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The Influence of Pornography on Sexual Scripts and Hooking Up Among Emerging Adults in College

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Abstract The explosive growth in access to the Internet has led to a commensurate increase in the availability, anonymity, and affordability of pornography. An emerging body of research has shown associations between pornography and certain behaviors and attitudes; yet, how pornography actually influences these outcomes has not been documented. In two studies (Study 1 $N = 969$; Study 2 $N = 992$) we examined the hypothesis that pornography influences potentially risky sexual behavior (hooking up) among emerging adults via sexual scripts. Our results demonstrate that more frequent viewing of pornography is associated with a higher incidence of hooking up and a higher number of unique hook up partners. We replicated these effects both cross-sectionally and longitudinally while accounting for the stability of hook ups over the course of an academic semester. We also demonstrated that more frequent viewing of pornography is associated with having had more previous sexual partners of all types, more one occasion sexual partners (“one night stands”), and plans to have a higher number of sexual partners in the future. Finally, we provided evidence that more permissive sexual scripts mediated the association between more frequent pornography viewing and hooking up. We discuss these findings with an eye toward mitigating potential personal and public health risks among emerging adults.

Keywords Pornography · Hooking up · Sexual scripts · Emerging adults

Introduction

In 1997, the first year the U.S. Census asked questions about Internet access, 17 % of American households had access to the Internet. Today, approximately 70 % of households have access to the Internet in their home (U.S. Bureau of the Census, 2009) with many more accessing the Internet using smartphones or tablets that can be carried anywhere. The explosive growth in access to the Internet has led to a commensurate increase in the availability, anonymity, and affordability of pornography (Cooper, 1998).

Internet pornography is popular and profitable with upwards of \$7 billion in profits in 2006 (Edelman, 2009). Although the effects of pornography are probably not uniformly negative, there is a considerable amount of research suggesting negative outcomes may be associated with its use. For example, viewing pornography is associated with increases in problematic attitudes and behaviors such as the sexual objectification of women (Bridges, Bergner, & Hesson-McInnis, 2003), increased aggressive attitudes and aggression toward women (Hald, Malamuth, & Yuen, 2010; Nøttestad, Overland, & Hald, 2010; Zillmann & Bryant, 1982), and greater acceptance of rape (Foubert, Brosi, & Bannon, 2011). Within romantic relationships, pornography use is associated with decreased sexual satisfaction (Morgan, 2011; Yucel & Gassanov, 2010; Zillmann & Bryant, 1988) and partner’s feelings of betrayal (Manning, 2006). Lambert, Negash, Stillman, Olmstead, and Fincham (2012) showed that pornography use is associated with less commitment and more infidelity among college students in committed dating relationships, including acts of infidelity that occurred in the context of a hook up. Yet, *how* pornography actually influences certain kinds of sexual behavior—potentially risky sexual behavior in particular—has not been well documented. In the present paper, we seek to extend research on the effects of pornography by exam-

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ining whether it influences sexual behavior among emerging adults via more permissive sexual scripts.

Research on Pornography and Potentially Risky Sexual Behaviors

The Centers for Disease Control (1995) and others (Braun-Courville & Rojas, 2009; Luder et al., 2011) operationalize risky sexual behavior among emerging adults as having sex while intoxicated, having sex without using protection (e.g., condoms), and having multiple sex partners, acknowledging that these behaviors increase risk for sexually transmitted infections (STIs), unplanned pregnancy, and sexual violence. Research on the association between pornography and risky sexual behaviors is somewhat mixed. For example, some studies examining the association between viewing pornography and condom use among adults show a negative association (Luder et al., 2011; Træen, Stigum, & Eskild, 2002), some fail to find an association (Braun-Courville & Rojas, 2009; Morgan, 2011; Wright & Randall, 2012) and one study finds that viewing pornography is associated with more frequent use of condoms (Wright, 2013). Pornography use is associated with expanded sexual horizons and respondents report that it helps to bring excitement to their sexual relationship (Olmstead, Negash, Pasley, & Fincham, 2012; Weinberg, Williams, Kleiner, & Irizarry, 2010). In fact, in couple relationships, women's use of pornography has been shown to increase their sexual satisfaction (Poulsen, Busby, & Galovan, 2013).

However, research also shows a connection between viewing pornography and increases in potentially risky sexual behavior. Pornography use is associated with a higher number of previous sex partners (Braun-Courville & Rojas, 2009; Carroll et al., 2008; Morgan, 2011; Wright, 2012, 2013; Wright & Randall, 2012). In fact, Carroll et al. found that men who viewed pornography every day averaged almost five times more lifetime sexual partners than non-users. Having more sex partners is associated with other risky behaviors, including not using contraception at last intercourse, smoking, binge drinking, and drug use (Kuoritti & Kosunen, 2009), poorer mental and physical health (Braithwaite, Delevi, & Fincham, 2010) and increased transmission of STIs (Foster, Clark, Holstad, & Burgess, 2012; Thompson, Kao, & Thomas, 2004). Collins et al. (2004) found that, even when controlling for a host of variables that might explain the association (e.g., age, grades, self esteem, parental monitoring), adolescents who view television programs with more sexual content were more likely to initiate intercourse and other non-intercourse sexual activities (such as sexual touching and oral sex) in the subsequent year. It is worth noting here that, because of federal regulations about what can be broadcast on television, the depiction of sexuality on television is relatively innocuous in comparison to the depiction of sexuality in pornography. Viewing pornography is associated with earlier sexual debut (Morgan, 2011), hastened sexual initiation with new

partners (Krahé, 2011) increased likelihood of having engaged in extramarital sex, and the use of prostitution (Wright & Randall, 2012). The present set of studies aimed to contribute to this body of research by examining whether pornography use is related to hooking up in a sample of emerging adults in college. Further, we examine a potential mediating mechanism that may account for any association found between pornography and hooking up: more permissive sexual scripts.

