

Does Pornography Consumption Increase Participation in Friends with Benefits Relationships?

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Abstract Friends with benefits (FWB) relationships integrate two types of relationships—friendship and a relationship that includes sexual intimacy but without an expectation of commitment. These relationships are often seen as less risky than other casual sexual behaviors, but they still pose a high risk of contracting an STI. Pornography consumption has been connected to increases in risky sexual behavior in other types of casual sex. In two studies (Study 1 $N = 850$; Study 2 $N = 992$), we examined the hypothesis that pornography use influences FWB behaviors, specifically through the mechanism of sexual scripts. Our results demonstrate that more frequent viewing of pornography is associated with a higher incidence of FWB relationships, a higher number of unique FWB partners, and engagement in all types of risky sexual behaviors during FWB relationships. We did a direct replication of these effects in Study 2 with all point estimates falling within their respective confidence intervals. We also examined these effects while controlling for the stability of FWB behaviors over the course of a semester. Finally, we provided evidence that more permissive sexual scripts mediated the association between frequency of pornography use and FWB behaviors. We discuss our findings with an eye toward mitigating public health risks among emerging adults.

Keywords Pornography · Friends with benefits · Sexual scripts · Emerging adults · Mediation

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Introduction

A relatively new sexual outlet for emerging adults that has only recently caught the attention of researchers is friends with benefits (FWB) relationships. FWB relationships integrate two types of relationships—friendship and a relationship that includes sexual intimacy but without an expectation of commitment (VanderDrift et al. 2012; Furman and Shaffer 2011). Unlike hookups, which typically involve two people who recently met engaging in sexual behavior without expecting a future relationship (Olmstead et al. 2013), those in FWB relationships agree to maintain their already existing friendship while adding the element of sexual activity but without the expectation of dates, public displays of affection, emotional attachment, etc. As a FWB relationship takes place, the two people in the relationship attempt to keep their friendship and sexual activity largely exclusive of one another, but maintain both throughout the duration of the FWB relationship (Olmstead et al. 2013).

However, it is often difficult for people to keep the two types of relationships exclusive from one another. Complications may arise when one person becomes emotionally attached to the other while his or her partner feels no such attachment (Owen and Fincham 2012; VanderDrift et al. 2012). Although 25 % of men reported the desire for the FWB relationship to turn into something more serious, it is usually women (40 %) who hope for more commitment, as early as the beginning of the arrangement (Owen and Fincham 2011), even though this desire is not always communicated (Owen and Fincham 2012). While people may enter a FWB relationship with the desire for it to progress into a romantic relationship, the opposite outcome is often the case. Approximately 10 % to 20 % of FWB relationships progress into romantic relationships (Bisson and Levine 2009; Eisenberg et al. 2009) with the majority of FWB relationships ending with participants staying friends while quitting the sexual relationship. However, many people, both men and women, have reported feeling awkwardness around their friend after having had a sexual encounter with them (Weaver et al. 2011). Perhaps the lack of romance and the complications and awkwardness associated with the multi-faceted relationship of friendship and sexual partner may help account for why FWB relationships have been found to be less satisfying, both emotionally and sexually, than more traditional committed romantic relationships (Lehmiller et al. 2014; Owen and Fincham 2012).

Despite this, FWB relationships appeal to people for several reasons and may provide some benefit for those involved. FWB relationships provide easy and relatively consistent access to sex (VanderDrift et al. 2012), and can help FWB partners to avoid jealousy, hurt feelings, or attachments that exist in more traditional committed relationships (Weaver et al. 2011). Additionally, in the short term, those involved in FWB relationships reported greater positive emotional reactions than negative in response to the relationship experience (Owen and Fincham 2011). A lack of long term or exclusive commitment to partners is also enticing for those open to FWB relationships (VanderDrift et al. 2012; Owen and Fincham 2011). Perhaps these factors are especially attractive to men since Owen and Fincham (2011) have found that men are more likely to engage in FWB relationships.

Women typically desire more commitment in relationships than men do, which may be a key reason for why women are less likely than men to be satisfied with a FWB relationship (Owen and Fincham 2011; Lehmiller et al. 2011). Interestingly, those individuals who used a FWB relationship as a jumping off point for a romantic relationship tended to be less satisfied with their relationships than those who started in a more traditional manner (Owen and Fincham 2012). In some studies, people in FWB relationships have also been found to have better communication about sex and exclusivity or “monogamy” in their sexual relationship (Owen and Fincham 2012; Weaver et al. 2011; Wentland and Reissing 2011), although that is not universally true (Lehmiller et al. 2014).

