



Published in final edited form as:

Arch Sex Behav. 2014 May ; 43(4): 833–843. doi:10.1007/s10508-013-0238-2.

Sexually Explicit Online Media and Sexual Risk among Men Who Have Sex with Men in the United States

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Abstract

This study aimed to describe sexually explicit online media (SEOM) consumption among men who have sex with men (MSM) in the United States and examine associations between exposure to unprotected anal intercourse (UAI) in SEOM and engagement in both UAI and serodiscordant UAI. MSM in the U.S. who accessed a men-seeking-men website in the past year ($N = 1,170$) were recruited online for a cross-sectional, Internet-based survey of sexual risk and SEOM consumption. In the three months prior to interview, more than half (57%) of the men reported viewing SEOM one or more times per day and almost half (45%) reported that at least half of the SEOM they viewed portrayed UA. Compared to participants who reported that 0–24% of the SEOM they viewed showed UAI, participants who reported that 25–49%, 50–74%, or 75–100% of the SEOM they viewed portrayed UAI had progressively increasing odds of engaging in UAI and serodiscordant UAI in the past three months. As SEOM has become more ubiquitous and accessible, research should examine causal relations between SEOM consumption and sexual risk-taking among MSM as well as ways to use SEOM for HIV prevention.

Keywords

HIV; men who have sex with men (MSM); sexually explicit media; pornography; sexual risk-taking

INTRODUCTION

Men who have sex with men (MSM) have been disproportionately affected by HIV/AIDS in the United States, accounting for approximately 63% of all new HIV infections and 52% of all persons living with HIV/AIDS (Centers for Disease Control and Prevention, 2012a, 2012b). Despite the high prevalence and availability of MSM-targeted HIV prevention interventions in the U.S., risky sexual behaviors, including unprotected anal intercourse

(UAI) and serodiscordant UAI, continue among some MSM (Crepaz et al., 2009; Finlayson et al., 2011; Guy et al., 2011), possibly placing these men at risk for the acquisition and transmission of HIV (Guy et al., 2011) as well as other sexually transmitted infections (van Kesteren, Hospers, & Kok, 2007). Furthermore, HIV-seropositive MSM engaging in UAI may also be at risk for reinfection with other strains of HIV (Sidat et al., 2008). Clearly, there remains an urgent need for innovative HIV prevention strategies specifically targeting MSM who engage in these potentially higher-risk behaviors.

Such strategies might profitably capitalize on the use of sexually explicit media (i.e., pornography), which has historically played a prominent role in the lives of MSM (Thomas, 2000). Indeed, sexually explicit media may serve a particularly important function among MSM, helping them understand and accept their sexual desires, behaviors, and identity within the stigmatizing social context of the U.S. (Hald, Smolenski, & Rosser, 2013). Further, it has been posited that young MSM turn to sexually explicit media for their early sexual education, often modeling what they see (Hurley, 2009; Kubicek, Beyer, Weiss, Iverson, & Kipke, 2010).

With the advent of the Internet, MSM began engaging in online sex-seeking behaviors (Halkitis & Parsons, 2003; Liao, Millett, & Marks, 2006) and consuming MSM-specific sexually explicit online media (SEOM) (Rosser et al., 2012). As the Internet has become an unrestricted and constantly expanding vehicle for the consumption of all forms of SEOM (e.g., video, live-streams, pictures, erotic stories) (Rosser et al., 2012), there has also been substantial growth in the MSM-specific sexually explicit media industry (Rosser et al., 2012; Weitzer, 2010). In the early 2000's, 10–25% of all sexually explicit media was estimated to be MSM-specific (Rich, 2001; Thomas, 2000). By 2007, that estimate rose to 33–50% (Morrison, Morrison, & Bradley, 2007).

As the MSM-specific SEOM industry has grown, there has also been an increase in the percentage of MSM-specific SEOM depicting unprotected sex (Downing, Schrimshaw, Antebi, & Siegel, 2013; Grudzen et al., 2009; Hurley, 2009). It has been argued that increasing consumer demand and access to amateur SEOM portraying UAI has created an online market that compels industry production of SEOM portraying UAI (McNeil, 2012; Rosser et al., 2012). This increase in the portrayal of unprotected sex has raised concerns about the safety of the actors and the potential encouragement of unsafe sexual practices among SEOM consumers (Hurley, 2009; Rosser et al., 2012).

Most research assessing the effects of sexually explicit media generally (not just online) has focused on heterosexual male populations (for a review, see Rosser et al., 2012). While it is possible that sexually explicit media exposure may have similar effects among MSM, it is likely that potential relations between sexually explicit media consumption and sexual behaviors among MSM will differ from those observed among heterosexual male populations, since these relations are embedded within a stigmatizing societal context which likely influences both sexually explicit media consumption and sexual risk-taking among MSM (Hatzenbuehler, O'Cleirigh, Mayer, Mimiaga, & Safren, 2011; Mayer et al., 2013).