Sexual Script Theory

One of the major theories in sex research is Gagnon and Simon's (2005) "sexual scripts" theory. This theory rejects the notion that sex is a purely biological construct; rather, it argues that sexuality is also socially constructed—that it is influenced by societal norms and mass media as well as personal experiences, values, and preexisting attitudes. The "sexual scripts" that we develop work like scripts that actors might use in a play: they help individuals to know what roles they should play and how a scene should proceed. Pornography is thought to play a role in influencing sexual scripts. Via social learning, those who view pornography incorporate the actions they view into their own sexual scripts. Pornography contributes to their definition of what sexuality is, how it should proceed, and what the consequences of various behaviors are likely to be.

Wright (2011) extended script theorizing by proposing a specific model that can be explicitly tested. This model (which he terms the ${}_3AM$ model) predicts that sexual media influences individuals through acquisition of behavioral scripts (e.g., "casual sex is normative and sophisticated"), followed by activation (e.g., exposure to media that reinforces this script, deepens the sense that it is "true to life," and keeps it cognitively accessible) and application of the script (e.g., initiating sex with someone the individual just met at a club). In line with social learning theory, the ${}_3AM$ model would not predict that all sexual media is equally likely to lead through this sequence (acquisition, activation, and application) to behavior. For example, media that portrays unattractive models who experience negative outcomes as a consequence of their sexual behavior (e.g., a flawed, unfaithful husband whose infidelity leads to divorce and unhappiness) would not be as likely to promote adoption and application of that behavior. In contrast, media portrayals of attractive models whose sexual behavior leads to uniformly positive outcomes are more likely to lead to internalization and activation of that sexual script. Because pornography generally approximates the latter message (Malamuth, 1996), it has the potential to become a potent defining agent in the formation of sexual scripts.

Indeed, for emerging adults who often have a limited amount of personal experience with sexual relationships, pornography has the potential to play a primary role in their development of sexual scripts. Mounting evidence shows that viewing pornography leads to more instrumental attitudes toward sex (e.g.,

seeing sex as a casual, uncommitted, recreational act) and greater acceptance of uncommitted sex, premarital sex, and extramarital sex (Braun-Courville & Rojas, 2009; Brown & L'Engle, 2009; Carroll et al., 2008; Peter & Valkenburg, 2010; Wright, 2013). In fact, Zillmann (2000) suggests that the underlying construct that is influenced by pornography use (the common factor in these studies) is “sexual callousness” where individuals experience, “diminished trust in intimate partners, the abandonment of hopes for sexual exclusivity with partners, [and] evaluation of promiscuity as the natural state” (p. 42).

There is also evidence to suggest that viewing pornography is associated with changes in specific sexual behaviors, as predicted by sexual scripts theory. Wang and Davidson (2006) sampled young women in rural China who reported that they perceive pornography as a form of sexual education and that viewing it often led them to experiment with the sexual practices they observed. In conjunction with Wang and Davidson, Tydén and Rogala (2004) found over half of their sample of young men in Sweden felt like pornography inspired them to try new sexual behaviors. Similarly, Weinberg et al. (2010) found that pornography use among college students served to normalize various sexual behaviors and to empower students to experiment with new sexual practices. Multiple studies have shown that viewing pornography is associated with a higher likelihood of having paid a prostitute for sex, and having engaged in extramarital sex (Wright, 2012, 2013; Wright & Randall, 2012). Because pornography usually depicts sex as taking place in an uncommitted, casual context, where sexual experimentation is often portrayed (Bridges, Wosnitzer, Scharrer, Sun, & Liberman, 2010; Brosius, Weaver, & Stabb, 1993), the influence of pornography on shaping sexual attitudes could lead to sexual behaviors such as “hooking up.” Our research seeks to examine whether viewing pornography is associated with more permissive sexual scripts about casual sex encounters and whether these permissive scripts, in turn, translate into actual hooking up behaviors.

Hooking Up

Hook ups are casual sexual encounters that occur without any expectation for future commitment. Sexual behaviors in these encounters can include kissing, sexual touching, oral sex, and vaginal or anal intercourse (Owen, Rhoades, Stanley, & Fincham, 2010; Paul, McManus, & Hayes, 2000) and can occur once or multiple times; as Garcia, Reiber, Massey, and Merriwether (2012) noted, the essential component of a hook up is “the uncommitted nature of a sexual encounter” (p. 162). In our studies, we chose to study the effect of pornography on hooking up among emerging adults because they are in a distinct developmental period marked by identity formation in the realm of sexual scripts; it is also a period when individuals are uniquely open to new ideas and potential changes in worldviews, with

many people often transitioning to a different worldview than they were raised with (Arnett, 2000). These changes in worldview are influenced by media and an individual's social milieu—for college students, sexual mores and behavior are a central theme in their exposure to media and in their social milieu (Gardner & Steinberg, 2005; Padilla-Walker, Nelson, Carroll, & Jensen, 2010).

Hook ups have become a common part of the college student culture. In fact, Bogle (2008) argued that the dominant model of courtship among traditional-age college students has shifted from dating to a model that normalizes and encourages spontaneous sexual encounters outside of dating or exclusive relationships. Evidence for this view is compelling; many studies on college hook ups reveal that most college students (estimates range from 40 % to over 75 %) report hooking up at least once (Garcia & Reiber, 2008; Owen et al., 2010; Paul & Hayes, 2002; Paul et al., 2000).

The prevalence of hooking up among college students suggests that they see it as harmless, but hooking up can increase risk for harm in a number of different domains, particularly for women. Hooking up has been repeatedly associated with psychological distress and this association is often more pronounced for women than for men (Bersamin et al., 2014; Fielder & Carey, 2010a; Grello, Welsh, & Harper, 2006; Owen et al., 2010; Owen & Fincham, 2011), perhaps because women are less comfortable with hooking up, and tend to feel more regret post-hook up than men (Fisher, Worth, Garcia, & Meredith, 2012; Lambert, Kahn, & Apple, 2003; Reiber & Garcia, 2010). Both men and women generally experience more positive than negative affect immediately following a hook up (Owen & Fincham, 2011; Owen, Fincham, & Moore, 2011), but women have more ambivalent emotional reactions than men and there is some evidence that the positive emotion women feel is related to their hopes that the hook up will turn into a committed relationship (Owen & Fincham, 2011). Alcohol use is positively associated with the number and riskiness of hook ups (Fielder & Carey, 2010b; Garcia & Reiber, 2008; Owen et al., 2011; Paul & Hayes, 2002). One study reported that only 6 % of hook ups occurred in the absence of alcohol or drug use (Paul & Hayes, 2002).

