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**An Experimental Investigation into Pornography's Effect on Men's Perceptions of the
Likelihood of Women Engaging in Porn-Like Sex**

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Author Note

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An Experimental Investigation into Pornography's Effect on Men's Perceptions of the Likelihood of Women Engaging in Porn-Like Sex

Abstract

This experimental study investigates whether exposure to pornography affects men's perceptions of the likelihood of women engaging in, and enjoying, "porn-like" sex. Participants ($N = 418$) were either exposed to non-pornographic control videos or pornographic videos in which a male taxi driver has sex with a female passenger. Participants' perceptions of the likelihood of women engaging in various sexual practices commonly depicted in pornography (e.g., unprotected sex with a stranger, rough sex) were then assessed across two vignettes. In the first vignette, a male taxi driver propositions a female passenger. In the second, a male boss propositions a female employee. The study was administered online to maximize ecological validity. No effect was found for experimental exposure. However, an effect was detected for past exposure. Men who had viewed taxi-themed pornography in the previous six months rated the female taxi vignette character as being more likely to engage in porn-like sex with a male taxi driver. Similarly, those who had viewed workplace-themed pornography in the previous six months judged the female workplace vignette character as being more likely to engage in porn-like sex with a male boss. The implications of these findings for theoretical models of sexual media socialization are discussed.

Keywords: pornography; sexually explicit media; men; media effects

Public Policy Relevance Statement

There is much public interest in the effects of pornography use on consumers' perceptions of women, yet relatively few experimental studies have investigated this issue. In the current

study, experimental exposure to pornography was not found to influence men's perceptions of the likelihood of women engaging in the kinds of sexual practices commonly depicted in pornography. However, the study did find that past use of certain kinds of pornography is associated with judging women to be more likely to engage in porn-like sex in some situations, indicating the potential socializing effect of pornography in regard to men's perceptions of what is sexually normative. It is possible that such changes to perceptions of sexual norms may negatively impact the lives of both men and women.

Introduction

Due to the proliferation of the Internet, pornography is now more easily accessible than ever before. Given this accessibility, it is perhaps not surprising that survey research consistently finds pornography consumption to be commonplace, especially among young men. A meta-analysis of four large-scale, nationally-representative surveys estimates that 46% of US men and 16% of US women aged between 18 and 39 are weekly pornography viewers (Regnerus, Gordon, & Price, 2015), although several smaller surveys have reported higher weekly viewing figures, especially among men (Kvalem, Træen, Lewin, & Štulhofer 2014; Nelson et al., 2014; Miller, Hald, & Kidd, 2017; Morgan, 2011; Rosser et al., 2013; Sun, Miezan, Lee, & Shim, 2015; Træen & Daneback, 2013). Additionally, multiple studies report that more than 90% of men have viewed pornography at some point (Kvalem et al., 2014; Nelson et al., 2014; Miller, et al., 2017; Morgan, 2011; Mulya & Hald, 2014; Rosser et al., 2013; Sun, Miezan, Lee, & Shim, 2015; Træen & Daneback, 2013).

The high prevalence of pornography consumption raises questions about the potential socializing effects of pornography use. A great deal of research has been generated in response to this. One particularly fruitful theory to be applied to the area of sexual media socialization is sexual script theory (Gagnon & Simon, 2005, see also Weideman, 2015). Simply put, sexual script theory posits that human sexual behaviour is guided by *scripts*: “the mental representations individuals construct and then use to make sense of their experience, including their own and others’ behavior” (Weideman, 2015, p. 7). Wright (2011) builds on sexual script theory with his acquisition, activation, and application model of media sexual socialization (₃AM; see also Wright & Bae, 2016; Wright & Tokunaga, 2015). The ₃AM argues that pornography plays an important role in creating new scripts (acquisition), priming existing scripts (activation), and encouraging the utilization of scripts to inform attitudes and behaviors (application). Accordingly, pornography may influence what is thought of as

normative, impacting perceptions of sexuality, sexual situations, sexual behaviours, and evaluations of sexual relations (Hald, Seaman, & Linz, 2014).

There is research indicating that pornography use affects consumers' attitudes and behaviors in ways that are consistent with sexual script theory. For example, content-analytic studies suggest that mainstream pornography rarely depicts condom use (Gorman, Monk-Turner, & Fish, 2010; Vannier, Currie, & O'Sullivan, 2014). To put this in the language of sexual script theory, much pornography contains scripts presenting condomless sex as normative. Wright, Tokunaga, and Kraus (2016) found that university students who frequently consumed pornography judged their peers to be less likely to use condoms (script acquisition and activation) and were themselves more likely to engage in condomless sex (script application). Similarly, pornography use has been found to be associated with a desire to engage in the kinds of sexual practices depicted in pornography (Morgan, 2011), permissiveness towards casual sex (Brown & L'Engle, 2009; Peter & Valkenburg, 2010), and more positive attitudes toward extramarital sex (Wright, Tokunaga, & Bae, 2014). One meta-analysis of correlation studies found that pornography use is associated with attitudes supporting violence against women, with a stronger effect for violent pornography (which presumably would be more likely to contain scripts suggesting that violence against women is normative), compared to non-violent pornography (Hald, Malamuth, & Yuen, 2010).

Although these results are consistent with sexual script theory, alternative explanations cannot be ruled out due to the cross-sectional nature of many of these studies. For example, the selective exposure hypothesis (see Wright et al., 2016; Wright & Bae, 2016) would suggest that consumers seek out pornography which reflects their existing attitudes and behavioral tendencies, rather than pornographic scripts shaping these attitudes and behaviors (e.g., those who hold attitudes supporting violence against women may be more likely to seek out violent pornography). It is due to this problem of determining direction of

causation that multiple authors (Hald, Seaman, & Linz, 2014; Wright & Bae, 2016) have called for more longitudinal and experimental studies into the effects of pornography.

While it is true that the pornography research literature relies heavily on cross-sectional evidence, some experimental studies are available to draw on. Allen, D'Alessio, and Brezgel (1995) meta-analyzed 33 experiments into the effect of pornography on aggression published between 1971 and 1984. Their analysis found experimental exposure to pornography to increase aggressive behavior. This effect was larger for violent pornography. However, the authors also found that this effect was moderated by experimental manipulation of anger. In the meta-analysis experimental exposure to pornography increased aggressive behaviour, but only among participants who were also provoked by a confederate. More recently, Wright and Tokunaga (2015) exposed male university students to explicit centerfolds. They found that the experimental exposure strengthened the sexual reductionism, masculinity validation, and nonrelational sexual beliefs of participants who did not regularly view such material. The centerfolds had no effect on the attitudes of participants who did regularly view such material (although the sexual reductionism, masculinity validation, and nonrelational sexual beliefs of this group were already high). Similarly, Hald and colleagues exposed male and female participants to 25 mins of non-violent pornographic videos (Hald & Malamuth, 2015; Hald, Malamuth, & Lange, 2013). They found experimental exposure to pornography increased attitudes supporting violence against women and hostile sexism among participants low in agreeableness (but not among those high in agreeableness). They also found experimental exposure to pornography to increase hostile sexism among female participants.