The few studies targeting MSM have yielded mixed results. Three studies failed to show associations between sexually explicit media consumption and sexual risk behaviors or safer sex beliefs among MSM (Gold & Skinner, 1992; Gold, Skinner, & Ross, 1994; Morrison et al., 2007). In contrast, six other, more recent studies have shown positive associations between sexually explicit media consumption and desire for manual-anal stimulation and anal intercourse as well as interest in sex with multiple partners, masturbation, sexual compulsivity, sexual knowledge, and enjoyment of sex (Eaton, Cain, Pope, Garcia, & Cherry, 2012; Hald et al., 2013; Parsons, Kelly, Bimbi, Muench, & Morgenstern, 2007; Rosser et al., 2013; Stein, Silvera, Hagerty, & Marmor, 2012; Weinberg, Williams, Kleiner, & Irizarry, 2010).

Three of these recent studies also found positive associations between sexually explicit media consumption and engagement in UAI among MSM. Eaton et al. (2012) found that time spent viewing sexually explicit media was positively associated with insertive UAI in the past month among higher-risk HIV-seronegative MSM. In a large online survey, Stein et al. (2012) found that increasing exposure to UAI in sexually explicit media was associated with increasing odds of engaging in UAI among higher-risk MSM in the New York City area. Finally, Rosser et al. (2013), in a large, U.S. national online survey, found that increasing exposure to UAI in sexually explicit media was positively associated with engagement in UAI and serodiscordant UAI with multiple partners in the past three months although increased exposure to sexually explicit media overall was not associated with increased engagement in UAI.

Despite almost universal SEOM use among MSM (Rosser et al., 2013; Stein et al., 2012) and SEOM's likely greater portrayal of UAI compared to sexually explicit media distributed in more traditional ways (e.g., DVDs, video tapes, magazines) (Downing et al., 2013; Grudzen et al., 2009), we are only aware of one study that has specifically assessed the association of SEOM as opposed to sexually explicit media more generally, with MSM's sexual behavior. In a recent daily diary study, Rosenberger (2012) found that MSM were more likely to engage in anal intercourse, oral sex, and oral-anal contact on the days they viewed SEOM compared to days they did not. However, this study did not report on potential associations between SEOM consumption and engagement in UAI.

Multiple gaps and methodological issues remain in this growing literature. Two of the studies assessing relations between sexually explicit media exposure and UAI were geographically constrained and limited to those who had recently engaged in higher risk sexual behaviors (Eaton et al., 2012; Stein et al., 2012), limiting the generalizability of the findings. Further, there are no established ways to measure SEOM consumption among MSM (Rosser et al., 2012). With the exception of Rosenberger (2012) and Rosser et al. (2013), surveys in this area have often lacked information about variables that are likely related to sexually explicit media consumption, including medium, venue, and genre (Rosser et al., 2012). Further, as this is a fairly new area of research, the development of measures in this area could benefit from community involvement. Using questions identified by MSM in the community as important factors of sexually explicit media consumption as well as those that are scientifically interesting allows for a richer understanding of how MSM use sexually

explicit media and how it may impact their behavior. Additionally, potential reasons for and moderators of the sexually explicit media-behavior association have not been explored.

In this article, we address some of these gaps. First, using a community-informed questionnaire we created, we sought to describe MSM's SEOM consumption. Second, we examined associations between exposure to UAI in SEOM and engagement in both UAI and serodiscordant UAI.

METHOD

Participants and Procedure

The Men and Media Study was a large, cross-sectional, Internet-based survey of MSM in the U.S. Participants (N = 1,170) were recruited during August–September 2012. To be eligible, participants needed to be: (1) 18 years old or older; (2) male; (3) report having anal sex, oral sex, or mutual masturbation with at least one man in the past year; (4) report accessing an online men-seeking-men website at least once in the past year; (5) report using SEOM in the past year; (6) be a U.S. resident; and (7) be new to the study.

We recruited MSM who accessed men-seeking-men websites because they have been identified as an appropriate target for online HIV prevention interventions (Centers for Disease Control and Prevention, 2011; Ybarra & Bull, 2007). Participants were recruited via three online methods: (1) banner advertisements on men-seeking-men websites (Men4Now.com, Recon.com, BGCLive.com, BearCentral.com, BearNation.us); (2) postings in the volunteers section of Craigslist.org in 25 large U.S. cities; and (3) Facebook advertisements targeting men living in the U.S. who reported being interested in men. For cities on Craigslist that required a specific neighborhood to be chosen to post an advertisement, neighborhoods were selected based on which had the highest population density and/or a historical association with the gay community. The volunteers section of Craigslist.org, as opposed to the M4M section, was chosen due to the decreased likelihood that our advertisement would be flagged and removed by the Craigslist community and the ability to include the survey URL and contact information in the advertisement.

