predict later offline sexual health and violence outcomes. An analysis of 2 waves of surveys completed by ethnically and socioeconomically diverse female adolescents (N = 296; 49% maltreated; aged 14–16 years) participating in a larger cross-sequential study was conducted to address these gaps. Established latent classes from the prerequisite study of online sexual experiences at Time 1 were *Online Abstinent* (low probability of any online sexual experiences), *Online Inclusive* (high probability of all online sexual experiences), *Attractors* (high probability of attracting attention from others), and *Seekers* (high probability of seeking out sexual content and interaction). Class membership uniquely predicted HIV risk, number of physically violent romantic partners, and the occurrence of sexual assault at Time 2. Although membership in risker online sexual experience classes predicted later offline risk and victimization, this was especially true for maltreated participants. These findings demonstrate the advantages of examining online sexual experiences in a way that emphasizes their complexity and individual differences in influential susceptibility.

Introduction

Recent reports indicate that adolescents are spending less time engaging with traditional media (e.g., TV, magazines, books) and more than 6 hours a day with online media (e.g., social media, apps, websites; Twenge, Martin, & Spitzberg, 2018), providing a relatively new context for development. However, the implications of the online context for *sexual*

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development remain largely unknown due to the lack of longitudinal research in this area. Importantly, previous research has documented that childhood maltreatment (e.g., sexual abuse, physical abuse, or neglect) is an early adverse exposure that shapes the sexual development of adolescents (Barnes, Noll, Putnam, & Trickett, 2009; Wilson & Widom, 2011). In particular, many maltreated adolescents have emotional or cognitive deficits that may make them more vulnerable during online sexual experiences (Noll, Shenk, Barnes, & Haralson, 2013). The current research aims to understand how the online context influences adolescent sexual development by examining specific patterns of online sexual experiences and the kinds of sexual health and victimization outcomes those patterns predict over time. Results from the present analysis may guide health professionals and intervention developers in tailoring prevention strategies to meet the diverse needs of female adolescents as they move through this critical developmental stage.

Female Sexual Development in an Online Context

Sexual Scripting Theory (Simon & Gagnon, 1984) posits that individuals assume culturally-specific traditions and rules that comprise a "script" to perform sexuality. Sexual scripts provide a cognitive schema of what constitutes normative sexual attitudes and behaviors. One manifestation of these sexual scripts is the categorization of sexually active girls as "bad girls" or "sluts" and non-active as "good girls" or "virgins" (Bay-Cheng, 2015; Tolman, 2009). For this script, bad girls are sexual, good for sex, but undeserving of respect. Whereas good girls are not sexual, but deserving of respect. To further complicate this juxtaposition, female adolescents are also exposed to an array of sexual imagery throughout mass media that emphasize sexual expression through physical attractiveness that is validated by others (Bay-Cheng, 2015). In other words, female adolescents may feel expected to prove sexual attractiveness online, while simultaneously managing the perception of less sexual behavior offline. These convoluted scripts create a confusing landscape for female adolescents to address their own needs if they are seeking validation of physical attractiveness and pleasing a partner. Social media is contributing to this confusing landscape with portrayals of sexualized women being both rewarded through "likes" and "shares" as well as punished through name-calling and harassment (Ringrose, Harvey, Gill, & Livingstone, 2013).

According to Objectification Theory (Fredrickson & Roberts, 1997), girls and women are sexually objectified in our culture, or seen as objects that others act upon instead of subjects that take action. Moreover, this theory contends that girls and women may self-objectify by taking an observer's perspective of their physical self as the primary view of their whole self (Fredrickson & Roberts, 1997). Indeed, the proliferation of sexualized images in our culture may be beckoning female adolescents to present themselves in a sexually appealing way online, through posting or sharing provocative images on social media (Vandenbosch & Eggermont, 2012). For example, female adolescents from Austria, Belgium, Spain, and North Korea who engage in more social media use are also higher in self-objectification (Trekels, Karsay, Eggermont, & Vandenbosch, 2018). This may be problematic because research has shown that female adolescents who post provocative self-presentations online are more likely to experience offline sexual victimization (Noll et al., 2009), higher in disordered eating (López-Guimerà, Levine, Sánchez-Carracedo, & Fauquet, 2010), and lower in cognitive ability (Vandenbosch & Eggermont, 2012). Although sexual self-

presentations may be linked with a host of negative factors, the behavior itself certainly does not cause sexual victimization. Indeed, research that examines motives and processes of perpetrators has revealed that they actively seek out potential victims who display themselves provocatively online because they see it as a sign of vulnerability (DeHart, et al., 2017). Therefore, this analysis takes a person-oriented approach to identify which behavior *patterns* (that could include sexual self-presentation) may be markers for *individuals* who may be in need of tailored sexual health and safety programming.

Online Sexual Experiences

The online context facilitates sexual experiences such as viewing internet pornography, exchanging nude images, chatting about sex, and posting provocative pictures on social media. Although adolescence is a time of sexual exploration, teens' online sexual experiences have garnered fear in the public arena. For example, one of the fastest growing bodies of research over the last two decades is that which focuses on the impact of internet pornography use on sexual behavior during adolescence (Peter & Valkenburg, 2016). Much of the findings suggest that pornography use among adolescents and emerging adults is linked with outcomes such as having had more unprotected penetrative and oral sex partners of all types, more frequent casual sex, and earlier onset of sexual activity (Peter & Valkenburg, 2016). Pornography use among *female* adolescents and emerging adults specifically, has been linked with outcomes such as a higher likelihood of engaging in sex at a younger age, a higher number of sex partners, and a lower likelihood of using contraception (Maas & Dewey, 2018; Peter & Valkenburg, 2016). These findings suggest that pornography use is a correlate of risky sexual behavior, yet the majority of previous studies have been cross-sectional, warranting longitudinal research to establish directionality in these associations.

