

Is pornography consumption associated with condom use and intoxication during hookups?

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In order to examine whether pornography consumption is associated with risky sexual behaviour among emerging adults, we examined two large samples of those who reported hooking up in the past 12 months (combined $n = 1216$). Pornography use was associated with a higher likelihood of having a penetrative hookup; a higher incidence of intoxication during hookups for men (but a lower incidence of intoxication during hookups for women); increasing levels of intoxication during hookups for men but decreasing levels of intoxication for women; and a higher likelihood of being in the riskiest category of having a penetrative hookup, without a condom, while intoxicated. For each of these outcomes, our point estimates for Study 2 fell within the 95% confidence intervals from Study 1. Controlling for trait self-control, binge drinking frequency, broader problematic patterns of alcohol use, openness to experience, and attitudes toward casual sex did not change the pattern of results. Implications for interventions to reduce sexual risk are discussed.

Keywords: hookups; pornography; condom use; intoxication; personality; USA

Hooking up has become common among emerging adults in college, and research has established an association between how frequently one views pornography and how likely one is to hook up. What remains less clear is whether those who view pornography are more likely to engage in riskier forms of hooking up, such as hooking up while intoxicated and/or without using a condom. Moreover, it is possible that the relationship between viewing pornography is spurious – that some other variable, such as impulsivity or favourable attitudes toward casual sex, increases both hooking up and pornography consumption. In this paper, we examine whether there is an association between pornography use and risky hookups (i.e., hookups without condoms and hookups while intoxicated) and whether any such link is better explained by other traits such as impulsivity, favourable attitudes toward casual sex or broader patterns of substance abuse. Understanding these associations may help those aiming to reduce the incidence of risky behaviour to identify individuals who are most at increased risk.

Hookups among emerging adults

Hookups are sexual encounters (i.e., kissing, sexual touching, oral sex and intercourse) that occur without any expectation for future commitment (Owen et al. 2010; Paul, McManus, and Hayes 2000). Between 40 and 86% of US college students report having hooked up at least once (Fielder and Carey 2010; Garcia and Reiber 2008;

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Owen et al. 2008; Paul, McManus, and Hayes 2000; Paul and Hayes 2002). Hookups can be characterised as risky to the extent that they are associated with having multiple sexual partners, sex without protection (condoms) and sex while intoxicated, as these are associated with increased risk for sexually transmitted infections, sexual victimisation and unwanted pregnancy (US Centers for Disease Control 2010).

Estimates of condom use during hookups vary widely, ranging from 0 to 81% (Fielder and Carey 2010; Lewis et al. 2012; Paul, McManus, and Hayes 2000). In one sample, only 50% of those that had engaged in intercourse perceived that not using a condom was risky – less than 5% who participated in oral sex without a condom perceived that their actions carried risk (Downing-Matibag and Geisinger 2009). Substance use, typically alcohol, is positively associated with a higher likelihood of hooking up for both men and women (Fielder and Carey 2010; Lewis et al. 2012; Owen, Fincham, and Moore 2011) – one estimate indicates that only 6% of hookups occurred in the absence of alcohol or drug use (Paul and Hayes 2002).

Sexual script theory provides a framework for understanding how pornography can influence sexual behaviour. Sexual script theory posits that conceptions of sexuality are influenced by multiple social influences – including mass media such as pornography – that contribute to notions of what sexuality is, how it should proceed and what the consequences of various behaviours are likely to be (Gagnon and Simon 2005). Wright's (2011) sexual script 'acquisition, activation, application model' (3AM) of media sexual socialisation more specifically predicts that sexual media helps individuals to internalise scripts through repeated exposure to themes (e.g., 'the desired outcome of a college party is a hookup') followed by application of the script. Scripts can be higher-order (e.g., internalising the belief system implicit in the individuals being portrayed in media) or more specific to a particular sexual behaviour (e.g., seeing two characters who just met leave a college party to hook up [Wright 2013]). Pornography almost universally presents a higher-order script of sexuality that is recreational (as opposed to relational and or procreational [see Malamuth 1996; Wright 2013]). This script of 'casual sex as recreation' may facilitate not only hooking up among college students, but also hooking up in the context of partying and intoxication (Bersamin et al. 2012). Experimental evidence suggests that viewing pornography causes individuals to endorse more permissive sexual scripts (Zillmann and Bryant 1982), more recent longitudinal studies also show that pornography consumption predicts casual sexual attitudes and behaviour (Peter and Valkenburg 2011; Wright 2012a) and that these sexual scripts mediate the effect of pornography on hooking up (Braithwaite et al. 2015). If sexual scripts are shaped by pornography, it is possible that specific risks presented in pornography translate into risky behaviours that occur in vivo. This may be especially true for emerging adults who may use pornography as a form of sexual education (Hare et al. 2015).

Pornography and condom use during hookups

A review of 100 pornographic films showed that condom use during vaginal intercourse was portrayed 3% of the time and condom use during oral sex was never portrayed (Grudzen et al. 2009); other data provide similar estimates (Vannier, Currie, and O'Sullivan 2014). Research on the association between pornography and condom use does not paint a consistent picture. Some studies show that viewing pornography is associated with a lower likelihood of using a condom (Luder et al. 2011; Peter and Valkenburg 2011; Wingood et al. 2001), some fail to find an association (Braun-Courville and Rojas 2009;

Wright and Randall 2012) and one study found a positive correlation between viewing pornography and more frequent use of condoms (Wright 2013).