By clicking on an advertisement or post, potential participants were portalled to the study's welcome page, which briefly described the study and directed potential participants to continue on for eligibility questions. Study eligibility was determined via seven yes/no questions covering the inclusion criteria. Informed consent was obtained using an online information statement. The survey used WebQ, the University of Washington proprietary online survey program. Upon completion of the 20–30 minute-survey, participants were offered the opportunity to enter a drawing to win one of 15 \$50 gift certificates to Amazon.com. All study procedures were reviewed and approved by the University of Washington Institutional Review Board.

Measures

Sociodemographics—Sociodemographic characteristics were assessed with standard formats and coded as follows: recruitment source (men-seeking-men websites, Facebook, Craigslist, other); age in years (18–29, 30–39, 40–49, 50+); race/ethnicity (Caucasian

American, Black/African American, Latino American, Other); annual income (< \$30,000, \$30,000); current living situation (own or rent domicile, other); education (less than an associate degree, associate degree or higher education); urban residence (yes, no), and sexual orientation (gay, other). The category “other” in current living situation included living in someone else’s house, a shelter, a dormitory, or a drug/health treatment center. Urban residence was specified by applying the ZIP code Rural-Urban Commuting Area Codes Approximation (Version 2.0) to collected ZIP code data (Rural Health Research Center, 2005).

HIV and STI Testing

Participants were asked their HIV serostatus; when they last tested for HIV; if they had been diagnosed with gonorrhea, Chlamydia, or syphilis in the past three months; if they had ever been diagnosed with genital or anal herpes (i.e., herpes simplex virus or HSV) or warts (i.e., human papillomavirus or HPV); and if they had been told by a healthcare provider in the past three months that they had a sexually transmitted infection that they did not recall the name of or that had not been asked about already. HIV and STI testing items were coded as follows: HIV-serostatus (HIV-seropositive, HIV-seronegative or unknown); HIV test within the past year (yes, no); and any STI in the past three months (yes, no).

Substance Use—The impact of participants’ use of alcohol and other drugs was assessed using the CAGE Adapted to Include Drugs (CAGE-AID) (Brown & Rounds, 1995), a validated 4-item questionnaire that assesses potential negative impacts of alcohol and other drug use. Per the CAGE-AID protocol, the questionnaire was only given to participants who reported current alcohol use or having ever experimented with drugs. A score of 2 on the CAGE-AID indicates probable substance abuse. We additionally asked participants which drugs they had used recreationally in the past three months (marijuana; poppers; erectile dysfunction medications [Viagra, sildenafil, Cialis, or Levitra]; amphetamines; cocaine; heroin; other opiates; hallucinogens; crack; ecstasy [methylenedioxy-methamphetamine or MDMA]; GHB [gamma hydroxyl butyrate]; ketamine; PCP [phencyclidine]; sedatives). A composite variable was created for any drug use.

Sexual Behaviors—Participants were asked to report only on voluntary sexual behavior (i.e., not forced), including number of male sex partners in the past three months, their age at first sexual contact with a male partner, and their age at first anal sex with a male partner. Participants were further asked about the percentage of times on a 7-point scale, ranging from none (0%) to all (100%), they engaged in anal intercourse with a male partner as the insertive partner and the receptive partner as well as the percentage of times a condom was used while being the insertive and the receptive anal sex partner in the past three months. Participants were then asked the number of UAI partners who directly told them they were HIV-seropositive, HIV-seronegative, or did not tell them their HIV serostatus in the past three months. Number of UAI partners was asked separately for insertive and receptive anal intercourse. Composite UAI (yes, no) and serodiscordant UAI (yes, no) variables were created using these sexual behavior variables along with participants’ self-reported HIV serostatus. As is the convention (Rosser et al., 2010), serodiscordant UAI was defined as UAI with a partner of discordant or unknown HIV serostatus.

Sexually Explicit Online Media (SEOM) Consumption—We developed a quantitative questionnaire of SEOM consumption using a three-stage process. First, a draft questionnaire was created based on extensive background research on MSM-specific SEOM and in-depth qualitative interviews with a convenience sample of MSM in the Seattle area ($N = 16$). Using a constant comparison analysis framework (Miles & Huberman, 1994), verbatim transcripts of the in-depth interviews were reviewed to identify key constructs, emergent themes, commonalities, and disparities offered by the participants. A coding manual was developed defining general themes and concepts, with sub-codes as needed to specify themes. The interviews were then coded in Atlas.ti 5.2 (Muhr, 2004). Draft questionnaire items were developed using the most common themes and concepts from the in-depth interviews in addition to questions that arose from background research on MSM-specific SEOM. In the second step, the draft questionnaire was pre-tested using in-person cognitive interviews with the same men as the in-depth interviews, as well as an additional convenience sample of Seattle area MSM ($N = 12$). These cognitive interviews involved having the participants “think-aloud” as they answered questions in the draft questionnaire and used structured probes to assess question comprehension (Czaja, 1998). Finally, after revisions based on the feedback from the cognitive interviews, the revised questionnaire was pre-tested online using the same procedures intended for the large online survey to a sample of MSM ($N = 100$), and revised again based on response frequencies. Consistently skipped items or items that received no endorsements were deleted. SEOM was defined by participants in the development phase as “any online media that is meant to be sexually arousing.”

