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K. L. Nielsen & Patrick M. Markey**

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Does Sexy Media Promote Teen Sex? A Meta-Analytic and Methodological Review

Christopher J. Ferguson¹ · Rune K. L. Nielsen² · Patrick M. Markey³

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Abstract Parents and policy makers are often concerned that sexy media (media depicting or discussing sexual encounters) may promote sexual behavior in young viewers. There has been some debate among scholars regarding whether such media promote sexual behaviors. It remains unclear to what extent sexy media is a risk factor for increased sexual behavior among youth. The current study employed a meta-analysis of 22 correlational and longitudinal studies of sexy media effects on teen sexual behavior ($n = 22,172$). Moderator analyses examined methodological and science culture issues such as citation bias. Results indicated the presence only of very weak effects. General media use did not correlate with sexual behaviors ($r = 0.005$), and sexy media use correlated only weakly with sexual behaviors ($r = 0.082$) once other factors had been controlled. Higher effects were seen for studies with citation bias, and lower effects when family environment is controlled. The impact of media on teen sexuality was minimal with effect sizes near to zero.

Keywords Mass media · Sexuality · Adolescents · Television

Introduction

The experience of everyday life is infused with different types of media, from the media we are involuntarily exposed to in public spaces to the media we actively choose to consume. Sex or sexualized content is a common feature in everything from magazines, to

✉ Christopher J. Ferguson
CJFerguson1111@aol.com

¹ Department of Psychology, Stetson University, 421 N. Woodland Blvd., Deland, FL 32729, USA

² IT University of Copenhagen, Copenhagen, Denmark

³ Villanova University, Villanova, USA

TV, to streaming services, to radio, to movies, to video games. This raises the question of whether sex in the media has an effect on society at large. Specifically, does exposure to sex in the media, including depictions or discussion of sexual encounters, have an effect on adolescents' sexual behavior? Social learning theory is often used to argue that it does [1]. Adolescents, who are supposedly impressionable, see attractive role models have casual sexual encounters without negative consequences and emulate their behavior. This question is of interest to policymakers, parents, educators, health professionals, adolescents themselves, and even the producers and distributors of media.

At present, however, the empirical evidence is best characterized as ambiguous. Some studies find effects for only specific populations, but not others [2]; some find effects of certain types of media, but not others [3]; some find effects for some types of sexual content, but not others. Standardized outcome measures are lacking and researchers have not settled on paradigmatic ways to investigate effects. Even the participants of the studies are understood differently across studies; some describe their participants as active agents that navigate their media environment [4]; others conceptualize their respondents as more or less passive subjects who are exposed to media in a non-reciprocal relationship [5]. Unsurprisingly perhaps, studies of the effects of sexual media on adolescent sexual behavior arrive at different conclusions. Recently, there was even an exchange between two teams of research, working on the same data set, where one group found a correlation but the other did not. Specifically, Brown and colleagues [4] found a relation between exposure to sex in the media and sexual outcomes for adolescents in a longitudinal survey that used covariate-adjusted regression analysis, however, when Steinberg and Monahan [4] reanalyzed the data, this time using propensity score matching, they found that the previously reported effect disappeared. Steinberg and Monahan argued that their approach better estimated the effect of media by accounting for covariates that predict exposure to media. However, in a comment, Collins, Martino and Elliot [6] counter argued that propensity score approaches do not necessarily provide more accurate data than does the approach of using regression with correlates, which was originally employed. Furthermore, Collins and colleagues reexamined previous data and argued that, overall, the link between media and sexual outcomes persists, even if a propensity score approach is used and that the link warrants caution and appropriate preemptive measures. The present study is primarily motivated by this recent exchange and seeks to move beyond the inconsistent findings from this single study by providing the first meta-analytical contribution to the debate.

Methods

Selection of Studies

Identification of relevant studies involved a search of the PsycINFO, MedLine and Digital Dissertations databases using the search terms (Child* OR Adolescen* OR youth)" AND "(Media OR Mass Media OR Television OR Music OR video games)" AND "sex*." In addition, recent reviews of the sexy media literature were examined for papers that may have been missed in the literature search. Included studies had to meet the following criteria:

- (1) Each study had to measure the influence of some form of media on an outcome related to sexual behavior. Outcomes could include pregnancy, risky sexual

behaviors, and initiation of sex. As our analysis was concerned with behavioral outcomes, studies which looked at sexual attitudes or intent to have sex only were not included. Media variables both included general time spent on media, such as watching television, as well as sexy media specifically. General time spent on media was included as a predictor variable given it appeared to be a common predictor variable in many studies, with some claiming effects on sexual behavior. Studies that only considered pornography were not included as our research questions are related to non-pornographic media.

