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Pornography and Sexual Aggression: Can Meta-Analysis Find a Link?

Christopher J. Ferguson[1] and Richard D. Hartley[2]

Abstract

Whether pornography contributes to sexual aggression in real life has been the subject of dozens of studies over multiple decades. Nevertheless, scholars have not come to a consensus about whether effects are real. The current meta-analysis examined experimental, correlational, and population studies of the pornography/sexual aggression link dating back from the 1970s to the current time. Methodological weaknesses were very common in this field of research. Nonetheless, evidence did not suggest that nonviolent pornography was associated with sexual aggression. Evidence was particularly weak for longitudinal studies, suggesting an absence of long-term effects. Violent pornography was weakly correlated with sexual aggression, although the current evidence was unable to distinguish between a selection effect as compared to a socialization effect. Studies that employed more best practices tended to provide less evidence for relationships whereas studies with citation bias, an indication of researcher expectancy effects, tended to have higher effect sizes. Population studies suggested that increased availability of pornography is associated with reduced sexual aggression at the population level. More studies with improved practices and preregistration would be welcome.

Keywords

pornography, sexual aggression, rape, domestic violence

Research regarding the effects of pornography consumption on sexually aggressive or violent behavior has been extensive and controversial over the past 40 years since the U.S. Meese Commission reviewed the issue in the 1980s. Although many arguments have been made that consuming pornography increases sexually aggressive behavior of males toward females, the results from extant studies are not conclusive regarding these negative effects. Most industrial countries have experienced large declines in rape and sexual assault while the availability and ease of access to pornography has increased over the same time period (Ferguson & Hartley, 2009). The current study conducts a meta-analysis of 59 existing correlational, experimental, and population studies examining the influence of pornography on sexual aggression.

To date, dozens of research studies have examined the relationship between pornography consumption and aggressive behavior. Outcomes from these studies are mixed, yet those that find a relationship usually report small but statistically significant effects of pornography on aggressive behavior (Alexy et al., 2009; Burton et al., 2010) in mostly samples of male adolescent or college students (for two recent studies, see Dawson et al., 2019; Hagen et al., 2018). Other studies find no effects (Endrass et al., 2009; Hagan et al., 2018) or even inverse relationships (Diamond et al., 2011). Further still, some studies suggest the relationship is more complex, citing both mediators and moderators that reduce the strength of the effect of pornography consumption on sexually aggressive behavior (Malamuth et al., 2000) or eliminate its influence altogether (Hagen et al., 2018; Kjellgren et al., 2009).

One issue of concern regarding the current corpus of research is how cross-study heterogeneity might be due to methodological issues influencing effect sizes. In other words, it is possible that methodological shortcomings can create "noise" resulting in false positive results in some studies or perhaps false negatives in others. False positive results can cause inflated effect sizes in meta-analyses, falsely boosting confidence in the existence of an effect in the population (for discussion in the similar realm of video game violence effects, see Drummond & Sauer, 2019). For instance, significant effect sizes might disappear after controlling for important theoretically relevant third variables, but meta-analyses that rely on bivariate effects may not properly control for these. Also, effect sizes may be artificially inflated by hypothesis guessing on the part of study participants, or researchers reanalyzing data to

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find results that best fit their hypotheses. Finally, some research has studied the effects in samples of sex offenders which also raises the issues of time-order specification in claims of causal relationships (Beauregard et al., 2004[AQ1]; Kingston et al., 2008[AQ2]).

There have been a few prior meta-analytic studies of the relationship between pornography consumption and aggressive behavior though it is unclear the degree to which they fully provide evidence for, or against, effects. The existing meta-analytic studies find that pornography consumption increases nonsexual aggression (Allen, D'Alessio, & Brezgel, 1995) in older laboratory studies (through 1985), though effects for aggressive sexual attitudes were mixed and controversial, particularly for nonexperimental studies (Allen et al., 1995; Hald et al., 2010). A more recent meta-analysis suggested there are small effects for the relationship between pornography use and actual sexual aggression (Wright et al., 2016[AQ3]) in correlational and longitudinal studies. However, this meta-analysis was limited by including an atypical "correction" for measurement error which may have inflated effect sizes estimates, overreliance on bivariate correlations (as opposed to effect sizes that control for relevant third variables), and lack of consideration of how methodological issues might influence effect sizes. Thus, there are reasons to suspect that prior meta-analyses may have overestimated confidence in the existence of effects.