Today, adolescents can create their own sexualized images and share these widely through mobile and social media platforms. Known as 'sexting', or sending nude images via an internet-connected device (Crimmins & Seigfried-Spellar, 2014), this online sexual experience has also recieved recent attention. Adolescents report sexting while intoxicated as a chief factor in facilitating casual hook-ups (Dir, Cyders, & Coskunpinar, 2013). However, sexting also appears to be a highly gendered experience where girls are more likely to be punished or shamed as "sluts" for sending or receiving nude images, whereas boys are rewarded and lauded as "studs" for the same behavior (Handyside & Ringrose, 2017; Ricciardelli & Adorjan; 2018). Unfortunately, the majority of research-to-date on the matter of sexting has found the experience to be linked with negative outcomes such as less condom use (Henderson & Morgan, 2011) and a higher likelihood of being sexually assaulted (Dir, Riley, Cyders, & Smith, 2018). Although a longitudinal study showed that sexting was associated with higher odds of having sexual intercourse one year later, sexting was not associated with higher odds of *unprotected* sexual intercourse (Temple & Choi, 2014). In contrast, posing provocatively online and chatting with strangers about sex is associated with types of victimization such as stalking (Southworth, Finn, Dawson, Fraser, & Tucker, 2007), sexual solicitation (Noll et al., 2009), harassment, and commercial sexual exploitation (Mitchell, Jones, Finkelhor, & Wolak, 2010). However, the directionality of victimization

experiences and sexting experiences is still unknown due to the lack of longitudinal research on online sexual experiences.

The Proteus Effect (Yee & Bailenson, 2007) asserts that a person's behavior will conform to their digital self-representation (e.g., avatar, online persona). In an online world, if someone has a sexy avatar, that individual may be more likely to engage in behaviors that are consistent with that perception. For instance, maltreated female adolescents have been found to create more sexualized avatars in a lab setting compared to non-maltreated female adolescents (Noll et al., 2009). In turn, those with more sexualized avatars were also more likely to experience online sexual solicitations that lead to offline meetings (Noll et al., 2009).

Ubiquitous sexualized imagery may be summoning female adolescents to present themselves in a sexually appealing way online, through posting or sharing provocative images on social media or through apps (Vandenbosch & Eggermont, 2012). In turn, female adolescents may receive sexual attention for that presentation, and that praise may have the potential to eventually transform their offline behavior. Given the self-blame for sexual experiences and the pressure to gain sexual worth through physical expression (Bay-Cheng, 2015), the Proteus Effect (Yee & Bailenson, 2007) would suggest that female adolescents who present themselves in sexually provocative ways online may be less sexually assertive in offline sexual scenarios. Thus, if the Proteus Effect (Yee & Bailenson, 2007) is occurring for female adolescents' online and offline sexual behavior, then prevention programs should target online sexual experiences as a means of preventing offline outcomes that negatively affect female adolescents.

Gender-based Violence Victimization and HIV Risk among Female Adolescents

A central developmental task during the transition to adulthood is the attainment of healthy romantic relationships (Conger, Cui, Bryant, & Elder 2000). However, many adolescent romantic relationships are characterized as tumultuous (Halpern-Meekin, Manning, Giordano, & Longmore, 2013). Recent nationally representative data show that 1 in 7 female adolescents experience physical dating violence victimization, whereas 1 in 19 male adolescents do (Kann et al., 2016). Emerging research has documented the role that technology plays in facilitating physical and sexual violence. Specifically, 25–56% of female adolescents report experiencing non-physical violence facilitated by mobile or online technology (Stonard, Bowen, Lawrence, Price, 2014; Zweig, Dank, Yahner, & Lachman, 2013). This type of abuse has been characterized as having a partner who has threatened and harassed via text message, written disparaging comments on their social media pages, used their social media account without their permission, or tracked their location via GPS (Stonard et al., 2014; Zweig et al., 2013). Moreover, adolescents experiencing sexual violence in offline romantic relationships also report technology-facilitated violence. Among college women, engaging in sexting is associated with having had experienced sexual assault, particularly while also using alcohol (Dir et al., 2018). Collectively, these findings underscore the need to better understand the links between online sexual experiences and offline experiences of sexual and relationship violence. Understanding these patterns may

bolster sexual assault prevention programs for adolescents and emerging adults by making them more relevant and engaging.

Female adolescents also experience unique vulnerability to HIV risk behavior due to gendered power dynamics in their romantic and sexual relationships. For example, the use of female condoms is rare (Weeks, Coman, Hilario, Li, & Abbott, 2013), and female adolescents have practical as well as psychological barriers to male condom use. Girls and young women are often shamed for carrying a condom in anticipation of sexual activity (de Vet et al., 2011). If a male partner does not initiate condom use, a female partner must negotiate that use or be able to safely and confidently refuse genital contact (Sales et al., 2012). The use of drugs and alcohol before sexual activity is also considered to be an HIV risk behavior for adolescents (CDC, 2011) largely because being intoicated during sexual activity is associated with a lesser likelihood of using a condom during sexual behavior (Patrick & Maggs, 2009). Further, having had a sexual partner during adolescence who originated from an online meeting is associated with having more lifetime sexual partners, sex before the age of 14, and having used alcohol or other substances at last sexual experience (Buhi et al., 2013). For female adolescents in particular, there is a lower likelihood of condom use with a sexual partner who originated from an online sexual solicitation (Rice et al., 2015). Thus, more research is needed to more fully understand whether or not the online context impacts the etiology of HIV risk behaviors, particularly among female adolescents who already face gendered barriers to use (Tolman, Striepe, & Harmon, 2003).

