

ORIGINAL ARTICLE

A Meta-Analysis of Pornography Consumption and Actual Acts of Sexual Aggression in General Population Studies

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Whether pornography consumption is a reliable correlate of sexually aggressive behavior continues to be debated. Meta-analyses of experimental studies have found effects on aggressive behavior and attitudes. That pornography consumption correlates with aggressive attitudes in naturalistic studies has also been found. Yet, no meta-analysis has addressed the question motivating this body of work: Is pornography consumption correlated with committing actual acts of sexual aggression? 22 studies from 7 different countries were analyzed. Consumption was associated with sexual aggression in the United States and internationally, among males and females, and in cross-sectional and longitudinal studies. Associations were stronger for verbal than physical sexual aggression, although both were significant. The general pattern of results suggested that violent content may be an exacerbating factor.

Keywords: Violence, Aggression, Pornography, Sexually Explicit Media, Meta-Analysis.

doi:10.1111/jcom.12201

Whether the consumption of pornography is associated with sexual aggression risk has been the subject of decades of scholarly inquiry and multiple government investigations. Rationales for why consuming pornography should, and should not, increase the likelihood of sexual aggression have been put forward by numerous researchers. Scholars who maintain that pornography is a risk factor point to theories of classical conditioning, operant learning, behavioral modeling, sexual scripting, construct activation, and gendered power (see D'Abreu & Krahe, 2014; Kingston, Malamuth, Fedoroff, & Marshall, 2009; Seto et al., 2010). Scholars who maintain that pornography reduces sexual aggression risk or that any effect is inconsequential argue for masturbatory catharsis, that pornography must be violent to affect aggression and violent pornography is extremely rare, or that countervailing prosocial influences dwarf

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any possible aggression-promoting messages that appear in pornography (see Diamond, Jozifkova, & Weiss, 2011; Ferguson & Hartley, 2009; Fisher & Grenier, 1994).

The former set of theories would lead to the hypothesis that people who consume pornography are more likely to behave in sexually aggressive ways than people who do not consume pornography or who less frequently consume pornography. The latter set of assertions would lead to the hypothesis that people who consume pornography are either less likely to behave in sexually aggressive ways or are indistinguishable in terms of sexual aggression from people who do not consume pornography or who less frequently consume pornography. To better understand which hypothesis provides a better match to the accumulated research findings, this article reports a meta-analysis of studies correlating direct measures of pornography consumption with direct measures of sexual aggression in general population studies. Following Hald, Malamuth, and Yuen's (2010) recent meta-analysis of aggression-related attitudes, pornography is defined as media featuring nudity and explicit sexual acts designed to arouse the consumer.

Previous meta-analyses

One tactic for investigating whether pornography impacts sexual aggression is to compare individuals who have and have not been charged with sexual offending. In a meta-analysis of eight studies, Seto and Lalumiere (2010) found that male adolescent sex offenders reported more exposure to sex or pornography than male adolescent nonsex offenders. Allen, D'Alessio, and Emmers-Sommer's (1999) meta-analysis included adult sex offenders and assessed both the use of and arousal to pornography. Sex offenders scored slightly higher than nonoffenders across 13 studies that assessed some indicator of use. A larger difference was found across the 32 studies that assessed sexual arousal, with sex offenders showing more arousal to pornography than nonoffenders.

While sex offender studies are suggestive, they assume that individuals who have not been charged with a sexual offense are sexually nonaggressive. Because most sexual assaults go unreported and a minority of reported sexual assaults lead to arrests, equating a lack of formal charges with a lack of sexual aggressiveness is problematic (Planty, Langton, Krebs, Berzofsky, & Smiley-McDonald, 2013; Rape Abuse Incest National Network (RAINN), 2015). Sex offender studies also conflate charges with actual offenses. For these reasons, Malamuth, Addison, and Koss (2000) argued that studies on pornography and sexually aggressive behavior in general population samples would be an important contribution to the literature, but noted that as of their writing, no meta-analysis had been conducted because of a paucity of studies.

General population studies that have been meta-analyzed involve (a) the effects of experimental exposure to pornography on nonsexual aggression and attitudes supportive of violence (ASV) and (b) naturalistic (i.e., self-selected) pornography consumption and ASV. Allen, D'Alessio, and Brezgel (1995a) meta-analyzed 33 experiments and found that pornography exposure increased nonsexual aggression.

Nonsexual aggression was operationalized as intentional physical, material, or psychological aggression (e.g., the administration of electric shocks). Allen, Emmers, Gebhardt, and Giery (1995b) meta-analyzed 16 experiments and found that pornography exposure increased ASV. Hald *et al.* (2010) meta-analyzed nine survey studies and found that naturalistic pornography consumption was associated with higher levels of ASV. Examples of ASV include acceptance of interpersonal violence, rape myth acceptance, and sexual harassment proclivities. Important both for experimentalists interested in further tests of the effects of pornography and for policy makers interested in the potential remedial role of media literacy efforts is a meta-analysis by Allen, D'Alessio, Emmers, and Gebhardt (1996) on educational briefings. This meta-analysis of 10 experimental studies suggested that educational preexposure briefing and postexposure debriefing materials informing participants about the fictional nature of pornography and the harms of sexual aggression may mitigate its adverse attitudinal effects.

Current meta-analysis

Despite years of research and social concern about pornography and sexually aggressive behavior, arguably the most important meta-analysis has yet to be conducted. Prior meta-analyses have shown that pornography consumption is associated with higher levels of nonsexual aggressive behavior and ASV, but nonsexual aggression in the laboratory cannot be directly equated to real-life acts of sexual aggression and attitudes do not always predict behavior. Accordingly, the first research question of the present meta-analysis asks whether pornography consumption is positively correlated with actual acts of sexual aggression (RQ1).