The early experiments meta-analyzed by Allen et al. (1995) have been criticized for lacking ecological validity (Fisher & Barack, 1991; Fisher & Grenier, 1994)—both in terms of the laboratory setting in which the studies were carried out and the frequent use of

experimental procedures that provided participants no option but to aggress (e.g., having participants choose the strength of an electric shock to be delivered to a female confederate, without giving participants the option of not shocking the confederate). While the more recently-conducted experiments described above (Hald & Malamuth, 2015; Hald et al., 2013; Wright & Tokunaga, 2015) differ from these early experiments in terms of the outcome variables assessed, there are still issues surrounding their ecological validity. It has to be acknowledged that viewing pornography in a laboratory setting is unusual and potentially embarrassing for participants, and may affect the way participants respond on outcome measures. Another issue that needs to be considered in regard to experimental investigations into the effects of pornography is past exposure. As has been outlined above, the prevalence of pornography consumption in the population is high (especially among men). As such, it is questionable as to whether experimental exposure to 15–30 mins of pornographic content (the typical level of experimental exposure) would be enough to create a meaningful difference between the control and exposure groups in terms of the treatment (although it may be enough to prime an existing script). We will refer to this as the *past exposure problem*.¹

Current Study

The current study employed a randomized experimental design in order to investigate whether exposure to pornography (both experimental and pre-experimental) affects men's judgements of women's willingness to engage in, and women's enjoyment of, "porn-like" sex (the kinds of sexual practices and situations commonly depicted in pornography, e.g., unprotected sex with a stranger, rough sex, ejaculation onto the partner). To the authors' best knowledge, there have been no experimental studies assessing whether pornography affects men's judgements of how likely women are to engage in, and enjoy, porn-like sex. The study

¹ One of the studies analyzed in Allen et al. (1995), Zillman and Bryant (1988), avoided the past exposure problem by experimentally exposing participants to pornography repeatedly over an extended period of time

focuses on men because 1) concern over the negative societal effects of pornography often focus on men's use of pornography, and 2) research indicates that men consume more pornography than women (Böhm, Franz, Dekker, & Matthiesen, 2014; Hald, 2006; Hald & Malamuth, 2008; Mulya & Hald, 2014; Paul & Shim, 2008; Regnerus et al., 2015).

This study seeks to remedy the major limitations of previous experimental studies into the effects of pornography, namely, lack of ecological validity and the past exposure problem. In order to replicate the environment in which most pornography is consumed (at home, in private), and thereby maximize ecological validity, the study was administered entirely online. In order to avoid the past exposure problem, experimental stimulus material was chosen from a very specific pornographic genre: pornography in which a male taxi driver has sex with a female passenger. It was reasoned that it would be less likely that participants would have been exposed to a great deal of such a specific genre of pornography in the recent past, thus the experimental exposure would be enough to create a meaningful treatment difference between the control and experimental exposure groups.

Participants' judgements were assessed across two written scenarios: one in which a male taxi driver propositions a female passenger, and one in which a male boss propositions a female employee. Based on sexual script theory we expected that those in the experimental stimulus condition, or those who had previously been exposed to similar material, would make judgements about the female character in the taxi scenario which more closely align with the world depicted in (taxi-themed) pornography. It was also believed that the effect of experimental exposure on social judgments would generalize across situations to the workplace scenario. Accordingly, the following hypotheses were tested as part of the current study:

H1: The experimental exposure group will judge women to be more likely to engage in, and enjoy, porn-like sex with a taxi driver compared to the control group.

H2: The experimental exposure group will judge women to be more likely to engage in, and enjoy, porn-like sex with their boss compared to the control group.

H3: Those who had been exposed to taxi-themed pornography prior to the experiment will judge women to be more likely to engage in, and enjoy, porn-like sex with a taxi driver compared to those who had not viewed such material.

H4: Those who had been exposed to workplace-themed pornography prior to the experiment will judge women to be more likely to engage in, and enjoy, porn-like sex with their boss compared to those who had not viewed such material.

Method

Participants

The final sample consisted of 418 men. The age of participants ranged from 18 to 72 years ($M = 30.14$, $SD = 13.61$). Students participating for course credit made up 46.9% of the sample with the remaining 53.1% being community members. Other demographic characteristics of the sample are reported in Table 1.

Procedure

The study was administered entirely online. On the first page of the study it was made clear to participants that the study may involve viewing pornographic video content. It was recommended that participants complete the study in a private place. Participant anonymity was highlighted.

Participants were randomly assigned to either the experimental or control condition, and then exposed to either 22 min of taxi-themed pornographic video content (experimental condition) or 22 min of non-pornographic video content (control condition). Participants in both conditions were instructed to watch the video content in its entirety. Following this, participants were presented with the two written vignettes: one in which a male taxi driver propositions a female passenger (taxi vignette) and one in which a male boss propositions a

female employee (workplace vignette). The outcome measures were interspersed throughout the vignettes. To control for order effects, the order in which the two vignettes were presented to participants was randomized. Participants were then presented with a brief questionnaire. The questionnaire assessed past pornography use and various background and demographic factors. The study took approximately 40 min to complete.

Participants were recruited via websites dedicated to hosting academic studies (Call for Participants, Social Psychology Network, and the Facebook page of Psychology Participants and Researchers), the blog Sex and Psychology, as well the student participant pool at the authors' host institution. Non-student participants were offered the chance to go into a prize draw (for a \$50 gift voucher). Ethical approval to conduct the study was obtained from the host institution.

A total of 457 participants completed the study. Duplicate cases ($n = 21$), cases with excessive missing data on the outcome variables ($n = 7$) and multivariate outliers ($n = 11$) were then deleted, leaving a final N of 418. Mahalanobis distances were used to identify multivariate outliers (using an α of .001; Tabachnick & Fidell, 2013).