The final questionnaire specifically inquired about SEOM consumption in the past three months. Participants were asked to check all reasons they viewed SEOM (e.g., “I was horny at the time,” “I wanted to orgasm or ‘get off’”). Participants were also asked to check all types of media they viewed (videos, pictures, erotic stories, live streams) and how much of the SEOM they viewed appeared to be produced by amateurs on a 7-point scale ranging from none (0%) to all (100%), coded as $< 50\%$, 50%). Further, participants were asked to select all the sexual combinations they viewed in SEOM. Sexual combinations were operationalized as all combinations of genders (female, male) and number of sexual partners (solo sexual activities, sex between two people, three-ways, and group sex). Examples include: “one woman by herself,” “one man with another man,” and “group sex with both men and women.” Participants were also asked to indicate if they viewed any sexual activities involving transgender persons (yes, no). A composite variable was created to indicate viewing any SEOM including female sex partners (yes, no).

Participants were asked to specify (1) all of the sexual acts they specifically searched for and (2) all of the sexual acts they intentionally or unintentionally viewed. Sexual acts covered in those two questions included: anal sex, vaginal sex, oral sex, mutual masturbation, solo masturbation, and fetish. For the purposes of this study, fetish was defined as “sexual play with objects, body parts, or situations not commonly thought of as ‘mainstream’.”

Frequency of SEOM consumption was assessed in two different ways. First, participants were asked how often they viewed SEOM in the past three months on a 9-point scale ranging from more than once an hour to less than once a month. SEOM frequency was

significantly skewed with the vast majority of participants (93%) viewing SEOM at least once per week. As such, SEOM frequency was coded using the category closest to the mean (< 1 or = 1 viewing per day). Participants were also asked to indicate how long they viewed SEOM on average per viewing session on a 7-point scale ranging from less than a minute to 61 minutes or more, coded = 30 or > 30 minutes per session.

To assess sexual stimulation during consumption, participants were asked to indicate the percentage of time, on a 7-point scale ranging from none (0%) to all (100%), they were concurrently masturbating or engaging in sexual acts with a partner while viewing SEOM. Three yes/no variables were created: (1) any sexual stimulation during consumption, (2) masturbation during consumption, and (3) sexual activity with a partner during consumption.

Prevalence of viewing UAI in SEOM during the past three months was assessed via the question: “How much of the online porn you looked at in the last three months clearly showed that a condom was not being used during anal sex?” (coded 0–24%, 25–49%, 50–74%, 75–100%). Participants were additionally 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) and their reasons for viewing UAI in SEOM (e.g., “It is what I do in my own sex life,” “It allows me to fantasize about a behavior I would never do myself”). Participants were also asked to indicate on a 4-point scale, ranging from 1 = strongly disagree to 4 = strongly agree, their agreement or disagreement with statements about viewing UAI in SEOM (e.g., “It looks more natural to me,” “I get more aroused”); each of these were dichotomized (strongly disagree/disagree, agree/strongly agree).

De-duplication—To address the issue of potential duplication due to repeat participation, key participant data (i.e., demographic and sexual risk characteristics) were cross-referenced. Only two participants appeared to have potentially taken the survey twice. In each case, the first entry was retained and the second entry was removed. As this study did not actively reimburse all participants, it is likely that there was not enough incentive for significant repeat participation.

Analyses

The current analyses were restricted to the participants who did not have discrepancies between their eligibility questions and survey responses, responded to the HIV serostatus question, and, as is the convention in online surveys (Rosser et al., 2009a), had completed surveys (i.e., the final question was answered). Of the 1,981 individuals who responded to eligibility questions, 1,201 were determined to be eligible and agreed to participate in the study. Of those, 24 were removed due to discrepancies between their eligibility question responses and their survey answers. An additional two participants did not respond to the question about HIV serostatus, 3 participants did not answer the final question of the survey, and 2 were determined to be potential duplicates.

Of the 1,170 MSM in the analytic sample, only 35 (3%) had missing data on one or more key variables (UAI, serodiscordant UAI, exposure to UAI in SEOM). To assess differences between participants who were missing data versus those with complete survey data,

Fisher's Exact Tests were conducted on the sociodemographic characteristics. No significant differences were found between those with missing versus complete data by race/ethnicity, annual income, education, current living situation, urban residence, or HIV serostatus. However, participants with missing data were more likely to have been recruited from men-seeking-men websites or Craigslist (Facebook: 26% vs. 48%, men-seeking-men websites: 57% vs. 47%, Craigslist: 17% vs. 3%, and other: 1% vs. 0%, $p < .001$) and be older (18–29 years old: 23% vs. 45%, 30–39 years old: 8% vs. 12%, 40–49 years old: 23% vs. 19%, and 50+ years old: 46% vs. 23%, $p < .01$) than participants with complete data.