Potential moderators

The association between pornography consumption and sexual aggressive behavior may not be uniform across samples and methods (Hald *et al.*, 2010; Mundorf, Allen, D'Alessio, & Emmers-Sommer, 2007). The exploration of moderating variables in a meta-analysis is limited by the characteristics of the located studies. The studies found for the present meta-analysis did allow, however, for the exploration of several potential moderators suggested by relevant literatures.

Biological sex

Because aggression in pornography is generally directed toward women (Bridges, Wosnitzer, Scharrer, Sun, & Liberman, 2010), it might be expected that pornography would more strongly predict the sexually aggressive behavior of males than females. However, women have been found to aggress against other women in pornography (Sun, Bridges, Wosnitzer, Scharrer, & Liberman, 2008) and females' social learning of aggression is not limited to same-sex models (Bandura, Ross, & Ross, 1961). This meta-analysis' second research question asks whether pornography consumption is differentially associated with sexually aggressive behavior among males and females (RQ2).

Age

Conventional theorizing would suggest that the effect of pornography on sexual aggression would be stronger for adolescents than adults due to adolescents' lack of sexual experience and less developed critical thinking and forethought capacities. But adults may also be affected for a number of reasons, including the possession of more gendered beliefs about sex and a longer history of exposure (Peter & Valkenburg, 2011; Wright & Tokunaga, 2015a). This meta-analysis' third research question asks whether pornography consumption is differentially associated with sexually aggressive behavior among adolescents and adults (RQ3).

National/International

It has long been suggested that the effect of pornography on sexual aggression is different outside of the United States (Malamuth & Billings, 1986), where most studies have been conducted. However, many recent studies of pornography consumption and other sexual behaviors in the United States and internationally have shown more similarity than difference (Wright, Bae, & Funk, 2013). This meta-analysis' fourth research question asks whether pornography consumption is differentially associated with sexually aggressive behavior in national and international studies (RQ4).

Pre-/post-Internet

Pornography is increasingly accessed online. Factors such as easier access to more violent content, anonymity, and increased control over content selection may enhance the effects of online pornography (Dines, 2010; Fisher & Barak, 2001; Shim & Paul, 2014). However, pornography had been suggested as a risk factor in sexual aggression and violent pornography was available well before the advent of the Internet (Donnerstein & Hallam, 1978; U.S. Attorney General, 1986). This meta-analysis' fifth research question asks whether pornography consumption is differentially associated with sexually aggressive behavior in pre-Internet and post-Internet studies (RQ5).

Type of pornography

If facilitating effects of pornography on sexual aggression depend on overt displays of force or coercion, then violent pornography consumption should correlate with sexual aggressiveness while nonviolent pornography consumption should not (Allen et al., 1995b). Translated methodologically, measures assessing naturalistic exposure to violent pornography will correlate with sexual aggression while measures assessing naturalistic exposure to nonviolent pornography will be unrelated to sexual aggression.

The violent/nonviolent binary may be flawed, however. An infrequently investigated—but often discussed—third category is nonviolent but objectifying and degrading pornography (Kingston et al., 2009; Seto et al., 2010). Not explicitly violent, but nevertheless dehumanizing, depictions may also affect aggressive attitudes and disinhibit aggressive behaviors (Wright & Tokunaga, 2015b). In their meta-analyses, Allen and colleagues found that experiments in which investigators

classified content as “nonviolent” did not result in a statistically weaker aggressive response (Allen et al., 1995a, p. 271) or, across all experiments, a statistically weaker increase in ASV (although content labeled “violent” produced a stronger effect than content labeled “nonviolent” within studies that included both conditions; Allen et al., 1995b, p. 19). If, in naturalistic studies, individuals who consume objectifying and degrading pornography record their exposure in relation to questions about their nonviolent pornography viewing, these studies may still find significant associations. Accordingly, this meta-analysis’ sixth research question asks if there is a difference in correlational strength between indices of violent pornography consumption and sexual aggression and indices of nonviolent pornography consumption and sexual aggression (RQ6).

Most measures of pornography consumption in naturalistic studies do not ask about exposure to various types of content, such as nonviolent, nonviolent but degrading, violent, and so forth, however. Instead, participants are simply asked about their frequency of consumption of content featuring nudity and explicit sex. These general, content nonspecific measures offer an opportunity to probe another important question. Recent studies suggest that the majority of popular pornography has themes of aggression, degradation, or objectification (Bridges et al., 2010; Dines, 2010; Sun et al., 2008). If these studies are accurate and the pornography consumed by most individuals features one or more of these themes, then content nonspecific measures and measures of violent consumption should both correlate with sexual aggression. However, if these studies are inaccurate and the pornography consumed by most individuals is devoid of aggression, degradation, or objectification, then content nonspecific measures of pornography consumption should be unrelated to sexual aggression. This meta-analysis’ seventh research question asks if there is a difference in correlational strength between indices of violent pornography consumption and sexual aggression and indices of general, content nonspecific pornography consumption and sexual aggression (RQ7).

Type of sexual aggression

Sexual aggression can take many forms. Two of the more researched types of sexual aggression are physical and verbal (Centers for Disease Control and Prevention (CDCP), 2014). Physical sexual aggression refers to the use or threat of physical force to obtain sex. Examples of physical force provided by the CDCP include “pinning the victim’s arms, using one’s body weight to prevent movement or escape, use of a weapon or threats of use, and assaulting the victim” (p. 11). Verbal sexual aggression refers to verbally coercive but not physically threatening communication to obtain sex, and sexual harassment. Examples of verbal coercion and harassment provided by the CDCP include “being worn down by someone who repeatedly asked for sex or showed they were unhappy; feeling pressured by being lied to, or being told promises that were untrue; having someone threaten to end a relationship or spread rumors; sending unwanted sexually explicit photographs; creating a sexually hostile climate, in person or through the use of technology” (p. 12).