Measures and Materials

Pornography use. Pornography use was defined for participants as “Any kind of material that aims to create or enhance sexual feelings or thoughts in the audience and, at the same time contains: 1) explicit depictions of genitals, and/or 2) clear and explicit depictions of sexual acts such as vaginal intercourse, anal intercourse, oral sex, masturbation etc.”

Participants were asked whether they had viewed pornography ever and in the last six months. Frequency of pornography use over the last six months was then assessed via an 8-point scale (where 1 = *less than monthly* and 8 = *more than once a day*). Average viewing session length over the last six months was assessed using a 6-point scale (where 1 = *less than 5 min* and 6 = *greater than 60 min*). These two items were z-standardized and averaged

to create an index of level of pornography use. Whether participants had viewed pornography depicting “taxi drivers having sex with their passengers” or “bosses having sex with their employees” at any point, and in the last six months (outside of the experiment), was also assessed.

Agreeableness. As mentioned above, agreeableness has been found to moderate the effect of experimental exposure to pornography (Hald & Malamuth, 2015; Hald, Malamuth, & Lange, 2013). Accordingly, a measure of agreeableness was included in the study so that its potential moderating effect could be assessed.

Agreeableness was assessed using the agreeableness subscale of Suciér’s (1994) short form version of the Big-Five Marker Scale (Goldberg, 1992). The subscale consists of eight Likert-type items (ranging from 1 = *extremely inaccurate* to 9 = *extremely accurate*). In the present study, scale scores had a Cronbach’s alpha of .86.

Socially desirable responding. Socially desirable responding refers to the tendency of research participants to “tailor responses for the purpose of looking good” (Meston, Heiman, Trapnell, & Paulhus, 1998, p. 148), by giving responses which conform to social norms. Socially desirable responding is especially likely on self-report measures relating to sensitive topics, such as sexual behavior (Krumpal, 2013; Meston et al., 1998). It was thought that socially desirable responding might impact participants’ responses on the outcome measures, their willingness to report their past use of pornography, and the likelihood that they would skip past the stimulus videos. Accordingly, a measure of social desirability—the 16-item version of the Balanced Inventory of Desirable Responding (Hart, Ritchie, Hepper, & Gebauer, 2015)—was included in the current study so that group differences in social desirability could be examined and controlled for if necessary. The scale breaks into two subscales: self-deceptive enhancement and impression management. In the current study, scale scores had alphas of .71 and .72 respectively.

Demographics. A number of demographic variables were also assessed including age (in years), country, sexual orientation (heterosexual; gay; bisexual; other), highest level of formal education (no university study; some undergraduate study; undergraduate degree; some postgraduate study/degree), and relationship status (in a relationship, cohabiting; in a relationship, not cohabiting; not in a relationship).

Experimental condition video content. Two pornographic experimental stimulus videos were used. The videos were taken from the website Youporn, one of the Internet's most visited adult websites (Alexa, 2017). Both scenes are roughly 11 mins long and depict a male taxi driver having sex with a female passenger.

In the first video, *Fake Taxi, Stranded French Tourist Earns Extra Cash*, a taxi driver parks in front of a woman in her early 20s standing by the side of the road. She explains that she is a tourist and that she wants to go to her hotel but has lost her credit card. The driver intimates that he can give the tourist money in exchange for sex. The tourist is reluctant initially, but then agrees. The scene cuts to a deserted overpass. The pair is standing by the taxi. The tourist performs oral sex on the driver. They then engage in vaginal sex. The tourist is depicted as enjoying this. The tourist again performs oral sex on the driver. The scene cuts to the pair again engaging in vaginal sex. The driver ejaculates onto the tourist's buttocks and thighs.

In the second video, *Fake Taxi, Heavy Metal Grupie [sic] Likes it Hard and Rough*, a taxi driver picks up a woman in her early 20s. She tells the driver that she wants to go to a hotel. The passenger explains that she was at a concert, she met the band, and that they had invited her to their hotel. It is implied that she is a groupie. The passenger then receives a text stating that the band is no longer staying at the hotel. The passenger is disappointed and the passenger and driver agree to have sex. The scene cuts to the taxi parking on a side-street. The passenger performs oral sex on the driver. The driver rips the passenger's stockings.

They engage in vaginal sex. The passenger is depicted as enjoying this. The driver spansks the passenger and grabs her ponytail. She is depicted as enjoying this also. The scene cuts to the driver ejaculating onto the face of the passenger. Both of the experimental stimulus clips are presented as real interactions (e.g., the footage is presented as if it is taxi security camera footage). In neither of the clips is a condom used at any point.

Control condition video content. Two non-pornographic control stimulus videos were used. Both were sourced from popular educational Youtube channels. The first video, *The Vikings! Crash Course World History 224*, outlines the history of the Vikings, with a focus on Viking trade and religion. The second video, *Healthcare Triage Answers Your Questions, Part 2*, features a physician answering healthcare related questions submitted by viewers (e.g., one question asked about the cause of hiccups and another asked about the benefits of eating less red meat). These videos were selected from the aforementioned channels because they were similar in length to the experimental stimulus videos, and because it was thought that they would not elicit a strong-emotional response in the viewer, but at the same time were not so dull as to bore the viewer and cause them to leave the study. Neither video depicted sexual behaviour or featured sexual content (although the second video does briefly mention medical research around the efficacy of abstinence only sex-education).

Time spent on video content. As the study was administered online it was not possible to directly observe whether participants complied with the instructions to watch the stimulus videos in their entirety. However, the time participants spent on the stimulus video section of the study was recorded as a validity measure (this was not made known to participants). Participants who spent too little or too much time on this section of the study were excluded from the analysis of the effect of the experimental exposure (see Validity and Manipulation Check below).

Vignettes and outcome measures.

Taxi vignette. The taxi vignette was designed to mirror the scenarios depicted in the experimental stimulus videos. The vignette involves a taxi driver (Bill) propositioning a young female passenger (Christy). The scenario was presented in blocks and after each block participants were asked to rate how likely it is that Christy would engage in a particular sexual act, or how enjoyable or arousing she would find this act. Each block was presented on a new page of the study. Participants were also asked the same questions in regard to the “average, single girl around Christy’s age.” The first two blocks were as follows (the full vignettes are available from the first author):

Block One: Christy is young, attractive and single. She is leaving a nightclub after a night out dancing with her friends. She has had a few drinks—she is tipsy but not drunk. Outside the club she hails a taxi. The taxi driver, Bill, is a little older than Christy. He has a medium build and is quite handsome. Christy asks how much it will cost to get home. Bill tells her. She says she can’t afford to go the whole way but asks if Bill can take her as far as he can for \$40. Bill agrees.

