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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 youth 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.

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Keywords (separated by '-') Mass media - Sexuality - Adolescents - Television

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Footnote Information

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

5 **Christopher J. Ferguson<sup>1</sup> · Rune K. L. Nielsen<sup>2</sup> ·**  
 6 **Patrick Markey<sup>3</sup>**

7  
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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 youth 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

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

36 At present, however, the empirical evidence is best characterized as ambiguous. Some  
37 studies find effects for only specific populations, but not others [2]; some find effects of  
38 certain types of media, but not others [3]; some find effects for some types of sexual  
39 content, but not others. Standardized tests do not exist and researchers have not settled on  
40 paradigmatic ways to investigation effects. Even the participants of the studies are  
41 understood differently across studies, some describe their participants as active agents that  
42 navigate their media environment [4]; others conceptualize their respondents as more or  
43 less passive subjects who are exposed to media in a non-reciprocal relationship [5].  
44 Unsurprisingly perhaps, studies of the effects of sexual media on adolescent sexual  
45 behavior arrive at different conclusions. Recently, there was even an exchange between  
46 two teams of research, working on the same data set, where one group found a correlation  
47 but the other did not. Specifically, Brown and colleagues [4] found a relation between  
48 exposure to sex in the media and sexual outcomes for adolescents in a longitudinal survey  
49 that used covariate-adjusted regression analysis, however, when Steinberg and Monahan  
50 [4] reanalyzed the data, this time using propensity score matching, they found that the  
51 previously reported effect disappeared. Steinberg and Monahan argued that their approach  
52 better estimated the effect of media by accounting for covariates that predict exposure to  
53 media. However, in a comment, Collins, Martino and Elliot [6] counter argued that  
54 propensity score approaches do not necessarily provide more accurate data than does the  
55 approach of using regression with correlates, which was originally employed. Furthermore,  
56 Collins and colleagues reexamined previous data and argued that, overall, the link between  
57 media and sexual outcomes persists, even if a propensity score approach is used and that  
58 the link warrants caution and appropriate preemptive measures. The present study is pri-  
59 marily motivated by this recent exchange and seeks to move beyond the inconsistent  
60 findings from this single study by providing the first meta-analytical contribution to the  
61 debate.

## 62 **Methods**

### 63 **Selection of Studies**

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

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

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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*”.
- (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