Given that the unethicity of and penalties for physical sexual aggression are more apparent than for verbal sexual aggression, physical sexual aggression may be more difficult to disinhibit. Indeed, physical sexual aggression is rarer than verbal sexual aggression (Boeringer, 1994; Kennair & Bendixen, 2012). It is important to see if pornography consumption is correlated with both types of aggression and if these correlations differ in magnitude. This meta-analysis' eighth research question asks whether pornography consumption is differentially associated with physical sexual aggression and verbal sexual aggression (RQ8).

Cross-sectional/longitudinal data

Cross-sectional data are those gathered on a single occasion. They allow for assessment of covariation, but not the temporal sequencing of associations. Longitudinal data are those gathered on two or more occasions. Longitudinal data allow for the assessment of both covariation and time-ordering. Because causality is more strongly suggested by prospective than concurrent associations (Malamuth et al., 2000), it is important to see if pornography consumption is associated with sexually aggressive behavior in both cross-sectional and longitudinal data. Additionally, as motives and opportunities for aggressive behavior may take time to arise or appear (Huesmann, 1998), it is important to test if there are differences in the magnitude of pornography–sexual aggression correlations in cross-sectional and longitudinal studies. This meta-analysis' ninth research question asks whether pornography consumption is differentially associated with sexually aggressive behavior in cross-sectional and longitudinal data (RQ9).

Report type

It is important to compare unpublished and published reports for two reasons. First, published reports may be of higher quality, having been vetted by anonymous peer reviewers (Neuman, Davidson, Joo, Park, & Williams, 2008). Second, unpublished reports may be more likely to report null correlations, if journal editors prefer to publish significant findings (Rothstein & Bushman, 2012). This meta-analysis' tenth research question asks whether pornography is differentially associated with sexually aggressive behavior in published and unpublished reports (RQ10).

Method

Literature search

The literature search was conducted as part of an ongoing effort to archive and review studies on media and sexual socialization. The search for the current study was continued until the end of 2014. Electronic database (e.g., Academic Search Premier, All Academic, Cinahl Complete, Communication & Mass Media Complete, ERIC, Google Scholar, JSTOR, Medline, ProQuest, PsycINFO, PubMed, and Sociological Abstracts) and ancestral (e.g., Bauserman, 1996; Flood, 2009; Hald, Seaman, & Linz, 2014; Kingston et al., 2009; Linz & Malamuth, 1993; Seto, Maric, &

Barbaree, 2001) searches were used to locate published and unpublished scientific reports. Searches were conducted by the study's authors. After this compilation effort, eight leading media and aggression scholars were contacted and asked to identify omissions.

Criteria for inclusion in the meta-analysis were threefold. First, the study had to sample from a general population. Sex offender/clinical studies were not included (see Allen et al., 1999; Seto & Lalumiere, 2010). Second, the study had to measure pornography consumption. Pornography was defined as sexually explicit media intended to arouse the consumer (Hald et al., 2010; Seto et al., 2001). Studies that measured exposure to sexually nonexplicit content in mainstream media only were not included. Third, the study had to assess sexually aggressive behavior. Studies that assessed sexually aggressive beliefs and attitudes only were not included (see Allen et al., 1995b; Hald et al., 2010). Authors were contacted directly when the search criteria were met but data necessary to extract an effect size (e.g., zero-order correlations) were not described in the report (Chang et al., 2014; Gorman, 2014; Thompson, Koss, Kingree, Goree, & Rice, 2010; Williams, Cooper, Howell, Yuille, & Paulhus, 2009; Ybarra, Mitchell, Hamburger, Diener-West, & Leaf, 2011). Authors were able to provide the needed information in all but one instance (Harries, 2011). Studies that did not measure pornography consumption and sexual aggression directly, but instead measured indirect indicators of pornography exposure (e.g., reductions in legal restrictions to access) and indirect indicators of sexual aggression (e.g., crime reports) were not included, as they are not able to inform the question of whether the people consuming the pornography are the ones who are or who are not committing the sexually aggressive acts.

Studies meeting these criteria are overviewed in Table 1. Twenty-two studies from 21 reports were identified (Seto et al., 2010, reported on two studies, one conducted in Sweden, the other in Norway).

Moderator coding

Biological sex

Fifteen reports either sampled males only or reported data from their male sample only. Six reports sampled and reported on both males and females. One paper reported on females only.

Age

Five studies' sample descriptions suggested that all or the majority of their participants were adolescents (teenagers aged 17 and younger). Seventeen studies' sample descriptions suggested that all or the majority of their participants were adults (individuals aged 18 and older).

National/International

Fourteen studies were conducted in the United States and eight studies were conducted internationally.

Table 1 Overview of Studies in Meta-Analysis

| Study | Age of Sample | Sex of Sample | Design of Study | Report Type | Country of Study |
|-----------------------------|---------------|-----------------|-----------------|-------------|-------------------|
| Boeringer (1994) | Adult | Male | Cross-sectional | Article | United States |
| Bonino et al. (2006) | Adolescent | Male and female | Cross-sectional | Article | Italy |
| Bouffard (2010) | Adult | Male | Cross-sectional | Article | United States |
| Brown and L'Engle (2009) | Adolescent | Male and female | Longitudinal | Article | United States |
| Carr and VanDeusen (2004) | Adult | Male | Cross-sectional | Article | United States |
| Chang et al. (2014) | Adolescent | Male and female | Longitudinal | Article | Taiwan |
| Crossman (1994) | Adult | Male | Cross-sectional | Thesis | United States |
| D'Abreu and Krahe (2014) | Adult | Male | Longitudinal | Article | Brazil |
| Demare et al. (1993) | Adult | Male | Cross-sectional | Article | United States |
| Gorman (2014) | Adult | Male and female | Cross-sectional | Thesis | United States |
| Hardit (2013) | Adult | Male | Cross-sectional | Thesis | United States |
| Kennair and Bendixen (2012) | Adolescent | Male and female | Cross-sectional | Article | Norway |
| Kjellgren et al. (2011) | Adult | Female | Cross-sectional | Article | Norway and Sweden |
| Malamuth et al. (2000) | Adult | Male | Cross-sectional | Article | United States |
| Peeks (2006) | Adult | Male | Cross-sectional | Thesis | United States |
| Seto et al. (2010) | Adult | Male | Cross-sectional | Article | Sweden |
| Seto et al. (2010) | Adult | Male | Cross-sectional | Article | Norway |
| Simons et al. (2012) | Adult | Male | Cross-sectional | Article | United States |
| Thompson et al. (2010) | Adult | Male | Longitudinal | Article | United States |
| Vega and Malamuth (2007) | Adult | Male | Cross-sectional | Article | United States |
| Williams et al. (2009) | Adult | Male | Cross-sectional | Article | Canada |
| Ybarra et al. (2011) | Adolescent | Male and female | Longitudinal | Article | United States |