Media Violence Research and the Extension to Pornography

Violence and aggression are not a uniquely American phenomenon, and media violence and its effects on aggressive behavior have been studied in both the United States and around the world for decades (Ferguson & Hartley, 2009). Violence as entertainment has also been the subject of controversy for a number of years, and much of the existing research on aggressive behavior has focused on media violence—television, movies, and video games—as a prominent causal mechanism in both adolescents and adults. Empirically speaking, however, most of the studies are lacking a strong link between violence in the media and aggression (Ferguson & Kilburn, 2009; Savage & Yancey, 2008). Although most pornography is not considered violent in nature, it has likewise garnered attention as a potential source for increased aggression, specifically in sexual assault perpetration on females by males (Ferguson & Hartley, 2009). A small percentage of pornography does depict assault and rape scenarios, but the majority is representative of mutually consenting adults engaged in sexual activity (Palys, 1986). Nonetheless, arguments are that pornography portrays females in submissive roles and increases negative attitudes toward women and therefore those who view it regularly have greater propensities to hold sexually aggressive attitudes and engage in sexually assaultive behavior (Richardson, 2018).

Over the past four decades, many studies have examined the effects of exposure to pornography and its effects on sexually aggressive attitudes and behaviors. The methodologies employed in these studies have generally explored the relationship via two forms. First, correlational studies provide analysis of participants' consumption of various levels of sexually explicit materials and their sexual attitudes and sexual behavior to include self-reported criminal sex offenses. Second, experimental research randomly assigns exposure to violent pornography, nonviolent pornography, and nonpornographic media and then administers questionnaires to participants measuring their attitudes (either toward females in general, or about sexually aggressive behavior) or provides opportunities to engage in minor aggression (e.g., providing mild electric shocks or immersing a hand in cold water) in a laboratory setting. Contemporary research has widened the context of the etiology of aggressive and violent behavior generally concluding that a number of other factors may be more important in explaining the aforementioned behaviors than pornography consumption. For example, other individual or personality traits such as hostile masculinity (Hunter et al., 2010), callousness (Abbey & McAuslan, 2004), and engagement in delinquent behavior (Espelage et al., 2015) have been shown to be determinants of sexual aggression, and that the effect sizes of these variables are much stronger than those for consumption of pornography (Vega & Malamuth, 2007).

A third group of studies considers relationships between pornography consumption and sexual violence at the population level (e.g., Diamond et al., 2011; Gentry, 1991). In such studies, changes in the population rate of sexual crimes are associated with changes in the availability of pornography, often due to changes in the law. Cross-nationally, most (though not all) such studies suggest that pornography consumption is correlated with reductions in sexual violence. However, such data are correlational in nature, and third variables at the societal level may also be responsible for these patterns.

Research on pornography has, in the past, been generally inconsistent and often critiqued on methodological grounds (e.g., Mould, 1988). For example, experimental studies of pornography often employed control media conditions that were a poor match for pornographic media, typically being dull, not featuring humans at all, or otherwise being poorly matched. Indeed, even in older studies, some scholars suggested that excitement, rather than sexual content per se, may have driven aggression (Zillman et al., 1974). Among survey studies, demand characteristics, single-responder bias, and common method variance all may contribute to small "noise"-level correlations that, particularly in large sample studies, may detect as "statistically significant" despite bearing no relevance to true effects in the population. Indeed, a recent review of survey studies of adolescents (Peter & Valkenburg, 2016) suggested that widespread methodological shortcomings and apparent researcher biases limited the degree to which the extant research could support the existence of causal effects.

Related to meta-analyses of such studies, individual study results are heterogeneous. Some studies even suggest that pornography may have positive effects such as being related to higher egalitarianism among porn consumers (Kohut et al., 2016). One weakness of meta-analysis is that meta-analysis

can artificially smooth over heterogeneity between studies, suggesting that *the average effect size wins*. This approach to meta-analysis is almost always biased in favor of the hypothesis and may artificially increase confidence in a hypothesis for which actual evidence is mixed. It can be more useful to explore, via meta-analysis, what methodological differences between studies account for variance in effect sizes, rather than assume that a weighted mean effect size is indicative of population effect sizes. This is particularly true when evidence suggests meta-analyses generally overestimate true effect sizes by a significant magnitude (Kvarven et al., 2019).