Although the fields of gender-based violence and sexual health often operate as separate entities, more scholars are calling for their integration due to several shared risk and protective factors (Schneider & Hirsch, 2018). In accordance with this call for integration and given the nuance of the latent class structure of female adolescent online sexual experiences (Maas, Bray, & Noll, 2018), the aim of the current analysis was to identify which online sexual experience profiles would differentially predict HIV risk, sexual assault, and relationship violence. Identification of such pathways not only informs healthy relationships and sexual health programming, but also the integration and tailoring of the two.

The Influence of Maltreatment

Both theory and research provide justifications for the expectation that adolescents who have been maltreated are both more likely to engage in higher rates of online sexual experiences and experience more negative offline consequences (Noll et al., 2013). Indeed, prior work has shown that maltreated adolescents engage in higher rates of sexual risk-taking online (provocative self-presentations and sexting; Noll et al., 2013) and offline (sex under the influence of alcohol or other substances, having sex without contraceptives, and prostitution; Bensley, Eenwyk, & Simmons, 2000; Wilson & Widom, 2011) and experience higher rates of sexual victimization than their non-maltreated counterparts (Noll et al., 2003). It is well established that exposure to domestic violence in the home, as well as experiencing childhood maltreatment, is associated with later relationship violence victimization (Messman-Moore & Brown, 2004) and revictimization (Finkelhor, & Turner, 2012). Female

adults who were sexually and physically abused as children are almost three times more likely to be sexually and physically revictimized compared to non-abused female adults (Barnes et al., 2009). In addition, a history of maltreatment is linked with a higher likelihood of contracting HIV (Wilson & Widom, 2011) and other sexually transmitted infections (Morokoff et al., 2009). Similarly, women who have been physically abused during childhood have a 5-fold increase in likelihood of HIV risk behaviors, and women who have been sexually abused as children have a 7-fold increase (Bensley et al., 2000). Although the pathways to HIV risk or sexual and relationship violence victimization likely differ for female adolescents, maltreatment remains a chief risk factor for both public health problems.

Current Study

Although research in the area of adolescents' online sexual experiences is increasing, there remains a dearth of longitudinal and multi-dimensional work that can better capture directionality and individual nuances in how online sexual experiences predict offline experiences. Prior research has used variable-centered analytic approaches, which fail to capture the complexity---and by extension reality---of behavior, where individuals have an array of experiences that are intertwined and not necessarily isolated (Bergman & Trost, 2006). The current analysis is an extension of prior research (Maas et al., 2018), which employed a person-centered approach, latent class analysis, to identify specific online sexual experiential patterns that were common among sub-groups of participants and used those patterns (or "classes") to predict later sexual health and victimization outcomes. Thus, the current research aims to address this issue by taking a more nuanced approach to research that examines specific patterns of online sexual experiences, and the kinds of sexual health and victimization outcomes those patterns longitudinally predict, in order to elucidate *specific individuals* who would benefit from tailored intervention strategies.

Studies that investigate the effects of specific online sexual experiences as uniform for all adolescents do not reflect the complex and varying ways adolescents are engaging in online environments, likely hindering effective prevention and intervention. In contrast, a person-centered approach can (1) highlight an individual's entire spectrum of online sexual experiences, (2) determine what predicts particular patterns of online sexual experiences, and (3) examine the consequences of those online experiential patterns (Bergman & Trost, 2006). In the prior study (Maas et al., 2018), four latent classes of online sexual experiences among female adolescents were found (see Table 1): one with low probabilities of having had any of the eight online sexual experiences (*Online Abstinent*); one with high probabilities of having had all eight online sexual experiences (*Online Inclusive*); and two with engagement in specific online sexual experiences (*Attractors* and *Seekers*). Maltreated female adolescents were more likely to be members of the *Online Inclusive* and less likely to be members of the *Online Abstinent* classes than non-maltreated female adolescents. Several offline sexual and substance use behaviors were also correlated with class membership. In general, most offline risk correlates were associated with a higher likelihood of membership in the *Attractors* or *Online Inclusive* classes, suggesting those two groups were most likely to be in need of intervention. However, having ever been pregnant was associated with a higher likelihood of membership in the *Seekers* class compared to the *Attractors* class, highlighting the need for differential prevention. Latent class analysis has also been used to

predict odds of contracting sexually transmitted infections as well as emotional experiences from class membership based on multiple sexual behaviors (Vasilenko, Kugler, Butera, & Lanza, 2014; Wesche, Lefkowitz, & Vasilenko, 2015). The current analysis will build upon this research by longitudinally predicting offline HIV risk, sexual assault, and relationship violence using earlier latent classes of online sexual experiences.

