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Sexually explicit media use among 14–17 year old sexual minority males in the United States

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Abstract

Adolescent sexual minority males (ASMM; < 18 years old) do not typically receive sexual education that addresses male-male relationships from traditional sources (i.e., school, parents). Therefore, many rely on sexually explicit online media (SEOM; i.e., pornography) to find sexual health information. The current study describes SEOM use by ASMM in the United States (U.S.) and examines the association between exposure to condomless anal sex (CAS) in SEOM and engagement in CAS. In 2017, ASMM ($N=206$; $M_{age}=16$, range: 14–17; 51% racial/ethnic minorities) from across the U.S. completed an online sexual health survey, including questions about SEOM use and sexual behaviors. Most (86%) reported that they had viewed SEOM. Engagement with SEOM was frequent (86% reported viewing one time per week) and lengthy (70% reported viewing for 15 minutes per session). Youth perceived that SEOM influenced how they, and other ASMM, think and behave sexually. Further, exposure to risky sexual behavior in SEOM appears to be associated with youths' dyadic sexual behavior. To support the healthy sexual development of ASMM, it is important to acknowledge the near-universal use of SEOM by ASMM, to identify ways to maximize its potential value, and to minimize potential harms.

Keywords

adolescent; sexual minority males; pornography; sexual behavior; YMSM

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ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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INTRODUCTION

In the United States (U.S.), adolescent (<18 years old) sexual minority males (ASMM) are less likely than their heterosexual peers to receive sexual education that addresses male-male sexual relationships from traditional sources (e.g., school, parents/guardians) (Nelson, Pantalone, & Carey, 2019; Raifman, Beyrer, & Arrington-Sanders, 2018; Rasberry et al., 2018). In order to learn about sexual expression and intimacy, as well as other sexual health information, many ASMM turn to the Internet, including to sexually explicit online media (SEOM) (Mustanski, Lyons, & Garcia, 2011; Nelson et al., 2019). Although the Internet can be a convenient and affirming source of sexual health information, it can also be unreliable, often providing misinformation or misleading characterizations of male-male sexual relations (DeHaan, Kuper, Magee, Bigelow, & Mustanski, 2013; Magee, Bigelow, Dehaan, & Mustanski, 2012; Nelson & Carey, 2016). This is especially true for SEOM, which often portrays sexual roles and behaviors that do not represent the realities of male-male sexual practices and often encourages sexual risk-taking (Nelson & Carey, 2016).

Despite the influence of SEOM, there is a dearth of research assessing the influence of SEOM on the sexual behavior of ASMM. The few studies that assess the impact of Internet use more generally on the sexual health of ASMM suggest that ASMM may be using SEOM to confirm their sexual attractions, understand what they find arousing, and learn about gay culture (Kubicek, Beyer, Weiss, Iverson, & Kipke, 2010; Mustanski et al., 2011). Only one U.S. study directly assessed SEOM use and its impact on sexual behaviors among ASMM. In qualitative interviews with Black/African American ASMM (ages 15–19) in Baltimore, Arrington-Sanders and colleagues found that their participants reported modeling their sexual experiences after what they view in SEOM, including engaging in condomless anal sex (CAS) (Arrington-Sanders et al., 2015).

Although there is limited research on SEOM use among ASMM, there is an increasing body of research assessing the impact of SEOM on adult sexual minority men. This research suggests that SEOM use has effects that are both positive (e.g., increased sexual knowledge, enjoyment of sex) and negative (e.g., increased sexually compulsive behavior, sexual risk taking) (Hald, Smolenski, & Rosser, 2013; Nelson, Leickly, Yang, Pereira, & Simoni, 2014; Nelson, Pantalone, Gamarel, & Simoni, 2016; Nelson, Simoni, et al., 2014; Perry, Nelson, Carey, & Simoni, 2018; Rosser et al., 2012, 2013; Schrimshaw, Antebi-Gruszka, & Jr, 2016; Stein, Silvera, Hagerty, & Marmor, 2012). Specific to sexual risk-taking, five online studies document a robust association between exposure to CAS in SEOM and engagement in CAS among adult sexual minority men in the U.S. (Nelson, Simoni, et al., 2014; Rosser et al., 2013; Schrimshaw et al., 2016; Stein et al., 2012; Whitfield, Rendina, Grov, & Parsons, 2018). With regard to adolescents, this association might be expected to be even stronger given their use of SEOM for sexual education and their developmental stage (i.e., elevated risk-taking and increased susceptibility to perceived peer norms, including media-based perceived norms (Brown, 2006; Nelson & Carey, 2016; Pedlow & Carey, 2004)). This is concerning as portrayals of CAS in SEOM have increased over the past three decades (Downing, Schrimshaw, Antebi, & Siegel, 2014; Grudzen et al., 2009).

Norm formation and sexual scripts are two pathways through which SEOM use may be influencing the sexual behaviors of ASMM, including engagement in CAS. Theory and research suggest that perceived norms predict subsequent behavior (Buhi & Goodson, 2007; Collins, Murphy, & Bierman, 2004; Rimal & Real, 2005). Norms influence behavior by suggesting what other members of the group are doing, as well as by guiding what individuals think they *should* be doing (Rimal & Real, 2005). In line with norm formation research, it is likely that the behaviors portrayed in SEOM, including the increasingly prevalent portrayals of CAS (Downing et al., 2014; Grudzen et al., 2009; Hurley, 2009), may lead ASMM to perceive the modeled behaviors as normative (rather than as an over-estimation), which could lead to their own engagement in those behaviors to adhere to the perceived norm.