Estimates of condom use during hook ups vary widely, ranging from 0 to 81 % (Fielder & Carey, 2010b; Owen & Fincham, 2011; Paul & Hayes, 2002; Paul et al., 2000). However, survey data inevitably present a socially desirable estimate of condom use (Agnew & Loving, 1998) and given the serious consequences of not using protection—particularly for women who are more at risk for contracting STI's from heterosexual intercourse (Mayaud & Mabey, 2004) and more likely to bear the burden of an unwanted pregnancy—unprotected hook ups can have significant public health implications. To extend previous research on both pornography and risky sexual behaviors, we explored the association between viewing pornography,

sexual attitudes, and hooking up among college students in the United States. Specifically, two studies examined whether viewing pornography was related to hooking up and whether this potential association was mediated by permissive sexual scripts.

Study 1

Building on the documented association between pornography viewing and sexual behaviors, we sought to test whether frequency of pornography viewing is associated with hooking up among emerging adults in college.

Method

Participants and Procedure

Participants for this cross-sectional study were recruited from an undergraduate family science course that fulfilled a university-wide general education requirement at a public university in the Southeastern United States. Participation in this study was one of multiple options for students to receive course credit. Data for Study 1 and Study 2 come from a larger data collection effort examining the course of emerging adulthood in the context of college. Participants provided data via an online survey that they completed at home or wherever they chose to access the Internet. Prior to collecting data, we obtained institutional review board approval for all procedures. For the studies presented in this paper, participants were excluded if they did not fall in the age range associated with emerging adulthood (18–25). Our sample comprises 969 (735 women, 234 men) students; the average age for men was 19.2 (SD = 1.36) and the average age for women was 19.0 (SD = 1.20). Most respondents were freshmen (43 %), followed by sophomores (28 %), juniors (23 %), and seniors (6 %). Caucasians comprised 71 % of the sample, African Americans 13 %, Latino 10 %, Asian 2 %, with “Other” ethnicities (Native American, Mixed, etc.) reported at 4 %.

Measures

Hooking Up

We used the following item to assess hooking up: “Some people say that a ‘hook up’ is when two people get together for a physical encounter and don’t necessarily expect anything further (e.g., no plan or intention to do it again).” After reading this definition participants were then asked how many people they had “hooked up” with in the past 8 weeks. Response options ranged in increments of one from 0 to 6 or more. Then, participants were asked to “check all the types of physical intimacy that occurred during [their] most recent hook up.” The options provided were *kissing*, *petting*, *oral sex*, and *intercourse* (*vaginal or anal*).

Frequency of Pornography Viewing Pornography viewing was assessed with an item asking, “Approximately how many times in the past 30 days have you viewed pornography (e.g., video, magazine, Internet)?” Answer selections included 1 (*never*), 2 (*once*), 3 (*a few times a month*), 4 (*about weekly*), 5 (*a few times a week*), 6 (*daily*), 7 (*a few times a day*), and 8 (*several times a day*).

Data Analysis Plan

Because we are interested in both the incidence of hooking up and the number of unique hook up partners, we conducted two types of analyses to examine the relationship between pornography use and hooking up. First, we used logistic regression to examine whether pornography use was associated with hooking up incidence, coded as a binary outcome (hooked up = 1, did not = 0). Second, because the number of unique hook up partners a person had is a count variable (i.e., a variable comprised of only non-negative integers that have a meaningful zero) with a high number of respondents reporting zero, ordinary least squares regression would provide biased estimates of the relationship between pornography use and this outcome. A more appropriate technique, which we used, is negative binomial regression, which assumes a distribution of over-dispersed (i.e., variances larger than means) count data with high numbers of zeros.

Results

Descriptive Statistics

Approximately 36 % of students hooked up in the previous 8 weeks. For those who hooked up, 95 % of hook ups involved kissing, 62 % involved petting, 46 % involved oral sex, and 45 % involved sexual intercourse. 33 % of respondents reported viewing pornography in the past 30 days. Among users, 35 % reported viewing pornography once, 31 % a few times a month, 10 % about weekly, 14 % a few times a week, 6 % daily, 2 % a few times a day, and 2 % several times a day. Sample means, standard deviations, and our correlation matrix can be seen in Table 1.

Is Viewing of Pornography Associated with Hooking Up?

Pornography viewing frequency was associated with the occurrence of hook ups [*Odds Ratio* (OR) = 1.27, $p < .001$]; a one-unit increase in pornography viewing frequency was associated with a 27 % greater likelihood of hooking up. Next, we examined whether pornography viewing frequency was associated with a higher number of unique hook up partners. Because these were count data, we used a negative binomial regression model and incidence rate ratios (IRR) to interpret the unstandardized coefficients. More frequent pornography viewing was associated with a higher number of different hook up partners

Table 1 Descriptive statistics for Study 1

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------------------|------|------|------|------|------|------|------|
| Mean | 1.78 | 0.36 | 1.67 | 0.30 | 0.20 | 0.15 | 0.15 |
| SD | 1.40 | 0.48 | 1.13 | 0.46 | 0.40 | 0.35 | 0.35 |
| 1. Porn frequency | 1.00 | | | | | | |
| 2. Did hook up occur? | 0.17 | 1.00 | | | | | |
| 3. Unique hook up partners | 0.19 | 0.78 | 1.00 | | | | |
| 4. Hook up: Kissing | 0.16 | 0.94 | 0.75 | 1.00 | | | |
| 5. Hook up: Petting | 0.17 | 0.70 | 0.60 | 0.72 | 1.00 | | |
| 6. Hook up: Oral sex | 0.23 | 0.57 | 0.46 | 0.60 | 0.66 | 1.00 | |
| 7. Hook up: Intercourse | 0.21 | 0.57 | 0.45 | 0.55 | 0.56 | 0.75 | 1.00 |

All correlations significant ($p < .05$)

($B = .08, p < .001$); each unit increase on the pornography scale was associated with a 9 % increase in the expected number of unique hook up partners in the previous 8 weeks.

Is Viewing of Pornography Associated with Potentially Riskier Forms of Hooking Up?