Consistent with research that links internet pornography use with risky sexual behaviors (Peter & Valkenburg, 2016), it is hypothesized that membership in the *Online Inclusive* or the *Seekers* classes will predict more HIV risk one year later compared to membership in the *Attractors* class (Hypothesis 1). Consistent with Objectification Theory (Fredrickson & Roberts, 1997) and the Proteus Effect (Yee & Bailenson, 2007), female adolescents who post sexy photos of themselves online and receive online attention from others will be more likely to seek out or receive similar attention offline at a later time point. Thus, it is hypothesized that membership in the *Attractors* class will predict a higher likelihood of sexual assault or relationship violence victimization one year later compared to membership in the *Online Abstinent or Seekers* classes (Hypothesis 2).

Given that maltreated female adolescents have a greater proclivity to engage in risky online and offline sexual behaviors than their non-maltreated counterparts (Noll et al., 2013), it is hypothesized that the association between class membership and later HIV risk will be stronger for maltreated female adolescents in the *Seekers* or *Online Inclusive* classes than non-maltreated participants in these classes or compared to maltreated female adolescents in the *Attractors* or *Online Abstinent* classes (Hypothesis 3). Given that maltreated female adolescents are at greater risk to be sexually victimized than their non-maltreated counterparts (Noll et al., 2003), it is hypothesized that the association between class membership and later sexual assault or relationship violence victimization will be stronger for maltreated female adolescents in the *Attractors* class compared to non-maltreated female adolescents in the *Attractors* class or maltreated participants in the other classes (Hypothesis 4).

Methods

Participants

The present set of analyses includes female adolescents ($N = 296$) who were part of a larger cross-sequential study aimed at uncovering precursors to teen pregnancy with 514 total participants (Noll & Shenk, 2013). Participants included in these analyses completed questionnaires on online experiences for at least two waves of data collection. The questions pertaining to online sexual experiences were added after initial data collection, and thus the sub-sample for these analyses is much smaller than the overall sample. All participants were recruited from a large, Midwestern city. The analytic sample at Time 1 had a mean age of 14.83 years ($SD = 1.05$), had a median family income level of \$20,000–\$29,000, and 51% came from single-parent households. The racial/ethnic make-up was 46% Caucasian, 44% African-American, 8% Bi- or Multi-Racial, 1% Hispanic, and 0.5% Native American. Participants in this subsample did not significantly differ from participants in the larger sample on the demographics above.

As previously detailed in Maas et al. (2018), approximately half the sample ($n = 146$) was maltreated; these participants were recruited from Child Protective Services (CPS) agencies and had substantiated instances of physical abuse, neglect, or sexual abuse. Non-maltreated participants were recruited through a hospital-based adolescent health center and were matched with maltreated participants on race/ethnicity, family income, and family constellation (e.g., one vs. two-parent household). Validated abuse assessments (Barnes et al., 2009) were conducted with participants and caregivers to determine that non-maltreated participants did not have any prior history of abuse or neglect.

Procedures

This study was approved by the Institutional Review Board at a large Children's Hospital Medical Center. In the parent study (see Noll & Shenk, 2013), the sample was assessed over 5 waves annually. Caregivers were enrolled to provide consent for adolescents and to report on adolescent behavior. Adolescents provided assent and completed paper and pencil questionnaires, a laboratory experiment, semi-structured guided interviews, and computer administered questionnaires regarding sensitive content including sexual activities to maximize anonymity. Dyads received approximately $20 per hour as compensation for their time, travel, and participation. Online sexual experiences were assessed for the first time during Wave 2 of the parent study. Hence, the current analyses used Wave 2 online sexual experiences to predict Wave 3 HIV risk, sexual assault, and relationship violence victimization (1 year later) to achieve temporal ordering. For purposes of clarity in this set of analyses, Time 1 refers to the second wave of data collection and Time 2 refers to the third wave of data collection in the parent study.

Measures

Online sexual experiences at Time 1.

Online sexual experiences.: Eight self-report items were derived to assess online sexual experiences (see Table 1), with possible responses ranging from 0 = "never" to 4 = "very often." All eight items had zero-inflated responses, and were dichotomized into 1 = "never" and 2 = "rarely-very often" in order to conduct the latent class analysis.

Offline outcomes at Time 2.

HIV Risk.: HIV risk was assessed with 8 self-report items. Scores were coded as a number between 0 and 8 indicating the number of HIV risk behaviors a participant engaged in during the last 12 months. Behaviors included: ever had intercourse without a condom, condoms failing during intercourse, intercourse or oral sex with an intravenous drug user, used intravenous drugs, shared needles, intercourse or oral sex with a bisexual partner, unprotected intercourse with a homosexual male, multiple concurrent intercourse partners, one night stands, and intercourse while drunk or high. Participant scores ranged from 0–8.

Number of physically violent romantic partners.: Having experienced physical relationship violence within the last 12 months was assessed using a series of questions about a boyfriend/romantic partner. Participants who answered "yes" to ever having had a boyfriend/partner and "yes" to currently having or having a boyfriend/partner within the past

year, were asked for each boyfriend/partner reported on, "In the past year, has this boyfriend/ partner ever been physically abusive to you (example: hit you, pushed you, or physically forced you into something you did not agree to)?" Participants indicated the number of boyfriend/partners within the past year who had been physically abusive. Participants without partners or with non-abusive partners were coded as '0'. Participant scores ranged from 0–4.