These differences across studies are likely driven, in part, by differences in sampling and methodology. Regarding age, some of these studies focused on younger age ranges (12–22 years in Braun-Courville and Rojas 2009; 16–20 in Luder et al. 2011; 14–18 in Wingood et al. 2001), some had broad age ranges that were weighted more toward adults (18–87 in Wright and Randall 2012; 18–89 in Wright 2013) and one study examined separate samples of adolescents and adults and found an association only among adults (Peter and Valkenburg 2011) – no studies have specifically focused on emerging adults in college. Most studies have examined only women (in Braun-Courville and Rojas [2009], 85% of the sample were women; Wingood et al. 2001 sampled only women) or men (Wright and Randall 2012; Wright 2013) and in the case of these latter two studies, the association was observed among those who were not married, but it was unclear whether participants were in a committed relationship, a factor that is known to significantly affect condom use (Anderson et al. 1999). Moreover, none of these studies were specific to hookups and none specifically inquired whether the sexual encounter was penetrative, which is a key consideration because hookups often include non-penetrative sexual encounters (e.g., sexual touching).

In sum, we do not know whether there is an association between pornography use and condom use during hookups among emerging adults in college. This is an important omission because emerging adults in college are one of the most at-risk groups for sex with multiple, uncommitted partners (Garcia et al. 2012). Further, it is important to examine condom use in the context of penetrative hookups, since non-penetrative hookups are not made safer by the use of condoms. As such we will examine the following hypotheses:

- H1: Pornography use will be associated with a higher incidence of penetrative hookups.
 H2: Pornography use will be associated with less condom use during penetrative hookups.

Pornography and substance use during hookups

Alcohol use is associated with a higher likelihood of hooking up and having more unique hookup partners (Fielder and Carey 2010; Welsh, Grello, and Harper 2006; Lambert, Kahn, and Apple 2003; Owen et al. 2010; Paul and Hayes 2002). This is an important association to understand because intoxication is associated with engaging in sexual behaviour that is later regretted (LaBrie et al. 2014; Owen, Fincham, and Moore 2011; Paul, McManus, and Hayes 2000). Three studies report correlations between men's pornography use and alcohol consumption (Carroll et al. 2008; Krahe 2011; Svedin, Åkerman, and Priebe 2011). Because none of these studies were specific to hookups and none tested for a difference between sexes (to see whether gender moderates these effects), it remains unclear whether there is a relationship between pornography use and alcohol use during hookups among emerging adults in college and whether this effect is different for men versus women.

It is possible that the association between pornography consumption and alcohol use is epiphenomenal – both alcohol use and pornography use are simply part of the exploration that is characteristic of emerging adulthood – or reflect a broader tendency to not regulate behaviour in opposition to one's impulses. If this is true, we would expect to see no association between intoxication during hookups and pornography consumption when we control for variables such as trait self-control and a tendency toward experience seeking. Self-regulation has been associated with pornography consumption among adolescents (Hardy et al. 2013) and alcohol use among emerging adults (Tangney, Baumeister, and

Boone 2004). Although self-regulation has been linked to many health behaviours (de Ridder et al. 2012), we are not aware of studies linking it to condom use. Similarly, associations have been documented between openness to experiences and sexual experiences during emerging adulthood, including condom use (Miller et al. 2004). As such, we control for these potentially confounding variables – to provide evidence against the possibility that the association between pornography consumption and our outcomes is spurious. Furthermore, because of established differences between men and women in frequency of pornography use (e.g., Willoughby et al. 2014) and sexual behaviour (Baumeister 2000) – and given the gender imbalance in our sample – we tested for whether or not gender moderated the association between pornography consumption and risky sexual behaviours.

Another likely reason for the association between pornography and risky sexual behaviour relates to the existence of sexual scripts. Pornography portrays scripts of partying and recreational sex that are incorporated into the viewer's behaviour. Because pornography tends to present sex as recreational – something that is done for pleasure, often with heretofore unknown acquaintances (Malamuth 1996; Wright 2013) and often in a context of partying¹ we would expect to see a unique association between pornography and intoxication during hookups even when we control for patterns of alcohol use, such as binge drinking and broader, problematic patterns of alcohol that lead to functional impairment. In the present study, we examine whether pornography use will continue to offer incremental prediction of intoxication during hookups even when controlling for broader patterns of alcohol use, hence:

- H3: Pornography use will be associated with a higher incidence of and increasing amounts of intoxication during hookups.
- H4: Pornography use will be associated with being in the riskiest possible category: engaging in a penetrative hookup without a condom while intoxicated.

The current study

In two samples, we examined whether pornography use was associated with the probability of engaging in penetrative hookups without a condom and engaging in hookups while intoxicated and whether any observed effect persisted when controlling for broader patterns of alcohol use, trait self-control and a tendency toward experience seeking. Understanding these associations may help to improve intervention efforts by identifying markers for risk behaviour. We present data from two studies in order to both test whether these results replicate and to provide summary effect sizes and confidence intervals from the aggregation of the two samples (following current recommendations to both directly replicate results and provide aggregate estimates of effect size [Maner 2014]). We were interested in whether our point estimates, rather than just the direction of effects, replicated. Making 'risky' predictions about point estimates and whether they replicate provides a more rigorous test of scientific theories than the usual, 'directional' approach to replication (Meehl 1978).