To rule out the possibility that pornography viewing was only associated with innocuous hook up behaviors (like kissing and petting), we examined pornography viewing frequency as a predictor of each hook up activity. Interestingly, pornography frequency was *more strongly* associated with potentially riskier hook up activities than less risky ones. Pornography viewing predicted a higher likelihood of kissing ($OR = 1.26, p < .001$), petting ($OR = 1.29, p < .001$), oral sex ($OR = 1.42, p < .001$), and intercourse ($OR = 1.38, p < .001$). For each unit increase in pornography viewing frequency, there was a 42 % higher likelihood of oral sex and 38 % higher likelihood of intercourse compared to only 26 and 29 % increases for kissing and petting, respectively.

Finally, because men are known to view pornography more frequently than women (Hald, 2006; Romito & Beltramini, 2011), we re-ran these models controlling for biological sex; although men were more likely to engage in each type of hook up, the link between pornography and hooking up held in all cases when controlling for biological sex. In sum, viewing pornography is associated with a higher incidence of hooking up, having a higher number of unique hook up partners, and engaging in all types of hook ups including the potentially most risky forms (i.e., oral sex and sexual intercourse).

Study 2

The purpose of Study 2 was to replicate and extend the findings observed in Study 1. First, we examined whether pornography viewing was associated with an individuals' broader sexual

history and future plans regarding sexual partners. Then, we tested whether the observed effects in Study 1 would replicate cross-sectionally and longitudinally when controlling for the stability of hook up behavior over the course of an academic semester (a period of time spanning just over 3 months). Finally, we explored a potential mechanism of action that mediates the longitudinal association between pornography use and sexual behaviors; namely, sexual scripts.

Method

Participants and Procedure

Participants were recruited using the same procedures described in Study 1. As in Study 1, participants were excluded if they were not between the ages of 18–25. We recruited 992 students (696 women, 296 men); the average age for men was 19.6 ($SD = 1.40$) and the average age for women was 19.4 ($SD = 1.34$). Most respondents were freshmen (38 %), followed by sophomores (31 %), juniors (22 %), and seniors (9 %). Caucasians comprised 69 % of the sample, African Americans 12 %, Latino 13 %, Asian 3 %, and “Other” (Native American, Mixed, etc.) 3 %.

Measures

The Revised Sociosexual Orientation Inventory (SOI-R)

We measured the attitude component of sexual scripts using the SOI-R. This measure was designed to assess three different sociosexual domains: desires, attitudes, and behaviors (Penke & Asendorpf, 2008). Confirmatory factor analysis has shown that the three separate components of desires, attitudes, and behaviors can be reliably differentiated. We used the sociosexual attitudes subscale (i.e., “Sex without love is OK,” “I can imagine myself being comfortable and enjoying ‘casual’ sex with different partners,” “I do not want to have sex with a person until I am sure that we will have a long-term, serious relationship”) as our measure of sexual scripts. Responses ranged from 1 (*Strongly Disagree*) to 9 (*Strongly Agree*) and items were scored so that higher scores reflected more permissive attitudes toward uncommitted sex. Cronbach's alpha for these three items was .86. In our analyses, we used the items that comprise this scale as indicators of a latent variable reflecting permissive sexual attitudes.

We also used the behavior subscale of the Sociosexuality Orientation Inventory (SOI; Penke & Asendorpf, 2008) to assess sexual histories and planned sexual futures. These questions asked, “With how many different partners have you had sex (sexual intercourse) within the past year?” response options ranged from 0 to 20+; “With how many partners have you had sex on one and only one occasion?” response options ranged from 0 to 20+; “How many different partners do you see

Table 2 Descriptive statistics for Study 2

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | |
|--------------------------------------|------|------|------|-------------|------|-------------|------|-------------|------|------|------|------|------|------|-------|------|------|------|--|
| Mean | 1.88 | 1.84 | 0.63 | 0.39 | 2.40 | 1.74 | 0.57 | 0.30 | 0.60 | 0.47 | 0.88 | 0.44 | 1.25 | 0.59 | 13.76 | 2.92 | 2.11 | 4.84 | |
| SD | 1.39 | 1.42 | 0.48 | 0.49 | 1.79 | 1.20 | 0.50 | 0.46 | 0.92 | 0.85 | 1.37 | 1.06 | 1.86 | 1.42 | 4.09 | 2.46 | 2.37 | 5.12 | |
| 1. Baseline: porn freq | 1.00 | | | | | | | | | | | | | | | | | | |
| 2. Followup: porn freq | 0.80 | 1.00 | | | | | | | | | | | | | | | | | |
| 3. Baseline: hook up occur? | 0.20 | 0.15 | 1.00 | | | | | | | | | | | | | | | | |
| 4. Follow up: hook up occur? | 0.21 | 0.17 | 0.35 | 1.00 | | | | | | | | | | | | | | | |
| 5. Baseline: unique hookup partners | 0.21 | 0.17 | 0.51 | 0.42 | 1.00 | | | | | | | | | | | | | | |
| 6. Follow up: unique hookup partners | 0.26 | 0.25 | 0.30 | 0.75 | 0.46 | 1.00 | | | | | | | | | | | | | |
| 7. Baseline: kissing | 0.17 | 0.10 | 0.82 | 0.34 | 0.45 | 0.26 | 1.00 | | | | | | | | | | | | |
| 8. Follow up: kissing | 0.25 | 0.21 | 0.35 | 0.91 | 0.39 | 0.72 | 0.35 | 1.00 | | | | | | | | | | | |
| 9. Baseline: petting | 0.13 | 0.10 | 0.41 | 0.18 | 0.27 | 0.18 | 0.49 | 0.16 | 1.00 | | | | | | | | | | |
| 10. Follow up: petting | 0.26 | 0.24 | 0.27 | 0.74 | 0.34 | 0.63 | 0.26 | 0.79 | 0.19 | 1.00 | | | | | | | | | |
| 11. Baseline: oral sex | 0.29 | 0.23 | 0.43 | 0.23 | 0.27 | 0.25 | 0.48 | 0.23 | 0.46 | 0.24 | 1.00 | | | | | | | | |
| 12. Follow up: oral sex | 0.32 | 0.30 | 0.20 | 0.54 | 0.27 | 0.51 | 0.18 | 0.58 | 0.07 | 0.64 | 0.29 | 1.00 | | | | | | | |
| 13. Baseline: intercourse | 0.18 | 0.17 | 0.49 | 0.15 | 0.23 | 0.16 | 0.42 | 0.14 | 0.29 | 0.17 | 0.51 | 0.17 | 1.00 | | | | | | |
| 14. Follow up: intercourse | 0.19 | 0.14 | 0.19 | 0.56 | 0.24 | 0.48 | 0.16 | 0.53 | 0.05 | 0.57 | 0.17 | 0.68 | 0.16 | 1.00 | | | | | |
| 15. Sexual scripts | 0.29 | 0.30 | 0.28 | 0.21 | 0.25 | 0.21 | 0.25 | 0.20 | 0.23 | 0.18 | 0.25 | 0.17 | 0.25 | 0.11 | 1.00 | | | | |
| 16. Past sexual partners | 0.14 | 0.10 | 0.26 | 0.14 | 0.36 | 0.13 | 0.22 | 0.12 | 0.19 | 0.18 | 0.18 | 0.10 | 0.35 | 0.18 | 0.15 | 1.00 | | | |
| 17. Past one night stands | 0.13 | 0.13 | 0.14 | <i>0.06</i> | 0.21 | <i>0.06</i> | 0.11 | <i>0.02</i> | 0.12 | 0.10 | 0.11 | 0.10 | 0.22 | 0.11 | 0.23 | 0.43 | 1.00 | | |
| 18. Predicted sexual partners | 0.42 | 0.39 | 0.33 | 0.34 | 0.50 | 0.38 | 0.31 | 0.33 | 0.23 | 0.37 | 0.30 | 0.35 | 0.22 | 0.29 | 0.40 | 0.37 | 0.25 | 1.00 | |