Almost half (48%) of the men were recruited using Facebook, 48% using men-seeking-men websites, 3% using Craigslist, and 1% using some other means (e.g., through a friend). To assess sociodemographic differences between participants by recruitment source, chi-square and Fisher's Exact Tests were conducted. Participants recruited via Facebook, compared to participants recruited via men-seeking-men websites or Craigslist, were more likely to be 18–29 years old (Facebook: 62% vs. men-seeking-men websites: 27% vs. Craigslist: 35% vs. other: 59%, $p < .001$), be Caucasian American (Facebook: 76% vs. men-seeking-men websites: 66% vs. Craigslist: 56% vs. other: 50%, $p < .001$), have an annual income less than \$30,000 (Facebook: 63% vs. men-seeking-men websites: 40% vs. Craigslist: 50% vs. other: 58%, $p < .001$), have less than an associate degree (Facebook: 47% vs. men-seeking-men websites: 30% vs. Craigslist: 8% vs. other: 33%, $p < .001$), and self-identify as gay (Facebook: 98% vs. men-seeking-men websites: 82% vs. Craigslist: 71% vs. other: 92%, $p < .001$). Additionally, participants recruited via Facebook, compared to participants recruited via men-seeking-men websites or Craigslist, were less likely to own or rent their domicile (Facebook: 69% vs. men-seeking-men websites: 84% vs. Craigslist: 88% vs. other: 83%, $p < .001$) or be HIV-seropositive (Facebook: 9% vs. men-seeking-men websites: 21% vs. Craigslist: 12% vs. other: 0%, $p < .001$). Lastly, participants recruited via men-seeking-men websites were slightly more likely to be located in a rural area compared to participants recruited using Facebook or Craigslist (Facebook: 9% vs. men-seeking-men websites: 13% vs. Craigslist: 0% vs. other: 8%, $p < .03$).

Sociodemographics, HIV/STI testing, substance use, sexual behavior, and SEOM consumption characteristics were described using frequency distributions and measures of central tendency and variation. Associations between exposure to UAI in SEOM and sexual risk outcomes were assessed using logistic regression models. Sexual risk outcomes were any UAI and any serodiscordant UAI. Exposure to UAI in SEOM was entered as an ordinal variable in all models. The following variables were assessed as potential confounders: age, race/ethnicity, education, annual household income, current living situation, urban residence, and HIV serostatus. To account for systematic differences in missing data and by recruitment source as well as variables that qualified as confounders, all models were adjusted for recruitment source, age, and HIV serostatus. Analyses were conducted using Stata 12 (StataCorp, 2011).

RESULTS

As shown in Table 1, participants were primarily Caucasian American (70%), urban (90%), and highly educated (63% had an associate degree or higher). Approximately half were 30

years old or older (55%), 15% were HIV-seropositive, and 21% reported having an STI (gonorrhea: 1.3%, Chlamydia: 1.8%, syphilis: 1.9%, HSV: 5.9%, HPV: 11.8%, other STI: 1.6%) in the past three months. Over half of the sample (56%) reported engaging in UAI and over a quarter (26%) reported engaging in serodiscordant UAI in the past three months.

Most of the men indicated multiple reasons for viewing SEOM (Table 2). The most common reasons were “I was horny at the time” (89%), “I wanted to orgasm or ‘get off’” (82%), and “I used it because I was bored” (64%). Most of the men also indicated that they viewed a wide variety of sexual combinations in SEOM, most commonly between men, but over a quarter of the men (28%) also reported viewing SEOM containing women. Overall, there was a high frequency of consumption among the participants with more than half (57%) viewing SEOM one or more times per day and over a third (41%) spending more than 30 minutes viewing SEOM per session. Lastly, almost all (96%) of the participants reported sexual stimulation during consumption, most commonly masturbation (95%).

Among this sample, there was a substantial amount of exposure to UAI in SEOM: 46% reported that half or more of the SEOM they viewed contained UAI (Table 3). A third (33%) of the participants indicated that they preferred that condoms not be used during anal intercourse between men in SEOM. Almost a third (29%) reported that they view UAI in SEOM because it is a behavior they engage in themselves. Lastly, the majority of participants felt that viewing UAI in SEOM looked more natural (74%) and was more arousing (61%) than SEOM showing protected anal intercourse.

There was a positive, linear relation between viewing UAI in SEOM and engaging in sexual risk-behaviors (Table 4). Specifically, compared to participants who reported that 0–24% of the SEOM they viewed showed UAI, participants who reported that 25–49%, 50–74%, or 75–100% of the SEOM they viewed portrayed UAI had progressively increasing odds of engaging in UAI and serodiscordant UAI in the past three months.