On the drive Christy and Bill are talking and flirting a little. Bill says that he picked up a group of girls at the same club earlier in the week and that they flashed their breasts to get a discount on the ride. Christy laughs. Bill tells Christy that if she flashes him he will drive her all the way home for the \$40.

- Do you think Christy would agree to flash Bill? Indicate the likelihood of Christy agreeing to this using the slider.
- Do you think that the average, single girl around Christy’s age would agree? Indicate the likelihood of an average, single girl agreeing to this using the slider.

Block Two: Christy agrees. She flashes Bill while they are stopped at a red light. Bill tells Christy that she is hot. Christy seems flattered by this. He then tells her that he knows a quiet park on the way where they can stop to make out if she wants.

- Do you think Christy would agree to make out? Indicate the likelihood of Christy agreeing to this using the slider.
- Do you think that the average, single girl around Christy's age would agree? Indicate the likelihood of an average, single girl agreeing to this using the slider.

Responses were recorded using unnumbered graphic rating scales (also called *slider scales*). Following Roster, Lucianetti, and Albaum's (2015) suggestion, participants were instructed that they need to move the slider in order for it to record a response. All responses had a possible range of 1 to 100, where 1 represents the left-most position on the slider (*not at all likely; not at all arousing/enjoyable; or very unrealistic*) and 100 represent the right-most position (*very likely; very arousing/enjoyable; or very realistic*).

Workplace vignette. The second vignette describes a lawyer (Steve) propositioning a younger employee (Tasha). The scenario discussed differs from what is depicted in the experimental stimulus videos, but features similar themes and power dynamics (i.e., a man in a position of relative power propositioning a young woman). In both vignettes it was specified that a condom was not used during the sexual encounter.

Outcome measure scoring. Table 2 outlines all the sex acts that participants were asked to respond to in the vignettes. Means and standard deviations for each item are also reported in Table 2. Aside from kissing, all of the acts mentioned in the vignettes were featured directly in the experimental stimulus videos. Participants were also asked to rate how realistic they found the vignettes to be.

For each vignette, responses were averaged across the seven sex acts to produce two overall scores (one for Christy or Tasha and one representing the average girl) where higher scores represent greater perceived likelihood of Christy, Tasha, or the average girl engaging in, and enjoying, porn-like sex.² This resulted in six outcome measures (three per vignette): 1) taxi vignette named character (Christy) likelihood rating; 2) taxi vignette average girl likelihood rating; 3) taxi vignette realism rating; 4) workplace vignette named character (Tasha) likelihood rating; 5) workplace vignette average girl likelihood rating; and 6) workplace vignette realism rating. The patterns of correlations between items on the four multi-item measures (outcome measures 1, 2, 4, and 5) were all similar, with inter-item correlations all being positive and significant. Inter-item correlations ranged from .36 to .70 for outcome measure 1, .39 to .77 for outcome measure 2, .22 to .67 for outcome measure 4, and .36 to .72 for outcome measure 5. The mean inter-item correlations for these scales were .51, .53, .45, and .56 respectively. Cronbach's alphas for the multi-item measure scores ranged from .85 to .90, suggesting good internal reliability.

Results

Validity and Manipulation Check

As was outlined above, in order to assess compliance with the study, the amount of time participants spent on the stimulus videos section of the study was recorded. Many participants did not comply with the instruction to watch both stimulus videos in their

² Some items ask about the likelihood of Christy, Tasha, or the average girl "engaging" in particular sexual acts (e.g., oral sex), while others ask about the likelihood of Christy, Tasha, or the average girl "enjoying" various sexual behaviors (e.g., rough sex). We felt this approach better reflected the progression of the behaviors depicted in the experimental stimulus videos. Both videos start with male characters asking female characters if they are willing to engage in a particular sexual act (e.g., oral sex), while later sexual behaviors (e.g., rough sex) are performed without first asking permission. We believe this approach not only reflects the stimulus videos used as part of the current study, but also mainstream pornography more generally, as content analyses (Bridges, Wosnitzer, Scharrer, Sun, & Liberman, 2010; Sun, Bridges, Wosnitzer, Scharrer, & Liberman, 2008) indicate that in mainstream pornography female characters typically respond to all sexual behaviors, even violent behaviors, with enthusiasm and pleasure.

entirety. The analysis assessing the experimental effect was limited to those who viewed approximately three-quarters (> 900 seconds) of the stimulus material. The value of 900 seconds was chosen to ensure adequate exposure to the stimulus material, but also a reasonable number of participants for the analysis. Those who spent an excessive amount of time (> 3000 seconds) in the stimulus videos section of the study were also excluded. This screening process left 200 participants ($n_{\text{con}} = 95$, $n_{\text{exp}} = 105$). A 2x2 chi-square test for independence indicated that study exclusion (participant excluded or included in analysis) was independent of condition assignment (control or experimental condition), $\chi^2(1, 1) = 0.02$, $p = .892$.

To confirm that the randomization process was successful, the control and experimental exposure groups were compared on age, overall level of pornography use, agreeableness, self-deceptive enhancement, and impression management using independent samples t tests. The control and experimental exposure groups were also compared on use of taxi-themed pornography in the last six months and use of workplace-themed pornography in the last six months using chi-square tests for independence. The groups did not significantly differ on any of the variables assessed.

The analysis assessing the effect of pre-experimental use of pornography on the outcome measures was performed on the entirety of the sample. This was done to maximize power and minimize sampling bias (as the compliant and non-compliant subsamples may differ on potential confounding variables).

Pornography Use among Sample

The vast majority of the overall sample reported having seen pornography at some point (96.7%) and in the last six months (91.4%). Median frequency of viewing pornography over the last six months was 1–2 times per week. Median viewing session length was 15–30 mins. About half of the sample (49.2%) reported having viewed taxi-themed at some point,

and 29.1% reported having viewed such material in the last six months. In terms of workplace-themed pornography, 73.7% of the sample reported viewing such material at some point, and 40.6% had viewed workplace-themed pornography in the last six months.

Effect of Experimental Exposure

Experimental exposure group means and their 95% confidence intervals are presented in Figure 1. Independent samples *t* tests were used to compare the control and experimental exposure groups. These tests are outlined in Table 3. As can be seen, the groups differed on taxi scenario realism only. Participants in the experimental exposure group rated the taxi scenario as *less* realistic than those in the control group.