SEOM use also likely shapes the sexual scripts of ASMM (Ross, 2005; Wright & Randall, 2012). Sexual scripts are cognitive schematic or personalized systems for defining sexual reality that guide and enable sexual decision-making (Frith & Kitzinger, 2001; Simon & Gagnon, 1984, 1986). Sexual scripts are determined, in part, by sociocultural factors, including perceived community norms (Gagnon, 1990; Irvine, 2003; Lenton & Bryan, 2005; Simon & Gagnon, 2005). In line with scripting theory (Simon & Gagnon, 1986), the behaviors portrayed in SEOM may both prompt and reinforce engagement in those behaviors among ASMM.

Although there is a growing literature on SEOM use and its relation to sexual behavior among heterosexual adolescents (Peter & Valkenburg, 2016), only the previously mentioned qualitative study (Arrington-Sanders et al., 2015) has specifically assessed SEOM use among ASMM. Therefore, the current study expands upon that work by describing SEOM use and perceived influence in a sample of ASMM from across the U.S. as well as the association between exposure to CAS in SEOM and engagement in CAS in real life. Thus, we describe (a) who is viewing SEOM, (b) what they are viewing, (c) how ASMM felt SEOM use affects their and other ASMM's beliefs about sexual behavior, and (d) whether viewing CAS in SEOM is related to engagement in sexual risk. A comprehensive understanding of SEOM use among ASMM is essential for guiding the creation of sexual health interventions for ASMM.

METHOD

Study Design

Questions related to sexually explicit media use were included in an online sexual health survey of ASMM. Study procedures have been described in detail elsewhere (Nelson et al., 2019). Briefly, participants were recruited in June-July 2017 via advertisements and posts on social media (e.g., Instagram, Facebook). Eligibility criteria included: (1) being age 14 to 17; (2) being cisgender male (i.e., male sex at birth and male gender identity); (3) self-identify as gay/bisexual, report being sexually attracted to males, or report voluntary past year sexual contact with a male partner; (4) residing in the U.S.; and (5) having a personal email address. Potential participants were directed to the study website, hosted using REDCap (Harris et al., 2009), for screening and consent. Capacity to consent was assessed using four questions that evaluated respondents' understanding of study procedures, risks,

and benefits (Dunn & Jeste, 2001). Respondents who were unable to accurately answer all four questions after three tries were considered ineligible. Those who responded accurately and consented received an email containing a survey link.

The survey was piloted with our Youth Advisory Board ($N=4$; age 16–18) for readability. The survey took 30 minutes ($SD=12$) on average, and completers were emailed a \$15 [Amazon.com](https://www.amazon.com) gift code. To protect against fraudulent entries or multiple enrollments, screening and survey responses were cross-referenced using age (age vs. date of birth), location (zip code vs. state of residence), sexual activity (multiple questions across the screener and survey assessing sexual behavior), and email address (Bowen, Daniel, Williams, & Baird, 2008; Sullivan, Grey, & Simon Rosser, 2013). All procedures, including a waiver of parental/guardian consent for the survey, were reviewed and approved by the hospital IRB.

Measures

Socio-demographics—Characteristics included recruitment source (Instagram, Facebook/other), census region of the U.S. (Northeast, Midwest, South, West), age (continuous), race/ethnicity (White, Black/African American, Latino, Mixed Race/Other), enrollment in school (yes, no), highest education level (10th grade, 11th grade or more), living situation (in guardians' home, other), urbanicity (metropolitan residence, other; (University of North Dakota Center for Rural Health, 2014), self-identified sexual orientation (gay, bisexual, heterosexual, other), outness about sexual attraction to males (definitely “out” all of the time, other), and age realized sexually attracted to men (continuous). Census region was designated using self-reported state of residence (U.S. Department of Commerce Economics and Statistics Administration, 2015).

Sexual Behavior—Participants were asked about ever having voluntarily engaged in a range of sexual behaviors (i.e., kissing, mutual masturbation, oral sex, vaginal sex, anal sex) with another person (yes, no). Participants who answered yes were asked the gender of their sexual partner(s) (male, female, transgender; check all that apply). Participants who reported female or male partners were asked about engagement in specific sexual behaviors with those partners (male: kissing, mutual masturbation, oral sex, anal sex; female: kissing, mutual masturbation, oral sex, vaginal sex, anal sex; check all that apply). Those who reported ever having male–male anal sex reported the number of total and condom-protected times they had anal sex with a male partner. Using this information, a calculated field established the number of condomless anal sex acts, which was presented to participants, who were asked to confirm it. A variable capturing “ever having male–male condomless anal sex” was created using this information (yes, no).

Sexually Explicit Online Media (SEOM) Use—Twenty-three SEOM questions were adapted from previous work with adult sexual minority men (Nelson et al., 2016; Nelson, Simoni, et al., 2014). Questions were adapted using feedback from our Youth Advisory Board to optimize readability and applicability to adolescents. Participants were asked if they had ever viewed sexually explicit media (yes, no). Participants who indicated yes, were asked about their methods of viewing (e.g., Internet or online using a phone, Internet or

online using a computer, magazines) and their age the first time they viewed (continuous). Participants were then asked to reflect on how much they agreed or disagreed on a 4-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*) with statements about how SEOM may affect ASMM (e.g., “online porn affects the way young males who are interested in sex with male partners think about sex,” “the way people behave in online porn makes it seem like sexually transmitted infections rarely happen”). Strongly agree and agree were collapsed into one category to indicate agreement. Strongly disagree and disagree were collapsed into one category to indicate disagreement.

Participants who reported viewing SEOM were then asked to check all reasons they viewed SEOM (e.g., “I was horny at the time,” “I wanted to orgasm or ‘get off’”) and all the sexual acts they intentionally or unintentionally viewed (e.g., anal sex, vaginal sex, oral sex, mutual masturbation, solo masturbation, and fetish). Fetish was defined as “sexual play with objects, body parts, or situations not commonly thought of as ‘mainstream’.”