DISCUSSION

Similar to other surveys investigating sexually explicit media consumption among MSM (Eaton et al., 2012; Rosenberger, 2012; Rosser et al., 2013; Stein et al., 2012), MSM in our study reported spending a substantial amount of time viewing SEOM. Participants also reported viewing a wide variety of sexual acts and sexual combinations, including over a quarter of participants reporting consumption of SEOM portraying sex with women. Stein et al. had a similar finding: almost half of the men in their survey reported viewing heterosexual sexually explicit media. One possible reason for an interest in heterosexual SEOM among MSM could be related to the characteristics of actors portrayed in MSM-specific sexually explicit media. MSM-specific sexually explicit media predominantly use actors who represent a masculine ideal (e.g., highly muscular and attractive) (Duggan & McCreary, 2004; Morrison et al., 2007). Conversely, heterosexual sexually explicit media tend to use male actors who represent a more realistic male body type (Crooks & Baur, 2010). For some MSM, this portrayal of a more realistic male body may be more relatable as well as represent a more accurate depiction of the types of men they are attracted to or able

to have sex with in real life. Further research exploring reasons for heterosexual SEOM consumption and potential relations with sexual behaviors among MSM is warranted.

Interestingly, while the majority of MSM reported viewing SEOM because they were “horny” or wanted to orgasm, a substantial amount also reported viewing SEOM out of boredom. Boredom may be related to SEOM consumption through operant conditioning, where MSM take part in a cycle of experiencing boredom, engaging in online sexual stimulation, and gaining temporary relief of their boredom (Chaney & Chang, 2005). It is possible that MSM who frequently engage in this cycle will habituate to more common SEOM content (e.g., masturbation, anal sex, oral sex) and will increasingly need to seek less frequently portrayed sexual behaviors (e.g., bondage/sadomasochistic behaviors, water sports, fisting, felching) to achieve the same level of boredom relief (for a review of the frequency of behaviors portrayed in MSM-specific SEOM, see Downing et al., 2013). Future research should examine the role of boredom in sexual risk-taking and SEOM consumption among MSM.

MSM in our sample reported nearly universal engagement in sexual stimulation during SEOM consumption. Sexual stimulation or arousal during consumption may positively reinforce SEOM consumption and the sexual risks portrayed in SEOM. Arousal has been shown to impact both learning (Clark, Milberg, & Ross, 1983; Schramke & Bauer, 1997) and decision-making (Bancroft, 2000; George et al., 2009; Gold, 2000; Loewenstein, Weber, Hsee, & Welch, 2001). State-dependent learning research supports the idea that physiologic arousal is retained along with stimulus content in any learning situation, and that being in a congruent state of arousal will provide an additional cue for retrieval of the learned information (Clark et al., 1983; Schramke & Bauer, 1997). Furthermore, Gold et al. (2000) posited that aroused individuals operate at a cognitive deficit and engage in heat-of-the-moment cognitive processes relying on risk-taking heuristics that may or may not be accurate or adaptive. Sexual arousal created by sexual stimulation during exposure to UAI in SEOM may directly reinforce the notion that UAI is an appropriate and effective way to reach sexual satisfaction. Further, MSM who are aroused during exposure to UAI in SEOM may more easily retrieve non-adaptive responses (e.g., sexual risk-taking) and make more heuristically based decisions when they are in an aroused state similar to what they experience during SEOM use (i.e., when they are engaging in sexual stimulation with a partner).

Compared to the two other large surveys in this area (Rosser et al., 2013; Stein et al., 2012), participants in our survey reported slightly more exposure to UAI in SEOM. This increased exposure could be due to the fact that SEOM may contain more depictions of UAI than sexually explicit media distributed in more traditional ways (Downing et al., 2013; Grudzen et al., 2009), giving participants in our survey, which was focused specifically on men who used SEOM, more opportunities for exposure to UAI. Additionally, this difference may be due to the timing of the surveys. As it is likely that the amount of SEOM portraying UAI has increased over time (Downing et al., 2013; Grudzen et al., 2009; Hurley, 2009), it is possible that even the few years difference between when these surveys were conducted could account for the slight increase in exposure to UAI in SEOM.

Similar to findings from Rosser et al. (2013), a third of the participants in our survey reported having a preference for SEOM portraying UAI. While we did not assess the relation between preferences for condom use in SEOM and sexual risk-taking, Rosser et al. found that MSM with a preference for UAI in sexually explicit media were significantly more likely to engage in sexual risk-taking. As noted by Rosser et al., the influence of preference for condom use in SEOM on sexual risk behaviors warrants further investigation.

Almost one-third of the participants reported that they watched UAI in SEOM because it is what they do in their own sex lives, indicating that at least this portion of men in the study directly connected what they watched with what they do. Additionally, most of the participants endorsed that viewing UAI in SEOM was more arousing and looked more natural than protected anal intercourse, suggesting that HIV prevention interventions proposing regulations that attempt to eliminate UAI in SEOM may not be well received and could potentially lead to an underground market of risky-sex SEOM. Lastly, our study confirmed a significant positive relation between exposure to UAI in SEOM and engagement in UAI and serodiscordant UAI. These results, in conjunction with the results of the other recent studies in this area (Rosser et al., 2013; Stein et al., 2012), indicate that further research into temporality and causal relations between exposure to UAI in SEOM and sexual risk-taking among MSM are justified.