- (2) Each study had to present statistical outcomes or data that could be meaningfully converted into effect size “*r*”.

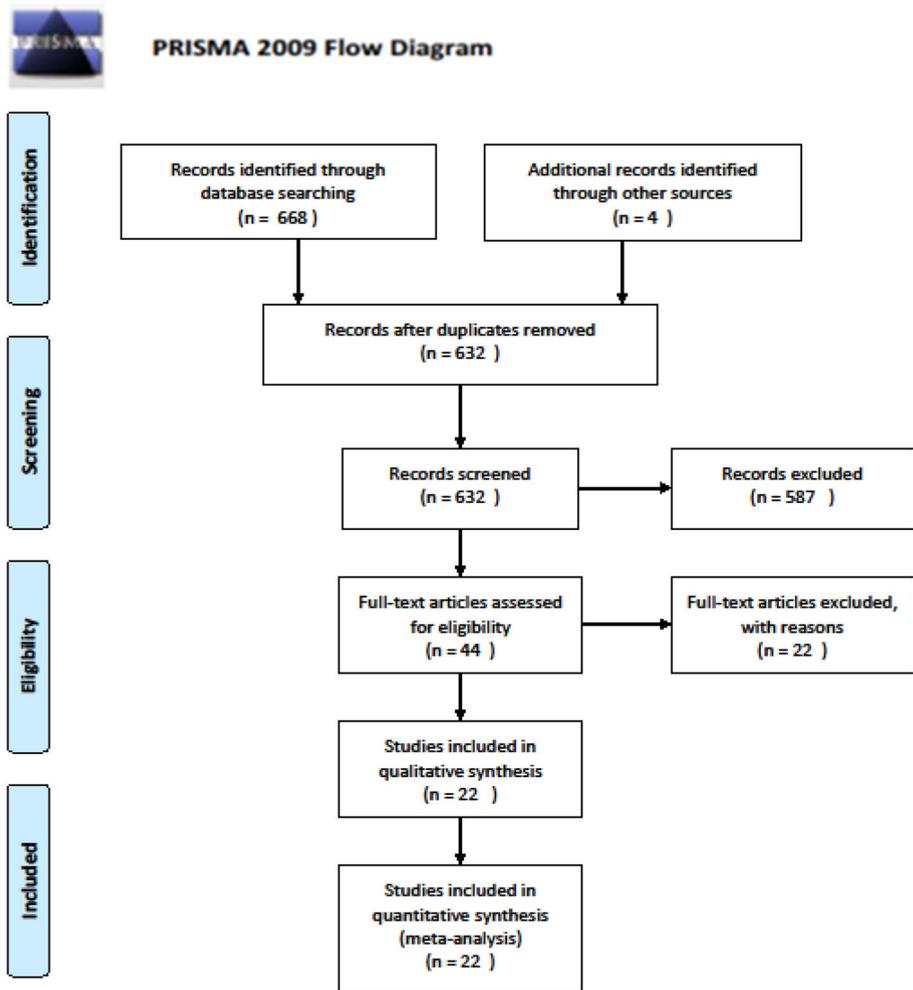


Fig. 1 PRISMA flow diagram

- (3) Participants in the study had to be below age 18 at least at time 1 (in longitudinal analyses). Longitudinal analyses that extended into adulthood were included so long as the initial assessment took place during childhood or adolescence.
- (4) A given sample was included only once in the meta-analyses to maintain independence. Some samples, including longitudinal studies, may produce multiple publications, but only one such study was included in the current analysis. In each case, the most conservative estimates of effect were included.
- (5) Studies from 2005 to 2015 were included to allow for an examination of relatively recent research examining relatively current media.

The initial search (carried out in March 2015) returned approximately 668 hits, the majority of which were either non-empirical or were with college student samples or otherwise did not meet the inclusion criteria above. Employing the inclusion criteria, the final search netted 22 published papers including among them 42 separate controlled effect size estimates, with total participants $n = 22,172$. Each article was assessed by two raters, each blinded to the other's ratings for inclusion. Krippendorff's alpha reliability on the inclusion decision was .80, with discrepancies then resolved by consensus of all researchers. This process was completed by May 2015. A PRISMA flow diagram is included as Fig. 1. As studies with more than one effect size involved different outcomes analyzed separately here, the independence of effect size estimates in the meta-analysis was not compromised. The list of studies is presented in an online table at: <http://www.christopherjferguson.com/Book2.xlsx>. Details on data extracted from each article are described below under effect size estimates and moderator analyses.