A second important factor to consider is that meta-analyses of correlational results have historically relied on bivariate correlations. This is because it is believed that bivariate correlations are more homogeneous than are controlled effect sizes such as standardized regression coefficients, which may include different controls between studies. However, current evidence suggests that bivariate correlations are, in fact, no more homogeneous than are standardized regression coefficients, and standardized regression coefficients are very suitable for use in meta-analysis (Furuya-Kanamori & Doi, 2016; Pratt et al., 2010; Savage & Yancey, 2008). Further, theoretical rationale suggests that bivariate correlations are unsuited for meta-analysis for many hypotheses. This is because relevant control third variables are considered theoretically necessary in many fields and failure to control for them will result in spuriously high effect sizes. Evidence from some pornography studies suggests this is an issue of considerable concern, with more carefully controlled studies being less likely to find evidence for pornography effects (e.g., Baer et al., 2015). Thus, considering controlled effects in correlational and longitudinal studies is likely superior than relying on bivariate effects.

The Current Study

The current study consists of a meta-analytic review of the extant literature on pornography consumption on sexual aggression across experimental, correlational, and population studies. This analysis concerns itself specifically with behavioral outcomes rather than attitudinal outcomes. This meta-analysis improves upon previous analyses in several ways. First, it examines three types of studies, experimental, correlational, and population-level simultaneously. This may help elucidate broader patterns between studies that may help to understand relationships between pornography and sexual aggression. Second, the current meta-analysis considers methodological issues that may influence effect sizes. To our knowledge, this is the first meta-analysis to do so. Third, for correlational and longitudinal studies, this meta-analysis will focus on standardized regression coefficients. This may help to elucidate whether pornography retains any predictive validity once third variables have been controlled. Finally, to our knowledge, this is the first meta-analysis on the effects of pornography consumption and aggressive behavior that has been preregistered. The preregistration is available at https://osf.io/njvdy

Method

Inclusion Criteria

To be included in the current meta-analysis, studies must have included a measure of pornography use, or experimental comparison of pornography with a control condition. Only behavioral outcomes related to aggression, violent assaults, or rape were considered. Attitudinal measures were not included. The studies also must have included enough information to calculate an effect size *r*. Specific selection of studies involved a search on PsycINFO and Medline using the terms "pornography" AND "aggress* OR violen* OR assault OR rape." This search yielded 63 studies. After removing studies which did not meet the inclusion criteria and duplicates, the result was 59 studies with 73 effect sizes included in the meta-analysis. For some studies, requests were made to author(s) for additional data that would allow for the calculation of effects sizes.

Other previous meta-analyses were also searched for relevant studies. In some cases, multiple studies have been undertaken utilizing the same data set. As these articles may have employed differing analytical methods, effect sizes can vary considerably between them. Between studies from the same data, preference was given to those which produced effect sizes with the maximum number of theoretically relevant controls.

Analytic Strategy

Both authors extracted effect sizes from each article and interrater reliability was calculated. The results from the interrater reliability calculations demonstrate $\alpha = .950$. The main effect size are standardized regression coefficients (βs) which were calculated from the most conservative value (e.g., involving greatest number of theoretically relevant controls) available in each study if correlational/longitudinal or effects calculated from experimental results (*F* value, *t* test, etc.). Comprehensive meta-analysis (CMA) was used to calculate a random effects mean effect size. CMA is a user-friendly program that is able to calculate meta-analytic results from raw effect sizes, estimate publication bias, and conduct moderator and meta-regression analyses. With random effects meta-analyses, the true effect size is assumed to vary somewhat from study to study which could be due to study methods, population, or outcome. Shinyapps was also employed to generate data related to publication bias including basic funnel plot analysis, Trim and Fill, PET/PEESE,[AQ4] *p*-curve, and *r*-index.