As outlined above, past research has found experimental exposure to pornography to impact the attitudes of participants low in agreeableness only (Hald & Malamuth, 2015; Hald et al., 2013). Additionally, Wright and Tokunaga (2015) found experimental exposure to centerfolds to influence attitudes among centerfold non-viewers only. Given that an experimental effect was not observed in the above analysis, further analysis was conducted to determine if agreeableness or past exposure to taxi-themed pornography were moderating the experimental effect (such that an experimental effect would be present among those low in agreeableness, or those who had never viewed taxi-themed pornography). This was done using model 2 of Hayes's (2018) PROCESS macro (version 3) for SPSS. Model 2 was selected so that the moderating effect of agreeableness (entered as a continuous variable) and past use of taxi-themed pornography (entered as a dichotomous variable: have viewed; have never viewed) could be tested simultaneously. Neither variable was found to moderate the experimental effect for any of the six outcome measures.

Effect of Pre-Experimental Exposure

To assess the effect of pre-experimental exposure to pornography, mean taxi vignette scores were compared between those who had not seen taxi-themed pornography in the

previous six months and those who had. Similarly, workplace vignette scores were compared between those who had not seen workplace-themed pornography in the previous six months and those who had. The results of these analyses are presented in Figure 2 and Table 4.

As can be seen, those who had consumed taxi-themed pornography in the previous six months scored significantly higher on named character likelihood ratings and average girl likelihood ratings than those who had not seen such material. However, the groups did not differ in terms of taxi scenario realism scores. This pattern was mirrored for the workplace outcome measures. Those who had viewed workplace-themed pornography in the previous six months scored significantly higher on named character likelihood and average girl likelihood, but not scenario realism, compared to those who had not.

Further analysis was then performed to determine whether these between-group differences were simply the result of groups differing on confounding variables. Exposure groups were compared on a number of possible covariates (age, overall level of pornography use, agreeableness, self-deceptive enhancement, and impression management) using independent samples *t* tests. The taxi-themed pornography exposure groups were found to significantly differ on age, $t(388) = 2.12, p = .035$, Cohen's $d = .23$, and overall level of pornography use, $t(405) = -3.97, p < .001$, Cohen's $d = -.43$. The workplace-themed pornography exposure groups were found to significantly differ on overall level of pornography use only, $t(404) = -5.79, p < .001$, Cohen's $d = -.58$.

Analysis of covariance was used to assess the effect of pre-experimental exposure to taxi-themed pornography on the taxi vignette outcome measures after adjusting for age and overall level of pornography use. The effect of past exposure to taxi-themed pornography on named character likelihood ratings remained significant, $F(1, 378) = 4.21, p = .041, \eta_p^2 = .011$. However, the effect was no longer significant for the average girl likelihood ratings, $F(1, 377) = 1.68, p = .196, \eta_p^2 = .004$.

The effect of pre-experimental exposure to workplace-themed pornography after adjusting for overall level of pornography use was then assessed. Past exposure to workplace-themed pornography continued to have a significant effect on both named character likelihood ratings, $F(1, 400) = 5.29, p = .020, \eta_p^2 = .013$, and average girl likelihood ratings, $F(1, 395) = 13.07, p < .001, \eta_p^2 = .032$, after adjusting for overall level of pornography use.

Discussion

This study assessed whether exposure to pornography impacts men's judgements about the likelihood of women engaging in, and enjoying, porn-like sex across two scenarios: one in which a male taxi driver propositions a female passenger, and one in which a male boss propositions a female employee. Experimental exposure to taxi-themed pornography was not found to impact participants' judgements of women (Hypotheses 1 and 2). Those in the experimental exposure group did not judge women to be any more likely to engage in porn-like sex with a taxi driver or their boss than those in the control group. These findings held even when potential moderators (agreeableness and past use of taxi-themed pornography) were taken into account.

The lack of an experimental effect runs counter to sexual script theory. Several possible explanations can be given. First, it may be the case that the amount of experimental exposure to pornography (22 mins) employed in the study was not enough to produce an effect. This being said, previous studies (Hald & Malamuth, 2015; Hald et al., 2013) have been able to produce an experimental effect (after accounting for moderating variables) based on a similar level of exposure (25 mins). Second, past exposure to taxi-themed pornography may have "drowned-out" the difference between the control and exposure group in terms of exposure to the stimulus material. As was mentioned above, taxi-themed pornography was chosen for the experimental stimulus material as it was reasoned that participants would be less likely to have consumed a great deal of such material in the recent past. However, use of

taxi-themed pornography was still relatively common among the sample, with almost one-third of participants having accessed taxi-themed pornography in the six months prior to the experiment. Third, the experimental stimulus material, or the experimental situation itself, may have induced participants to think more critically about the representativeness of taxi-themed pornography. Wright's (2011) 3AM postulates that audience factors are important in determining the effect of sexual media exposure. For example, it is argued that pornography is less likely to affect the attitudes and behaviors of individuals who are more willing, or better able, to critically evaluate the scripts presented in sexual media. Similarly, as part of his heuristics processing model of cultivation effects, Shrum (2001; 2009) suggests that the effect of media on attitudes is moderated by consumers' ability and motivation to think critically about the source of a message. In line with the argument that the experimental exposure primed participants' to be more critical in their judgements, those in the experimental stimulus group rated the taxi vignette as significantly *less* realistic than the control group. Furthermore, this effect on realism scores was not seen for the workplace-themed vignette.

Hypotheses 3 and 4 were supported, that is to say, an effect was found for past exposure to pornography. Those who had consumed taxi-themed pornography in the six months prior to the study judged the named female character described in the taxi vignette as being more likely to engage in, and enjoy, porn-like sex with a taxi driver (even after adjusting for group differences in age and overall level of pornography use). Similarly, those who had consumed taxi-themed pornography in the six months prior to the study also judged the average women as being more likely to engage in, and enjoy, porn-like sex with a taxi driver. However, this finding was no longer significant once group differences in age and overall level of pornography use were controlled for. In this particular analysis, age was found to be significantly negatively associated with the outcome measure (whereas the

association between overall level of pornography use and the outcome measure was found to be non-significant). Thus the initial difference on this measure may have simply been a reflection of consumers of taxi-themed pornography tending to be younger, and younger men being more likely to believe that women are willing to engage in porn-like sex with a near stranger. It is unclear why age would be correlated with participants' beliefs in this way. It may be the case that, compared to older people, younger people are more likely to believe that casual sex is socially acceptable, and thus more likely to believe that casual sex occurs frequently. Empirical evidence supports the notion that younger people tend to be more accepting of casual sex (Twenge, Sherman, & Wells, 2015).