However, these discussions do not always translate into actual sexual exclusivity for those in FWB relationships. In one sample, 24 % had multiple FWB partners, which poses a significant risk for contracting and spreading STIs (VanderDrift et al. 2012). The risk of contracting an STI is particularly problematic in these circumstances because men in multiple casual sexual relationships report less frequent use of contraceptives when compared to men who do not have sex with multiple partners (Olmstead et al. 2013). In one study, a third of participants reported a lack of consistent condom use when engaging in sexual acts with a friend (Weaver et al. 2011). Evidence suggests that this inconsistent use of protection may be affected by the trust that sexual partners have for their partner (Gerrard et al. 1996), an increase in comfort with their partner, and feeling that there is little or no risk involved in engaging in sex with an established friend (Weaver et al. 2011).

Sexual Scripts and Pornography Use

One common theory in the development of sexuality is sexual scripts. Sexual scripts are the cognitive framework by which individuals conceptualize sexuality including when, where, how and with whom of how sexual encounters should proceed. Sexual scripts are theorized to arise from many sources including environmental or sociocultural influences (Gagnon and Simon 2005). Using this theory, Dworkin and O’Sullivan (2005) found that sexual scripts are somewhat fluid; that is, they are different between individuals and are changed over time and with experience, including vicarious experience like pornography. Since the disruptive innovation of the Internet at the end of the last century, the availability, anonymity, and affordability of pornography has grown significantly (Cooper 1998). As its use has increased, pornography has become a notable influence in shaping sexual scripts (Stulhofer et al. 2008), and via social learning, those viewing pornography incorporate what is portrayed into their own sexual scripts and sexual behavior (Weinberg et al. 2010).

Some researchers have found pornography to be a useful learning tool that expands one’s sexual repertoire (Weinberg et al. 2010; Olmstead et al. 2012) and helps increase excitement and satisfaction under certain circumstances (e.g., wives use of pornography increases husband sexual satisfaction, but not their own sexual satisfaction; Poulsen et al. 2013). Research has also found that pornography is associated with problematic outcomes. Specifically, pornography use has showed to be associated with problematic behaviors towards women, including increased

sexual objectification of women (Bridges et al. 2003), greater acceptance of rape (Foubert et al. 2011), and an increase in aggressive attitudes and aggression towards women (Hald et al. 2010; Nøttestad et al. 2010).

In addition to negative behaviors and attitudes toward women, individuals who use pornography may be more likely to engage in sexual acts in general (Wright 2012). Specifically, pornography use has been found to be associated with engagement in prostitution and extradyadic sexual acts (Wright and Randall 2012), a higher number of lifetime sexual partners (Braithwaite et al. 2015; Lehmiller et al. 2014; Wright and Randall 2012), and a greater number of hookups and risky behaviors during hookups (Braithwaite et al. 2015). Similarly, pornography has also shown to be associated with more instrumental attitudes toward sex and greater acceptance of uncommitted sex, premarital sex, and extramarital sex (Braun-Courville and Rojas 2009; Brown and L'Engle 2009; Carroll et al. 2008; Peter and Valkenburg 2010; Wright 2013). However, little research has been done on the relationship between pornography and FWB relationships. We attempt to address this gap in the research in the present studies.

The Present Research

Based on the positive association between frequency of pornography use and frequency and riskiness of hookups (Braithwaite et al. 2015), this study was designed to see if a similar correlation exists in FWB relationships. Hookups and FWB relationships are both casual sex relationships and thus share a certain level of riskiness; however, that FWB relationships take place with a partner who is familiar may change the influence of pornography on sexual behaviors during these encounters. Knowing their partner well before a sexual encounter may lead people to do more risky things in the context of the relationship because of a greater level of trust (Cooper and Orcutt 2000; VanderDrift et al. 2012). We examined whether pornography use is associated with higher levels of certain risky sexual behaviors, including having a larger number of unique FWB partners and the degree of risk associated with each intimate behavior ranging from kissing to intercourse.

The sample under investigation is composed of a large number of emerging adults. In addition to the large size of our sample, emerging adults are the most relevant age group to examine FWB relationships and risky sexual behaviors because about half of emerging adults have reported having casual sex with a friend without any intention to begin a committed relationship and a third reported doing so on more than one occasion (Afifi and Faulkner 2000). Based on sexual script theory and previous research, we predict that those who view pornography more frequently will be more likely to engage in FWB relationships, have more unique sexual partners, and engage in all types of risky sexual behavior during FWB encounters including the more sexually risky penetrative FWB encounters (oral sex and intercourse). To determine whether observed effects replicate, we will examine our hypotheses in two samples and—in Study 2—while controlling for the longitudinal stability of FWB behaviors. Also in Study 2, we will test whether permissive sexual scripts mediate the relationship between pornography consumption and risk behavior. Finally, to ensure that the biological sex of participants is not

driving any observed association (especially since our sample had more women than men), we tested for gender differences for each of our associations.

Study 1

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 large, public university in the Southeastern United States. Participation in this study was one of multiple options for students to receive course credit. Data 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 and content.