Pre-/post-Internet

Few studies demarcated pornography found online and offline. As historians have identified 1995 as an important turning point for popular Internet use (Campbell, 2015; Dominick, Messere, & Sherman, 2008), it was noted if a study was published in/before or after 1995. Three studies were published in 1995 or before. In one instance, Malamuth et al. (2000) published their study after 1995 but gathered their data in the 1980s, so this study was included in studies conducted in/before 1995. Thus, four studies were identified as “pre” Internet and eighteen as “post” Internet.

Type of pornography

Measures of pornography consumption were classified as violent, nonviolent, and general. Following prior meta-analyses (Hald et al., 2010; Mundorf et al., 2007), violent pornography was defined as content depicting sex without consent, with coercive acts, or with aggressive behavior. As an example of nonconsensual content, Boeringer (1994, p. 293) asked about men's exposure to depictions where “force is used and there is an explicit lack of consent.” As an example of coercive content, Peeks (2006, p. 93)

asked about men's exposure to depictions of women "receiving negative treatment" or being "drunk or on drugs." As an example of aggressive content, Seto et al. (2010, p. 222) asked whether men and Kjellgren, Priebe, Svedin, Mossige, and Langstrom (2011, p. 3357) asked whether women had "ever watched violent pornography." Eight studies included measures of violent pornography consumption.

Nonviolent pornography was defined as content depicting consensual sex, without coercive acts, and without aggressive behavior. Only two studies included measures that approximated this definition. Demare, Lips, and Briere (1993) asked about men's exposure to depictions of "mutually consenting sex" (p. 289) and classified affirmative responses as nonviolent pornography exposure. Ybarra et al. (2011, p. 5) asked about boys' and girls' exposure to depictions of individuals being "physically hurt by another person while they were doing something sexual." Ybarra et al. classified boys and girls who indicated consuming pornography, but not being exposed to any depictions featuring violence, as nonviolent pornography consumers.

Fourteen studies included only a general, content nonspecific measure of pornography consumption. As one illustration, Simons, Simons, Lei, and Sutton (2012, p. 384) asked men how often during the past year they had "viewed an X-rated movie or visited an X-rated website on the Internet." As another illustration, Bonino, Ciairano, Rabaglietti, and Cattelino (2006, p. 272) asked boys and girls how frequently they had "read or seen pornographic magazines or comics in the last six months and had watched pornographic films or videos in the last six months." While some of these measures identified particular delivery mechanisms (e.g., website, movie, and magazine), none of them identified the type of content being delivered (e.g., violent and nonviolent).

Type of sexual aggression

Following the CDCP (2014), physical sexual aggression was defined as the use or threat of physical force to obtain sex, and verbal sexual aggression was defined as verbally coercive but not physically threatening communication to obtain sex, and sexual harassment. Six studies assessed physical sexual aggression. Kennair and Bendixen (2012, p. 483), for example, measured boys and girls' "use of explicit physical force" to obtain sex. As another example, Crossman (1994, p. 67) assessed if men had "tried to obtain sexual intercourse through threatening to use physical force" or had "obtained sexual acts, such as oral or anal intercourse, through using threats or physical force." Six studies assessed verbal sexual aggression. As one illustration, Demare et al. (1993, p. 289) assessed whether men had engaged in verbally coercive tactics with women such as "threatening to end your relationship" or "pressuring her with continual argument." As another illustration, Chang et al. (2014, p. 4) assessed harassing behaviors among boys and girls such as "asked someone to do something sexual online when they did not want to."

Cross-sectional/longitudinal data

Seventeen studies were cross-sectional and five were longitudinal.

Report type

Four reports were unpublished theses and 18 were published journal articles.

Effect size extraction and correction for measurement error

Reports were examined for their effect size estimates. In many instances, the r correlation between pornography use and sexual aggression was reported; however, in some cases, the correlation had to be estimated through unadjusted odds ratios and chi-square values. In reports where a 2×2 contingency table was presented, the log odds ratio was first transformed into Cohen's d and then into r .

The effect sizes were corrected for measurement error, which attenuates the maximum theoretical effect size (Schmidt & Hunter, 2015). Because attenuation can sometimes occur disproportionately across classes of reports, it is particularly important when testing for moderators to correct for measurement error. The scale reliability reported in each study was used in the correction equation for measurement. The Spearman–Brown formula was used to estimate a case's reliability when one was not reported. The single-item alphas used to estimate the reliability were as follows: pornography consumption ($\alpha_{\text{single-item}} = .42$, $M_{\text{item}} = 4$) and sexual aggression ($\alpha_{\text{single-item}} = .27$, $M_{\text{item}} = 6$).

Results

Analytic approach

The corrected correlations were summarized using a random-effects model meta-analysis. Random-effects procedures are based on the assumption that variation in the true effects exists beyond variation due to sampling error alone (Anker, Reinhart, & Feeley, 2010; Borenstein, Hedges, Higgins, & Rothstein, 2009; Hedges & Vevea, 1998). The effect sizes of the relationship between pornography consumption and sexual aggression are presumed to be normally distributed, and in accounting for this variation, generalizations can be made beyond the set of studies included in this meta-analysis (Hedges & Vevea, 1998). To test the potential moderators, mixed-effects model subgroup analyses were conducted. In the mixed-effects model, a random-effects model is used to estimate the effects *within* subgroups but a fixed-effect model is used to estimate the variance *between* subgroups.