Methods

Participants and procedure

Participants were recruited from an undergraduate family science course that fulfilled a university-wide general education requirement at a public university in the Southeastern USA. Participation in this study was one of multiple options for students to receive course

credit. Data for Study 1 and Study 2 came from a larger data collection effort examining the course of emerging adulthood in the context of college. Participants provided data via an online survey. Prior to collecting data, we obtained institutional review board approval for all procedures and content.

Data were collected across two separate semesters. Starting from a sample of $n = 1980$, we excluded 40 participants who did not fall into the age range associated with emerging adulthood (18–25 years). Because we were interested in risky behaviours that occurred in the context of hookups, we excluded those who reported that they had not hooked up in the past 12 months (731 participants) and those who were missing data on the question that assessed hooking up (7 participants). Of the sample, 63% had hooked up in the previous 12 months; we excluded the 37% of the sample that had not hooked up. The analysed sample thus comprised 1216 students (767 women, 449 men); the average age for men was 19.6 (SD = 1.40) the average age for women was 19.2 (SD = 1.15). Approximately 65% of respondents were younger than 20 years and 35% were 20 or older. Most respondents were first-year college students (42%), followed by second-years (34%), third-years (18%) and fourth-years (6%). Caucasians comprised 71% of the sample, African Americans 11%, Latino 13%, Asian 3% and ‘Other’ (e.g., Native American, Mixed, etc.) 2%.

Measures

Hooking up

We used the following item to assess hooking up: ‘Some people say that a “hookup” 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 12 months. Response options ranged in increments of 1 from 0 to 10 or more. Then, participants were asked to ‘check all the types of physical intimacy that occurred during [their] most recent hookup’. The options provided were *kissing*, *petting*, *oral sex* and *intercourse (vaginal or anal)*. For binary outcomes (prevalence) we used dummy variables, where 1 indicates that the sexual behaviour occurred, 0 indicates that it did not.

Substance use and condom use

Next, participants were asked, ‘During your most recent hooking up experience, were you under the influence of a substance (e.g., alcohol)?’ Responses options were *not intoxicated* (coded as 1), *somewhat intoxicated* (2), *intoxicated* (3) and *very intoxicated* (4). To assess the prevalence of intoxication during hookups, we used dummy variables, where 1 indicates any degree of intoxication (from *somewhat intoxicated* to *very intoxicated*) and 0 indicates that the respondent was *not intoxicated* during the most recent hookup. They were also asked ‘During your most recent hooking up experience, did you or your partner use condoms?’ the response options were *no* (coded as 1) or *yes* (0).

Frequency of pornography viewing

Pornography viewing was assessed by an item asking, ‘Approximately how many times in the past 30 days have you viewed pornography (e.g., video, magazine, internet)?’ Answer selections included *never* (coded as 1), *once* (2), *a few times a month* (3), *about weekly* (4), *a few times a week* (5), *daily* (6) and *a few times a day* (7). This is an item commonly used to assess patterns of pornography use; for example the General Social Survey uses this

item and number of studies examining associations between patterns of pornography use and sexual outcomes have been published from this dataset using this item (e.g., Wright 2012b, 2013).

Control variables

To provide a test of whether certain personality traits or broader patterns of substance use explain participants' risky behaviours, we included a measure of trait self-control (Tangney, Baumeister, and Boone 2004) ($\alpha = .84$), a single item assessing binge drinking (Reinert and Allen 2007) ('How often in the last 30 days did you have five or more drinks on one occasion?'), a measure of broader problematic patterns of alcohol use among students in college (Maddock et al. 2001) ($\alpha = .80$), a two-item measure of openness to experience (Gosling, Rentfrow, and Swann 2003) ($\alpha = .42$), and a measure of attitudes toward casual sex from the Sociosexuality Inventory (Penke and Asendorpf 2008) ($\alpha = .85$).

Data analysis

We conducted two types of analysis to examine the relationship between pornography use and our outcomes variables. For binary outcomes (e.g., whether or not a condom was used during a hookup) we used logistic regression and reported odds ratios. For ordinal outcomes (e.g., how intoxicated a participant was during the last hookup), we used ordered logistic regression and reported odds ratios – in this case, odds ratios indicated the probability of being in a higher or lower ordered category (e.g., *not intoxicated*, *somewhat intoxicated*, etc.). Prior to interpreting results, we screened for influential observations using procedures recommended by Hosmer, Lemeshow and Sturdivant (2013) and Long and Freese (2006); for two outcomes (penetrative hookups, binary alcohol use), influential cases were found and omitted from the models, though in both instances these omissions did not change the substantive interpretation of the results.