Those who had consumed workplace-themed pornography in the six months prior to the study judged women (across both outcome measures) to be more likely to engage in, and enjoy, porn-like sex with their boss (even after adjusting for group differences in overall level of pornography use).

As outlined in the Introduction, the selective exposure hypothesis asserts that individuals seek out sexual media that conforms to their pre-existing beliefs. Given that this study found an effect for past exposure, but no evidence of an experimental effect, it could be argued that the study's results are better explained by the selective exposure hypothesis than sexual script theory. However, past exposure was not found to affect perceptions of the realism of the study vignettes. Those who had consumed taxi-themed pornography in the previous six months did not rate the taxi vignette as more realistic than those who had not. Similarly, those who had consumed workplace-themed pornography did not judge the workplace vignette as more realistic than those who had not. This lack of a difference between the past exposure and non-exposure groups in terms of perceptions of the realism of the vignette scenarios undermines the selective exposure hypothesis as an explanation for the

effect of past exposure. It is also possible that the observed effect of past exposure is the result of an unmeasured confounding variable (e.g., sexual liberalism).

However, if the observed effect for past exposure really does reflect changes to participants' sexual scripts as a result of their sexual media consumption, why was an experimental effect not also observed? While some potential explanations for the lack of an experimental effect have already been outlined above, the *sleeper effect* is also worth considering. The sleeper effect posits that consumers are more likely to be persuaded by a non-veridical source after a time delay. While the exact cause of the sleeper effect is debated (see Kumkale & Albarracín, 2004; Priester, Wegener, Petty, & Fabrigar, 1999) it has been suggested that the effect may be due to consumers forgetting the non-credible nature of a particular source, but not the source's message (Pratkanis, Greenwald, Leippe, & Baumgardner, 1988). Similarly, in the current study a process similar to the sleeper effect might have resulted in participants rejecting the sexual scripts depicted in the experimental stimulus videos (as participants recognized that pornography is a non-veridical source of sexual information), but accepting pornographic scripts they had been previously exposed to, as a result of these scripts becoming dissociated from their source with the passage of time. Alternatively, it may simply be the case that the experimental manipulation was not able to capture the more powerful cumulative effect of multiple exposures across time. In support of this, Riddle (2010) found that one session of exposure to vivid, violent television did not impact participants' perceptions of crime, whereas repeated experimental exposure did.

Limitations and Future Directions

This study had a number of limitations. First, this study employed a non-probability sample. For this reason we should be somewhat cautious of generalizing from the current study to all men (especially older, less educated men who were underrepresented in the sample). Second, many participants did not view the stimulus videos in their entirety (see

Validity and Manipulation Check). This reduced the study's power and may have introduced self-selection bias. It also meant that some participants may not have been experimentally exposed to all of the sex acts referred to in the vignettes (e.g., participants who did not watch to the end of either videos would not have been experimentally exposed to external ejaculation). However, the majority of sex acts discussed in the vignettes occurred in both stimulus videos. Therefore, it is probable that those who watched around three-quarters of the stimulus videos (the cut-off for inclusion in the analysis of the experimental effect) would have been experimentally exposed to the majority of the sex acts discussed in the vignettes. The fact that many of the participants did not view the stimulus videos in their entirety may be a reflection of the way users actually consume pornographic video content (for example, skipping to particular sex acts within a video, rather than watching a video from start to finish) and therefore reflect the ecological validity of the study. To the authors' best knowledge, there is no existing research investigating how consumers actually interact with online pornographic videos. However, many pornographic websites—for example, Pornhub, Redtube, and Youporn (which was used to source the experimental stimulus clips)—make it easy for users to skip to specific content within a video. For example, all of the aforementioned websites are designed such that when the cursor is placed on the video progress bar, a thumbnail of that video frame is displayed. The inclusion of these kinds of features by website designers suggest that many users skip to specific content (e.g., particular sexual acts), rather than watching videos from start to finish.

Conducting the current study in a laboratory setting (rather than administering the study online) likely would have reduced non-compliance with the experimental stimulus instructions. However, we consider the non-compliance that occurred to be part of the trade-off between ecological validity and experimental control. We contend that correlational studies, highly controlled laboratory studies, and more ecologically-valid experimental

studies all have something to offer our understanding of sexual media effects, and should be considered in tandem.

Another limitation of the study is that the experimental exposure occurred on a single occasion only, thus the cumulative effect of multiple exposures across time was not captured. Furthermore, a large percentage of the sample (roughly half) had been exposed to taxi-themed pornography in the past. This somewhat undermined our objective to avoid the past exposure problems associated with previous experimental studies into the effects of pornography. In the future, researchers may wish to employ more obscure genres of pornography for use as stimulus material. However, given the near ubiquity of pornography use among men, it may be difficult to find pornographic genres that potential samples have had no contact with. Finally, the study did not assess whether participants masturbated while watching the stimulus materials (which is possible given that this was an online study). Currently, very few sexual media effects studies have accounted for the role of masturbation (Hald et al., 2014). This is despite evidence indicating that pornography use is most typically accompanied by masturbation (Böhm et al., 2014; Carvalheira, Træen, & Štulhofer, 2015). Hald et al. (2014) identifies two ways in which masturbation (and subsequent ejaculation) may impact the effects of sexual media: 1) by acting as a positive reinforcer, and 2) by reducing arousal (post-ejaculation). Notably, arousal has been found to mediate the relationship between experimental exposure to pornography and anti-women attitudes (Hald & Malamuth, 2015; Hald et al., 2013).

In the future researchers may want to 1) assess the effects of sexual media among more diverse samples, 2) utilize both laboratory and ecologically-representative experimental designs, 3) inquire about participants' usual style of pornography consumption (e.g., watching videos from start to finish, versus watching particular sex acts only), 4) experimentally expose participants to pornography repeatedly, 5) select very obscure genres

of pornography to avoid the past exposure problem (if focusing primarily on the effect of experimental exposure), and 6) assess the effect of masturbation (although we acknowledge that there are ethical and practical obstacles to doing this).

Conclusions and Implications

Whereas previous studies have tended to focus on pornography's influence on consumers' attitudes (e.g., sexism), the current study focused on pornography's influence on judgements of frequency and probability, namely men's judgements of the likelihood of women engaging in porn-like sex in situations similar to those depicted in particular genres of pornography (taxi- and workplace-themed pornography). The study provides some evidence that pornography can influence consumers' judgements of social reality, by affecting consumers' perceptions of the likelihood of women enthusiastically engaging in the kinds of sexual practices commonly depicted in pornography.