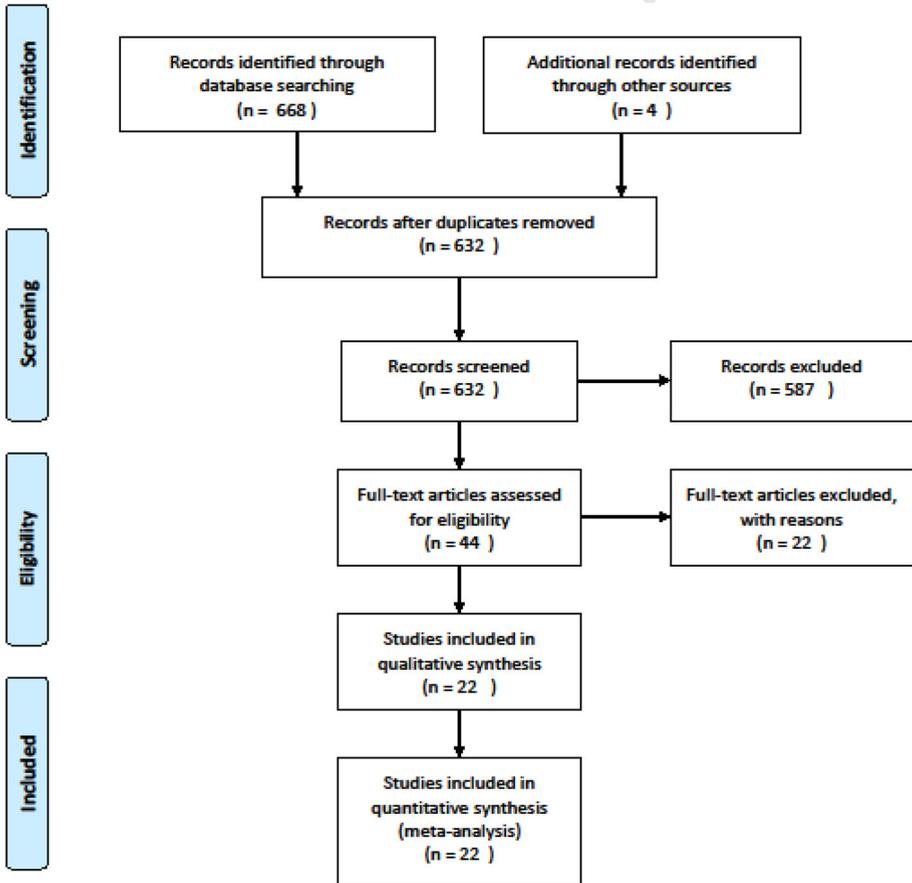


Fig. 1 PRISMA flow diagram



87 publications, but only one such study was included in the current analysis. In each  
88 case, the most conservative estimates of effect were included.  
89 (5) Studies from 2005 to 2015 were included to allow for an examination of relatively  
90 recent research examining relatively current media.

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

#### 104 Effect Size Estimates

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

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

127 **AQ2** In the present analysis, only controlled effect sizes (i.e. standardized regression weights)  
128 will be considered. The effect size  $r$  was used in this analysis both due to the inclusion of  
129 numerous longitudinal and correlational effect sizes in the analysis and because  $r$  tends to  
130 be straightforward as an effect size and easy to interpret. Increasingly, meta-analytic  
131 scholars have argued for the superiority of controlled effect sizes rather than bivariate,  
132 given the later tend to return spuriously high effects and are no superior in regard to



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133 psychometric properties [7, 11, 12]. This is particularly true in cases, such as this, where  
134 confounding variables are theoretically likely.

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

146 Although it was not common, in several articles, results were reported as non-significant  
147 without an effect size reported or data sufficient to calculate an effect size. When this  
148 occurred, attempts were made to contact the original authors for relevant data. If such data  
149 were no longer available, or authors did not respond null effects were entered as zero, so as  
150 not to spuriously exclude null effects from the analysis. Authors were also contacted for  
151 additional analyses for papers with atypical statistical analyses that did not allow for easy  
152 interpretation or effect size extraction. Such requests were typically for straightforward  
153 linear regression results, to keep effect sizes homogeneous in origin. For two papers by the  
154 same research group [13, 14], authors did not respond to requests for more data and these  
155 papers were subsequently dropped from analyses. One dataset underwent an unusual  
156 exchange of debate regarding effect sizes [2, 4] in which differing analyses resulted in  
157 somewhat different results. A further dataset [1] appeared to have potential issues with  
158 multicollinearity. In this study, total television and sexy television were both included in  
159 regression models despite being highly correlated. Results indicated sizeable coefficients in  
160 opposing directions related to the outcome variable a “bouncing beta” phenomenon that  
161 can sometimes indicate multicollinearity. The authors graciously reran analyses on request  
162 with media variables in separate regression models rather than together. Upon reanalysis,  
163 neither sexy television viewing nor total television viewing were significant predictors of  
164 the outcome variable (pregnancy) appearing to confirm a multicollinearity problem.  
165 Consistent with our policies we included the most conservative results from this exchange.  
166 Effect size estimates for included studies are provided online at: <http://www.christopherjferguson.com/Book2.xlsx>. All effect size estimates are weighted for sample  
167 size.  
168

169 Several moderators were also examined for potential quality issues that might influence  
170 effect sizes. Effect sizes were coded for whether they controlled for family or peer  
171 influences. Studies were also coded for citation bias, or the tendency to fail to cite studies  
172 disagreeing with the position of the authors. This was given a binary code. Studies were  
173 given credit so long as they acknowledged even a single source discrepant with their own  
174 view. If no such sources were cited, the article was coded as having citation bias. This  
175 approach is similar to that used in other areas of study identifying important cultural issues  
176 within science that may influence the reporting of results [15].



177 **Analysis**

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

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

192 **Results**

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

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

208 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	K	r+	95 % C.I.	Homogeneity test	$\tau^2$	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

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

209 **Discussion**

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

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

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

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

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

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

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



273 **Compliance with Ethical Standards**

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

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

277  
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