For each outcome, we generated estimates and confidence intervals for Study 1 and Study 2 to determine whether these effects replicated across samples. To generate an aggregate estimate, we combined the two samples but accounted for potential non-independence in our sample due to within-group clustering across semesters using robust standard errors with semester as the clustering variable. This approach adjusts our confidence intervals to account for nesting within groups and mitigates against Type I errors. Finally, to test for the possibility that the link between pornography use and these outcomes was epiphenomenal – that is, that pornography is only an incidental correlate of variables that have a truly meaningful relationship with risky outcomes – in our combined sample, we tested whether each of the observed associations remained when we controlled for variables that are known to be associated with risky behaviours during emerging adulthood (i.e., trait self-control, binge drinking, problematic patterns of alcohol use, openness to experience and attitudes toward casual sex). We tested for problems with multicollinearity in these models and detected none.

Results

Descriptive statistics

In the combined sample, 45% of respondents reported having viewed pornography: 10% reported having viewed pornography once, 16% a few times a month, 6% about weekly,

10% a few times a week, 3% daily, and less than 1% more than once a day. Regarding hookups, 63% reported that their most recent hookup was penetrative (i.e., included either oral sex or intercourse). Regarding condom use, 50% reported that they did not use a condom during their most recent hookup. Regarding alcohol use during the most recent hookup, approximately 55% of respondents reported being intoxicated during the most recent hookup: 25% reported being *somewhat intoxicated*, 21% reported being *intoxicated*, and 10% reported being *very intoxicated*. Sample means, standard deviations and correlation matrices for both studies can be seen in Tables 1 and 2.

Is pornography use associated with penetrative hookups?

In a sample comprised only of those who reported hooking up in the past 12 months, viewing pornography was associated with a higher likelihood of having had a penetrative hookup (i.e., included oral sex or intercourse) during the most recent hookup experience (Study 1: $OR = 1.34$, 95% $CI [1.19, 1.52]$; Study 2: $OR = 1.41$, 95% $CI [1.24, 1.61]$; Aggregate: $OR = 1.38$, 95% $CI [1.31, 1.45]$) each unit increase on the pornography viewing frequency scale was associated with a 38% higher odds of a penetrative hookup. We examined a second model to explore the possibility that biological sex played a role in this association.² We found that the association between pornography use and penetrative hookups was significantly stronger for women ($OR = 1.70$, 95% $CI [1.68, 1.71]$) than for men ($OR = 1.14$, 95% $CI [1.05, 1.24]$).

Is pornography use associated with penetrative hookups when accounting for control variables?

Next, we examined the same model but included all the control variables (i.e., trait self-control, binge drinking, problematic patterns of alcohol use, openness to experience and attitudes toward casual sex). For men, the association between pornography and penetrative hookups was weakened ($OR = 1.07$, 95% $CI [.99, 1.17]$) such that the lower bound of the confidence interval just included 0 (analogous to $p = .06$). For women, pornography use was still strongly related to penetrative hookups ($OR = 1.58$, 95% $CI [1.50, 1.67]$).

Is pornography use associated with condom use during penetrative hookups?

In this analysis, we included only those who reported that their most recent hookup was penetrative. We did not find a consistent association between pornography use and condom use (Study 1: $OR = 1.00$, 95% $CI [.88, 1.13]$; Study 2: $OR = .87$, 95% $CI [.77, 1.00]$; Aggregate: $OR = .93$, 95% $CI [.82, 1.06]$). However in our second model where we examined whether including biological sex changed the pattern or results, we found that being a women was significantly associated with condom use ($OR = 1.51$, 95% $CI [1.50, 1.51]$), suggesting that women are more at risk for not using condoms during penetrative hookups.

Are women more at risk to not use condoms when accounting for control variables?

When accounting for control variables, participants who were women continued to report less condom use than men during the most recent hookup ($OR = 1.28$, 95% $CI [1.09, 1.51]$).

Table 1. Descriptive statistics and correlations for Study 1.

	1	2	3	4	5	6	7	8
Mean	2.22	0.63	0.52	0.55	1.95	0.13	0.64	-0.55
SD	1.57	0.48	0.50	0.50	1.03	0.34	0.48	0.79
1. Porn use frequency	1							
2. Penetrative hookup	0.20***	1						
3. Condom used	0.04	0.34***	1					
4. Intoxicated (binary)	0.09*	-0.03	-0.04	1				
5. Intoxicated (ordinal)	0.12**	-0.02	-0.08	0.84***	1			
6. Riskiest category	0.09*	0.30***	-0.41***	0.36***	0.36***	1		
7. Female	-0.71***	-0.18***	-0.04	-0.04	-0.05	-0.05	1	
8. Female-porn interaction	-0.74***	-0.08	-0.01	-0.19***	-0.21***	-0.10*	0.58***	1

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 2. Descriptive statistics and correlations for Study 2.