Past-year sexual assault.: Experiencing an unwanted sexual event (sexual assault or abuse) was assessed using the *Comprehensive Trauma Interview* (CTI; Noll et al., 2003), which was developed as a semi-structured interview to elicit factual information concerning traumatic events as well as subjective responses to those events and was given to participants annually to detect new or ongoing traumatic experiences. The CTI also includes several detailed follow-up questions for each traumatic experience including (1) the age of the event or onset of re-occurring events; (2) frequency of occurrence; and (3) the relation and ages of perpetrators. Participant responses were coded with '0' representing never being sexually abused or assaulted or never being sexually abused or assaulted within the last year and '1' representing having had been sexually abused or assaulted by someone within the past year.

Analysis Plan—Established latent classes of online sexual experiences (Maas et al., 2018) were used to predict HIV risk, sexual assault, and relationship violence victimization one year later and to determine whether maltreatment moderated those predictions. The 3-step regression analysis function (Bakk & Vermunt, 2016) was utilized in Latent Gold 5.0 (Vermunt & Magidson, 2013). The first step consisted of running a latent class analysis (Collins & Lanza, 2010). Second, posterior probabilities of class membership for each participant were saved and each participant was assigned to the class with her modal probability. Assigned class membership was then treated as an observed, categorical predictor of outcomes in the third step. Third, two linear and one logistic regression model used latent class membership to predict the number of HIV risk behaviors, the number of physically violent partners, and whether or not a participant experienced sexual assault in the past year. The Bolck, Croon, and Hagenaars (2004) adjustment (BCH adjustment) with the 3-step approach (Bakk & Vermunt, 2016) was used to adjust for classification error in the modal assignments. The *Attractors* class was chosen as the reference class in order to make the most comparisons between unique patterns of experiences. For example, using the *Attractors* class allowed for its comparisons to both the *Seekers* and *Online Inclusive* classes, which would have not been possible if either *Online Inclusive* or *Online Abstinent* was chosen as the reference group. Each model included latent class membership, maltreatment status, and interactions between class membership and maltreatment status as predictors. In addition, each model included a control variable to account for the Time 2 outcome at Time 1.

Results

In Table 2, the frequencies, means, standard deviations, and maltreatment differences utilizing matched-pair *t*-tests or logistic regressions for HIV risk, physical violence, and sexual assault are presented. Maltreated participants engaged in a greater number of HIV risk behaviors and experienced more physical violence on average in the past 12 months

than non-maltreated participants. However, maltreated and non-maltreated adolescents did not differ significantly on having experienced sexual assault in the last 12 months.

Latent class analysis with a grouping variable was used to examine measurement invariance in the latent class structure by maltreatment status. Comparison of freely estimated and constrained models suggested that the latent class structure did not differ significantly by maltreatment status (χ^2 [36] = 45.81, $p > .10$). Therefore, the same four classes were observed among both maltreated and non-maltreated participants. Maltreatment status was, however, a significant predictor of latent class membership ($W = 19.19$, $p < .01$). Follow-up pairwise comparisons showed that maltreated participants were more likely to be members of the *Online Inclusive* class than non-maltreated participants (χ^2 (1) = 10.31, $p < .01$). However, maltreated participants were less likely to be members of the *Online Abstinent* class than non-maltreated participants (χ^2 (1) = 7.33, $p < .05$).

For the HIV risk model (see Table 3), it was hypothesized that members of the *Online Inclusive* and/or the *Seekers* class would report more HIV risk behaviors one year later compared to members of the *Attractors* class. Participants in the *Online Inclusive* class were more likely to report HIV risk behaviors one year later than participants in the *Attractors* class. However, participants in the *Seekers* class were less likely to report HIV risk behaviors one year later than participants in the *Attractors* class. Thus, Hypothesis 1 was only partially supported.

For the physical violence model (see Table 3), it was hypothesized that members of the *Attractors* class would have a higher likelihood of sexual assault and relationship violence victimization one year later compared to members of the *Online Abstinent* and/or *Seekers* classes. However, participants in the *Seekers* class were more likely to have had a physically violent romantic partner in the past year than participants in the *Attractors* class. For the sexual assault model (see Table 3), there was a trend for participants in the *Online Inclusive* and a significant effect for participants in the *Seekers* classes having been more likely to experience sexual assault one year later than participants in the *Attractors* class. Therefore, Hypothesis 2 was not supported.

Figure 1 displays the results from the moderational analyses examining maltreatment differences in how class membership predicts later outcomes. It was hypothesized that being maltreated and being a member of the *Seekers* class or *Online Inclusive* class would predict more HIV risk behaviors than non-maltreated participants in these classes or maltreated participants in the other classes (Hypothesis 3). In the HIV model, the interaction between maltreatment status and class membership was not globally significant, indicating that the addition of the interactions did not increase the amount of explained variance in HIV risk. Thus, maltreatment status did not moderate the prediction of HIV risk from class membership. It was hypothesized that being maltreated and being a member of the *Attractors* class would predict more instances of sexual assault and more physically violent romantic partners than non-maltreated participants in the *Attractors* class or maltreated participants in the other classes (Hypothesis 4). In the physical violence and sexual assault models the interactions were globally significant, indicating that maltreatment status does moderate the prediction of sexual assault and number of physically violent romantic partners

from class membership. Participants in the *Seekers* class had more violent romantic partners compared to participants in the *Attractors* class, particularly if they had been maltreated. Participants in the *Online Inclusive* class were more likely to be sexually assaulted than participants in the *Attractors* class, particularly if they had been maltreated. Further, participants in the *Online Abstinent* class were less likely to be sexually assaulted than participants in the *Attractors* class, particularly if they were *not* maltreated.