As with any study, there were limitations that restrict the generalizability of our findings. While our sample was comparable to other large Internet surveys of MSM (Groß, Hirshfield, Remien, Humberstone, & Chiasson, 2013), it was slightly more urban, more gay identified, less educated, and more sexually risky (e.g., more UAI and serodiscordant UAI) as well as included more HIV-seropositive participants than other recent Internet surveys of MSM in the U.S. who access men-seeking-men websites (Rosser et al., 2009b). Thus, it is possible that it is not representative of all MSM in the U.S. who access men-seeking-men websites. Additionally, this study relied on self-report and subjective assessments (e.g., whether SEOM clearly showed that a condom was being used or not) which are both subject to social desirability and recall bias. Social desirability bias was likely minimized by the anonymous nature of our survey although it is still possible that there may have been some underreporting of more undesirable behaviors. To mitigate recall bias, we limited the recall period to the past three months. Additionally, while we believe that a stigmatizing social context is likely to influence both SEOM consumption and sexual risk-taking among MSM, due to limitations in our dataset, we were unable to specifically assess for the impact of societal stigma in our analyses.

A prominent limitation of this study, and the majority of research in this area, is the cross-sectional design, which precludes evaluations of temporal sequence or causal relations and removes the ability to determine whether viewing UAI in SEOM precedes or succeeds engagement in UAI or serodiscordant UAI. Future research in this area would benefit from longitudinal and experimental study designs. Specifically, to assess for temporal sequence or causal relations in the short-term, an online daily diary study could be conducted. Another means of assessing short-term effects of exposure to UAI in SEOM would be a laboratory-based experiment where MSM are randomized to exposure to SEOM with or without condoms and then asked to either respond to interactive videos depicting high-risk sexual

scenarios or project themselves into written scenarios in which they are required to make sexual risk decisions. These techniques have been successfully used in research assessing the impact of alcohol intoxication and arousal on condom use decisions among MSM (Maisto, Palfai, Vanable, Heath, & Woolf-King, 2012; Shuper & Fisher, 2008) and heterosexual men (George et al., 2009). Lastly, to assess for the longer-term effects of exposure to UAI in SEOM, a multi-year cohort study could be conducted.

Overall, our findings suggest that there is a substantial amount of SEOM consumption and exposure to UAI in SEOM among MSM in the U.S. Further, we confirmed a positive association between viewing UAI in SEOM and engaging in UAI and serodiscordant UAI. The reach and potential influence of SEOM on sexual risk-taking among MSM could provide an ideal opportunity for MSM-targeted HIV prevention interventions on a large scale. Given the dearth of research in this area, we agree with Rosser et al. (2013) and Stein et al. (2012) that until there are more definitive answers about the relation between SEOM consumption and sexual risk-taking among MSM, and particularly whether there is a causal relation, considerable caution and additional research is needed before interventions using SEOM are implemented. Specifically, as many websites now offer men the opportunity to access both SEOM and seek sex at the same time (Rosser et al., 2012), it will be important to understand more clearly the connections between online sexual partner-seeking, SEOM consumption, and sexual risk-taking. Additionally, relations between sexual risk-taking and factors such as consumption of heterosexual SEOM, boredom, and preferences for condom use in SEOM should be more thoroughly explored. Further, as these behaviors are likely influenced by the hostile social context in which they are occurring, it will be important for future research to specifically assess the impact of societal stigmatization on these relations. Finally, as MSM-specific SEOM has become progressively more accessible and ubiquitous, research is needed on ways to use SEOM for HIV prevention that are feasible, effective, and acceptable. Such work must take particular care to be sex positive and avoid further stigmatizing a group that has historically been marginalized because of their sexuality and behaviors; further stigmatization may only serve to exacerbate sexual risk-taking (Hatzenbuehler et al., 2011; Mayer et al., 2013).

Acknowledgments

We would like to thank our participants, as well as the Simoni Lab for their help with this project. Research reported in this publication was supported by NIMH of the National Institutes of Health under award numbers F31MH088851 and K24MH093243. Additional support was provided by the Department of Psychology at the University of Washington, the American Psychological Association of Graduate Students, and the University of Washington Center for AIDS Research (CFAR), an NIH-funded program (P30AI27757) which is supported by the following NIH Institutes and Centers (NIAID, NCI, NIMH, NIDA, NICHD, NHLBI, NIA).

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Table 1

Sociodemographic, HIV/STI, substance use, and sexual behavior characteristics of 1,170 men who have sex with men (MSM) in the United States.