	1	2	3	4	5	6	7	8	9	10	11	12
Mean	2.08	0.62	0.49	0.55	1.95	0.14	3.70	2.01	3.16	0.07	0.63	-0.49
SD	1.48	0.49	0.50	0.50	1.01	0.35	2.54	0.86	0.68	0.75	0.48	0.79
1. Porn use frequency	1.00											
2. Penetrative hookup	0.20***	1.00										
3. Condom used	0.10*	0.25***	1.00									
4. Intoxicated (binary)	0.04	-0.14***	-0.05	1.00								
5. Intoxicated (ordinal)	0.03	-0.12**	-0.08*	0.85***	1.00							
6. Riskiest category	0.06	0.31***	-0.40***	0.37	0.35***	1.00						
7. Binge Drinking	0.21***	0.05	0.01	0.33***	0.37***	0.14***	1.00					
8. Problematic alcohol use	0.11**	0.18***	-0.02	0.27***	0.28***	0.22***	0.45***	1.00				
9. Self-control	-0.15***	-0.03	0.04	-0.13**	-0.15***	-0.06	-0.26***	-0.31	1.00			
10. Openness to experience	-0.02	0.01	0.07	-0.03	-0.04	-0.03	0.03	-0.07	0.07	1.00		
11. Female	-0.67***	-0.18***	-0.12**	-0.01	-0.02	0.00	-0.23***	-0.05	0.05	-0.05	1.00	
12. Female-porn interaction	-0.76***	-0.11	-0.08	-0.14***	-0.13**	-0.08*	-0.20***	-0.10*	0.11*	0.06	0.55***	1.00

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Is there a link between pornography use and intoxication during hookups?

Intoxication as a binary outcome

To examine this research question, we first examined the prevalence of intoxication during hookups. Pornography use was significantly associated with substance use during the most recent hookup (Study 1: $OR = 1.12$, 95% $CI [1.01, 1.25]$; Study 2: $OR = 1.07$, 95% $CI [.96, 1.19]$; Aggregate: $OR = 1.10$, 95% $CI [1.05, 1.15]$). Our second model showed that biological sex moderated this association: for men, pornography use was associated with an increased likelihood of intoxication during the most recent hookup ($OR = 1.49$, 95% $CI [1.30, 1.71]$), whereas for women, pornography use was associated with a decreased likelihood of intoxication during the most recent hookup ($OR = .70$, 95% $CI [.67, .73]$). Based on this model, for men, 35% (95% $CI [26, 44]$) of those who never viewed pornography are predicted to have been intoxicated compared to 62% (95% $CI [57, 68]$) who viewed *about weekly* and 83% (95% $CI [75, 90]$) of those who viewed pornography *several times a day*. For women, 57% (95% $CI [57, 58]$) of those who never viewed pornography are predicted to have been intoxicated compared to 31% (95% $CI [30, 33]$) who viewed *about weekly* and 13% (95% $CI [11, 16]$) of those who viewed pornography *a few times a day*. A graph illustrating these probabilities can be seen in Figure 1.

Intoxication as an ordinal outcome

We then examined intoxication as an ordinal outcome, where higher values indicated increasing amounts of intoxication. Pornography use was associated with increasing amounts of intoxication (Study 1: $OR = 1.14$, 95% $CI [1.04, 1.26]$; Study 2: $OR = 1.05$, 95% $CI [.96, 1.16]$; Aggregate: $OR = 1.10$, 95% $CI [1.02, 1.19]$).³ Again, gender moderated these findings such that pornography use was associated with increasing amounts of intoxication for men ($OR = 1.40$, 95% $CI [1.20, 1.62]$) but decreasing amounts of intoxication for women ($OR = .70$, 95% $CI [.63, .77]$).

Is pornography use associated with being intoxicated during hookups when accounting for control variables?

Including all control variables in the model examining intoxication incidence, pornography use continued to be associated with a higher likelihood of intoxication for

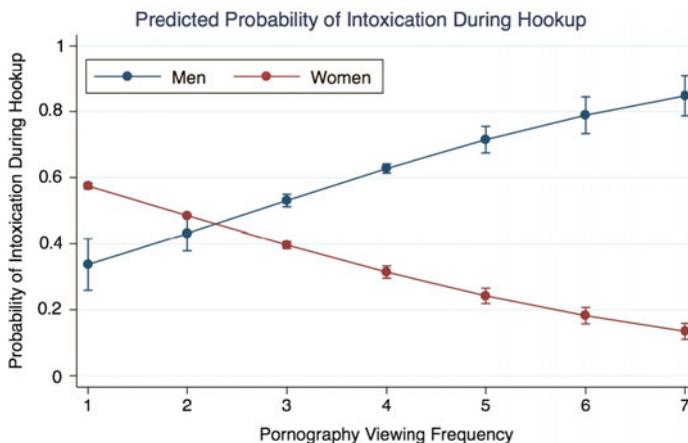


Figure 1. Predicted probabilities of being intoxicated during the most recent hookup.

men ($OR = 1.35$, 95% $CI [1.15, 1.58]$) and a lower likelihood of intoxication for women ($OR = .61$, 95% $CI [.58, .63]$). We then examined intoxication from an ordinal perspective and found that, for men, pornography continued to be significantly associated with increasing levels of intoxication ($OR = 1.26$, 95% $CI [1.06, 1.50]$). For women, pornography use continued to predict decreasing levels of intoxication ($OR = .62$, 95% $CI [.54, .71]$).

Is pornography use associated with being in the riskiest possible category?