Discussion

Given the overwhelming increase in adolescents' time spent online since the advent of the internet (Twenge et al., 2018), the aim of this study was to determine if patterns of online sexual experiences longitudinally predict HIV risk behaviors, odds of sexual assault, or number of physically violent dating partners among female adolescents. Unlike the majority of prior work that has investigated various online sexual experiences separately to determine their risk factors, the present analyses demonstrate the utility of latent class analysis for examining complex patterns of online sexual experiences that have *differential* risk and prevention implications. These findings suggest that online sexual experiences can be considered a dimension of sexual risk taking among female adolescents, but the *combinations* of these experiences may matter more, especially for maltreated adolescents.

Building on the classes identified in the prior study with this same sample (Maas et al., 2018), the *Online Inclusive* class (those who had a high probability of engaging in all eight online sexual experiences) was more likely to engage in HIV risk behaviors and experience sexual assault one year later as compared to the *Attractors* class (those who experienced the most sexual attention online). Maltreated adolescents were also more likely to engage in HIV risk behaviors and be members of the *Online Inclusive* class than non-maltreated adolescents. Sexual Scripting Theory (Simon & Gagnon, 1984) would suggest that members of the *Online Inclusive* class are engaging in more HIV risk behaviors because they are being sexually socialized online. For instance, there is a high probability of internet pornography use for the *Online Inclusive* class members. The most frequented pornographic websites depict sex in a gender-stereotypical way without attention paid to commitment or contraception (McKee, 2005). This socialization process could explain why several studies show that female adolescents and emerging adults who use pornography tend to have more sex partners, report trying to copy behaviors seen in pornography, are more likely to engage in anal sex compared to female adolescents who do not use pornography (Maas & Dewey, 2018; Mattebo, Tydén, Häggström-Nordin, Nilsson, & Larsson, 2016). Therefore, female adolescents may benefit from pornography education programming that promotes critical thinking skills, to mitigate influential effects from pornography viewing (see Rothman, Adhia, Christensen, Paruk, Alder, & Daley, 2018).

The *Online Inclusive* class also had a high probability of sexting, which is consistent with past research on risky correlates of sexting (Temple & Choi, 2014). However, a recent study distinguished sexting correlates between adolescents in a romantic relationship vs. those who are single (Van Ouytsel, Walrave, Lu, Temple, & Ponnet, 2018). Romantically partnered adolescents who were sexting did not have higher rates of substance use, risky sex, or deviant behavior, whereas those who were sexting while single did (Van Ouytsel et al.,

2018). Future research should consider the relational context and motivations for sexting to delineate risk of harmful outcomes from normative sexual development processes. Results presented here suggest the need to understand internet pornography use in conjunction with other sex-seeking online behaviors (e.g., chatting about sex) as well as attracting (e.g., sexting) behaviors as opposed to these experiences in isolation.

In the physical violence model, being a member of the *Seekers* class (those who intentionally sought out pornography and sex chatting), especially for participants who were maltreated, predicted having had more violent romantic partners one year later. The *Seekers* had a high probability of having used internet pornography, initiated a chat about sex online, had someone comment about how sexy they are on social media, and had someone request sexy/nude photos. Given that participants who were maltreated and members of the *Seekers* class were even more likely to have more violent partners, it is possible that maltreated *Seekers* have a history of volatile romantic relationships. Indeed, maltreated female adolescents are more likely to be revictimized in adolescence and adulthood than those who were not maltreated during their youth (Noll, Horowitz, Bonanno, Trickett, & Putnam, 2003).

Although the *Seekers* were not more likely to engage in HIV risk behavior compared to the *Attractors*, they were more likely to have ever been pregnant at Time 1 (Maas et al., 2018). Accordingly, more investigation into the nature and context of online sexual experiences would be beneficial for the *Seekers*. For example, are they experiencing coercion to send nude images from their physically violent partner? Although not measured here, future research in this area should consider the role of partner coercion in sexting. Revictimization prevention for maltreated youth should include education on online experiences including cyber-initiated violence.

In the sexual assault model, being a member of the *Online Inclusive* class, especially for maltreated participants, predicted a higher likelihood of sexual assault 1 year later. Moreover, being a member of the *Online Abstinent* class (having very little online sexual experiences) predicted a lower likelihood of sexual assault, and there was a trend of membership in the *Seekers* class predicting a lower likelihood of sexual assault. This finding suggests that the combination of 'attracting' and 'seeking' are more predictive of sexual assault than either experiential pattern alone. These results provide support for Objectification Theory (Fredrickson & Roberts, 1997), which posits that self-objectifying behaviors produce harmful outcomes through focused attention on external approval instead of personal well-being. However, a prior study of offline sexual objectification as a predictor of sexual victimization found that sexual assertiveness mediated the link, such that participants who were high in sexual objectification and low in sexual assertiveness were more likely to be sexually victimized (Franz, DiLillo, & Gervais, 2016); whereas, participants who were high in sexual objectification and high in sexual assertiveness were not more likely to be sexually victimized (Franz et al., 2016). Therefore, our results imply that female adolescents engaging in sexualized self-presentation could benefit from sexual assertiveness programming as a protective factor for sexual violence victimization.