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). From our initial sample of $N = 882$, we excluded 14 participants who were over the age of 25 and 18 participants who were under the age of 18. The analyzed sample for Study 1 was thus comprised of 850 participants (658 women, 192 men); the average age for men was 19.3 ($SD = 1.3$) the average age for women was 18.9 ($SD = 1.2$). Most respondents were freshmen (43 %), followed by sophomores (29 %), juniors (22 %), and seniors (6 %). Caucasians comprised 73 % of the sample, African Americans 12 %, Latino 9 %, Asian 2 %, and “Other” (e.g., Native American, Mixed, etc.) 4 %.

Measures

FWB Relationship We used the following item to assess whether participants had a FWB relationship: “Some people say that a ‘friend with benefits’ is a friendship in which there are also physical encounters, but no ongoing committed relationship (e.g., not boyfriend/girlfriend)” After reading this definition participants were then asked how many “friends with benefits” they had in the past 6 weeks. Six response options ranged in increments from 0 to 5 or more. Those who indicated that they had a FWB relationship in the past 6 weeks were then asked to “check all the types of physical intimacy that occurred during [their] ‘friends with benefits’ experience.” 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).

Results

Data Analysis Plan

In Study 1 and Study 2 we use conducted two types of analyses to examine the relationship between pornography use and our outcomes variables. Because it is likely that whether a person engaged in a FWB relationship or not is a process that is distinct from how many unique friends with benefits relationships a person engages in, we examined FWB behavior as a binary outcome (whether it occurred or not) and as a count outcome (how many unique FWB partners the participant had). When examining binary outcomes we used logistic regression and report odds ratios (*OR*). For count outcomes, we used negative binomial regression and report incident rate ratios (*IRR*), which indicate the increase in expected counts per unit increase on the pornography viewing frequency scale. Despite the fact that it is common to see research that uses ordinary least squares (*OLS*) regression regardless of the nature of the dependent variables being analyzed, these are important adjustments to make because using *OLS* regression when the data do not meet the statistical assumptions of that approach can lead to biased estimates and/or parameter estimate that are uninterpretable.

Descriptive Statistics

Thirty-three percent of respondents reported viewing pornography in the past 30 days: 12 % reported viewing pornography once, 10 % a few times a month, 3 % about weekly, 4 % a few times a week, 2 % daily, 1 % a few times a day and 1 % several times a day. Twenty-one percent of participants reported having a FWB relationship in the past 6 weeks. Regarding specific behaviors among those who reported having a FWB relationship, 87 % reported kissing, 64 % reported petting, 55 % reported oral sex, 55 % reported intercourse. Sample means, standard deviations, and our correlation matrix can be seen in Table 1. There was an 82 % retention rate between the beginning and the end of the semester.

Is Pornography Use Associated with a Higher Prevalence of FWB Relationships?

Using logistic regression, we observed a significant association between pornography viewing frequency and whether or not participants had a FWB relationship in the previous 6 weeks (*OR* 1.41, $p < 0.001$, 95 % *CI* [1.26, 1.58]). Specifically, each unit increase in pornography viewing frequency was associated with a 41 % increase in the likelihood that the respondent engaged in a FWB relationship. To illustrate the nature of the observed association, we generated the predicted probabilities for each of the pornography viewing frequency response options using the margins command in *Stata*. The clear dose–response association is apparent: only 17 % (95 % *CI* [14, 21]) of those who had not viewed pornography in the past

Table 1 Descriptive statistics and correlations for Study 1

	1	2	3	4	5	6	7	8	9
Mean	1.78	0.21	0.20	0.14	0.12	0.12	0.27	0.77	-0.35
SD	1.40	0.41	0.40	0.35	0.33	0.33	0.59	0.42	0.83
1. Porn consumption	1.00								
2. Any FWB (prevalence)	0.24***	1.00							
3. FWB kiss	0.22***	0.96***	1.00						
4 FWB sexual touching	0.26***	0.81***	0.80***	1.00					
5. FWB oral sex	0.28***	0.73***	0.72***	0.76***	1.00				
6. FWB intercourse	0.22***	0.74***	0.71***	0.68***	0.79***	1.00			
7. Unique FWB partners	0.25***	0.90***	0.86***	0.74***	0.67***	0.69***	1.00		
8. Female	-0.59***	-0.16***	-0.15***	-0.16***	-0.17***	-0.16***	-0.20***	1.00	
9. Porn × female interaction	-0.73***	-0.17***	-0.16***	-0.18***	-0.16***	-0.14***	-0.21***	0.55**	1.00

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

30 days were predicted to have had a FWB relationship in the past 6 weeks compared to 36 % (95 % CI [30, 42]) of those who viewed pornography *about weekly* and 61 % (95 % CI [48–75]) of those who had viewed pornography *a few times a day*.