Research Question 1: overall association

Effect sizes for 22 cases were extracted from the 21 reports identified in the literature search (see Table 2). The total number of participants evaluated in the meta-analysis was 20,820 (males = 13,234, females = 7,586), with an average of 947 ($Mdn = 479$) per case. Across the cases, the sample-weighted mean effect size of the association between pornography use and sexual aggression was positive and significant, $r = .28$, $SE = 0.01$, 95% CI [.24, .32], $p < .001$, random-effects variance (ν) = .007. Accordingly, consumption of pornography was associated with an increased likelihood of committing actual acts of sexual aggression.

Table 2 Raw and Corrected Effect Sizes for Studies in Meta-Analysis ($N = 20,820$)

| Study | <i>N</i> | Raw Overall <i>r</i> | Corrected Overall |
|-----------------------------|----------|----------------------|-------------------|
| Boeringer (1994) | 477 | .268 | .390 |
| Bonino et al. (2006) | 779 | .233 | .463 |
| Bouffard (2010) | 325 | .180 | .201 |
| Brown and L'Engle (2009) | 967 | .190 | .277 |
| Carr and VanDeusen (2004) | 99 | .300 | .382 |
| Chang et al. (2014) | 2,268 | .135 | .218 |
| Crossman (1994) | 480 | .218 | .260 |
| D'Abreu and Krahe (2014) | 120 | .200 | .254 |
| Demare et al. (1993) | 383 | .153 | .283 |
| Gorman (2014) | 415 | .078 | .115 |
| Hardit (2013) | 177 | .120 | .191 |
| Kennair and Bendixen (2012) | 1,123 | .185 | .261 |
| Kjellgren et al. (2011) | 4,212 | .221 | .221 |
| Malamuth et al. (2000) | 2,652 | .170 | .203 |
| Peeks (2006) | 154 | .230 | .291 |
| Seto et al. (2010, Sweden) | 1,978 | .325 | .325 |
| Seto et al. (2010, Norway) | 1,971 | .304 | .304 |
| Simons et al. (2012) | 308 | .170 | .235 |
| Thompson et al. (2010) | 644 | .110 | .136 |
| Vega and Malamuth (2007) | 102 | .480 | .655 |
| Williams et al. (2009) | 88 | .090 | .095 |
| Ybarra et al. (2011) | 1,098 | .384 | .427 |

Research Question 2: biological sex

Research Question 2 asked whether biological sex moderates the association between pornography consumption and sexual aggression. The mixed-effects model subgroup analysis did not indicate a moderating effect of biological sex, $Q_{\text{bet}}(1) = 0.24$, $Z_{\text{diff}} = 0.49$, $p = .62$. The average correlation for the 21 cases sampling males ($r = .29$, 95% CI [.24, .33], $p < .001$) did not significantly differ from the average correlation for the seven cases that sampled females ($r = .26$, 95% CI [.18, .34], $p < .001$).

Research Question 3: age

The question of whether the correlations between pornography consumption and sexual aggression changed as a function of age groups was asked in Research Question 3. The cases were categorized into a group that used adolescent samples and a group that sampled adults. The results of the subgroup analysis demonstrated that the association between pornography consumption and sexual aggression was not moderated by age group, $Q_{\text{bet}}(1) = 2.11$, $Z_{\text{diff}} = 1.45$, $p = .15$. The mean correlation for the cases that sampled adolescents ($r = .33$, 95% CI [.25, .40], $p < .001$, $k = 5$) did not differ from the cases that sampled adults ($r = .26$, 95% CI [.21, .31], $p < .001$, $k = 17$).

Research Question 4: national/international

Research Question 4 asked whether a difference in the average correlations between pornography consumption and sexual aggression exists between studies conducted in the United States and those conducted internationally. The international studies ($r = .28$, 95% CI [.21, .34], $p < .001$, $k = 8$) yielded almost the identical mean effect size as studies conducted in the United States ($r = .28$, 95% CI [.22, .34], $p < .001$, $k = 14$). Accordingly, whether the study was conducted nationally or internationally did not affect the relationship between pornography consumption and sexual aggression, $Q_{\text{bet}}(1) = 0.001$, $Z_{\text{diff}} = 0.03$, $p = .97$.

Research Question 5: pre-/post-internet

Study year was tested as a possible moderator in Research Question 5. The cases were grouped into one of two categories: reports released in or before 1995 and reports made available in or after 1996. This categorization makes it possible to probe whether the association between pornography consumption and sexual aggression differed prior to and after the adoption of the Internet on a mass scale. The results of the subgroup analysis demonstrated that year was not a significant moderator, $Q_{\text{bet}}(1) = 0.001$, $Z_{\text{diff}} = 0.03$, $p = .97$. The average correlation of the four studies conducted prior to 1995 ($r = .28$, 95% CI [.17, .37], $p < .001$) was similar in magnitude to the average correlation of the 18 studies conducted after 1996 ($r = .28$, 95% CI [.23, .33], $p < .001$).

Research Question 6: nonviolent/violent pornography

The content of the pornography consumed was tested as a moderator of associations between pornography consumption and sexual aggression in Research Question 6. Correlations with nonviolent pornography consumption were compared to correlations with violent pornography consumption. Although violent pornography consumption ($r = .37$, 95% CI [.28, .45], $p < .001$, $k = 8$) produced a stronger association on average than nonviolent pornography consumption ($r = .27$, 95% CI [.07, .45], $p = .008$, $k = 2$), the moderation was nonsignificant, $Q_{\text{bet}}(1) = 0.91$, $Z_{\text{diff}} = 0.95$, $p = .34$.