Effect Size Estimates

One issue that has arisen as a potential problem for meta-analyses is the proper extraction of effect size estimates. In order to meet the homogeneity assumption of meta-analysis, most meta-analyses have extracted the equivalent of bivariate " r " particularly from correlational or longitudinal data. However, this approach risks providing spurious estimates of effects. Bivariate relations between two variables might easily be explained by "third" variables. For instance, boys might be both inclined to watch more sexy media and be inclined toward greater sexual behaviors; a correlation between media and sexual behavior would be little more than a spurious gender effect. Thus it is essential that gender is controlled. Increasingly, scholars have advocated the use of controlled rather than bivariate effect size estimates in meta-analysis [7, 12]; for meta-analyses to rely solely on bivariate r leads to increased risks of misleading conclusions coming from these analyses. For a meta-analysis to remain rooted to bivariate r , it would be theoretically possible for every single study to conclude that any correlation between media and sexual behavior was reduced to non-significance once other factors were controlled, yet for a meta-analysis of these studies to conclude significant effect existed. In this circumstance, reliance on the bivariate r , when examining well-controlled multivariate correlational and longitudinal studies in meta-analysis is problematic.

If reliance on bivariate r is problematic, the solution is unclear. Several authors have suggested that betas indeed can be used as effect size estimates in meta-analyses. As Rosenthal and DiMatteo [8] note betas can be used as effect size estimates, with the cautionary note to recall that betas employ multivariate controls as opposed to r s. Other authors have echoed this basic view [9, 10].

In the present analysis, only controlled effect sizes (i.e. standardized regression weights) will be considered. The effect size r was used in this analysis both due to the inclusion of numerous longitudinal and correlational effect sizes in the analysis and because r tends to be straightforward as an effect size and easy to interpret. Increasingly, meta-analytic scholars have argued for the superiority of controlled effect sizes rather than bivariate, given the later tend to return spuriously high effects and are no superior in regard to psychometric properties [7, 11, 12]. This is particularly true in cases, such as this, where confounding variables are theoretically likely.

In some cases studies presented more than one effect size relevant to a single construct (for example, using two or more separate measures of sexual behavior) in these cases they were aggregated for an average effect size. Similarly, in some cases, a single dataset may have produced several publications considering the same outcome for the same time-point for the same sample. Unless the data represented different time-points (i.e. correlational and longitudinal data in separate publications), datasets were included only once in the meta-analysis. Some manuscripts presented multiple competing statistical models with different effect size estimates, particularly for multivariate analyses. When this occurred, the most conservative model was used as the effect size estimate for the controlled analyses. Given the question of how much variance remains for media effects, once other factors are well-controlled, this approach was viewed as valuable.

Although it was not common, in several articles, results were reported as non-significant without an effect size reported or data sufficient to calculate an effect size. When this occurred, attempts were made to contact the original authors for relevant data. If such data were no longer available, or authors did not respond null effects were entered as zero, so as not to spuriously exclude null effects from the analysis. Authors were also contacted for additional analyses for papers with atypical statistical analyses that did not allow for easy interpretation or effect size extraction. Such requests were typically for straightforward linear regression results, to keep effect sizes homogeneous in origin. For two papers by the same research group [13, 14], authors did not respond to requests for more data and these papers were subsequently dropped from analyses. One dataset underwent an unusual exchange of debate regarding effect sizes [2, 4] in which differing analyses resulted in somewhat different results. A further dataset [1] appeared to have potential issues with multicollinearity. In this study, total television and sexy television were both included in regression models despite being correlated. Results indicated sizeable coefficients in opposing directions related to the outcome variable a “bouncing beta” phenomenon that can sometimes indicate multicollinearity. The authors graciously reran analyses on request with media variables in separate regression models rather than together. Upon reanalysis, neither sexy television viewing nor total television viewing were significant predictors of the outcome variable (pregnancy) appearing to confirm a multicollinearity problem. Consistent with our policies we included the most conservative results from this exchange. Effect size estimates for included studies are provided online at: <http://www.christopherjferguson.com/Book2.xlsx>. All effect size estimates are weighted for sample size.

Several moderators were also examined for potential quality issues that might influence effect sizes. Effect sizes were coded for whether they controlled for family or peer influences. Studies were also coded for citation bias, or the tendency to fail to cite studies disagreeing with the position of the authors. This was given a binary code. Studies were given credit so long as they acknowledged even a single source discrepant with their own view. If no such sources were cited, the article was coded as having citation bias. This

approach is similar to that used in other areas of study identifying important cultural issues within science that may influence the reporting of results [15].