To ensure that the biological sex of participants was not driving this association, we generated a second logistic regression model that included a female dummy variable (female = 1, male = 0) as well as an interaction term for biological sex and pornography viewing frequency. Biological sex was not significantly associated with FWB relationships, nor was the interaction term. Likewise, including this variable in the model did not significantly diminish the association between pornography viewing frequency and the likelihood of having a FWB relationship in the last 6 weeks.

Is this Association Robust for Each FWB Intimate Behavior?

We wanted to ensure that this association was not being driven by FWB intimate behaviors that present less potential risk (i.e., kissing, petting), but that it is clearly significant for intimate behaviors that are potentially more risky (i.e., oral sex and intercourse). To do this we generated separate logistic regression models for each of these behaviors. We found that pornography viewing frequency was significantly associated with kissing (OR 1.39, $p < 0.001$, 95 % CI [1.24, 1.56]), petting (OR 1.50, $p < 0.001$, 95 % CI [1.33, 1.69]), oral sex (OR 1.55, $p < 0.001$, 95 % CI [1.37, 1.75]) and intercourse (OR 1.43, $p < 0.001$, 95 % CI [1.27, 1.61]). These parameter estimates suggest that the association between pornography viewing frequency and sexual behavior is consistent across each of the intimate behaviors we assessed.

To ensure that the biological sex of participants was not driving any of these associations, we generated a second model for each of the FWB intimate behaviors that included our female dummy variable and the previously described interaction term. For kissing, petting and intercourse, biological sex was not significantly associated with FWB behaviors nor did including this variable significantly reduce association between pornography viewing frequency and the outcome under examination. For oral sex, a different picture emerged. Although biological sex did not have a direct association with FWB relationships, the interaction of biological sex and pornography use was significant such that the association between pornography use and FWB relationships that involved oral sex was significantly stronger for women (OR 1.88, $p < 0.001$, 95 % CI [1.47, 2.41]) than for men (OR 1.31, $p < 0.01$, 95 % CI [1.08, 1.60]).

Is Pornography Use Associated with a Higher Number of Unique FWB Relationship Partners?

Because a higher number of unique sexual partners is a risk factor for STI's, we examined whether pornography viewing frequency is associated with a higher number of unique FWB partners. Using negative binomial regression for over-dispersed count data, we observed a significant association between pornography

viewing frequency and number of unique FWB partners ($IRR = 1.31, p < 0.001, 95\% \text{ CI } [1.20, 1.42]$); each unit increase in pornography viewing frequency was associated with a 31% higher expected count of unique FWB partners in the previous 6 weeks. Thus the predicted number of FWB partners for someone who never viewed pornography would be 0.21 (95% CI [0.17, 0.25]) partners, someone who viewed pornography about weekly is predicted to have 0.47 (95% CI [0.37, 0.56]) partners and someone who viewed pornography several times a day would be 1.37 (95% CI [0.68, 2.06]) partners in the past 6 weeks. Finally, when we controlled for biological sex, it was not significantly associated with FWB relationships, nor was the interaction term, and the inclusion of this variable in the model did not significantly diminish the association between pornography viewing frequency and the number of unique FWB partners in the previous 6 weeks.

Discussion

In support of our hypotheses, pornography consumption was associated with a greater prevalence of FWB relationships and a higher number of unique FWB partners in the past 6 weeks. This association was robust across different intimate behaviors (i.e., kissing, petting, oral sex, and intercourse) and was not limited only to behaviors that have less inherent risk. Finally, these associations were present for both men and women; in fact the only gender difference that emerged showed a stronger relationship for women than for men. The finding that the association between pornography consumption and oral sex in FWB encounters was stronger for women than men was unexpected, but we tested whether this pattern replicated in an independent sample before attempting to interpret it.

Study 2

We conducted a second study to replicate and extend the findings observed in Study 1. In Study 2, we had two major aims. First, we wanted to determine whether our point-estimates observed in Study 1 would replicate, so we designed a direct replication in our Study 2 analysis. Second, to extend the findings from Study 1, we wanted to determine whether the observed association between pornography and sexual behavior remains when we control for the longitudinal stability of FWB behavior over the course of an academic semester. This approach allows us to make inferences about the direction of the association between pornography consumption and FWB behaviors. It also has the potential provide evidence against the alternate hypothesis that pornography simply reflects a broader predilection for sexual behavior, rather than having a unique association with FWB behavior. By controlling for the stability of FWB behaviors, we are able to examine whether pornography offers incremental predictive power above and beyond the stability of FWB behaviors.

Method

Participants and Procedure

Participants for Study 2 were recruited using the same procedures as in Study 1. The only difference in procedure was that FWB relationship data was collated at the beginning and end of the academic semester (a period of time spanning approximately 3.5 months) in Study 2. Prior to collecting data, we obtained institutional review board approval for all procedures and content.