Frequency of SEOM use was assessed in two different ways. First, participants were asked how often they viewed SEOM on a 9-point scale (*more than once an hour* to *less than once a month*). SEOM frequency was coded using the category closest to the mean (< 1 or 1 viewing per week). Participants were also asked to indicate how long they viewed SEOM on average per viewing session on a 7-point scale (*less than a minute* to *61 minutes or more*). Average viewing time per session was coded using the category closest to the mean (< 15 or > 15 minutes per session). To assess sexual stimulation during viewing, participants were asked to indicate the percentage of time, on a 7-point scale (*none (0%)* to *all (100%)*), they were concurrently masturbating while viewing SEOM (any, none). They were then asked if they had ever engaged in sexual activity with a partner while viewing SEOM (yes, no).

Participants were also asked “What, if anything, do you think you have learned from online porn?” (e.g., how to have sex with male partners, how to talk with male partners; check all that apply) and how much they agreed or disagreed on a 4-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*) with the following statements about how they felt SEOM might influence them: (1) “Online porn influences what I think sex should be like,” (2) “Online porn influences what I think my sex partner(s) should look like,” and (3) “Online porn influences what I think I should look like.” Strongly agree and agree were collapsed into one category to indicate agreement. Strongly disagree and disagree were collapsed into one category to indicate disagreement.

Prevalence of viewing CAS in SEOM was assessed via the question: “Of the online porn you have viewed that showed men having anal sex with other men, how much of it showed that a condom was NOT being used?” with response options on a 7-point scale (*none (0%)* to *all (100%)*). Participants were also asked about their preferences for condom use during anal sex between men in SEOM (prefers condoms are used, prefers condoms are not used, no preference). Finally, participants were asked how much they agreed or disagreed, 4-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*), with a variety of statements about viewing CAS in SEOM (e.g., “It looks more natural to me,” “I get more aroused or sexually excited”). Strongly agree and agree were collapsed into one category to

indicate agreement. Strongly disagree and disagree were collapsed into one category to indicated disagreement.

Data Analyses

The data analyses were limited to participants who answered the question about whether they had ever viewed sexually explicit media ($N = 206$; only one participant did not answer that question and was removed from analyses). Socio-demographic and sexual behavior differences in ever having viewed sexually explicit media were assessed using Fisher's exact test and t -tests. Differences in agreement with statements about the effect of SEOM on ASMM by ever having viewed sexually explicit media were assessed using Fisher's exact tests. Among participants who responded that they had previously viewed SEOM ($N = 177$), SEOM viewing characteristics were described using frequency distributions. Among participants who reported having viewed anal sex in SEOM ($N = 164$), characteristics related to viewing CAS in SEOM were described using frequency distributions.

Consistent with previous analyses with adult sexual minority male populations (Nelson, Simoni, et al., 2014), exposure to CAS in SEOM was coded 0–24%, 25–49%, 50–74%, 75–100%. Participants who reported (a) having never viewed SEOM or (b) having never viewed anal sex in SEOM were included in the 0–25% exposure to CAS in SEOM category based on the supposition that both groups had functionally never been exposed to CAS in SEOM. The association between exposure to CAS in SEOM (0–24%, 25–49%, 50–74%, 75–100%) and engagement in CAS (yes, no) was assessed using Firth logistic regression controlling for age and race/ethnicity. Firth (i.e., penalized likelihood) logistic regression was used to account for small-sample bias given small cell size of participants who had engaged in condomless anal sex with males (Firth, 1993; Heinze & Schemper, 2002). Further, although age and race/ethnicity were not bivariately associated with both the independently and dependent variables, we controlled for them due to their established associations with sexual health disparities and risk behavior (Centers for Disease Control and Prevention, 2018). No other potential confounds were associated with both viewing CAS in SEOM and engagement in CAS. Analyses were conducted using Stata 15 (StataCorp, 2017).

RESULTS

Participants

As shown in Table 1, average age was 16 years old ($SD = 1.0$). Almost half (48%) identified as racial/ethnic minorities. Participants lived in 40 states (West: 35%, South: 29%, Midwest: 20%; Northeast: 16%). The majority lived in a metropolitan area (87%), were currently in school (95%), and lived in their guardian's home (93%). Most (66%) identified as gay. One-third (31%) reported being "out" all of the time about their sexual attraction to male partners. Average age of realizing sexual attraction to males was 12 ($SD = 2.1$). Most (63%) reported having had voluntary sexual contact in their lifetime. Forty-one (20%) participants reported having engaged in male–male condomless anal sex.

Sexually Explicit Media Use ($N = 206$)

In this sample, 86% of participants reported viewing SEOM. Participants who were recruited via Instagram (90% vs. 48%; $\chi^2 = 32.0, p < 0.001$), lived with their guardians (96% vs. 72%; $\chi^2 = 20.6, p < 0.001$), and realized their sexual attraction to males at an earlier age (12 [$SD = 2.1$] vs. 13 [$SD = 1.8$]; $t = 3.1, p < 0.01$) were more likely to report having ever viewed sexually explicit media. Reporting voluntary sexual behaviors with male (kissing, mutual masturbation, oral sex) and female (kissing) partners was also associated with having ever viewed sexually explicit media (Table 1).

Most participants agreed with all eight statements related to the use of SEOM among ASMM (Table 2). The most commonly endorsed statements were: (1) “Online porn affects the way young males who are interested in sex with male partners think about sex” (89%), (2) “The way people behave in online porn makes it seem like sexually transmitted infections rarely happen” (83%), and (3) “Sexual behaviors show in online porn affect the way young males who are interested in sex with male partners my age behave” (82%). Participants who viewed sexually explicit media were less likely to agree that sexually explicit media makes it seem like popular people have sex (65% vs. 86%; $\chi^2 = 5.2, p = 0.03$) and nobody uses condoms (46% vs. 79%; $\chi^2 = 10.4, p = 0.002$). Of note, participants who viewed sexually explicit media were more likely to agree that the sexual behaviors portrayed in sexually explicit media affect the way that ASMM behave (86% vs. 59%; $\chi^2 = 12.4, p = 0.001$).