Analysis

The Comprehensive Meta-Analysis (CMA) software program was used to fit both random and fixed effects models. Hunter and Schmidt [16] argue that random effects models are appropriate when population parameters may vary across studies, as is likely here. As such, only random effects will be reported. Because few studies considered specific outcomes such as pregnancy, outcomes were clustered into two broad groups, initiation of sex (the age of first intercourse) and general sexual behaviors (including frequency of sexual behaviors, risky sexual behaviors and pregnancy).

All results discussed below were coded such that positive effect sizes represent associations with negative outcomes. Thus a positive effect size between media and initiation of sexual behavior, for instance, would represent an indication that media *harmed* sexual initiation by resulting in earlier initiation. This was done to represent negative effects consistently across effect sizes. The potential for publication bias was assessed using the tandem procedure [17]. This procedure is an empirically demonstrated, conservative estimating procedure for assessing publication bias, with low Type I error rates.

Results

Results for all studies on the main outcome variables, initiation of sexual behavior and general sexual behavior are presented in Table 1. Results indicated generally weak evidence for media effects on teen sexual behavior. Results were slightly larger for initiation of sex as opposed to general sexual behaviors but none broke a minimal level of $r = 0.10$ to emerge from trivial effects.

Moderator effects are presented in Table 2. Perhaps the most significant is the comparison between total media use time variables and those which considered sexy media specifically. As might be expected, outcomes for sexy media were higher than for total media time, which was near zero in effect size. Yet the effect size for sexy media was also very small, within the trivial range. Results were slightly higher for boys than for girls. Controlling for family environment and peer influences also resulted in reduced effect sizes. Further, studies which were balanced in their literature review tended to produce effect sizes no different from zero. Larger, although still very small, effect sizes were seen in studies which engaged in citation bias, suggesting that researcher expectancy effects can influence effect sizes in this research field.

No evidence for publication bias was seen among controlled effect sizes in this field.

Table 1 Meta-analytic results all sexy media exposure studies on outcome variables, controlled effect sizes

Effect sizes	<i>K</i>	<i>r</i> ⁺	95 % C.I.	Homogeneity test	τ^2	Publication bias?
Initiation of sex	16	0.079	(0.039, 0.118)	$X^2 (15) = 86.78, p < 0.001$	0.005	No
Sexual behavior	22	0.037	(0.000, 0.073)	$X^2 (21) = 86.63, p < 0.001$	0.006	No

Table 2 Moderator analysis for categorical moderators of sexy media effects for all outcomes with controlled effect sizes

Effect sizes	<i>k</i>	<i>r</i> ₊	95 % C.I.	Homogeneity test	τ ²	Publication bias?
Gender						
Boys	10	0.075	(0.020, 0.130)	X ² (9) = 32.95, <i>p</i> < 0.001	0.006	No
Girls	10	0.024	(−0.029, 0.076)	X ² (9) = 32.69, <i>p</i> < 0.001	0.005	No
Family environment controlled						
Yes	29	0.045	(0.013, 0.076)	X ² (28) = 157.28, <i>p</i> < 0.001	0.006	No
No	9	0.088	(0.041, 0.134)	X ² (8) = 21.65, <i>p</i> < 0.001	0.003	No
Peer influences controlled						
Yes	10	0.047	(−0.019, 0.114)	X ² (9) = 80.10, <i>p</i> < 0.001	0.010	No
No	28	0.056	(0.029, 0.084)	X ² (27) = 99.34, <i>p</i> < 0.001	0.004	No
Independent variable						
Hours total exposure	13	0.005	(−0.039, 0.049)	X ² (12) = 54.76, <i>p</i> < 0.001	0.005	No
Sexy media	25	0.082	(0.050, 0.113)	X ² (24) = 102.78, <i>p</i> < 0.001	0.005	No
Citation bias						
No	8	0.007	(−0.064, 0.079)	X ² (7) = 27.96, <i>p</i> < 0.001	0.008	No
Yes	30	0.067	(0.039, 0.095)	X ² (29) = 135.85, <i>p</i> < 0.001	0.004	No

Discussion

Whether sexy media do or do not contribute to sexual behaviors among youth remains a controversial issue. Results from the current meta-analysis suggests that, with other factors such as family environment or peer influences controlled, evidence for an association between media and sexual behavior is minimal. Total media viewing had a relationship with sexual behavior that was no different from zero, whereas sexy media specifically had a near-zero relationship with sexual behavior, with very small effects. Given these findings it is not possible to support the hypothesis that sexy media contributes to either the initiation of sex among youth, nor to sexual behaviors more generally.