Again, participants were excluded if they did not fall in the age range associated with emerging adulthood (18–25). From our initial sample we excluded 18 participants who were over the age of 25 and 4 participants who were under the age of 18. The analyzed sample for Study 1 was thus comprised of 992 participants (696 women, 296 men); the average age for men was 19.6 (SD = 1.4) the average age for women was 19.4 (SD = 1.3). Most respondents were freshmen (39 %), followed by sophomores (31 %), juniors (21 %), and seniors (9 %). Caucasians comprised 69 % of the sample, African Americans 12 %, Latino 13 %, Asian 3 %, and “Other” (e.g., Native American, Mixed, etc.) 3 %.

Measures

FWB Relationship We used the following item to assess whether participants had a FWB relationship: “Some people say that a ‘friend with benefits’ is a friendship in which there are also physical encounters, but no ongoing committed relationship (e.g., not boyfriend/girlfriend)” After reading this definition participants, at the baseline assessment, were then asked how many “friends with benefits” they had in the past 12 months; response options ranged in increments of one from 0 to 10 or more. At the end of the semester, the same prompt was presented, but participants were asked to indicate how many friends with benefits they had in the past 6 weeks with response options ranging in increments of one from 0 to 5 or more.

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*), 4 (*about weekly*), 5 (*a few times a week*), 6 (*daily*), and 7 (*a few times a day*).

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 and Asendorpf 2008). 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

Table 2 Descriptive statistics and correlations for Study 2

	1	2	3	4	5	6	7	8
Mean	1.88	0.41	0.23	0.88	0.30	3.81	0.70	-0.41
SD	1.39	0.49	0.42	1.53	0.65	2.62	0.46	0.72
1. Porn consumption	1.00							
2. Any FWB at baseline	0.14***	1.00						
3. Any FWB at follow-up	0.20***	0.31***	1.00					
4. Unique FWB partners at baseline	0.23***	0.69***	0.35***	1.00				
5. Unique FWB partners at follow-up	0.21***	0.31***	0.86***	0.40***	1.00			
6. Sexual scripts	0.46***	0.38***	0.25***	0.40***	0.23***	1.00		
7. Female	-0.65***	-0.15***	-0.18***	-0.24***	-0.22***	-0.51***	1.00	
8. Porn × female interaction	-0.71***	-0.10**	-0.11**	-0.19***	-0.12***	-0.37***	0.51***	1.00

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

items were scored so that higher scores reflected more permissive attitudes toward uncommitted sex. Cronbach's alpha for these three items was 0.86.

Results

Descriptive Statistics

Thirty-six percent of respondents reported viewing pornography in the past 30 days: 9 % reported viewing pornography once, 14 % a few times a month, 5 % about weekly, 6 % a few times a week, 2 % daily, 1 % a few times a day. Forty-one percent of participants reported having a FWB relationship in the past year. At the end of semester assessment, 23 % reported having a FWB relationship in the past 6 weeks. Sample means, standard deviations, and our correlation matrix can be seen in Table 2.

Is Pornography Use Associated with a Higher Prevalence of FWB Relationships?

Using logistic regression, we found that pornography use in the last month was associated with having had a FWB relationship in the previous year (OR 1.24, $p < 0.001$, 95 % CI [1.12, 1.36]). Predicting out of this model, 37 % (95 % CI [33, 40]) of those who had not viewed pornography in the past month had a FWB relationship in the past year compared to 52 % (95 % CI [46, 58]) of those who view pornography *about weekly*, and 67 % (95 % CI [56, 78]) of those who viewed it *a few times a day*. Again, when we controlled for biological sex, it was not significantly associated with FWB relationships, nor was the interaction term, nor did including this variable in the model significantly diminish the association between pornography viewing frequency and having a FWB relationship in the past year.

Because we wanted to see how closely we could replicate our parameter estimates from Study 1, we also looked at the cross sectional association between pornography use and FWB relationships at the end of the semester (where the referent for FWB relationships was the previous 6 weeks, as it was in Study 1). Again, there was an association between pornography use and having had a FWB relationship (OR 1.28, $p < 0.001$, 95 % CI [1.15, 1.42]) such that 19 % (95 % CI [16, 22]) of those who had never viewed pornography had a FWB relationship compared to 33 % (95 % CI [27, 39]) who viewed pornography *about weekly* and 50 % (95 % CI [37, 64]) of those who viewed pornography *a few times a day*. Each of these estimates falls within the respective confidence intervals of their respective Study 1 estimates suggesting that these estimates are reliable across samples.

Does Pornography Use Prospectively Predict a Higher Prevalence of FWB Relationships When Accounting for the Stability of These Relationships?