Finally, we examined the riskiest possible outcome: an individual engaged in a penetrative hookup without a condom while intoxicated. Of participants, 14% ($n = 167$) fell into this riskiest category. Pornography use was significantly associated with being in the riskiest category (Study 1: $OR = 1.16$, 95% $CI [1.01, 1.33]$; Study 2: $OR = 1.12$, 95% $CI [.97, 1.30]$; Aggregate: $OR = 1.14$, 95% $CI [1.11, 1.18]$). Again, gender moderated this effect, such that pornography use was strongly associated with being in the riskiest category for men ($OR = 1.37$, 95% $CI [1.33, 1.42]$), but not for women ($OR = 1.00$, 95% $CI [.97, 1.03]$). Thus for men, 7% (95% $CI [3, 11]$) of those who never viewed pornography are predicted to be in this riskiest category compared to 15% (95% $CI [12, 19]$) who viewed about weekly and 32% (95% $CI [19, 45]$) of those who viewed pornography several times a day.

Is pornography use associated with being in the riskiest possible category when accounting for control variables?

For men, pornography use continued to be associated with being in the riskiest category ($OR = 1.29$, 95% $CI [1.27, 1.32]$). For women, pornography became significantly associated with a lower likelihood of being in the riskiest category ($OR = .89$, 95% $CI [.87, .91]$) when we accounted for control variables.

Do these effects replicate?

For each of the preceding analyses, estimates from Study 2 fell within the confidence intervals from Study 1, suggesting not only that these effects replicate directionally, but also that point estimates replicate across our two large samples of emerging adults who hooked up in the past 12 months.

Discussion

In two separate samples, we replicated the findings that pornography use is associated with a higher incidence of penetrative hookups, intoxication during hookups and being in the riskiest category during the most recent hookup (penetrative hookup without a condom while intoxicated). The association between pornography use and intoxication was moderated by gender: pornography consumption was associated with a higher likelihood of and increasing amounts of intoxication for men, whereas for women, pornography use was associated with a lower likelihood of and decreasing amounts of intoxication. For each of these outcomes, we observed that our point estimates from Study 1 not only replicated directionally, but that each of the point estimates for Study 2 fell within the 95% confidence intervals from Study 1, providing strong evidence for the reliability of these point estimates. Finally, we examined whether these associations were rendered non-significant when accounting for the potential effects of trait self-control, binge drinking, problematic patterns of alcohol use, openness to experience and attitudes toward casual

sex. Controlling for these alternate explanations did not substantively change the pattern of results, suggesting that the association between pornography use and risky hookup behaviours is not better explained by these variables.

Taken together, these findings advance our knowledge of the unique association between pornography and risky sexual behaviour by showing that pornography use is associated with behaviours classified by the Centers for Disease Control as risky. As we suggested in the introduction, we propose that sexual scripts theory offers a compelling rationale for these associations. Although sexual scripts are multiply influenced, media is thought to be a potent developmental influence in general, and pornography in particular may contribute to emerging adults' definition of what sexuality is, how sexual encounters unfold and what the consequences of various behaviours are likely to be (Wright 2011). In fact, because emerging adults are relatively inexperienced with sex, pornography may play a more salient role in their conceptualisation of sexuality than for those who have had more sexual experience. With sexual script theory as an overarching theoretical framework, we attempt to contextualise our findings in light of previous research on the association between pornography use, condom use and intoxication during hookups.

How do our findings fit with and extend previous research?

Condom use

Most studies examining the association between pornography use and condom use have examined primarily women (Braun-Courville and Rojas 2009; Tr en, Stigum, and Eskild 2002; Wingood et al. 2001) or men (Wright and Randall 2012; Wright 2013) and none have specifically examined condom use during hookups. Our study included both men and women and failed to find a reliable bivariate association between pornography use and condom use during penetrative hookups. It is possible that there is simply no effect between these variables – results from previous research have been inconsistent, with the average effect hovering near zero. Another possibility for why we observed a null association is that condom use is negotiated between two partners. Because we were only able to assess the pornography consumption patterns of one of these partners, any effect that may exist between pornography and condom use may become diluted by the impact of the other partner. However, we did observe that women are at greater risk for not using condoms during hookups. We recommend that future research routinely test for differential patterns of condom use during hookups as a function of biological sex and that research in this area consistently test for gender differences when examining this association.

When we tested condom use in context with other risky behaviours, we found that men who viewed pornography were most at risk for not using condoms during the riskiest kinds of hookups – penetrative hookups where the respondent was intoxicated – showing that pornography use is directly associated with riskier sexual behaviour. Pornography consumption is also indirectly related to risky sexual behaviour as it is associated with participating in penetrative hookups and having multiple sexual partners (Braithwaite et al. 2015). Since a non-trivial number of hookups occur without protection (estimates range from 19 to 100%), pornography is indirectly associated with exposure to risk via its association with these behaviours.

Intoxication during hookups

Previous research relevant to the link between pornography use and intoxication during hookup was limited to three studies that reported associations between men's pornography

use, alcohol consumption and binge drinking (Carroll et al. 2008; Krahé 2011; Svedin, Åkerman, and Priebe 2011) but none of these studies were specific to hookups, none focused on emerging adults, despite their disproportionately high-risk status, and none tested for differences between men and women. Our study showed that a robust association exists between pornography use and intoxication during hookups among emerging adults in college. Moreover, we showed that this association persists when we control for potent covariates, including frequency of binge drinking and broader problematic patterns of alcohol use. Perhaps most important, we showed that there is a stark difference between men and women for this association: for men, pornography use was *positively* associated with risk behaviour during hookups, whereas for women, pornography use was *negatively* associated with risk behaviour. We propose two possible reasons why this difference may exist.