Research Question 7: general assessment/violent assessment

Whether indices that assess exposure to violent pornography specifically yield stronger associations than indices that evaluate pornography consumption more generally was asked in Research Question 7. In the eight cases that measured violent pornography consumption ($r = .37$, 95% CI [.28, .45], $p < .001$), a stronger sample-weighted mean correlation was reported in comparison to the 14 cases that measured general pornography consumption ($r = .26$, 95% CI [.19, .34], $p < .001$). This difference was marginally significant in the mixed-effects model subgroup analysis, $Q_{\text{bet}}(1) = 3.34$, $Z_{\text{diff}} = 1.83$, $p = .07$.

Research Question 8: type of sexual aggression

Cases that measured verbal or physical sexual aggression were identified. This categorization was performed to test whether associations between pornography consumption and sexual aggression differed depending on if the aggression was verbal or

physical in Research Question 8. Pornography consumption was associated with both verbal ($r = .30$, 95% CI [.24, .36], $p < .001$, $k = 6$) and physical ($r = .20$, 95% CI [.13, .26], $p < .001$, $k = 6$) sexual aggression, but the association was significantly larger for verbal sexual aggression, $Q_{\text{bet}}(1) = 5.49$, $Z_{\text{diff}} = 2.34$, $p = .02$.

Research Question 9: cross-sectional/longitudinal data

Studies that employed a cross-sectional design were compared to studies that used a longitudinal design in Research Question 9. The design of the study was not a significant moderator of the association between pornography consumption and sexual aggression across the 22 cases, $Q_{\text{bet}}(1) = 0.05$, $Z_{\text{diff}} = 0.22$, $p = .83$. The average cross-sectional correlation (i.e., the correlation of pornography consumption and sexual aggression at the same data collection: $r = .28$, 95% CI [.23, .33], $p < .001$, $k = 17$) was nearly equivalent in direction and magnitude to the average prospective correlation (i.e., the correlation of pornography consumption at an earlier data collection with sexual aggression at a later data collection: $r = .27$, 95% CI [.18, .36], $p < .001$, $k = 5$).

Research Question 10: report type

The potential moderating effect of report type was tested in Research Question 10. The cases were categorized into published and unpublished reports. No difference was detected by the moderator analysis, $Q_{\text{bet}}(1) = 1.44$, $Z_{\text{diff}} = 1.20$, $p = .23$. The average correlation of published reports ($r = .29$, 95% CI [.24, .33], $p < .001$, $k = 18$) did not differ from the average correlation of unpublished reports ($r = .21$, 95% CI [.10, .33], $p < .001$, $k = 4$).

Discussion

The meta-analysis reported in this article investigated associations between naturalistic pornography consumption and actual acts of sexual aggression in 22 general population studies. The results are reviewed and contextualized in the remainder of the study. Directions for future research are also considered.

Overall association

Associations between pornography consumption and sexual aggression in the general population can be examined at the aggregate or individual level. Using secondary statistical indices, the former technique correlates an indirect metric of consumption, such as the number of pornographic movies available during a particular time period, with an indirect assessment of sexual aggression, such as government data on rape during the same time period. Using experimental and survey methods, the latter technique correlates attributes of individuals' sexual aggression which are measured directly with those individuals' actual patterns of pornography consumption. Because aggregate methods cannot inform the key question of whether those who consume more pornography differ in their sexually aggressive behavior

from those who consume less pornography and have to rely on group-level data to conjecture about individual-level behavior, the vast majority of pornography and sexual aggression research has been conducted at the individual level (Kingston & Malamuth, 2011; Malamuth & Pitpitan, 2007). Individual-level data should be privileged over aggregate-level data when they are available (MacInnis & Hodson, 2015). Accordingly, the results of the present meta-analysis are situated within the individual-level, general population literature.

Noting continued disagreement about pornography consumption and sexual aggression, Allen et al. (1995a, 1995b) meta-analyzed experimental studies on pornography exposure, nonsexual aggression, and ASV. Pornography exposure was found to have a consistent effect on nonsexual aggression and ASV, resolving the debate about the reliability of experimental studies (Fisher & Grenier, 1994; Malamuth et al., 2000). The debate about the validity of pornography experiments in general, however, remained. Fisher and Grenier, for example, questioned the information value of experiments, in addition to their consistency. They argued that experiments suffer from limitations such as subject awareness, selective attrition, and lack of ecological validity. They called for “naturalistic studies of the development of sexually violent behavior” (p. 37). Later, Fisher and Barak (2001, p. 317) noted the need for “research concerning effects of exposure to sexually explicit materials on those who choose to consume them.” The only design capable of assessing effects is the experimental design, and random assignment to conditions is necessary for a study to be an experiment. Without random assignment, any group differences postexposure may be due to self-selection dynamics and preexisting attitudes and behaviors. Additionally, ethical considerations preclude attempts at sexual aggression inducement. In sum, experiments cannot make the requested contributions. They can only be made by correlational investigations, such as survey studies.

Hald et al.’s (2010) meta-analysis of naturalistic pornography consumption and ASV was directly related to these calls. This meta-analysis found that higher levels of pornography consumption were associated with stronger ASV. Fisher, Kohut, Gioacchino, and Fedoroff (2013) were not swayed by these results, however, and emphasized that sexually aggressive behavior is the chief cause for concern.