We then examined the longitudinal effect of pornography on later FWB relationship while accounting for the stability of FWB relationships at the beginning of the semester. Pornography use prospectively predicted a 32 % higher likelihood of

engaging in a FWB relationship ($OR\ 1.32, p < 0.001, 95\ \% CI [1.17, 1.49]$). Of note, this effect was larger than the cross-sectional association that did not account for the stability of FWB encounters over time. This effect was robust to the inclusion of biological sex and the interaction of pornography viewing frequency and biological sex.

Is Pornography Use Associated with a Higher Number of Unique FWB Relationship Partners?

Using negative binomial regression, we found that pornography use was cross-sectionally associated with the number of unique FWB partners in the past year ($IRR = 1.26, p < 0.001, 95\ \% CI [1.18, 1.36]$); those who had never viewed pornography were predicted to have 0.67 (95 % CI [0.59, 0.76]) unique FWB partners compared to 1.4 (95 % CI [1.12, 1.59]) for those who viewed pornography *about weekly* and 2.7 (95 % CI [1.74, 3.72]) for those who viewed *a few times a day*. In our second model, we found a significant main effect for gender such that women had 39 % fewer unique FWB partners ($IRR = 0.61, p < 0.001, 95\ \% CI [0.46, 0.82]$). The interaction was not significant nor did including these variables reduce the significance of the association between pornography and unique FWB partners.

Replicating the Parameter Estimates from Study 1 More frequent viewing of pornography was associated with a higher number of unique FWB partners ($IRR = 1.28, p < 0.001, 95\ \% CI [1.18, 1.40]$). Those who had never viewed pornography were predicted to have had 0.23 (95 % CI [0.19, 0.27]) unique partners compared to 0.48 (95 % CI [0.38, 0.58]) for those who viewed pornography *about weekly* and 1.02 (95 % CI [0.59, 1.45]) for those who viewed pornography *a few times a week*. Each of these estimates falls within the respective confidence intervals from Study 1 suggesting these estimates are reliable across samples.

Does Pornography Use Prospectively Predict a Higher Number of Unique FWB Relationships When Accounting for the Stability of These Relationships?

Controlling for the stability of baseline FWB relationships, pornography viewing frequency longitudinally predicts a higher number of unique FWB partners ($IRR = 1.20, p < 0.001, 95\ \% CI [1.09, 1.31]$). In our second model, we found that women had significantly fewer FWB partners than men ($IRR = 0.62, p = 0.01, 95\ \% CI [0.43, 0.90]$) and the interaction between biological sex and pornography use was also significant such that baseline pornography use predicts a higher number of unique FWB partners for women ($IRR = 1.25, p < 0.05, 95\ \% CI [1.05, 1.49]$), but this effect was not significant for males ($IRR = 1.03, p > 0.10, 95\ \% CI [0.90, 1.19]$). This is consistent with Study 1 which found some differential effects for men versus women for the association between pornography use and the likelihood of engaging in oral sex during a FWB encounter.

Accounting for all the effects in this model (most notably, that men have a higher intercept for unique number of partners) we estimated how many unique FWB partners a person is predicted to have in the previous 6 weeks as a function of how frequently they view pornography. Among those who never viewed pornography, men were predicted to have 0.38 (95 % CI [0.21, 0.58]) partners; women were predicted to have 0.20 (95 % CI [0.16, 0.24]) partners in the past 6 weeks. Among those who viewed pornography about weekly, men were predicted to have 0.66 (95 % CI [0.47, 0.85]) partners; women were predicted to have 0.35 (95 % CI [0.21, 0.49]) partners in the past 6 weeks. Among those who viewed pornography a few times a day, men were predicted to have 1.15 (95 % CI [0.46, 1.84]) partners; women were predicted to have 0.61 (95 % CI [0.12, 1.10]) partners in the previous 6 weeks.

Do Sexual Scripts Mediate the Influence of Pornography on FWB Behavior?

We tested for mediation using Structural Equation Modeling (SEM) following the recommendations for mediation set forth by Shrout and Bolger (2002). We used the generalized structural equation modeling (GSEM) routines in *Stata* since we had binary and count outcomes. Specifically, we tested whether sexual scripts mediated the impact of pornography on the incidence of FWB relationships (a binary outcome) and on the unique number of FWB partners (a count outcome). See Fig. 1 for a graphical representation of our mediational model. We also tested whether gender moderated these mediational effects and found that it did not for either outcome.