Characteristics of SEOM use ($N = 177$)

As shown in Table 3, the average age of first SEOM viewing was 12 ($SD = 1.8$). The vast majority of participants reported using their phone (95%) or a computer (79%) to view sexually explicit media. The most frequently endorsed reasons for viewing SEOM were: (1) “I was horny at the time” (91%), (2) “I wanted to orgasm or ‘get off’” (83%), and (3) “I wanted to learn about how men have sex with other men” (65%). Anal (93%) and oral (92%) sex were the most commonly viewed behaviors, along with solo (86%) and mutual (82%) masturbation. Most participants (86%) reported viewing SEOM at least once a week. The majority (70%) viewed for 15 or more minutes per session. Almost all (98%) reported having masturbated while viewing. The majority stated that SEOM use helped them to learn which sexual behaviors they were interested in trying (84%), the types of partners they find attractive (79%), and how to have sex with male partners (75%). Lastly, most participants agreed that SEOM influences what they think sex should be like (66%) and what they think they should look like (60%).

Viewing Anal Sex in SEOM ($N = 164$)

Among participants who reported viewing anal sex in SEOM, the majority (65%) reported not having a preference about condom use during anal sex in SEOM (Table 4). Most participants agreed that viewing CAS in SEOM looked more natural (66%), reminds them of what sex could be like if HIV/AIDS was not a health concern (62%), and is more arousing or sexually exciting (53%). Notably, almost half (46%) reported that viewing CAS in SEOM made them believe that other men would not want to use condoms during sex.

Exposure to CAS in SEOM and Relation with CAS (*N* = 206)

Most participants (54%) reported that 50% of the SEOM they viewed portrayed CAS (Table 5). Counter to expectation, increasing exposure to CAS in SEOM (0–24%, 25–49%, 50–74%, 75–100%) was not linearly associated with engagement in CAS (AOR: 1.3, 95% CI: 0.98, 1.8). Given that the lower confidence interval was just below one and the cell sizes for the categories encompassing those with <50% exposure to CAS in SEOM were relatively small, this lack of association might have been due to an uneven distribution of the independent variable. Therefore, we completed a post-hoc analysis using fifth logistic regression and collapsing across exposure categories (0–49% vs. 50–100%). We found that participants who reported that 50% of the SEOM they viewed portrayed CAS had 2.4 times the odds (95% CI: 1.1 – 5.2) of engaging in CAS compared to those who reported <50% exposure.

DISCUSSION

Primary findings from the current study are that (1) the vast majority of ASMM reported that they had viewed SEOM, (2) that engagement with SEOM was frequent and lengthy, and (3) that SEOM influenced how they (and other ASMM) think about – and behave – sexually. The primary reasons youth endorsed using SEOM were sexual. Further, exposure to risky sexual behavior in SEOM was associated with youths' actual sexual behavior in real life. In short, engagement with SEOM plays a prominent role in the sexual development of ASMM. As this is the first quantitative study of SEOM use among ASMM, the importance of these findings for understanding the emerging sexuality of ASMM is clear.

Similar to heterosexual youth (Peter & Valkenburg, 2016), interest in sex motivates engagement with SEOM. In this sample, viewing SEOM for the first time occurred around the age when puberty typically begins for young men (Herman-Giddens et al., 2012) and, accordingly, around the age that sexual desire and arousal increase, and sexual function emerges (Fortenberry, 2013). ASMM in this sample viewed SEOM at least weekly and for greater than 15 minutes at a time. Additionally, ASMM in this sample viewed SEOM most often because they were “horny” or “wanted to orgasm” and while masturbating. Lastly, youth who had become aware of their attraction to same-sex partners earlier in life were more likely to have viewed SEOM. Taken as a whole, these findings suggest that SEOM use plays an important role in the emergence of sexuality for many ASMM.

Additionally, youth reported that their sexual expectations had been influenced by SEOM and that SEOM taught them about (or shaped them regarding) their sexual interests. For example, most youth reported that they perceived SEOM had affected what they thought sex should look like, how they themselves should look, and how ASMM more generally think about sex. These findings align with norm formation research on how ASMM perceive their peers' behaviors, as well as how they themselves are expected to behave (Rimal & Real, 2005). In addition, the majority of ASMM who viewed SEOM reported that they had learned what sexual behaviors they were interested in, what types of partners they find attractive, and how to have sex with male partners from SEOM. These findings can be considered from the perspective of sexual script theory (Simon & Gagnon, 2005, 1984), in that the types of actors and acts portrayed in SEOM influence the development of the sexual

scripts of ASMM. These findings have implications for ASMM's sexual health given that portrayals of sex in SEOM are purposively scripted and unrealistic (Thomas, 2000). Thus, these multiple pathways of influence from SEOM to youth's sexual behavior suggests that educational interventions need to address ASMM's use of SEOM as well as SEOM's influence on perceived norms.

The centrality of SEOM to the sexual development of ASMM is especially important because of the relationship of SEOM to sexual risk behavior. Similar to results among adult sexual minority men (Nelson, Simoni, et al., 2014; Rosser et al., 2013; Schrimshaw et al., 2016; Stein et al., 2012), we found that increased exposure to CAS in SEOM was associated with reported CAS in real life. This finding suggests the processes linking exposure in SEOM to actual behavior may start early. One important difference regarding the finding in the current study is that the association was not linear, but rather emerged for youth who had reported that at least 50% of the SEOM exposure included CAS. This may reflect methodological differences between studies; for example, a smaller sample of youth reported engaging CAS compared to adult samples and a majority of youth in the sample reported high proportions of CAS in the SEOM they viewed. These "restrictions in range" may have limited the potential for covariation. Therefore, future research on SEOM among young ASMM should be mindful of the likely variability in both SEOM exposure and in CAS in a sample when designing recruitment procedures.