All correlations significant ($p < .05$) with the exception of those in italics

yourself having sex with during the next 5 years? (Please give a specific, realistic estimate)” response options ranged from 0 to 30+. Both of these scales from the SOI were measured at baseline.

Our assessment of hooking up was the same as Study 1 with two exceptions. First, when we assessed hook ups at baseline (the beginning of the semester) we asked how many hook ups had occurred in the past 12 months; at the follow up assessment we asked how many hook ups had occurred in the previous 8 weeks—despite the fact that our study spanned over 3 months, we intentionally limited the retrospective report to the past 8 weeks. Second, when assessing hooking up, rather than using the term “petting,” we used the term “petting/intimate touching” for the sake of clarity. The measure of pornography viewing frequency was the same as that used in Study 1.

Results

Descriptive Statistics

Approximately 63 % of students had hooked up in the previous 12 months. For those who hooked up, 89 % of hook ups involved kissing, 47 % involved petting/intimate touching, 46 % involved oral sex, and 49 % involved sexual intercourse. 36 % of respondents reported having viewed pornography in the past 30 days. Among users, 21 % reported viewing pornography once, 38 % a

few times a month, 14 % about weekly, 20 % a few times a week, 4 % daily, and 3 % a few times a day. Sample means, standard deviations, and our correlation matrix can be seen in Table 2.

Sexual History and Future Plans

First, we examined whether the frequency of viewing pornography is associated with past sexual experiences and plans for future sexual experiences. Again, because these were count data, we used a negative binomial regression model (and incidence rate ratios to interpret the unstandardized coefficients). We found that more frequent pornography viewers reported having more past sexual partners ($B = .11, p < .001$); each unit increase on the pornography scale was associated with an 12 % increase in number of previous sexual partners. Frequency of viewing pornography was associated with more previous one-time sexual encounters ($B = .15, p < .001$); each unit increase on the pornography scale was associated with a 16 % increase in previous one-time sexual encounters. Finally, pornography viewing was associated with planning to have more sexual partners in the next 5 years ($B = .26, p < .001$); each unit increase on the pornography scale was associated with a 30 % increase in planned future sexual partners. To clarify these findings, we generated the predicted number of partners at each level of pornography viewing. Those who never viewed pornography had, on average, 2.6 past sexual partners; whereas, those who viewed pornography

multiple times per day had 5.0 past sexual partners on average. Regarding one-time sexual encounters, those who did not view pornography reported having had 1.8 one-time sexual partners; those who viewed multiple times daily reported having had 4.2 one-time sexual partners. Regarding future partners, those who reported not viewing pornography anticipated having 3.5 partners in the next 5 years; those who viewed multiple times per day anticipated having 17.0 partners in the next 5 years. To rule out the possibility that the men in the sample were generating these effects, we re-ran each of these models controlling for biological sex; the link between pornography and hooking up remained significant in all cases when controlling for biological sex.

Replication and Extension of Study 1

We next examined whether we could replicate the cross-sectional effects observed in Study 1. Each one-unit increase in pornography viewing was associated with a 42 % higher likelihood of hooking up ($OR = 1.42, p < .001$) and a 12 % increase in the expected number of unique hook up partners ($B = .11, p < .001$). More pornography use was associated with engaging in all types of hooking up behavior: kissing ($OR = 1.29, p < .001$), petting/intimate touching ($OR = 1.27, p < .001$), oral sex ($OR = 1.55, p < .001$), and sexual intercourse ($OR = 1.37, p < .001$).

We sought to extend the findings from Study 1 in two ways: first, to show that these effects replicated longitudinally and second, to examine whether sexual scripts mediate the association between pornography viewing and hooking up. Controlling for the prevalence of hook ups at the beginning of the semester, pornography use at baseline predicted the incidence of hook ups ($OR = 1.26, p < .001$) as well as a higher number of different hook up partners ($B = .07, IRR = .07, p < .001$). This suggests that these effects replicated longitudinally while controlling for the stability of hooking up over the course of an academic semester.

Mediation

Prior to testing for mediation using Structural Equation Modeling (SEM), we tested for the effect of biological sex on each of the outcomes in our regression models and found that it may moderate the association between pornography and outcomes. To explore the effect of biological sex, in our mediational analyses we used a multiple group latent class model approach (using the KNOWNCLASS function in *Mplus*) to examine whether these effects were moderated by biological sex. For each of our models, we insured that the best log likelihood was replicated initially and again when we re-ran the model with twice the number of random starts. See Fig. 1 for a graphic representation of our mediational model and Table 3 for a summary of our tests of mediation for hook up incidence and number of unique hook up partners as well as an estimate of

the strength of mediation effects following procedure recommended by Shrout and Bolger (2002).