First, it is possible that women who view pornography are more sexually savvy than women who do not. In general, women are less likely to seek out pornography than men (Maddox, Rhoades, and Markman 2011), so it is possible that those who do so are more sexually educated and thus less likely to do risky things during hookups, such as be intoxicated. Wright's 3AM theorises that pre-existing scripts moderate the effects of exposure to sexual media; specifically, if women pornography consumers are sexually savvy and health and risk conscious, seeing risky sexual behaviour in pornography may actually serve as a reminder for them to use condoms and avoid other risks like intoxication. Supporting this line of thinking, Peter and Valkenburg (2011) found that pornography influenced adult, but not adolescent, sexual risk behaviours; they argued that youth are more aware of sexual risks than adults so are less affected by porn that portrays sexual risks. We recommend that future research not only attempt to replicate this gender effect, but also explore whether sexual knowledge and experience are associated with women's pornography use in order to determine whether our theorising holds up to empirical scrutiny.

The second possible explanation – one that is not mutually exclusive from the first – is that the implicit messages in pornography targeting men are different than the implicit messages in pornography targeting women. Mosher and MacIan (1994) postulate that in order to create 'deep involvement' in erotic, sexually explicit videos, pornography must fit a person's sexual script. Men prefer role enactment exhibited by new, pleasure-centred experiences, whereas women prefer relational, person-centred scripts (Mosher and MacIan 1994). Indeed, women do not enjoy pornography when it goes against their preferred scripts (Mosher 1973). Modern research continues to assert that the sexual scripts more often preferred by men are recreational and focus on physical pleasure as the goal of sexuality, whereas pornography targeting women takes a relational and emotional approach to sexuality that humanises (rather than objectifies) the people involved (Bowleg, Lucas, and Tschann 2004; Peter and Valkenburg 2011). Further, Peter and Valkenburg (2011) found that exposure to pornography affected men's sexual risk behaviour, but not adult women's. We recommend that future research explicitly measure these constructs to help disentangle these effects and provide insight into whether the specific scripts portrayed in pornography predict later sexual behaviour.

Implications and future research directions

Preventive interventions are thought to be most effective when targeting groups that are most at risk (Coie et al. 1993), ideally with content that is tailored to those specific groups. As cited earlier, previous research has already identified that college students are at risk for hookups generally, hookups that occur while intoxicated, and hookups without condoms;

but our research has identified subgroups within this larger group who are particularly at risk for specific outcomes, even relative to this generally risky group. College interventions that target risk behaviour may profitably take these findings into account when developing curricula and when attempting to target those who are most at risk. For example, many college interventions attempt to address perceptions of social norms as these are known to be important predictors of risky sexual behaviour (Sanderson and Yopyk 2007). Previous research has established a prospective relationship between pornography use and attitudes about casual sex (Braithwaite et al. 2015). By screening for frequent pornography consumption in college health settings, individuals who are likely to have internalised social norms via pornography may be identified and provided with information to correct perceptions and improve outcomes. For example, college-based interventions often focus explicitly on trying to help participants get more helpful, accurate norms for sexual behaviour (O'Grady, Wilson, and Harman 2009) and change attitudes that facilitate sexual risks (Fisher et al. 1996). Research on alcohol use among college students suggests that increased tailoring of social norms campaigns tends to produce more robust effects (Lewis and Neighbors 2006), thus targeting frequent pornography users and helping them to adjust their internal norms to match reality, rather than the norms portrayed in pornography, may enhance treatment effects.

More broadly, public health campaigns attempt to target their informational outreach efforts to those who are more at risk (Keller et al. 2004). In addition to the usual formats for public service announcements (e.g., billboards, radio advertisements), it may be effective to use services like Google 'adwords' to target those between the ages of 18–25 who are searching for pornography and present public health messages that help to create more realistic social norms, that convey the importance of condom use, or that warn against hooking up while intoxicated. If public service messages like this can reduce costs associated with risky sexual behaviour, these campaigns may be a good investment. Even if pornography is not a causal agent, at least pornography is a marker for risk, and thus efforts to reach frequent pornography users with public health messages would be targeting an at-risk group.

A number of factors limit the inferences we can make from these data. First, our data were cross-sectional so we cannot establish any kind of temporal ordering in the pornography/risk relationship. For example, it is possible that those who hook up are more likely to seek out pornography; although longitudinal research that has attempted to establish temporal ordering favours the view that pornography consumption precedes risk behaviour (e.g., Brown and L'Engle 2009; Peter and Valkenburg 2011). Second, our data were self-reported survey data, which assumes participants have good insight and report past events accurately. Research using multiple methods of measurement (e.g., informant report; dyadic data) would add considerably to this line of research. Related to this, there are certain limits to the way we measured constructs: our measure of openness to experience had only two items, our measure of intoxication was not specific to particular substances (e.g., alcohol versus marijuana) and our measure of pornography use asked only about frequency of use and provided no information about the content of pornography. Future research would do well to use more specific methods of assessing these constructs. Finally, our sample was comprised of relatively young emerging adults in college in the USA. Although this is an important population to study because of the high prevalence of risky sexual behaviours, our findings may not generalise beyond US culture to older emerging adults or to those who do not attend college.