Nevertheless, these findings indicate that there is a clear need for further study of the mechanisms by which SEOM exposure and use among ASMM shape their early sexual lives and developing sexual behaviors. For example, research with longitudinal or daily diary designs could clarify the temporality and dose of SEOM exposure that lead to engagement in certain sexual behaviors in reality. Experimental designs could examine the effects of different types of SEOM on psychological or physical arousal. Given that access to SEOM occurs at earlier ages (due to advances in technology, especially mobile devices), research on SEOM among adolescence might aim to identify ways to prepare youth for what they are likely to see, to promote healthy use, to develop media literacy, and to reduce the potential harmful effects of SEOM (Nelson & Carey, 2016). Research might also seek to clarify understanding of individual factors (e.g., personality, developmental background) and media factors (i.e., related to the SEOM itself) regarding why and when SEOM use might carry risk for ASMM. Results from future work in this area can then guide teachers, parents and other guardians and inform educational interventions to promote healthy sexual development among ASMM.

Results from the current study should be considered in the context of its limitations. The overall sample size was modest and the subsamples of youth who reported engaging in CAS, as well as youth who reported having never viewed SEOM were small. Thus, these associations should be interpreted with caution prior to replication with larger samples. In addition, the cross-sectional nature of the data precludes any claims about the causality of SEOM use on sexual behavior. Future studies can expand upon these findings with larger samples of youth, particularly those who are already engaging in potentially risky sexual behavior.

In spite of these limitations, the current study leverages several strengths to expand our scientific understanding of the use and influence of SEOM among ASMM. The study recruited a sample of ASMM from across the U.S., many of whom identified as non-White, strengthening the geographic and demographic generalizability of the findings. The study is among the first to reach sexual minority male youth this young and therefore extends our understanding of how SEOM use emerges early in adolescence.

Overall, these findings indicate that ASMM, who lack access to tailored sexual education, use SEOM regularly, with a variety of motivations, and identify multiple consequences of their use, notably influences on sexual behavior. As most ASMM have few prominent models of healthy male-male sexual relationships, viewing SEOM at the beginning of their sexual awakening and prior to sexual debut, may increase the likelihood that the behaviors modeled in SEOM will shape the way ASMM think about sex and eventually the way they engage with sexual partners. Health professionals seeking to support the healthy sexual development of ASMM must now recognize the nearly universal influence of SEOM on ASMM. Research might identify ways to use SEOM for benefit rather than harm, and also prepare young people for the media that are likely to encounter, even at earlier ages.

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REFERENCES

- Arrington-Sanders R, Harper GW, Morgan A, Ogunbajo A, Trent M, & Fortenberry JD (2015). The role of sexually explicit material in the sexual development of same-sex-attracted Black adolescent males. *Archives of Sexual Behavior*, 44(3), 597–608. 10.1007/s10508-014-0416-x [PubMed: 25677334]
- Bowen AM, Daniel CM, Williams ML, & Baird GL (2008). Identifying multiple submissions in Internet research: preserving data integrity. *AIDS and Behavior*, 12(6), 964–973. 10.1007/s10461-007-9352-2 [PubMed: 18240015]
- Brown JD (2006). Media literacy has potential to improve adolescents' health. *The Journal of Adolescent Health*, 39(4), 459–460. 10.1016/j.jadohealth.2006.07.014 [PubMed: 16982377]
- Buhi ER, & Goodson P (2007). Predictors of Adolescent Sexual Behavior and Intention: A Theory-Guided Systematic Review. *Journal of Adolescent Health*, 40(1), 4–21. 10.1016/j.jadohealth.2006.09.027 [PubMed: 17185201]
- Centers for Disease Control and Prevention. (2018). Diagnoses of HIV infection among adolescents and young adults in the United States and 6 dependent areas, 2011–2016. (No. 23 (No. 3)). Retrieved from Centers for Disease Control and Prevention website: <http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>
- Collins L, Murphy S, & Bierman K (2004). A conceptual framework for adaptive preventive interventions. *Prevention Science*, 5, 185–196. [PubMed: 15470938]
- DeHaan S, Kuper LE, Magee JC, Bigelow L, & Mustanski BS (2013). The interplay between online and offline explorations of identity, relationships, and sex: a mixed-methods study with LGBT youth. *Journal of Sex Research*, 50(5), 421–434. 10.1080/00224499.2012.661489 [PubMed: 22489658]