Incidence

We first examined whether pornography viewing was associated with whether respondents hooked up or not (incidence) over the course of an academic semester and whether sexual scripts mediated this effect. For men, pornography viewing at baseline was associated with sexual scripts ($\beta = .35, p < .001$) but sexual scripts were not a significant predictor of whether or not men hooked up ($OR = 1.09, p = .14$); thus, the indirect effect via sexual scripts was not significant for men (OR for indirect effect = 1.04, $p = .16$). However, the direct effect of pornography on hooking up retained significance for men ($OR = 1.25, p < .05$) suggesting that pornography may influence hooking up behavior via some other mechanism besides sexual scripts.

For women, pornography viewing at baseline was associated with sexual scripts ($\beta = .14, p < .01$) and more permissive sexual scripts predicted more hooking up ($OR = 1.18, p < .01$); thus, the indirect effect via sexual scripts significantly mediated the longitudinal effect of pornography viewing on hooking for women (OR for indirect effect = 1.06, $p < .05$).

Number of Unique Hook Up Partners

Next, we examined whether pornography viewing was related to the number of unique hook up partners over the course of a semester and whether sexual scripts mediated this effect. For men, pornography viewing at baseline was associated with sexual scripts ($\beta = .35, p < .001$) but sexual scripts were not a significant predictor of the number of unique hook up partners ($B = .01, p = .29$); thus, the indirect effect via sexual scripts was not significant for men (B for indirect effect = .01, $p = .31$). However, the direct effect of pornography on hooking up retained significance for men ($B = .06, p < .05$) suggesting that pornography may influence the number of unique hook up partners a man has via some other mechanism besides sexual scripts.

For women, pornography viewing at baseline was associated with more permissive sexual scripts ($\beta = .14, p < .001$) and sexual scripts predicted more unique hook up partners ($B = .04, p < .01$; each unit increase on the pornography scale equals an expected partner count that is 4 % higher); thus, the indirect effect via sexual scripts significantly mediated the longitudinal effect of pornography viewing on the number of unique hook up partners women have (B for indirect effect = .02, $p < .05$).

Does Gender Significantly Moderate Mediational Effects?

To determine whether biological sex moderates an observed effect, it is not sufficient to observe a significant parameter estimate for one sex and a non-significant parameter estimate for

Fig. 1 Mediation model used to examine whether sexual scripts mediate the effect of pornography viewing on hooking up when controlling for the stability of hooking up over the span of an academic semester (approximately 3 months)

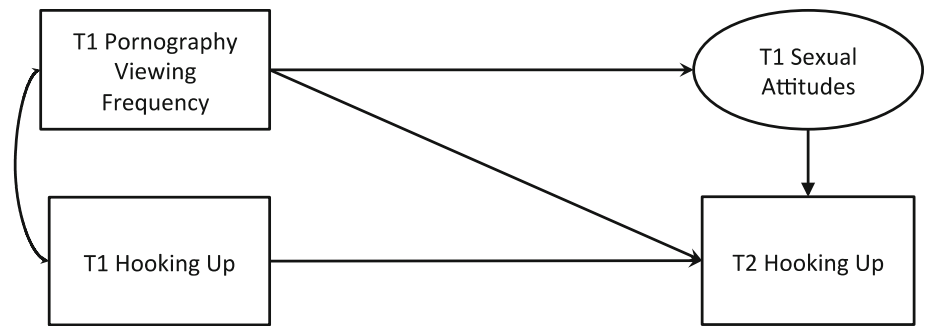


Table 3 Tests of mediation for hook up incidence and unique number of hook up partners

| | Hook up incidence | Number of unique hook up partners |
|---|-------------------|-----------------------------------|
| Tests of mediation for men | | |
| Baseline measure of dependent variable | OR = 5.11* | IRR = 1.15* |
| Sexual attitudes (<i>b</i>) | OR = 1.09 | IRR = 1.01 |
| Assessment of the strength of mediation | | |
| Indirect effect via sexual scripts ($a \times b$) | OR = 1.04 | IRR = 1.01 |
| Direct effect of porn in full mediational model (c' path) | OR = 1.25* | IRR = 1.06* |
| Direct effect of porn with influence of mediator set to 0 (c path) | OR = 1.62* | IRR = 1.27* |
| Proportion of effect that operates via mediator ($a \times b/c$) | 0.07 | 0.04 |
| Tests of mediation for women | | |
| Baseline measure of dependent variable | OR = 5.90* | IRR = 1.16* |
| Sexual attitudes (<i>b</i>) | OR = 1.18* | IRR = 1.04* |
| Assessment of the strength of mediation | | |
| Indirect effect via sexual scripts ($a \times b$) | OR = 1.06* | IRR = 1.02* |
| Direct effect of porn in full mediational model (c' path) | OR = 0.82 | IRR = 0.96 |
| Direct effect of porn with influence of mediator set to 0 (c path) | OR = 0.94 | IRR = 0.85 |
| Proportion of effect that operates via mediator ($a \times b/c$) | 1.13 | 1.20 |

the other; instead, one needs to test for a difference between the parameter estimates across sexes. To do this, we constrained the components of the mediational model— a (IV to mediator), b (mediator to outcome), c (direct effect of IV on DV), and $a \times b$ (indirect effect) to be equal between men and women using the “model test” command in *Mplus*. The associated Wald test showed that these paths were not significantly different across groups for both hook up incidence and number of unique hook up partners, indicating that these effects were not significantly moderated by biological sex.

Do Sexual Scripts Mediate the Association for Individual Hook up Behaviors Over Time?