The funnel plot is a graphic representation of the correlation between effect size and sample size. When there is no publication bias (null studies are published as reliably as statistically significant studies), the funnel will be symmetrical and there will be no correlation between effect size and sample size. When there is publication bias (a preference is shown for statistically significant studies), a correlation emerges between effect size and sample size. This is because smaller studies require higher effect sizes to obtain statistical significance. Although sometimes visible by observing the funnel plot, some

tests such as Egger's Regression specifically examine for this correlation. The Trim and Fill procedure likewise examines for a correlation between effect size and sample size and, from this, can impute likely missing studies, thereby providing a revised estimate of the more likely actual effect size in the population. PET/PEESE has some similarity to Trim and Fill, insofar as both allow for the imputation of missing studies, albeit PET/PEESE can test for both linear and curvilinear relationships between effect size and sample size. Unfortunately, all such tests tend to be underpowered such that much publication bias is typically missed.

p-Curve and *r*-index are a little different in that they look for unexpectedly high proportions of "statistically significant" results given observed power, albeit in different ways. *p*-Curve analyses examine for a clustering of *p* values around .05 which may suggest *p*-hacking, or scholars massaging their data to get it over the threshold of statistical significance. *r*-Index, by contrast, looks for the degree to which published studies have a higher than expected proportion of statistically significant results given the observed power of such studies. Both tests essentially examine for the potential for questionable researcher practices that are converting nonsignificant results to significance. It is worth noting that all of these methods have high false negative rates, particularly among studies with high sample sizes and low effect sizes. Thus, these are best considered a canary in the coal mine for dangerous levels of publication bias rather than being able to rule out publication bias altogether.

Given that meta-analysis is a powerful analytic tool, almost all find "statistical significance." Nonetheless, many small effects may be statistical artifacts due to methodological issues such as demand characteristics or single responder bias. Consistent with recommendations of Orben and Przybylski (2019)[AQ5], an effect size of $r = .10$ will be considered the minimum for practical significance. Use of a minimal effect size for interpretation reduces the potential for overinterpretation for false positive results. Effect sizes below .10 are often false positives, explained mainly by methodological noise rather than real effects and, as such, have considerable potential for misinforming the research community about the strength of evidence in support of a hypothesis.

Moderator Analysis

Moderator analyses are designed to test for study-level factors that may influence effect sizes. Particularly, when overall results suggest high degrees of between-study heterogeneity, moderator analyses can help to explore why some studies find different effects than do others. For instance, were the use of standardized aggression measures to result in effect sizes that were reliably different from studies which employed unstandardized measures, this practice could be said to be an important moderator of effect size.

Best practices analysis. We coded studies for utilizing current best practice standards to assess whether employing best practices made an impact on the reported effect sizes. Correlational studies were given credit (1 point each) for the following best practices: (1) using a standardized outcome measure for aggression or violence; (2) using a clinically validated measure of aggression (e.g., Child Behavior Checklist); (3) using more than one respondent (e.g., parent and child); (4) including distractor questionnaires to reduce demand characteristics; (5) controlled, at minimum mental health and family environment (and gender if not male only), for longitudinal studies, T1 aggression is controlled (and gender if involving both males and females); and (6) preregistration of analysis plan.

Experimental studies similarly were given credit (1 point each) for the following best practices: (1) using a standardized outcome measure for aggression, (2) using a clinically validated measure of aggression, (3) using a closely matched control condition differing only in pornographic content, (4) using distractor tasks to reduce demand characteristics, (5) queries for hypothesis guessing, and (6) preregistration of analysis plan. This process allowed for a final score ranging from 0 to 6 in either type of study that was used as a moderator variable to assess whether there is any influence on effect size for employing best practices.

These best practices are consistent with outlines for best practices in media effects and aggression research broadly (e.g., Savage, 2004). Preregistration, however, is a relatively new concept, though it has been argued as a critical component for media and aggression research as it reduces the potential for questionable researcher practices that can cause spurious or unreliable results (Przybylski & Weinstein, 2019).

Citation bias. The sample was also assessed for citation bias. If the literature review includes zero citations that conflict with the authors hypotheses, they were coded as having citation bias. So long as a paper acknowledged at least one research study or paper conflicting with the authors' hypotheses, they were not coded as having publication bias. Of the 59 studies, 23 were found to have citation bias issues (39%). In other fields, citation bias has been found to be associated with higher effect sizes, suggesting it is a good indicator of researcher expectancy effects and may help to estimate bias in meta-analytic results (Ferguson, 2015).