- Downing MJ, Schrimshaw EW, Antebi N, & Siegel K (2014). Sexually explicit media on the internet: a content analysis of sexual behaviors, risk, and media characteristics in gay male adult videos. *Archives of Sexual Behavior*, 43(4), 811–821. 10.1007/s10508-013-0121-1 [PubMed: 23733156]
- Dunn LB, & Jeste DV (2001). Enhancing informed consent for research and treatment. *Neuropsychopharmacology*, 24(6), 595–607. 10.1016/S0893-133X(00)00218-9 [PubMed: 11331139]
- Firth D (1993). Bias Reduction of Maximum Likelihood Estimates. *Biometrika*, 80(1), 27–38. 10.2307/2336755
- Fortenberry JD (2013). Puberty and adolescent sexuality. *Hormones and Behavior*, 64(2), 280–287. 10.1016/j.yhbeh.2013.03.007 [PubMed: 23998672]
- Frith H, & Kitzinger C (2001). Reformulating Sexual Script Theory Developing a Discursive Psychology of Sexual Negotiation. *Theory & Psychology*, 11(2), 209–232. 10.1177/0959354301112004
- Gagnon JH (1990). The Explicit and Implicit Use of the Scripting Perspective in Sex Research. *Annual Review of Sex Research*, 1(1), 1–43. 10.1080/10532528.1990.10559854
- Grudzen C, Elliott M, Kerndt P, Schuster M, Brook R, & Gelberg L (2009). Condom Use and High-Risk Sexual Acts in Adult Films: A Comparison of Heterosexual and Homosexual Films. *American Journal of Public Health*, 99, S152–S156. [PubMed: 19218178]
- Hald GM, Smolenski D, & Rosser BRS (2013). Perceived Effects of Sexually Explicit Media among Men Who Have Sex with Men and Psychometric Properties of the Pornography Consumption Effects Scale (PCES). *The Journal of Sexual Medicine*, 10(3), 757–767. 10.1111/j.1743-6109.2012.02988.x [PubMed: 23110358]
- Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, & Conde JG (2009). Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*, 42(2), 377–381. 10.1016/j.jbi.2008.08.010 [PubMed: 18929686]
- Heinze G, & Schemper M (2002). A solution to the problem of separation in logistic regression. *Statistics in Medicine*, 21(16), 2409–2419. 10.1002/sim.1047 [PubMed: 12210625]
- Herman-Giddens ME, Steffes J, Harris D, Slora E, Hussey M, Dowshen SA, ... Reiter EO (2012). Secondary Sexual Characteristics in Boys: Data From the Pediatric Research in Office Settings Network. *Pediatrics*, 130(5), e1058–e1068. 10.1542/peds.2011-3291 [PubMed: 23085608]
- Hurley R (2009). Bareback to basics: How gay porn undermines safe sex campaigns. *BMJ*, 338, b910.
- Irvine JM (2003). Introduction to “Sexual Scripts: Origins, Influences and Changes.” *Qualitative Sociology*, 26(4), 489–490. 10.1023/B:QUAS.0000005263.56276.9c
- Kubicek K, Beyer WJ, Weiss G, Iverson E, & Kipke MD (2010). In the dark: young men’s stories of sexual initiation in the absence of relevant sexual health information. *Health Education & Behavior*, 37, 243–263. <https://doi.org/1090198109339993> [pii] 10.1177/1090198109339993 [PubMed: 19574587]
- Lenton AP, & Bryan A (2005). An affair to remember: The role of sexual scripts in perceptions of sexual intent. *Personal Relationships*, 12(4), 483–498. 10.1111/j.1475-6811.2005.00127.x
- Magee JC, Bigelow L, Dehaan S, & Mustanski BS (2012). Sexual health information seeking online: a mixed-methods study among lesbian, gay, bisexual, and transgender young people. *Health Education & Behavior*, 39(3), 276–289. 10.1177/1090198111401384 [PubMed: 21490310]
- Mustanski B, Lyons T, & Garcia SC (2011). Internet use and sexual health of young men who have sex with men: a mixed-methods study. *Archives of Sexual Behavior*, 40(2), 289–300. 10.1007/s10508-009-9596-1 [PubMed: 20182787]
- Nelson KM, & Carey MP (2016). Media Literacy Is an Essential Component of HIV Prevention for Young Men Who Have Sex With Men. *Archives of Sexual Behavior*, 45(4), 787–788. 10.1007/s10508-016-0712-8 [PubMed: 26895006]
- Nelson KM, Carey MP, & Fisher CB (2019a). Is guardian permission a barrier to online sexual health research among adolescent males interested in sex with males? *Journal of Sex Research*, 56(4–5), 593–603. [PubMed: 29952665]

- Nelson KM, Leickly E, Yang JP, Pereira A, & Simoni JM (2014). The influence of sexually explicit online media on sex: do men who have sex with men believe they “do what they see”? *AIDS Care*, 26(7), 931–934. 10.1080/09540121.2013.871219 [PubMed: 24382316]
- Nelson KM, Pantalone DW, & Carey MP (2019). Sexual health education for adolescent males who are interested in sex with males: An investigation of experiences, preferences, and needs. *Journal of Adolescent Health*, 64(1), 36–42. 10.1016/j.jadohealth.2018.07.015 [PubMed: 30292649]
- Nelson KM, Pantalone DW, Gamarel KE, & Simoni JM (2016). A New Measure of the Perceived Influence of Sexually Explicit Online Media on the Sexual Behaviors of Men Who Have Sex With Men. *Journal of Sex Research*, 53(4–5), 588–600. 10.1080/00224499.2015.1066744 [PubMed: 26479019]
- Nelson KM, Simoni JM, Morrison DM, George WH, Leickly E, Lengua LJ, & Hawes SE (2014). Sexually explicit online media and sexual risk among men who have sex with men in the United States. *Archives of Sexual Behavior*, 43(4), 833–843. 10.1007/s10508-013-0238-2 [PubMed: 24464547]
- Pedlow CT, & Carey MP (2004). Developmentally appropriate sexual risk reduction interventions for adolescents: rationale, review of interventions, and recommendations for research and practice. *Annals of Behavioral Medicine*, 27(3), 172–184. 10.1207/s15324796abm2703_5 [PubMed: 15184093]
- Perry NS, Nelson KM, Carey MP, & Simoni JM (2019). Sexually explicit media exposure as a sexual milestone among gay, bisexual, and other men who have sex with men. *Health Psychology*, 38(1): 29–32. 10.1037/hea0000678 [PubMed: 30307275]
- Peter J, & Valkenburg PM (2016). Adolescents and pornography: A review of 20 years of research. *Journal of Sex Research*, 53(4–5), 509–531. 10.1080/00224499.2016.1143441 [PubMed: 27105446]
- Raifman J, Beyrer C, & Arrington-Sanders R (2018). HIV education and sexual risk behaviors among young men who have sex with men. *LGBT Health*, 5(2), 131–138. 10.1089/lgbt.2017.0076 [PubMed: 29297755]
- Rasberry CN, Condron DS, Lesesne CA, Adkins SH, Sheremenko G, & Kroupa E (2018). Associations between sexual risk-related behaviors and school-based education on HIV and condom use for adolescent sexual minority males and their non-sexual-minority peers. *LGBT Health*, 5(1), 69–77. 10.1089/lgbt.2017.0111 [PubMed: 29240528]
- Rimal RN, & Real K (2005). How Behaviors are Influenced by Perceived Norms A Test of the Theory of Normative Social Behavior. *Communication Research*, 32(3), 389–414. 10.1177/0093650205275385
- Ross MW (2005). Typing, doing, and being: Sexuality and the internet. *The Journal of Sex Research*, 42(4), 342–352. 10.1080/00224490509552290 [PubMed: 19827239]
- Rosser BRS, Grey JA, Wilkerson JM, Iantaffi A, Brady SS, Smolenski DJ, & Horvath KJ (2012). A commentary on the role of sexually explicit media (SEM) in the transmission and prevention of HIV among men who have sex with men (MSM). *AIDS and Behavior*, 16(6), 1373–1381. 10.1007/s10461-012-0135-z [PubMed: 22252476]
- Rosser BRS, Smolenski DJ, Erickson D, Iantaffi A, Brady SS, Galos DL, ... Wilkerson JM (2013). The effects of gay sexually explicit media on the HIV risk behavior of men who have sex with men. *AIDS and Behavior*, 17(4), 1488–1498. 10.1007/s10461-013-0454-8 [PubMed: 23564010]
- Schrimshaw EW, Antebi-Gruszka N, & Jr MJ (2016). Viewing of Internet-based sexually explicit media as a risk factor for condomless anal sex among men who have sex with men in four U.S. cities. *PLOS ONE*, 11(4), e0154439 10.1371/journal.pone.0154439 [PubMed: 27119990]
- Simon W, & Gagnon J (2005). *Sexual Conduct: The Social Sources of Human Sexuality* (2 edition). New Brunswick N.J.: Aldine Transaction.
- Simon W, & Gagnon JH (1984). *Sexual Scripts*. *Society*, 22(1), 53–60.
- Simon W, & Gagnon JH (1986). Sexual scripts: Permanence and change. *Archives of Sexual Behavior*, 15(2), 97–120. 10.1007/BF01542219 [PubMed: 3718206]
- StataCorp. (2017). *Stata Statistical Software: Release 15*. College Station, TX: StataCorp LP.