Next, we examined whether sexual scripts longitudinally mediated each of the individual hook up behaviors while controlling for the stability of these behaviors. For each type of hook up, we tested for moderation by biological sex and found that the parameter estimates of our mediational models were not significantly

different on the basis of biological sex, so the effects for the entire sample are reported here. More permissive sexual attitudes mediated the effect of pornography use on kissing (indirect effect OR = 1.03, $p < .05$), intimate touching (indirect effect OR = 1.09, $p < .001$), oral sex (indirect effect OR = 1.06, $p < .001$), and sexual intercourse (indirect effect OR = 1.10, $p < .001$). These results, again, suggest that the effects of pornography are not just associated with increases in less risky types of hook ups.

In sum, Study 2 showed that more frequent viewing of pornography is associated with having had more previous sexual partners, more previous one-time only sexual partners (i.e., “one night stands”) and plans to have more future sexual partners. In addition, we replicated the findings from Study 1 showing that more frequent viewing of pornography was associated with increases in potentially risky sexual behavior. We extended the findings from Study 1 by showing that these effects replicated even when accounting for the longitudinal stability of hooking up behavior and that these changes were mediated through sexual scripts.

Discussion

This series of studies showed that more frequent viewing of pornography is reliably associated with sexual behaviors that are potentially more risky. Specifically, we examined hook ups (defined as casual sexual encounters that occur on one occasion and without any expectation for future commitment) among college students and found that increased pornography viewing was associated with a higher incidence of hooking up and a higher number of unique hook up partners. Further, we found that this effect was not limited to behaviors such as kissing and intimate touching, but was also significant, and often more robust, for potentially more risky sexual behaviors such as oral sex and sexual intercourse. We replicated these effects both cross-sectionally and longitudinally when accounting for the stability of hook ups over the course of an academic semester. We also demonstrated that more frequent viewing of pornography is associated with having had more previous sexual partners of all types, more one occasion sexual partners (“one night stands”), and plans to have a higher number of sexual partners in the future. Finally, we provided evidence for a mediating mechanism of action; specifically, pornography was related to more permissive sexual scripts which, in turn, mediated the association between more frequent pornography viewing and hooking up, as well as having a higher number of unique hook up partners.

Although a sizeable amount of research has examined the association between pornography and problematic attitudes or beliefs, less research has examined the association between pornography use and actual behavior. One study examined the association between pornography use and hooking up as a form of infidelity among those in committed dating relationships (Lambert et al., 2012). Our studies had a broader sample, allowing us to examine hooking up more generally among college students, not just within the context of a committed relationship. Further, our studies are notable for not only examining sexual behavior, but also for breaking down different types of sexual behavior associated with the use of pornography. This allowed us to see that pornography consumption was associated in a clear dose–response relationship with the known risk factor, having multiple sex partners. It also allowed us to document that viewing pornography is more robustly associated with forms of sexual behavior that are potentially riskier, such as oral sex and intercourse, than for less risky behaviors, such as kissing and petting. Recall that the $\text{}_3\text{AM}$ sexual scripts model predicts that sexual media influences behavior through acquisition of scripts followed by activation and application of the script. Consistent with that theory, we observed a more robust relationship for the potentially riskier forms of sexual behavior, perhaps because pornography often portrays these specific acts (vaginal/anal intercourse and oral sex) and focuses less on kissing or petting. As such, individuals are likely to have viewed intercourse in pornography, incorporated it into their sexual scripts, and applied

it by not only having a hook up, but also by engaging in potentially riskier sexual behaviors such as oral sex or intercourse. In the future, it would be valuable to see whether these mediational effects replicate and to more specifically assess whether the specific behaviors portrayed in the pornography correlate with specific behaviors that occur in vivo.

Research on pornography, and in the social sciences more broadly, often examines associations between variables, but fails to document the mechanisms that drive these associations. Mechanisms are important to study because they allow us to understand phenomena at a deeper level and provide the ability to intervene more effectively to prevent harm. To provide good evidence for a mechanism of action, a number of criteria should be met: demonstration of a strong association between the cause and the mediator, specificity of that association, consistency of the association (i.e., replication), experimental manipulation (where possible), establishing that the “cause” precedes the “effect,” showing a gradient (e.g., dose–response) and establishing plausibility or coherence (does the specified mechanism of action make good sense and fit with the existing literature?) (Kazdin, 2007). Our set of studies identified, and helped to establish, sexual scripts as a mechanism by which pornography influences risky sexual behavior by meeting some, but not all, of these criteria. We replicated the association between pornography use and sexual scripts that has been observed in other research (strong association), demonstrated that this effect was consistent across two studies (consistency of association), showed that pornography use prospectively predicted hooking up via the mediator even when controlling for the stability of hooking up behavior (temporal precedence), demonstrated that more pornography use predicted a higher rate of potentially risky sexual behavior in the past (gradient/dose–response) and our study arises from existing theory on sexual scripts and tests the veracity of predictions made from these theories (plausibility/coherence). But more work needs to be done; our study tested only one potential mediator and others are likely at work in explaining the association between pornography and risky sexual behavior. Further, very little experimental research has been done on pornography (perhaps because human subjects committees are uncomfortable with the idea of intentionally exposing participants to pornography), but this type of research would help us to more fully understand the mechanisms at work in explaining the association between pornography viewing and risky sexual behavior.

Our findings support the theory that sexual scripts mediate the association between pornography viewing and hooking up. More specifically, our results show that the frequency of viewing pornography predicted, via sexual scripts, whether an individual would hook up (including all forms of hooking up) and also how many unique hook up partners they had over the course of an academic semester. Our examination of sexual scripts included both a cognitive/attitudinal component of sexual scripts (assessed using the SOI-R) as well as behavioral (assessed using reports of hook up behavior). However, even when accounting for the

role of sexual script attitudes (i.e., sex without love is okay), there was a significant direct effect for men between pornography use and sexual behaviors. This suggests that sexual scripts are likely not the only mechanism at work in explaining the relationship between pornography use and hooking up. Future research might examine other potential mechanisms that may mediate this association. For example, it is possible that pornography reduces the anxiety of having sex with an unknown individual in an exposure-like process, and this reduction in anxiety mediates this association. Also, more complex models that include potential moderators such as having a higher need for sensation (Brown & L'Engle, 2009), the perceived realism and utility of the pornography that is viewed (Peter & Valkenburg, 2010), religiosity, etc. should be examined.