It could be argued that judgments about the likelihood of women having pornographic sex are less important than pornography's effects on more general attitudes, such as sexism. However, we would suggest that pornography influencing such probability judgements may still have widespread societal implications, especially given the high prevalence of men's pornography use. Furthermore, it is possible that perceptions around the likelihood of women engaging in, and enjoying, porn-like sex may themselves act to influence attitudes and behaviours more generally. For example, as is discussed above (see Introduction), Wright et al. (2016) found that pornography consumption is predictive of judging condom usage to be less common among one's peers, which in turn, is associated with personally engaging in unprotected sex. In the same way, judging women to be more likely to engage in, and enjoy, porn-like sex may influence pornography users' conceptions of sexual norms, such that users are more likely to believe porn-like sex to be the norm in both short- and long-term relationships. Conceivably this could flow-on to affect consumers' attitudes (e.g., causing

consumers to adopt more positive attitudes toward personally engaging in porn-like sex) and behaviors (e.g., causing consumers to imitate the sexual practices depicted in pornography with sexual partners, or even causing consumers to proposition strangers in the ways depicted in some pornography). In support of this notion, extant cross-sectional research suggests a positive association between pornography use and holding a preference for engaging in the kinds of sexual practices commonly depicted in pornography (Miller, McBain, Li, & Raggatt, 2018; Morgan, 2011). Shifts in pornography users' conceptions of sexual norms could potentially foster sexual dissatisfaction within relationships. For example, pornography users may feel a sense of relative deprivation if their partners are unwilling to engage in, what they consider to be, "normal" sexual practices. Alternatively, pornography non-users may feel resentment if they are expected, or pressured, to engage in sexual practices which they have no interest in. Similarly, because pornography consumption reinforces the notion that porn-like sex is wildly pleasurable for all involved, pornography users may feel upset (or even sexually inadequate) if their partners do not find pornographic sex to be pleasurable. Alternatively, it could be argued that expanding societal conceptions around what is sexually normative might have positive repercussions, by reducing the stigma associated with sexual practices which have previously been stigmatized. Whether educating consumers on the non-representative nature of pornography would be enough to nullify the deleterious effects of pornography use is unclear.

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Table 1

Demographic Characteristics of Final Sample (N = 418)

Variable	<i>n</i> (%)
Sexual orientation	
Heterosexual	315 (75.4)
Gay	15 (3.6)
Bisexual	49 (11.7)
Other	16 (3.8)
Missing	23 (5.5)
Highest level of formal education	
No university study	106 (25.4)
Some undergraduate study	130 (31.0)
Undergraduate degree	83 (19.9)
Some postgraduate study/degree	78 (18.6)
Missing	21 (5.0)
Country	
Australia/New Zealand	167 (40.0)
Asia	44 (10.5)
Europe	34 (8.1)
USA	129 (30.9)
North America, other	12 (2.9)
Other	8 (1.9)
Missing	24 (5.7)
Relationship status	
In relationship, cohabiting	143 (34.2)
In relationship, not cohabiting	89 (21.3)
Not in relationship	181 (43.3)
Missing	5 (1.2)

Table 2

Overall Sample's Mean Responses to Each of the Vignette Items

Sex Acts	<i>M (SD)</i>		
	Named Character	Avg Girl	Realism
Taxi Vignette			
1. Flashing breasts ^a	54.71 (26.18)	41.35 (25.41)	-
2. Kiss ^a	41.27 (24.83)	27.11 (21.75)	-
3. Oral sex, performed on male ^a	54.54 (27.03)	35.31 (26.58)	-
4. Vaginal sex ^a	50.31 (28.93)	29.47 (26.56)	-
5. Spanking, of female ^b	61.67 (25.48)	49.38 (27.98)	-
6. Dirty talk (“dirty girl” and “slut”) ^b	49.41 (26.02)	35.89 (25.13)	-
7. Ejaculation onto partner’s torso/breasts ^b	52.13 (26.04)	41.01 (26.65)	-
8. Scenario realism ^c	-	-	22.38 (22.26)
Workplace Vignette			
1. Kiss ^a	60.27 (24.49)	41.66 (24.94)	-
2. Manual stimulation, performed on male ^a	47.36 (27.31)	30.90 (24.82)	-
3. Oral sex, performed on male ^a	63.42 (26.17)	38.06 (28.31)	-
4. Hair pulling during oral sex ^b	57.25 (25.26)	44.98 (27.16)	-
5. Vaginal sex ^a	54.71 (27.58)	33.30 (27.11)	-
6. Rough sex ^b	51.48 (26.70)	36.59 (27.46)	-
7. Ejaculation onto partner’s face ^b	43.48 (28.36)	28.32 (25.53)	-
8. Scenario realism ^c	-	-	27.66 (24.16)

Note. All items had a potential range of 1–100.

^a Slider anchored by *not at all likely* and *very likely*. ^b Slider anchored by *not at all arousing/enjoyable* and *very arousing/enjoyable*. ^c Slider anchored by *very unrealistic* and *very realistic*.

Table 3

Comparison of Experimental Exposure Groups (Control Group and Experimental Group) on Outcome Measures (Named Character, Porn-Like Sex Likelihood; Average Girl, Porn-Like Sex Likelihood; Scenario Realism) for Both Vignettes

	<i>M (SD)</i>		<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
Taxi Vignette Measures	Control ^a	Experimental ^b				
Christy	51.36 (19.12)	50.56 (21.43)	0.28	196	.782	.04
Average Girl	37.82 (20.15)	33.66 (19.35)	1.48	196	.141	.16
Scenario Realism ^c	24.73 (23.16)	17.77 (18.10)	2.34	175.68	.020	.34
Workplace Vignette Measures						
Tasha	52.26 (18.45)	51.94 (20.76)	0.12	196	.908	-.02
Average Girl	37.06 (20.68)	32.23 (20.68)	1.64	196	.103	.23
Scenario Realism	29.78 (26.96)	25.63 (21.13)	1.22	197	.226	.17

^a $n = 95$. ^b $n = 105$. ^c assumption of homogeneity of variances violated thus Welch's t test used in place of Student's t test.