- Stein D, Silvera R, Hagerty R, & Marmor M (2012). Viewing pornography depicting unprotected anal intercourse: are there implications for HIV prevention among men who have sex with men? *Archives of Sexual Behavior*, 41(2), 411–419. 10.1007/s10508-011-9789-2 [PubMed: 21755381]
- Sullivan PS, Grey JA, & Simon Rosser BR (2013). Emerging technologies for HIV prevention for MSM: what we have learned, and ways forward. *Journal of Acquired Immune Deficiency Syndromes*, 63 Suppl 1, S102–107. 10.1097/QAI.0b013e3182949e85 [PubMed: 23673879]
- Thomas J (2000). Gay male video pornography: past, present and future In *Sex for sale: prostitution, pornography, and the sex industry* (pp. 49–66). New York, NY: Routledge.
- University of North Dakota Center for Rural Health. (2014, 8 4). RUCA 3.10. Retrieved July 7, 2017, from <https://ruralhealth.und.edu/ruca>
- U.S. Department of Commerce Economics and Statistics Administration. (2015). Census regions and divisions of the United States. Retrieved from U.S. Census Bureau website: https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf
- Whitfield THF, Rendina HJ, Grov C, & Parsons JT (2018). Sexually explicit media and condomless anal sex among gay and bisexual men. *AIDS and Behavior*, 22(2), 681–689. 10.1007/s10461-017-1952-x [PubMed: 29079951]
- Wright PJ, & Randall AK (2012). Internet pornography exposure and risky sexual behavior among adult males in the United States. *Computers in Human Behavior*, 28(4), 1410–1416. 10.1016/j.chb.2012.03.003

Table 1.

Socio-demographics by sexually explicit media use among 14 to 17 year old sexual minority males in the United States ($N=206$)

	Ever viewed sexually explicit media			χ^2
	Total $N = 206$	Yes $n = 177$	No $n = 29$	
Socio-demographics	n (%)	n (%)	n (%)	
Recruitment source				32.0***
Instagram	173 (84)	159 (90)	14 (48)	
Facebook/Other	33 (16)	18 (10)	15 (52)	
Region				3.8
Northeast	33 (16)	26 (15)	7 (24)	
Midwest	41 (20)	33 (19)	8 (28)	
South	58 (29)	53 (31)	5 (17)	
West	70 (35)	61 (35)	9 (31)	
Race/Ethnicity				4.5
White	106 (52)	94 (54)	12 (41)	
Black/African American	30 (15)	23 (13)	7 (24)	
Latino	42 (21)	34 (19)	8 (28)	
Mixed Race/Other	26 (13)	24 (14)	2 (7)	
Currently enrolled in school	195 (95)	168 (95)	27 (93)	0.3
Highest level of education achieved				1.2
10th grade	127 (64)	108 (62)	19 (73)	
11th grade or more	73 (37)	66 (38)	7 (27)	
Live in guardian's home	191 (93)	170 (96)	21 (72)	20.6***
Metropolitan residence	170 (87)	142 (86)	28 (97)	2.7
Sexual Orientation				5.0
Gay	135 (66)	111 (63)	24 (83)	
Bisexual	50 (24)	46 (26)	4 (14)	
Heterosexual	11 (5)	11 (6)	0 (0)	
Other	10 (5)	9 (5)	1 (3)	
"Out" about sexual attraction to males	63 (31)	54 (31)	9 (31)	0.0
Sexual Behavior				
Any sexual contact	130 (63)	123 (69)	7 (24)	22.0***
Male Partners				
Kissing	107 (52)	101 (57)	6 (21)	13.2***
Mutual masturbation	84 (41)	82 (46)	2 (7)	16.0***
Oral sex	76 (37)	75 (42)	1 (3)	16.2***
Anal sex	55 (27)	50 (28)	5 (17)	1.5

Condomless anal sex	41 (20)	39 (22)	2 (7)	3.6
Female Partners				
Kissing	61 (30)	58 (33)	3 (10)	6.0*
Mutual masturbation	36 (17)	34 (19)	2 (7)	2.6
Oral sex	31 (15)	29 (16)	2 (7)	1.8
Vaginal sex	24 (12)	22 (12)	2 (7)	0.7
Anal sex	10 (5)	10 (6)	0 (0)	1.7
Age	m (SD)	m (SD)	m (SD)	t
Current age in years	16 (1.0)	16 (1.0)	16 (1.1)	-1.3
Age realized sexually attracted to males	12 (2.1)	12 (2.1)	13 (1.8)	3.1**

*
p<0.05

**
p<0.01

p<0.001.