Incidence We first examined whether pornography viewing was associated with whether respondents engaged in a FWB relationship or not (incidence) over the course of an academic semester and whether sexual scripts mediated this effect. Pornography consumption at baseline was associated with more permissive sexual scripts ($B = 0.87$, 95 % CI [0.78, 0.98]) and permissive sexual scripts predicted a higher odds of engaging in a FWB relationship over the course of a semester ($B = 0.08$, 95 % CI [0.001, 0.16]; the indirect effect via sexual scripts was significant ($B = 0.07$, 95 % CI [0.00, 0.14]). As recommended by Shrout and Bolger (2002) we computed an effect ratio (axb/c) that demonstrates that 25 % of

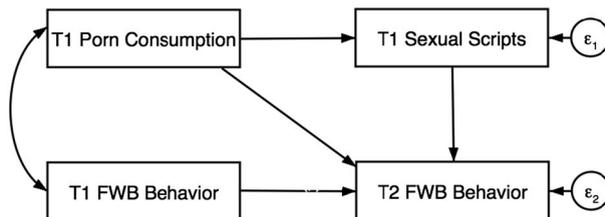


Fig. 1 Mediation model used to examine whether sexual scripts mediate the effect of pornography viewing on friends with benefits sexual encounters when controlling for the stability of friends with benefits encounters over the span of an academic semester (approximately 3.5 months)

the effect of pornography on the incidence of FWB relationship operates via the mechanism of more permissive sexual scripts.

Number of Unique FWB Partners Next, we examined whether pornography viewing was related to the number of unique FWB partners over the course of a semester and whether sexual scripts mediated this effect. Pornography viewing at baseline was associated with more permissive sexual scripts ($B = 0.87$, 95 % CI [0.77, 0.98]) and permissive sexual scripts predicted a higher number of unique FWB partners over the course of a semester ($B = 0.08$, 95 % CI [0.01, 0.17]; the indirect effect via sexual scripts was significant ($B = 0.08$, 95 % CI [0.01, 0.15]). An effect ratio demonstrates that 35 % of the effect of pornography consumption on the unique number of FWB partners one has operates via the mechanism of more permissive sexual scripts.

Discussion

The findings from Study 2 provide a close replication of the findings from Study 1. Specifically, we found that pornography use was associated with a greater prevalence of FWB relationships and a higher number of unique FWB partners in the past 6 weeks. Additionally, we found the same positive association between pornography consumption and FWB outcomes when participants were asked about FWB encounters in the past year.

Study 2 also extended the findings observed in Study 1 by examining our research questions while controlling for the longitudinal stability of FWB relationship across the semester. In a pattern that mirrors the cross-sectional associations, we found pornography use was associated with a higher prevalence of FWB relationships and a higher number of unique FWB partners when controlling for the stability of FWB encounters. In fact, the association between pornography use and prevalence of FWB relationships was stronger longitudinally than it was cross-sectionally, offering evidence that pornography consumption is a unique, non-redundant predictor of FWB sexual behaviors. Additionally, we found evidence that pornography increases the odds of entering FWB relationships and having more unique FWB partners via the mechanism of more permissive sexual scripts. That is, more pornography consumption is associated with more permissive sexual scripts and this, in turn, predicts FWB behavior over the course of an academic semester. Finally, we showed that the association between pornography consumption and these outcomes was mediated by more permissive sexual scripts. Specifically, those who viewed pornography had more permissive sexual scripts and this, in turn, made them more likely to engage in FWB relationships and to have more unique FWB partners.

General Discussion

In two large samples of emerging adults in college, we found that pornography use was associated with a higher incidence of entering a FWB relationship, a variety

of sexual behaviors (including penetrative FWB encounters) and a higher number of unique FWB partners. These effects were observed cross-sectionally and longitudinally. Study 2 provided a direct replication of Study 1 and each of the parameter estimates from Study 2 fell within the 95 % confidence intervals of the parameter estimates from Study 1, providing strong evidence for the reliability of this relationship across samples and time points, as well as increasing confidence in the accuracy of the observed point-estimates.

Because of previous research showing gender differences in associations between pornography and risk outcomes, we tested for gender differences in our studies. Generally, the relationship between pornography consumption and risk outcomes were consistent between males and females, but there were two exceptions. First, we found a significant interaction in Study 1 wherein the relationship between pornography consumption and the odds of engaging in an oral sex FWB encounter were higher for women than for men. In Study 2, we did not replicate this specific effect, but a second gender difference emerged wherein baseline pornography use predicted a higher number of FWB partners for females but not for males. In both cases, pornography use seemed to have a differentially stronger effect on women than on men, although specific effects were not consistent across studies.

Existing research examining whether gender moderates the influence of pornography on risky sexual behavior provides essential context for our findings. Research examining risk during hookups finds that pornography consumption has a negative association with intoxication during hookups for women, but a positive association for men (Braithwaite et al. 2013); in other words, women who viewed pornography more frequently engaged in less risky behaviors during hookups than women who viewed pornography less frequently. Research examining FWB encounters reveals a different pattern of findings; that is, pornography consumption is associated with increased risk in FWB encounters for men, but no such association exists for women (Braithwaite et al. 2015).