Although much of the research on pornography finds different patterns of results for men and women, biological sex did not moderate our findings. This is consistent with what may be an emerging trend showing that previously observed gender differences in pornography may be shrinking (Mansson, Daneback, Tikkanen, & Lofgren-Martenson, 2003). Perhaps this has to do with the increasing availability of pornography over the Internet. Emerging adults today have a lower threshold (a few keystrokes) for accessing pornography compared to previous generations when pornography was more difficult to obtain. As a result, some who are simply curious, but not particularly driven to seek it out, may be accessing pornography when they would have been unlikely to do so in previous generations. Understanding whether and when pornography has different effects on the basis of the viewer's, biological sex is an important question to explore in future research. In previous research, men's pornography use has been reliably associated with less sexual intimacy and less satisfaction with the sexual partner (Zillmann & Bryant, 1988). But men tend to view pornography on their own whereas women tend to view it with their partner (Maddox, Rhoades, & Markman, 2011); perhaps because of this, women's use of pornography has been shown to increase their sexual satisfaction (Poulsen et al., 2013). More research needs to be done to further illuminate the nature of these potentially different effects for men and women.

Limitations

Our studies were limited in the following ways. First, they were correlational, and although we attempted to compensate for this by looking for dose–response patterns, mechanisms of action, and establishing temporal precedence, experimental research is needed to strengthen causal claims. Second, we had a relatively simple measure of pornography viewing frequency—a single question asking respondents how often they had viewed pornography in the past 30 days. A more sophisticated measurement that assesses the type of pornographic media (internet, video, etc.), how much time was spent viewing pornography, what the content of the pornography was and whether it was

viewed with or without a partner could yield important insights. Third, our second study had a longitudinal component, but it only covered the span of an academic semester; a longer period of time is needed to better examine the long-term impact of pornography. Fourth, it is possible that the way we described hook ups to participants led them to believe that an uncommitted sexual encounter is a hook up, only if it occurs once (when the essential definition of a hook up is the uncommitted nature, not the number of times it occurred); this could have led to some under-reporting of the prevalence and frequency of hook ups. Finally, our studies included only college students. Although this is a group of particular interest for the variables under examination (given the developmental tasks they face and the college hook up culture), it is unknown how well these results generalize to other groups.

Our study also has a number of notable strengths. First, we had two sizeable samples of college students. College students and emerging adults more generally are in a phase of life that is marked by sexual experimentation such as hooking up; thus, understanding this group can yield important insights about how to intervene in helpful ways with a group that has a high likelihood of engaging in potentially risky sexual behaviors. Second, research on pornography tends to focus exclusively on men and our study included women as well, which serves to provide a more inclusive view of the effects of pornography in this important age group. Further, our results showed that the observed effects were not moderated by biological sex; a great deal of research makes the inferential error that gender differences exist because a parameter estimate was significant for one sex but not the other whereas our findings were based on empirical tests of parameter estimates between men and women. Third, much research in this area looks only at associations between variables, but we went deeper, looking at mechanism, which allows us to translate more basic research into intervention and to understand the phenomena in question at a deeper level.

Implications

These findings have several practical implications. Because hooking up has become a normative part of college culture, we suggest that premarital relationship education includes information about hooking up with an eye toward mitigating the potential public health risks associated with it. Although our findings do not provide insight about whether pornography use predicts condom or alcohol use during hook ups, we did provide evidence that pornography use predicted a higher number of sexual partners. Specifically, we showed that those who view pornography are more likely to have had a higher number of unique hook up partners, more previous sexual partners, more previous “one night stand” partners, and more planned future sexual partners. In light of these findings and other research showing that condom use ranges from 0 to 81 % during hook ups, we suggest that interventions include information about the need

for safe sex practices. In addition, interventions could also educate participants about other important facts gleaned from scientific study of hooking up: that it is associated with distress, especially for women; that for penetrative hook ups, women reported that condom use was associated with fewer positive and more negative emotional reactions (Owen & Fincham, 2011); that women often hope that hooking up is a prelude to a committed relationship, whereas men tend to see it purely as recreational; that alcohol use is ubiquitous in hooking up and can cloud judgment and make individuals more likely to *slide* through relationship transitions that they might not *decide* their way into (Stanley, Rhodes, & Markman, 2006). This kind of relationship education need not be value laden; rather it could simply present scientific facts about the causes, correlates and consequences of hooking up thus allowing students to make more fully informed decisions about these issues.

Because our work established that pornography use predicts a higher likelihood of future hook ups even when accounting for the stability of hooking up, we might especially seek out and educate those who are consumers of pornography. Preventive interventions are most effective when we can first identify those who are at higher risk and then provide interventions with the best empirical support for decreasing risk (Halford, Markman, Kline, & Stanley, 2003). Research also continues to move in a direction where interventions are tailored to the specific circumstances and needs of individuals (Braithwaite & Fincham, 2013). Because we have shown that pornography use is associated with permissive sexual scripts and, in turn hooking up, our research suggests that we target pornography users, especially heavy consumers since we observed a dose–response pattern to this relationship. Currently, premarital interventions talk little about sex, but few experimental studies of pornography use indicate that pornography use harms the sexual relationship (e.g., Zillmann & Bryant, 1988) and correlational studies find that, compared to couples where they view pornography together, solitary pornography users report less commitment and less sexual satisfaction (Maddox et al., 2011). This same study showed that compared to those who do not use pornography at all, pornography users experience poorer couple communication, relationship adjustment, commitment, sexual satisfaction, and more infidelity. Thus, targeting those who use pornography might help us to identify individuals who are more at risk for relationship problems on more than one dimension.

Conclusion

In conclusion, our studies are some of the largest conducted on pornography use and hook ups among college students. When one considers these findings, the broader literature examining the influence of pornography on attitudes and behavior, and the exponential increase in availability of pornography, it becomes more difficult to dismiss pornography consumption as harmless and simply “part of growing up.” With a generation developing

sexual scripts that are informed by a medium that portrays a view of sexuality that is often shallow, misogynistic, patriarchal, and that almost invariably occurs in a context separated from healthy, committed relationships, there may be attitudinal and behavioral consequences that are difficult to undo. As successive generations grow up immersed in pornography, it may become increasingly important to supplement their learning about sex with views of sexual relationships that go beyond the lessons taught in pornography.

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