Sociodemographics	n (%)
Recruitment source	
Facebook	563 (48)
Men-seeking-men websites	561 (48)
Craigslist	34 (3)
Other	12 (1)
Race/Ethnicity	
Caucasian American	821 (70)
Black/African American	146 (13)
Latino American	102 (9)
Other	99 (8)
Age in years	
18–29	524 (45)
30–39	148 (13)
40–49	220 (19)
50+	278 (23)
Associate degree or higher education	728 (63)
Own or rent domicile	896 (77)
Urban residence	1,050 (90)
Gay sexual orientation	1,043 (90)
HIV/STI testing	
HIV test past year	739 (63)
HIV-seropositive	175 (15)
Any STI past three months	230 (21)
Substance use past three months	
Probable substance abuse ^a	150 (13)
Alcohol use	905 (78)
Any drug use	569 (51)
Marijuana	358 (32)
Poppers	231 (21)
Erectile dysfunction medications	139 (13)
Cocaine	52 (5)
Amphetamines	51 (5)
Other	149 (13)
Sexual debut	
Age at first sexual contact with a male partner (M, SD)	17 (7)

Sociodemographics	n (%)
Age at first anal sex with a male partner (M, SD)	20 (7)
Sexual risk-taking past three months	
No. of male sexual partners (M, SD)	4.2 (9)
Any UAI	650 (56)
Any serodiscordant UAI	299 (26)

Note. Serodiscordant unprotected anal intercourse (UAI) was defined as UAI with a partner of discordant or unknown HIV serostatus.

^a 2 on the CAGE Adapted to Include Drugs (CAGE-AID; (Brown & Rounds, 1995).

Table 2

Sexually explicit online media (SEOM) consumption characteristics in the past three months among 1,170 men who have sex with men in the United States.

Reasons for viewing	n (%)
"I was horny at the time"	1,038 (89)
"I wanted to orgasm or 'get off'"	962 (82)
"I used it because I was bored"	746 (64)
"I used it for stress relief"	584 (50)
"I used it out of habit or routine"	528 (45)
"It helped me fall asleep faster"	350 (30)
"I found it entertaining in a non-sexual way"	247 (21)
"I used it to create a sexy environment for me and my sex partner"	213 (18)
Media viewed	
Videos	1,098 (95)
Pictures	903 (78)
Erotic stories	528 (46)
Live streams	353 (30)
50% appeared to be produced by amateurs	505 (43)
Sexual combinations viewed	
One man with another man	1,151 (99)
Three-ways with only men	1,020 (87)
Group sex with only men	943 (81)
One man by himself	807 (69)
Any including female sex partners	326 (28)
Any including transgender partners	67 (6)
Sexual acts viewed	
Anal sex	1,126 (97)
Oral sex	1,118 (96)
Mutual masturbation	917 (79)
Solo masturbation	859 (74)
Fetish	804 (69)
Vaginal sex	331 (28)
Sexual acts specifically searched for	
Anal sex	995 (86)
Oral sex	826 (71)
Fetish	600 (52)
Solo masturbation	388 (33)
Mutual masturbation	385 (33)

Reasons for viewing	n (%)
Vaginal sex	88 (8)
Frequency of consumption	
1 viewing per day	661 (57)
> 30 minutes of viewing per session on average	479 (41)
Sexual stimulation during consumption	
Any	1,121 (96)
Masturbation	1,103 (95)
Sexual activity with a partner	424 (36)

Note. Fetish was defined as “sexual play with objects, body parts, or situations not commonly thought of as ‘mainstream’.”

Table 3

Characteristics related to viewing unprotected anal intercourse (UAI) in sexually explicit online media (SEOM) during the past three months among 1,170 men who have sex with men in the United States.

% of SEOM viewed containing UAI	n (%)
0–24%	398 (34)
25–49%	222 (19)
50–74%	388 (34)
75–100%	141 (12)
Preferences for condom use in SEOM	
No preference	533 (46)
Prefer condoms are not used	384 (33)
Prefer condoms are used	236 (21)
Reasons for viewing UAI in SEOM	
I enjoy watching anal sex regardless of condom use	621 (54)
It is what I do in my own sex life	336 (29)
It allows me to fantasize about a behavior I would never do myself	293 (26)
Agreed/strongly agreed with the following statements about viewing UAI in SEOM	
It looks more natural to me	843 (74)
It reminds me of what sex could be like if HIV/AIDS wasn't a health concern	803 (70)
I get more aroused	702 (61)
I feel uncomfortable with the risk the actors are taking	419 (37)

Table 4

Logistic regression analyses assessing for relations between exposure to unprotected anal intercourse (UAI) in sexually explicit online media (SEOM) and engaging in UAI or serodiscordant UAI among 1,170 men who have sex with men in the United States.

	UAI		Serodiscordant UAI	
	OR	(95% CI)	OR	(95% CI)
Percentage of SEOM showing UAI				
0–24%	1.0	--	1.0	--
25–49%	1.7	(1.5 – 1.9)	1.4	(1.2 – 1.6)
50–74%	2.9	(2.3 – 3.6)	2.0	(1.5 – 2.5)
75–100%	4.9	(3.4 – 7.0)	2.7	(1.8 – 4.1)

Note. Serodiscordant UAI was defined as UAI with a partner of discordant or unknown HIV serostatus. OR = Odds Ratio, CI = Confidence Interval. All models were adjusted for recruitment source, age, and HIV serostatus.