Alternatively, we might have considered a raw count of cited studies which supported or didn't support effects, perhaps creating a proportional index of neutrality ratioed by total number of citations. This would create a continuous variable for citation bias. This has intuitive appeal given that crediting a study as avoiding citation bias for only citing a single study is likely to underestimate the true extent of citation bias. However, fairly computing such a ratio appeared difficult. For instance, the proportion of null and significant studies published may vary over time. Very early studies (from the 1970s, say) might have few nonsignificant studies to choose from given early research tends often to artificially provide evidence for effects only to experience a decline effect (Gorman, 2017). As such, this would not fairly indicate citation bias. Further, the dichotomous method has been tested and

Table 1. Meta-Analytic Results Pornography Use on Aggressive Behavior Across Study Types.

Effect Sizes	*k*	r_+	r_c	95% CI	Homogeneity Test	I^2	τ	Publication Bias?
Nonviolent pornography								
Correlational	23	.05		[−.00, .09]	$\chi^2(22) = 120.58$, $p < .001$	81.1	.093	No
Longitudinal	9	.05		[−.02, .13]	$\chi^2(8) = 70.62$, $p < .001$	88.7	.109	No
Experimental	17	.08		[−.01, .19]	$\chi^2(16) = 43.55$, $p < .001$	61.0	.159	No
Population	6	−.53		[−.86, .13]	$\chi^2(5) = 4{,}020.1$, $p < .001$	99.8	.897	No
Violent pornography								
Correlational	10	.13	.09	[.09, .16]	$\chi^2(9) = 23.60$, $p = .005$	61.9	.041	Maybe
Experimental	7	.24		[−.10, .53]	$\chi^2(6) = 78.35$, $p < .001$	92.3	.440	No

Note. The effect size r_c indicates the effect size corrected for publication bias where applicable. k = number of studies; r_+ = pooled effect size estimate; I^2 = heterogeneity statistic; publication bias = decision based on the tandem procedure.

successful in previous research (Ferguson, 2015), where as a ratio method has not. We recognize the potential merit to both approaches but have relied on the dichotomous approach for our current analysis.

Other moderator analyses. Other moderators were considered for this meta-analysis. These included the potential moderating effects of study year, gender, at-risk status, nonviolent versus violent porn, and age of the sample. Meta-regression was used for continuous moderator variables.

Results

Main Analyses

Main results are presented in Table 1. For nonviolent pornography, results generally did not suggest a relationship between nonviolent pornography use and sexual aggression across study types. Only the effect sizes for population studies was greater than the effect size cutoff for interpretation, and this result suggested an inverse relationship between pornography availability and sexual aggression at the societal level. However, variability between studies was very high and all effect size confidence intervals crossed the zero mark. This suggests that, taken together, results across study types suggest largely negligible effects for nonviolent pornography on sexual aggression.

For violent pornography, only correlational studies and experimental studies were available. Experimental studies demonstrate a mean effect size that was small but nontrivial. However, due to high variability between studies, the effect size confidence interval crossed zero. Thus, it is difficult to interpret these effect sizes as representative of a population mean effect size and the overall result was nonsignificant. For correlational studies, the effect sizes were very small, but the confidence interval did not cross zero. However, potential publication bias reduced the effect size below the level we used for interpretation.

Moderator Analyses

Meta regression analyses. Several continuous variables were considered via meta-regression which tests the correlation between the variable and effect sizes. For studies of nonviolent pornography, there was an inverse relationship between best practices and effect sizes ($Z = -6.37$, $p < .001$) though the relationship was nonsignificant for studies of violent porn. This indicates that better studies were related to lower effect sizes in regard to nonviolent pornography, suggesting potential inflation of effect sizes due to poorer practices.

Regarding age, age was inversely related to effect size for studies of nonviolent pornography ($Z = -2.02$, $p = .043$) although this was of only threshold significance. No moderating effect for age was found for violent pornography studies. It is worth nothing that many studies, particularly older experimental studies, did not report age. As such, this outcome was examined only for a subset of studies ($k = 37$).