The general population studies in the present meta-analysis assessed both self-selected pornography consumption and actual acts of sexual aggression, aligning with the requests of prior evaluative commentaries. Although previous meta-analyses have had far smaller total sample sizes than the present synthesis’ 20,000 plus total ($N = 2,040$ in Allen et al., 1995a; $N = 4,268$ in Allen et al., 1995b; $N = 2,309$ in Hald et al., 2010), results were consistent with these earlier summaries in that pornography consumption was correlated with heightened sexual aggression risk. It is worth noting that the magnitude of both the overall corrected ($r = .28$) and uncorrected ($r = .22$) associations in the present meta-analysis, which focused on actual acts of sexual aggression, were larger than the overall association sizes found in prior syntheses that included a surrogate for sexual aggression risk ($r = .13$ in Allen et al., 1995a; $r = .10$ in Allen et al., 1995b; $r = .18$ in Hald et al., 2010). It should also be

noted that the uncorrected correlations for verbal ($r = .23$, 95% CI [.18, .28], $p < .001$) and physical ($r = .16$, 95% CI [.10, .21], $p < .001$) sexual aggression were also significant.

Association contingencies

Of the nine moderation tests, seven were null, one was marginal, and one was significant. This general lack of moderation is consistent with past meta-analytic research on pornography and nonsexual aggressive behavior (Allen et al., 1995a) and media consumption and aggression more generally (Anderson et al., 2010). Yet, it is suggested that this homogeneity of results be viewed tentatively, as Hald et al.'s (2010) meta-analysis on naturalistic pornography consumption and ASV suggested the likely presence of moderating factors and several moderation comparisons in the present study were based on limited cases or measures. Additional research is needed before any firm conclusions can be drawn about moderating factors. Given that all 22 studies yielded a positive overall correlation, though, it appears likely that any differences found in future research will be more in degree than kind.

Consistent with Allen et al.'s (1995a) meta-analysis of laboratory aggression, biological sex was not a significant moderator. Pornography consumption was associated with an increased likelihood of sexually aggressive behavior for females as well as males. As men's arousal to pornography is stronger than women's (Allen et al., 2007), this finding aligns with the finding of Mundorf et al. (2007) that arousal to pornography is not a reliable predictor of its effects on aggression. Rather, pornography consumption may affect females' aggressive behavior due to the observation of aggressive female models or to identification with male aggressors. Future studies should test whether pornography consumption is more strongly associated with females' verbal sexual aggression than physical sexual aggression (Crick & Grotpeter, 1995) and if pornography consumption more strongly predicts females' same-sex sexual aggression (e.g., insults and harassment) than males' same-sex sexual aggression (Sun et al., 2008). Research is also needed on shifts in women's negative psychological reactions to pornography with repeated exposures. Brief exposure studies have found that women respond more negatively to pornography than men (Allen et al., 2007) and negative reactions would appear to inhibit the likelihood of a modeling effect. Pornographic scripts may become normalized with repeated exposures, however, decreasing negative reactions and increasing the likelihood of script application (Wright, 2011; Zillmann & Bryant, 1982, 1986).

Age was not a moderating factor. Pornography consumption was associated with an equivalent likelihood of sexual aggression among adults and adolescents. Adults' sexually aggressive scripts may be influenced by pornography due to repeated exposures and the possession of scripts congruent with pornography's presentation of gendered power. It is important to note, though, that most of the adult samples were of college students or college-aged students. Because perpetrators of sexual aggression are generally acquainted with their targets and targets of sexual aggression are predominantly adolescents and young adults (Felson & Cundiff, 2014; Planty et al.,

2013), this similarity is perhaps not surprising. Interestingly, the weakest association was found in the study with the oldest sample (Gorman, 2014; average participant age = 46). Future studies should incorporate a wider range of adults so that associations can be compared across a breadth of age groups.

Associations between pornography consumption and sexually aggressive behavior in international studies were not significantly different from those conducted in the United States. What is clear from this analysis is that the association between pornography consumption and sexual aggression is not unique to the United States. What remains unclear is whether the association varies in degree between countries. The reports available for the present meta-analysis allowed only for a basic national/international comparison. A variety of countries were represented (e.g., Brazil, Italy, Norway, Sweden, and Taiwan), but no more than two studies were conducted in any country other than the United States. Only when multiple reports are available within particular countries will a more nuanced analysis be possible.

It has been suggested that the content of pornography found online and novel elements of the online experience may enhance the effects of Internet pornography. As few studies differentiated mechanisms of delivery, a direct comparison of online and offline pornography consumption was not possible. It was found, however, that associations in studies published or conducted before 1995 did not differ from those in subsequent reports. While this finding does not support the contention of exacerbated impacts of Internet pornography, it should certainly not discourage researchers interested in further tests of this hypothesis. Future survey studies on sexually aggressive behavior can ask specific questions about medium of delivery (Peter & Valkenburg, 2007) and future experiments on sexually aggressive attitudes can manipulate aspects of users' experience that mimic online versus offline dynamics (Shim & Paul, 2014).

Violent and nonviolent pornography consumption were each associated with sexual aggression and the difference between the associations was not significant. Two important points are in order regarding these findings. First, that nonviolent pornography consumption was associated with sexual aggression is consistent with the results of prior meta-analyses (Allen et al., 1995a, 1995b; Hald et al., 2010). Measures of self-reported nonviolent pornography consumption may predict sexually aggressive behavior because acts that are indeed violent are not perceived as such by desensitized consumers (Jensen, 2007) or because content that is nonviolent is still objectifying and degrading (Wright & Tokunaga, 2015b). Second, caution is suggested regarding the conclusion from these findings that pornography with violence is no more impactful on the likelihood of sexual aggression than pornography without violence. Although the difference was not statistically significant, the violent pornography association was stronger ($r_{\Delta} = .10$) than the nonviolent pornography association. Significance tests are impacted by sample size, and only two studies assessed nonviolent pornography consumption—the smallest comparison group in the meta-analysis. Additionally, descriptions of the pornography measures that authors called “nonviolent” did not clearly indicate whether each met all the criteria of nonviolence: fully consensual sex without any coercion or any aggressive behavior.