There are several limitations of this work that provide opportunity for future research. First, the sexual orientation of the participants is unknown because they reported on a boyfriend/partner. Future research should examine patterns of online sexual experiences among sexually diverse adolescents as they might predict different outcomes. Second, data were not collected on types of cyber abuse, such as stalking or harassment. Current research has shown that the use of technology to perpetrate types of abuse in adolescent romantic relationships is becoming more common (Zweig et al., 2013). Thus, future research on relationship violence should include questions about cyber abuse-as abuse behaviors that occur predominately in the form of computer-mediated communication would go undetected in more traditional measures of abuse. Third, the comprehensive trauma interview (CTI) that each participant received annually as part of the study was designed to elicit responses about severely traumatizing experiences that would otherwise go undetected in self-report questionnaires. In contrast, research has shown that college women may not acknowledge instances of unwanted sexual experiences or even forced sexual experiences as rape, if they did not conceptualize the event as highly traumatic (Donde, Ragsdale, Koss, & Zucker, 2018). Therefore, there could be a range of sexual assault experiences that the CTI did not uncover in this adolescent sample.

Theoretical and Practical Implications

The Proteus Effect (Yee & Bailenson, 2007), which suggests that offline behaviors conform to online identities, may indeed elucidate the means by which unique patterns of online sexual experiences predict later victimization. If the *Attractors* and *Online Inclusive* classes are posting sexy photos of themselves and receiving requests from men for sex, they may be more likely to "play the role" of sex object offline. This dynamic is concerning because perpetrators tend to approach potential victims based upon their profile picture and other indicators of emotional vulnerability or sexual readiness (Whittle, Hamilton-Giachritsis, Beech, & Collings, 2013). Therefore, the internet may be a context where female adolescents are practicing harmful self-objectification, attracting attention from potentially dangerous men, and then feeling obligated to please them offline.

Readers should be cautioned that these findings do not imply that female sexual or relationship violence survivors should be blamed for their own abuse. It could be effective to teach female adolescents that there is never a need to engage in unwanted sexual behavior, regardless of one's degree of flirting or sexual display. Furthermore, ensuring that male adolescents do not interpret sexual self-presentation and flirting behaviors as invitations to pursue offline sexual behavior could prevent sexual assault and coercion. In general, it is critical for educators, parents, and therapists to be specific in their warnings of sexual self-presentation as a risk factor for attracting perpetrators but *not* an invitation deserving of assault.

It is also important to acknowledge that it is normative for adolescents to be curious about sex and seek out sexual content and interaction online (O'Sullivan, 2014). Thus, online sexual experiences themselves should not be pathologized (O'Sullivan, 2014). Future research and practice in this area should inquire into patterns of online sexual experiences as potentially indicative of qualities or vulnerabilities that increase risk for *some* adolescents.

Indeed, there could be protective mediating or moderating factors that were not uncovered here, and such factors should be investigated to move the field forward.

Conclusion

Considerable attention has been paid to describing adolescents' online sexual experiences and identifying deleterious correlates with such experiences. However, a comprehensive understanding of the nature and longer-term effects of online sexual experiences has been limited due to the lack of person-oriented and longitudinal work in this area. The present analysis adds to the literature in several ways by examining how various *patterns* of online sexual experiences among female adolescents longitudinally predict sexual health and violence outcomes one year later. These findings suggest that the combinations of online sexual experiences matter for later HIV risk, sexual assault, and relationship violence victimization. Moreover, for maltreated female adolescents, engaging in more online sexual experiences predicted a significantly higher likelihood of sexual victimization, suggesting that addressing online sexual experiences for revictimization prevention is needed. Uncovering the multidimensionality of online sexual experiences of adolescents is important insofar as many sexual behaviors during this period set a young person on a path that can have consequences that are life-long. Thus, sexuality education and internet safety programming should not only incorporate online sexual experiences into current curriculum, but also target specific individuals and their online sexual experience patterns to reduce HIV risk, sexual assault, and relationship violence.

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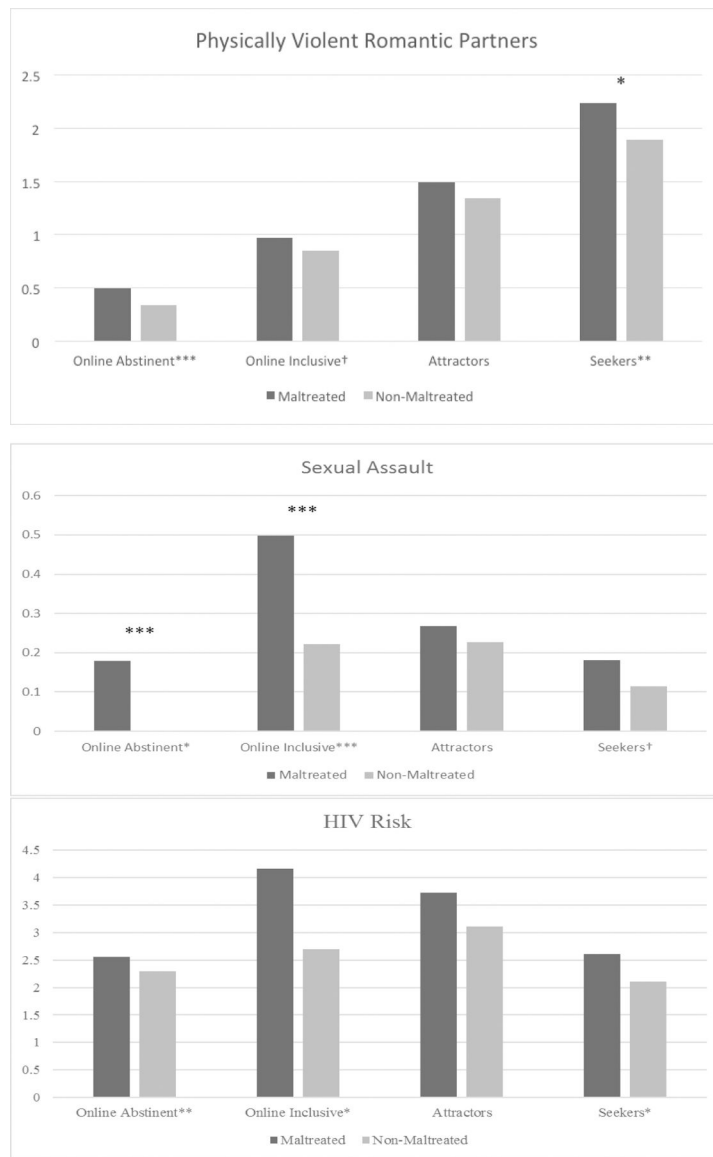
Figure 1. Offline outcomes by online class membership and maltreatment status