Regarding year of publication, year of publication was associated with effect size ($Z = 3.91$, $p < .001$) suggesting some increase in effect sizes in more recent studies of nonviolent pornography. No significant moderating effect was found for publication year for studies of violent pornography.

Categorical moderators. For studies of nonviolent pornography, effect sizes using random effects modeling were not found to be moderated by gender ($Q = 0.23$, $p = .972$) or publication status ($Q = 0.25$, $p = .621$). However, effects did differ by at-risk status with high-risk individuals showing greater effect sizes regarding nonviolent pornography ($Q = 4.55$, $p = .033$). Effects also differed in regard to citation bias, with much higher effects ($r = .101$) among studies with citation bias than those without ($r = .010$) which, in the latter case, were nonsignificant ($Q = 6.07$, $p = .014$).

For studies of violent pornography, effect sizes using random effects modeling were not found to be moderated by gender ($Q = 0.48$, $p = .490$) or at-risk status ($Q = 1.36$, $p = .244$). However, publication status ($Q = 5.27$, $p = .022$) was a significant moderator, with dissertations ($r = -.003$) showing far smaller effects than published studies ($r = .189$). This may be one indication of publication bias in some of the violent pornography literature. Effects also differed in regard to citation bias, with much higher effects ($r = .353$) among studies with citation bias than those without ($r = .096$; $Q = 16.42$, $p < .001$).

Publication bias. Analyses of funnel plots suggested that publication bias may be present for correlational studies of violent pornography but were generally absent for most other research areas. Given the high heterogeneity in results and high number of null results, neither *p*-curve nor *r*-index were appropriate for examination as these are more often used with the number of positive findings are high, particularly in relation to what might be expected given observed power. It's important to point out that most existing techniques for publication bias have a high false negative rate, particularly in large sample studies with small effect sizes. Thus, it is possible more publication bias exists than was found here.

Discussion

Investigations of the effects of pornography on aggressive behavior or sexual assault have produced inconsistent results. Some studies finding small statistically significant effects of pornography on aggressive behavior (Alexy et al., 2009; Burton et al., 2010; Dawson et al., 2019), and others reporting no effects (Endrass et al., 2009; Hagan et al., 2018), or even results suggesting that pornography may reduce aggressive and assaultive behavior (Diamond et al., 2011). The few previous existing meta-analytic studies are also mixed related to conclusions about a relationship between pornography consumption and aggressive behavior (Allen, D'Alessio, & Brezgel, 1995; Allen et al., 1995; Hald et al., 2010; Wright et al., 2016). Additionally, much of this research is dated, is merely correlational, and/or suffers from methodological flaws, suggesting that prior studies may have overestimated effect sizes.

Our meta-analytic results reveal no relationship between exposure to nonviolent pornography and sexual aggression. Population studies were the only research area that reached our effect size cutoff, and the results demonstrate at the macrolevel that increased consumption of pornography is associated with lower levels of sexually aggressive behavior. Our analytic results of the relationship between violent pornography exposure and aggressive behavior were confined to experimental and correlational studies. The meta-analytic findings from the correlational studies suggested a small mean effect size, as did the results from the experimental studies; the confidence interval for the correlational studies did not overlap zero but the one for the experimental studies did. Taken together, these results suggest that the only area to demonstrate evidence for an association regarded correlational studies of violent pornography. However, even for these, identified publication bias reduced the effect size below the level we considered as sufficient for interpretation as hypothesis supportive. Thus, current evidence for an effect for nonviolent pornography suggests an absence of identifiable effects whereas for violent pornography, the current evidence may best be considered inconclusive.

The above findings notwithstanding, we also tested several moderator variables via meta-regression analyses. The findings from these analyses further call into question any positive relationship between pornography consumption and sexual aggression due to a negative association between study quality and effect sizes. Best practices, age of sample, sample's at-risk status, and date of study all showed significant relationships to effect sizes for nonviolent pornography consumption suggesting that effects sizes have the potential to be inflated for studies whose methods are less sound. There were no significant moderating relationships for the studies of violent pornography. Finally, both citation bias and publication status also impacted effect sizes; those deemed to have citation bias issues had higher effect sizes, which was true for both studies of violent and nonviolent pornography. For experimental studies of violent pornography, unpublished dissertations had lower effect sizes than did published studies, whereas for correlational studies, identified correlations between sample size and effect size suggest a preference for the publication of studies supporting hypotheses and to not publish null studies as frequently.