Why do we observe a consistent link between pornography consumption and risk during casual sex encounters for men, but a less consistent link for women? Perhaps these differences are driven not only by gender, but also by the phenomena under examination. In studies that focus on hookups, pornography use among women has been found to be negatively associated with risky sexual behavior (a “protective” association), but in studies examining risk during FWB encounters the effect is null or—as the present studies show—there is a positive association with risky sexual behavior. Women view pornography less frequently than men, so it is possible that women who choose to view pornography are more sexually savvy (a selection effect) or that they become more sexually savvy as a result of viewing pornography (a causal effect). Being sexually savvy might increase vigilance for sexually risky behavior, but only in situations where risk is perceived. One explanation for the observed gender differences in this area of research, therefore, is that more sexually savvy women (those who view pornography) perceive risk during hookups because the sexual activity occurs with a stranger, but that the perception of risk is minimized in FWB relationships because of the familiarity with the partner.

This notion is consistent with the findings that higher levels of trust and familiarity with sexual partners are associated with less use of protection against

sexual risks (Cooper and Orcutt 2000; VanderDrift et al. 2012). Furthermore, the themes in pornography preferred by women tend to convey sexual scripts consistent with the broad theme of friends turning into lovers where the scripts in pornography favored by men tend to be less relational and more focused on objectified bodies and sexual acts (Mosher and Maclan 1994). Although more research is needed to replicate and further clarify the specifics of these gender effects, we suggest that future research not conflate hookups and FWB encounters under the broader category of casual sexual encounters, but rather examine them as distinct phenomena.

Because FWB relationship research is only beginning, our findings are valuable from a basic research perspective, but our findings also have implications for intervention. Our studies provide evidence for pornography consumption as a marker for risk of engaging in FWB relationships, of having a higher number of unique FWB partners, and of engaging in penetrative sex during FWB encounters. More research is needed to determine whether pornography is simply a marker of risk for FWB encounters or whether it plays a causal role, but even before this is fully established, our knowledge of this association can help to identify individuals who are at higher risk for these risky behaviors among college student populations. For example, the most effective use of our findings would be to target those who seek pornography on the Internet with public health messages that counterbalance the portrayals of sexuality in pornography with social science data. These messages might focus on findings that people in committed relationships enjoy more sexual satisfaction, have a higher frequency of sexual interactions, and can communicate about sex with their partner more readily than those in casual sexual relationships (Lehmiller et al. 2014). Messages targeting women searching for pornography might highlight that women are twice as likely to experience orgasm during sex within a committed relationship compared to casual sex encounters (Garcia et al. 2013), that FWBs are often not sexually exclusive (Lehmiller et al. 2014; VanderDrift et al. 2012) and that sensitivity to sexual risks might be weakened due to their friendship with a potential FWB partner.

Limitations and Future Directions

Our study is limited because it focused only on emerging adults in college and failed to capture the experiences of those who are unable to or who do not choose to seek higher education. We also had a disproportionate number of women compared to men, but we mitigated against this by accounting for potential gender differences in our analysis. Perhaps also because of the nature of our sample, the confidence intervals at the high ends of our prediction estimates (i.e., for those who viewed pornography multiple times per day) were very wide, indicating a uncertainty in our parameter estimates at the high end of the scale. Future research that explicitly examines the high end of pornography use would help to rectify this. Another area of limitation has to do with the scope of our measurement: in addition to using only self-report, we did not examine other sexual risks such as whether or not participants used condoms or were intoxicated during their FWB sexual encounters.

Furthermore, our measure of pornography consumption focused exclusively on frequency of viewing pornography and did not assess the content of the pornography. Future research examining these topics would be could more confidently test whether the scripts portrayed in pornography are enacted by those who viewed them if they measured pornography consumption at a more specific level.

Our research also has a number of notable strengths. We advanced research on the link between pornography and FWB relationships by establishing some—but not all—criteria for causation (Bradford Hill 1965). We replicated the association between pornography use and casual sexual behavior 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 FWB relationships even when controlling for the stability of FWB 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).

In addition, we conducted a direct replication (rather than the more common conceptual replications) and tested for the replication of point estimates rather than simply looking for whether the direction of effects replicated. This provides strong support that the specific estimates of pornography on FWB relationships are representative of the wider population of emerging adults in college. Furthermore, this replication involved point predictions and confidence intervals rather than focusing on problematic p values (Cummings 2014). Thus, we can provide practical predictions to inform real world application. For example, based on our data we can confidently predict (based on cross-validated equations) that approximately 61 % of emerging adults who view pornography a few times a day will be in a FWB relationship, with an average of 1.37 partners over the past 6 weeks.

Our findings provide emergent evidence that emerging adults who view pornography are more likely to engage in FWB relationships, to have a higher number of unique FWB partners, and to engage in all types of FWB encounters including penetrative sexual encounters. Future research can use these findings as a foundation for further testing the mechanisms that drive this effect, ruling out potential alternate explanations and exploring what may be driving the few sex differences we found. A greater understanding of these relationships will improve our ability to intervene in ways that promote healthy sexual relationships.

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