The comparison between general, content nonspecific measures of pornography consumption and measures of violent pornography consumption is informative of this question. Although the difference between the violent and content nonspecific associations was similar to the difference between the violent and nonviolent associations (i.e., violent association .11 stronger than the content nonspecific association), the former comparison involved more cases and was marginally significant. If the content of pornography was uniform or irrelevant to an effect, it appears unlikely that these patterns would emerge in the data. Taken together with research that has found significant nonviolent/violent differences (Hald *et al.*, 2010) and content analyses of popular pornography (Bridges *et al.*, 2010; Sun *et al.*, 2008), it appears most likely that (a) the level of violence, degradation, and objectification matters, but (b) the pornography consumed by the average individual contains enough of these elements that it is associated with an elevated likelihood of sexual aggression. Future studies should be comprehensive and explicit when defining and measuring pornography labeled as “nonviolent,” and should evaluate whether nonaggressive, nondegrading, nonobjectifying pornography is so infrequently consumed that its existence is largely irrelevant to discussions of pornography’s social impact.

Pornography consumption was associated with both verbal and physical sexual aggression, but the association was stronger for verbal sexual aggression. It is important to emphasize, however, that sexual harassment can be extremely damaging and verbal coercion to obtain sex, even without the threat of physical force, is still an act of sexual violence (CDCP, 2014). It is also important to reiterate that the association for physical sexual aggression, although smaller than the association for verbal sexual aggression, was still positive and significant. Pornography consumption was associated with an increased probability of the use or threat of force to obtain sex. Future studies should more frequently demarcate different types of sexual aggression and investigate the circumstances under which pornography consumption is most likely to correlate with each type.

Pornography consumption was associated with sexually aggressive behavior in both cross-sectional and longitudinal studies. The significant average association in longitudinal research, along with the findings of individual longitudinal studies in the meta-analysis, does not support the position that pornography–sexual aggression associations are simply due to sexually aggressive individuals watching content that conforms to their already established aggressive sexual scripts (Fisher *et al.*, 2013). Brown and L’Engle (2009), for example, found that pornography consumption predicted boys’ later sexual aggression even after controlling for their earlier sexual aggression. Relatedly, D’Abreu and Krahe (2014) found that prior sexual aggression was a poor predictor of later pornography use.

Finally, the possibility that significant pornography–sexual aggression associations are due to publication bias was not supported. Pornography consumption was associated with sexual aggression in both published and unpublished reports.

Implications for theory

Assessing the magnitude and direction of the association between pornography consumption and sexually aggressive behavior has been the primary goal of naturalistic studies to date. Most studies are guided by the overall question of whether sexual media are a source of social learning, as opposed to testing specific elements of models developed to explain the role of pornography in sexual aggression specifically (e.g., the confluence model of sexual aggression) or the mechanisms, pathways, and moderators operable in sexual media effects on sexual behavior more generally (e.g., the sexual script acquisition, activation, application model of sexual media socialization, or $_3$ AM). This limits the theoretical implications that can be drawn from the results of the present meta-analysis. Nevertheless, several of the aggregated results, results from individual studies, and results from related studies can be used to broach the following points for theory development consideration.

First, the extant data would not support a theory postulating inherent sex differences in the effects of pornography on aggression. Predictions of gender dissimilarity would have to be based on differentiating proximal factors as opposed to uniform biological variance. Second, while there are certainly developmental differences between adolescents and emerging adults, the extant data would not support a theory predicting that these differences lead to one group or the other being more or less susceptible to the effects of pornography on sexual aggression. Third, the extant data would not support a catharsis theory of violent pornography and sexual aggression. From a catharsis perspective, individuals who consume violent pornography purge their sexually aggressive inclinations vicariously, reducing their likelihood of manifest sexual aggression. Without such an outlet, individuals who do not consume violent pornography become more likely to enact their aggressive inclinations on real-life victims. Contrary to the catharsis perspective, violent pornography consumers were more—not less—likely to commit actual acts of sexual aggression. Fourth, the finding that pornography consumption was more strongly associated with verbal than physical sexual aggression would support a theory hypothesizing that the disinhibiting effects of pornography will be stronger for behaviors that individuals perceive as less antisocial or that are associated with less severe penalties.

Fifth, although the studies taken together did not allow for a meta-analytic test of personal attributes, the results of a few individual studies included in the meta-analysis did indicate the importance of individual differences. Future studies should more frequently assess characteristics that are associated with sexual aggression and report zero-order correlations for groups at differing levels of risk (Hald, Malamuth, & Lange, 2013; Kingston *et al.*, 2009). This will allow for a better understanding of the individual differences that interact with pornography exposure to most strongly increase the likelihood of sexual aggression. Three specific attributes suggested by prior research are an impersonal orientation toward sex, a hostile approach to gender relations, and a disagreeable personality. Both naturalistic and experimental research indicate that associations between pornography consumption and sexually aggressive behavior are likely higher when these attributes are present

(Hald & Malamuth, 2015; Malamuth, Hald, & Koss, 2012; Malamuth & Pitpitan, 2007; Malamuth et al., 2000; Vega & Malamuth, 2007).

Conclusion

Meta-analyses have now found that pornography consumption affects nonsexual aggression and ASV in laboratory studies and is correlated with ASV and sexually aggressive behavior in naturalistic studies. As with all behavior, sexual aggression is caused by a confluence of factors and many pornography consumers are not sexually aggressive. However, the accumulated data leave little doubt that, on the average, individuals who consume pornography more frequently are more likely to hold attitudes conducive to sexual aggression and engage in actual acts of sexual aggression than individuals who do not consume pornography or who consume pornography less frequently.

It is acknowledged that the results of the present meta-analysis will not change the minds of those committed to the position that pornography cannot affect sexual aggression (see Linz & Malamuth, 1993; Malamuth & Pitpitan, 2007). The field will have to accept a “weight of evidence” approach to evaluation as opposed to a “consensus among scholars” approach. Following the call of Malamuth et al. (2000) for a meta-analysis of naturalistic pornography consumption and sexually aggressive behavior in general population samples, the present synthesis contributes to the weight of the evidence.

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*Indicates a study included in the meta-analysis.

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