Table 4

Comparison of Pre-Experimental Exposure Groups on Outcome Measures (Named Character, Porn-Like Sex Likelihood; Average Girl, Porn-Like Sex Likelihood; Scenario Realism) for Both Vignettes

	<i>M (SD)</i>		<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
Use of taxi-themed pornography, last six months?	No ^a	Yes ^b				
Christy	50.48 (19.76)	56.45 (19.55)	-2.80	404	.005	-.30
Average Girl	35.60 (19.67)	40.80 (19.87)	-2.43	403	.016	-.26
Scenario Realism	22.43 (21.64)	21.49 (22.98)	0.39	401	.695	.04
Use of workplace-themed pornography, last six months?	No ^c	Yes ^d				
Tasha ^e	52.06 (20.60)	56.93 (17.16)	-2.60	395.16	.010	-.25
Average Girl	33.11 (20.89)	40.71 (20.14)	-3.65	401	>.001	-.37
Scenario Realism	27.62 (24.65)	27.76 (23.40)	-0.06	403	.953	-.01

^a $n = 284$. ^b $n = 122$. ^c $n = 239$. ^d $n = 169$. ^e assumption of homogeneity of variances violated thus Welch's t test used in place of Student's t test.

PORNOGRAPHY AND MEN'S PERCEPTIONS OF WOMEN

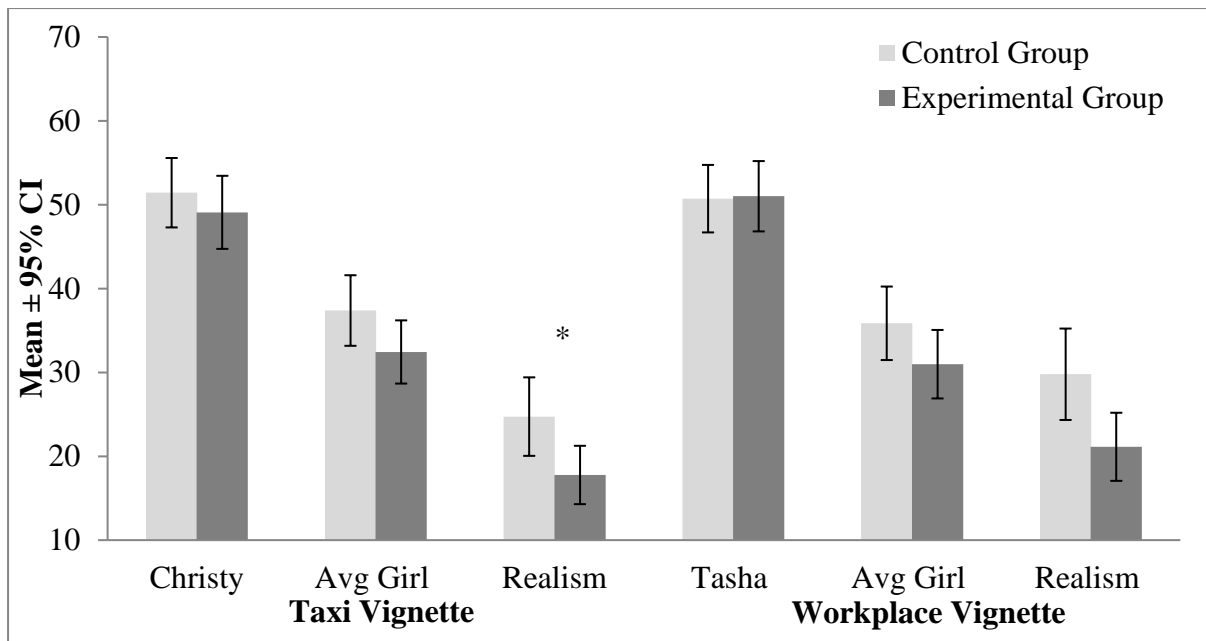


Figure 1. Mean scores and 95% CIs for study outcome measures (named character, porn-like sex likelihood; average girl, porn-like sex likelihood; scenario realism) by experimental exposure group (control group and experimental group). * $p < .05$.

PORNOGRAPHY AND MEN'S PERCEPTIONS OF WOMEN

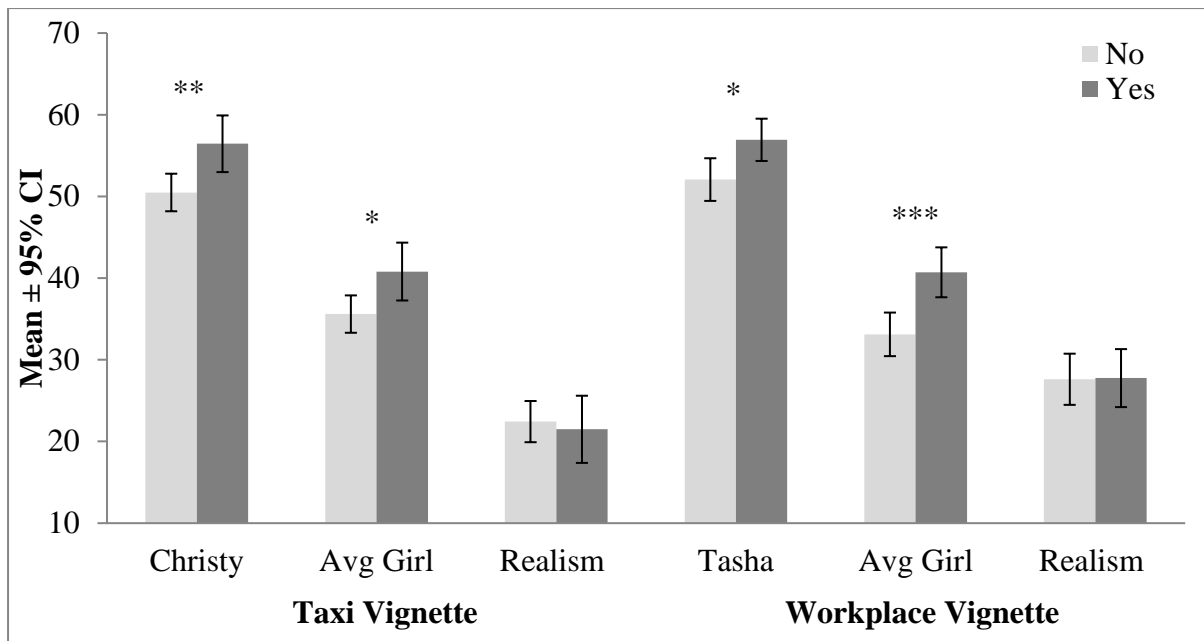


Figure 2. Mean scores and 95% CIs for study outcome measures (named character, porn-like sex likelihood; average girl, porn-like sex likelihood; scenario realism) by pre-experimental exposure group (“Use of taxi-themed pornography in previous six months?” for taxi vignette measures, and “Use of workplace-themed pornography in previous six months?” for workplace vignette measures). * $p < .05$; ** $p < .01$; *** $p < .001$.