These limitations are offset by a number of strengths. Our study filled in a number of gaps in this area of research by examining risky sexual behaviours in the context of hookups

among college students – a high-risk group in which these associations had not been established. Our analysis compared various risk behaviours among a sample that was selected on the basis of hooking up, which is a stringent way to examine risk since all of these students are already engaging in casual sexual behaviour; moreover, we controlled for a host of relevant variables in order to test the possibility that the observed associations between pornography and risky behaviours are spurious. Finally, we followed the best practices for scientific inquiry using inferential statistics by replicating our point-estimates and focusing on effect sizes and confidence intervals (Cumming 2014). This approach allows us to make inferences about these phenomena with greater confidence than more commonly used approaches to null-hypothesis testing that focus only on *p*-values. For example, based on a predictive equation that has been cross-validated in two large samples, one could use our findings to estimate, based on frequency of pornography use, the likelihood of a man who is in college hooking up while intoxicated in the next six weeks. This level of specificity opens up the possibility of targeting at-risk individuals and making recommendations based on their specific characteristics in order to more effectively reduce sexual risk.

As hooking up becomes a more common part of emerging adulthood in the USA, particularly for those in college (Bogle 2008), it becomes important to quantify the potential public health risks that are associated with hooking up and to understand risk and protective factors so we can reduce these risks. When we view our findings in concert with previous research on hooking up, we see that this relatively new pattern of courtship and exploration is associated with significant public health risks. If pornography use is useful marker – if not causal agent – for risky sexual behaviour, understanding and leveraging this variable in our prevention efforts may allow us to more effectively mitigate these risks for emerging adults in college.

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Notes

1. Although content analysis have not yet been conducted on ‘party’ scripts in pornography, a search for the term ‘party’ in the title field of the Internet Adult Film Database (<http://www.iafd.com>) yielded nearly 1700 results with dates ranging from 1973–2015.
2. For each of our tests of the statistical significance of the differences between parameter estimates for men and women, we conducted a regression in which the dependent variable was regressed on pornography viewing frequency, biological sex (women = 1, men = 0) and an interaction term between pornography use and biological sex.
3. Because ordered logistic regression assumes that the relationship between predictors and each level of the ordinal outcome variable are equal, we conducted the Brant test (Brant, 1990) for each equation where we use ordered logistic regression to test this parallel regression assumption. In each case, the obtained statistic was not significant, indicating that our data did not violate this assumption.

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Résumé

Afin de vérifier si la consommation de la pornographie est associée aux comportements sexuels à risque chez les jeunes adultes, nous avons examiné deux larges échantillons de jeunes ayant déclaré avoir eu des rencontres sexuelles dans les douze derniers mois (N combiné =1216). La consommation de la pornographie s'est révélée associée à une plus forte probabilité de rapports sexuels avec pénétration; une plus forte incidence d'intoxication à l'alcool chez les hommes, lors des rencontres sexuelles (mais une plus faible incidence pour les femmes); des taux croissants d'intoxication à l'alcool chez les hommes lors des rencontres sexuelles, mais décroissants pour les femmes; et une plus forte probabilité d'appartenir à la catégorie la plus à risque, d'avoir des rapports avec pénétration, sans préservatifs et en étant ivre. Pour chacun de ces résultats, nos estimations ponctuelles, relativement à l'étude 2, sont retombées dans les 95 % d'intervalle de confiance de l'étude 1. L'ajustement pour l'auto-contrôle des traits de personnalité, la fréquence de la « biture express », de plus vastes modèles problématiques d'abus d'alcool, l'ouverture à l'expérience et les attitudes vis-à-vis des rapports sexuels occasionnels n'a pas modifié le schéma d'ensemble des

résultats. Les implications de ces derniers pour les interventions de réduction des risques sexuels sont discutées.

Resumen

Con el objetivo de analizar si existe una relación entre el consumo de pornografía y una conducta sexual arriesgada en adultos jóvenes, estudiamos dos amplias muestras de personas que informaron haber tenido relaciones sexuales casuales en los últimos doce meses (N combinado =1216). Se asociaba el uso de la pornografía con una mayor probabilidad de tener relaciones sexuales casuales con penetración; una mayor incidencia de intoxicación por parte de los hombres durante las relaciones sexuales casuales (pero una menor incidencia de intoxicación en el caso de las mujeres); mayores niveles de intoxicación en hombres durante las relaciones sexuales casuales pero menores niveles de intoxicación en el caso de las mujeres; y una mayor probabilidad de pertenecer a la categoría con el mayor riesgo que tiene relaciones sexuales casuales con penetración y sin preservativo en estado de intoxicación. Para cada uno de estos resultados, nuestras estimaciones puntuales para el Estudio 2 se sitúan dentro de los intervalos de confianza de 95% del Estudio 1. Factores como el autocontrol de la personalidad, la frecuencia de los abusos de alcohol, conductas problemáticas más generales del uso de alcohol, abrirse a la experiencia y las actitudes hacia el sexo casual no hicieron cambiar el modelo de los resultados. Debatimos las repercusiones en las iniciativas para reducir los riesgos sexuales.