Table 2.

Strong Agreement or Agreement with statements related to the use of sexually explicit online media (SEOM) by sexually explicit media use among 14 to 17 year old sexual minority males in the United States ($N = 206$)

	Ever viewed sexually explicit media			χ^2
	Total $N = 206$ n (%)	Yes $n = 177$ n (%)	No $n = 29$ n (%)	
Online porn...				
affects the way young males who are interested in sex with male partners think about sex	184 (89)	161 (91)	23 (79)	3.5
makes it seem like it's appropriate for young males who are interested in sex with male partners to be sexually active	162 (79)	138 (78)	24 (83)	0.3
makes it seem as if most young males who are interested in sex with male partners are having sex	139 (68)	122 (69)	17 (59)	1.3
makes it seem like popular people have sex	139 (68)	114 (65)	25 (86)	5.2*
makes it seem like few young males who are interested in sex with male partners choose abstinence	114 (56)	95 (54)	19 (66)	1.3
makes it seem like nobody uses condoms	103 (50)	81 (46)	22 (79)	10.4**
The way people behave in online porn makes it seem like sexually transmitted infections rarely happen	170 (83)	146 (82)	24 (83)	0.0
Sexual behaviors shown in online porn affect the way young males who are interested in sex with male partners my age behave	168 (82)	151 (86)	17 (59)	12.4**

*
p<0.05

**
p<0.01.

Table 3.

Sexually explicit online (SEOM) use characteristics among 14 to 17 year old sexual minority males who report viewing SEOM in the United States ($N= 177$)

Methods of viewing	<i>n</i> (%)
Internet or online using a phone	168 (95)
Internet or online using a computer	139 (79)
Men-seeking men or dating websites or phone apps	55 (31)
Magazines	17 (10)
DVDs	9 (5)
Reasons for viewing	
“I was horny at the time”	161 (91)
“I wanted to orgasm or ‘get off’”	147 (83)
“I wanted to learn about how men have sex with other men”	115 (65)
“I used it because I was bored”	91 (51)
“I used it for stress relief”	88 (50)
“I used it out of habit or routine”	63 (36)
“It helped me fall asleep faster”	58 (33)
“I wanted to learn a new sex move to try in my own life”	33 (19)
“I found it entertaining in a non-sexual way”	34 (19)
“I used it to create a sexy environment for me and my sex partner”	7 (4)
Sexual acts viewed	
Anal sex	164 (93)
Oral sex	162 (92)
Solo masturbation	152 (86)
Mutual masturbation	146 (82)
Vaginal sex	123 (69)
Fetish	120 (68)
Frequency of use	
1 viewing per week	150 (86)
> 15 minutes of viewing per session on average	118 (70)
Sexual stimulation during use	
Masturbation	172 (98)
Sexual activity with a partner	21 (12)
What have you learned from SEOM	
What sexual behaviors I am interested in trying	149 (84)
What types of partners I find attractive	140 (79)
How to have sex with male partners	132 (75)

Methods of viewing	<i>n</i> (%)
About gay culture	69 (39)
How to talk with male partners	28 (16)
Agreed/strongly agreed with the following statements about SEOM	
It influences what I think sex should be like	119 (68)
It influences what I think I should look like	105 (60)
It influences what I think my sex partner(s) should look like	80 (45)
Age of first viewing (M, SD)	12 (1.8)

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Table 4.

Characteristics related to viewing condomless anal sex (CAS) in sexually explicit online media (SEOM) among 14 to 17 year old sexual minority males who report viewing anal sex in SEOM in the United States ($N = 164$)

Preferences for condom use during male-male anal sex in SEOM	<i>n</i> (%)
No preference	105 (65)
Prefer condoms are used	38 (23)
Prefer condoms are not used	19 (12)
Indicated agreement or strongly agreement with the following statements about viewing CAS in SEOM	
It looks more natural to me	105 (66)
It reminds me of what sex could be like if HIV/AIDS wasn't a health concern	98 (62)
I get more aroused or sexually excited	83 (53)
It makes me believe that other men won't want to use condoms when we have sex	73 (46)
It represents a fantasy for me	71 (45)
It makes it seem okay for me not to use condoms all the time	63 (40)
It makes me want to have sex without condoms	62 (39)
I feel uncomfortable with the risk the actors are taking	40 (35)

Table 5.

Logistic regression analyses assessing for relations between exposure to condomless anal sex (CAS) in sexually explicit online media (SEOM) and engaging in CAS among 14 to 17 year old sexual minority males in the United States ($N = 206$)

	CAS		CAS	
	Yes <i>n</i> (%)	No <i>n</i> (%)	AOR	(95% CI)
Percentage of SEOM viewed showing CAS				
0–24%	8 (20)	57 (35)	1.0	--
25–49%	5 (12)	23 (14)	1.3	(0.9 – 1.8)
50–74%	18 (44)	48 (29)	1.8	(0.7 – 3.0)
75–100%	10 (24)	35 (21)	2.5	(0.2 – 4.8)

Note. AOR=Adjusted Odds Ratio, CI=Confidence Interval, model adjusted for age and race/ethnicity.