Note. Physically violent partners is measured by number of partners. Sexual assault is measured as odds of having been sexually assaulted in the last year. HIV risk is measured by number of HIV risk behaviors. Asterisks for class membership prediction of outcome-below the bars; for maltreatment as a significant moderator of the effects of class membership-above the bars. Estimated values are for outcomes at prior risk = 0 at Time 1. The reference class is the *Attractors*.

† *p* < .10, * *p* < .05, ** *p* < .01, *** *p* < .00.

Table 1.

Latent class prevalences and item response probabilities for 4-class model of online sexual experiences

	Latent class membership probabilities			
	Class 1: Online Abstinent 52%	**Class 2: Online Inclusive 19%**	**Class 3: Attractors 15%**	**Class 4: Seekers 13%**
Indicators	**Item-Response Probabilities for Item Endorsement**			
Visit porn sites	0.05	0.59	0.00	0.46
Cybersex/role-play	0.03	0.95	0.00	0.05
Sex chat	0.05	0.56	0.00	0.68
Sexting	0.11	0.65	0.29	0.22
Sexy profile pic	0.00	0.55	0.74	0.00
Sexy comments	0.38	0.94	1.00	1.00
Sexy photos	0.08	0.99	0.56	0.41
Sex solicitation	0.04	0.76	0.58	0.25

Note. Indicators are dichotomous online sexual behaviors. Each class indicator was scored as 1 = not endorsing the item and 2 = endorsing the item.

Table 2.

Descriptive statistics, t-tests, and odds ratios for differences in HIV risk and gender-based violence victimization between maltreated and non-maltreated female adolescents.

Variable	Label	Whole Sample Valid % N = 296	Maltreated Valid % n = 146	Non-Maltreated Valid % n = 150	t/Odds Ratio
HIV risk[1]	M	3.14	3.61	2.99	
	SD	1.84	1.12	1.91	3.01**
	missing	6	4	2	
Physical violence[2]	M	.37	1.15	.81	
	SD	.49	.29	.32	2.86*
	missing	9	4	5	
Sexual assault[3]	No	86.7	90.2	84.4	
	Yes	13.3	9.8	15.6	.79†
	missing	0	0	0	

Note. Odds ratio for binary outcome in bold. Maltreated = 1; non-maltreated = 0.

[1] HIV risk is a behavioral count variable with scores ranging from 0–8.

[2] Physical violence is a count variable of number of physically abusive romantic partners in the last year ranging from 0–4. The distribution was zero-inflated.

[3] Sexual assault was derived from the comprehensive trauma interview. A binary variable was coded such that 0 is no experience of sexual assault and 1 is any experience of sexual assault.

†
$p < .10$

*
$p < .05$

**
$p < .01$.

Table 3.

Regression models showing HIV risk, physical violence, and sexual assault predicted by earlier online sexual experience class membership.

	HIV Risk	Physical Violence	Sexual Assault
	β	β	Odds /Odds Ratios
Intercept	3.92***	0.706***	5.67***
Control	0.526***	−0.587**	0.22
Maltreatment	0.703*	0.261*	5.78**
Online Inclusive	0.456*	0.129†	3.21**
Online Abstinent	−1.285**	−0.202***	−5.23***
Sex Seekers	−0.112*	1.416**	−0.85
Step 2-2* LL	**NS**	*******	*******
Intercept	2.120***	0.297***	5.05**
Control	0.505***	−0.401**	0.19
Maltreatment	0.714*	0.321*	4.38†
Online Inclusive	0.670*	0.019†	4.36***
Online Abstinent	−1.110*	−.227***	−2.12*
Sex Seekers	−0.030	1.037**	−1.15†
Online Inclusive*Maltreatment	0.787	−0.099	4.33***
Online Abstinent*Maltreatment	−1.015	−0.070	−5.46***
Seekers*Maltreatment	0.216	0.743*	2.15†

Note. Control = Time 1 HIV Risk, Time 1 physical violence, or Time 1 sexual assault. Maltreated = 1; non-maltreated = 2. The intercept represents the reference class *Attractors*; Step 2–2* LL is the global significance test for the interactions between maltreatment status and class membership.

†
 p <.10

*
 p < .05

**
 p < .01

***
 p < .00.