Overall, our findings taken together suggest that reports of relationships between pornography consumption and subsequent sexually aggressive behavior probably overestimate the strength of this relationship. Our more comprehensive meta-analytic approach revealed that the effect sizes reported in individual studies are likely spurious due to some potential moderating effects that were established here. In conclusion, reports that make claims of contributions to the etiology of aggression and sexual assault behavior might be overstated. The empirical upshot is that more methodologically sophisticated research studies need to be conducted in order to draw valid conclusions about this relationship. Our meta-analytic results lead to conclusions that pornography consumption is not a strong, nor consistent, predictor for real-world sexually aggressive behavior.

We also agree with Peter and Valkenburg (2016) that significant methodological limitations are systematic and greatly reduced our confidence in the ability of this research field to be used to make conclusions about the public health impact of pornography. These issues should be relatively easily fixable. We outline many practices we consider to be state of the art, such as the use of standardized assessments, distractor tasks, and careful matching of experimental conditions. Our results suggest these best practices matter, with better studies less likely to find effects. We recommend that future studies adhere to these best practices far more closely than has been the case in the past.

Further, none of the studies in this realm have been preregistered. Given the high degree of false positives throughout social science research, this is a major problem for this field. We highly recommend in future studies that scholars rigorously preregister their hypotheses, measures, and analysis plans prior to data collection. We suspect that a pool of highly rigorous preregistered studies will be effective at clarifying pornography effects.

It is worth noting that most samples are conducted with U.S. or European majority populations. Among experimental studies, Whites are vastly overrepresented. It would be helpful for most studies to consider a wider range of ethnicities and countries of origin. Further, relatively few studies consider the

impact of pornography viewing on female sexual aggression toward males or other females.

Lastly, we observe that some of the confusion from prior meta-analyses may have stemmed from overreliance on bivariate correlations. Such correlations are likely to spuriously inflate effect size estimates and produce misleading conclusions regarding links between pornography and outcome behaviors and attitudes. Multivariate results employing proper theoretically relevant controls should be considered the gold standard for future research.

It is worth considering why the results from pornography research have been so inconsistent, as well as why such a gulf exists between the data and public pronouncements in the political realm. Our analyses suggest that there are methodological issues which can help explain inconsistencies between studies. Results were less likely to support significant effects when they employed a greater degree of best practices designed to reduce researcher degrees of freedom (such as the use of standardized, well-validated measures), or participant hypothesis guessing (such as distractor tasks). Although such studies were absent from the existing data, we suspect that preregistered studies would offer clearer evidence for or against effects. If the pattern holds from better practice studies employing higher levels of standardization, we expect preregistered studies to largely provide evidence against effects though, this of course, remains to be seen.

Although less quantifiable, our observation from reading the narratives of the included studies suggested to us that this realm is a highly evocative, emotionally valenced one. To a large degree, this can often make it difficult to separate the data from the narrative stories researchers appear inclined to tell, particularly when these narratives align with moral agendas. Thus, such narratives may easily spill over into the political realm, with socially conservative politicians in particular, employing selective evidence from science to promote pornography as an alleged public health issue, despite a lack of clear evidence to support such a position. This is, perhaps, not surprising given the degree to which pornography overlaps with sexual values from the perspective of social conservatives on the one hand and concerns about exploitation and misogyny from the perspective of some progressives and feminists on the other. Our observation is that the field of pornography research would be greatly enhanced in terms of objectivity to the degree it can be shielded from such considerable societal pressures. Widespread adoption of preregistration and other open science methods may be one means by which transparent objectivity might be achieved.

In conclusion, the current pool of empirical studies is unable to support beliefs linking pornography to sexual aggression. It is possible that this conclusion might change with more rigorous, standardized, preregistered studies. However, given the moral valence of this topic, we suspect debates about pornography effects will continue into the foreseeable future. We suggest that scholars would do well to be more cautious in asserting causal effects of pornography until a pool of highly rigorous studies become available. We hope that our analysis is one element in encouraging such a change in the culture of pornography research and aggression.

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References marked with an asterisk indicate studies included in the meta-analysis

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