Why media has so little impact on youth behavior in this realm may not be too difficult to understand. A considerable amount of sexuality is undoubtedly genetically and maturationally hard-wired. With the onset of puberty, motivation toward sexual behavior is normative. However, in a culture in which delay of sexuality is a moral obligation particularly for youth, that culture may begin to view youth sexuality as non-normative and search for outside influences that may “corrupt” youth into sexual behaviors. This does not

mean that socialization is unimportant for youth sexual development. Parents and peers both play important roles in developing moral values around sexuality. However, parents' frustrations at youth ignoring these moral messages (messages the parents themselves may have ignored when they were youth) highlight the limits of socialization. To the extent that peer encouragement toward sexual behavior has greater success, this may have less to do with the persuasiveness of peers, and more with encouraging messages fitting better with biological drives than abstinence messages that conflict with them. This discussion is not intended to minimize peer and parent socialization influences, which are likely the strongest socialization influences on teen sexual behavior. In comparison to parents and peers, media messages may be too distal to have much influence. In aggression research, the Catalyst Model [18] notes that peer and parent influences, in combination with genetics, may drive the development of aggressive personalities in early years. Media, by contrast, is viewed as too distal to be influencing. The same may be said for sexy media and sexual development.

Although the current study did not directly examine this issue, it is possible that media may have some influence on youth who are deprived of other socialization influences. That is to say, when parental and peer directives are minimal, media may become the only source of information on sexuality. Thus, our results don't exclude the possibility of this at-risk situation. No studies we came across addressed this potential in a meaningful way and it may be a fruitful avenue for further research. At the same time it is important to recognize that recent research has suggested that parental input regarding sexual behavior appears to have minimal impact, particularly for boys [19]. It is possible that social inputs on sexual behavior among teens may be minimal overall.

It is worth noting that our analyses considered sexual behavior as outcomes. It is possible that sexy media use may still have an influence on sexual attitudes. However, whether or not this is so, media effects do not seem to carry over into behavior.

In reviewing the research in this field it was apparent that several serious issues limit the validity of many studies. First, there is an issue of demand characteristics. Many studies closely pair questions about media with questions about sexuality. In such designs it may be possible for youth to hypothesis guess, producing spurious results. Further, few studies included a manipulation check for mischievous or unreliable responding. Mischievous responding, in which participants endorse extreme questions to be whimsical, is known to produce spurious correlations [20]. Without such checks, the validity of any observed correlations is unknown. These problems were so widespread in this research field it was difficult to systematically test for their influence in meta-analysis due to low variance.

In conclusion, we echo the concerns of Steinberg and Monahan that proclaiming links between sexy media and youth sexual behavior are premature. Highlighting media effects, particularly based on weak data, does come with some risks. For instance, media effects often get considerable public attention, yet attention to the wrong issue can distract society from more pressing and important issues related to teen sexuality that can actually be helpful. These may include encouraging parents to discuss sexuality with their teens, proper sex-ed programs in schools, and examining ways peer networks can be used to promote safe sex. At present it may be best for practitioners to highlight that the impact of sexy media on youth sexual behavior is minimal and to encourage parents to speak directly to their children about sex. The encouraging message from our results is that media are unlikely to thwart parental efforts to socialize children should parents take the initiative.

Compliance with Ethical Standards

Conflict of Interest All authors declare they have no conflicts of interest to report.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

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Christopher J. Ferguson, PhD is professor of psychology at Stetson University in DeLand, FL. He has conducted numerous studies related to media effects across numerous realms. Particular areas of expertise include video game violence and body dissatisfaction. He has also published works of fiction including a novel, *Suicide Kings*. His work can be found at ChristopherJFerguson.com.

Rune K. L. Nielsen, MSc has recently completed his doctorate at IT University Copenhagen. His areas of expertise include video game addiction and media effects. He is affiliated with IT University Copenhagen's Center for Computer Games Research.

Patrick M. Markey, PhD is professor of psychology at Villanova University. His expertise includes video game effects, human-computer interactions, and interpersonal relationships. He directs Villanova's Interpersonal Research Laboratory which seeks to understand how behavioral tendencies develop and are expressed within social relationships. Research in the lab examines how interpersonal behaviors affect unhealthy dieting, civic behavior, personality judgment, and aggression after playing violent video games.