

Original Investigation

Parent-Adolescent Sexual Communication and Adolescent Safer Sex Behavior

A Meta-Analysis

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IMPORTANCE Parent-adolescent sexual communication has received considerable attention as a factor that can positively affect safer sex behavior among youth; however, the evidence linking such communication to youth contraceptive and condom use has not been empirically synthesized.

OBJECTIVES To examine the effect of parent-adolescent sexual communication on safer sex behavior among youth and explore potential moderators of this association.

DATA SOURCES A systematic search of studies published from database inception through June 30, 2014, using the MEDLINE, PsycINFO, and Communication & Mass Media Complete databases and relevant review articles yielded 5098 studies, of which 52 studies with 25 314 adolescents met the study eligibility criteria. Analysis was conducted from July 1, 2014, to July 27, 2015.

STUDY SELECTION Studies were included if they sampled adolescents (mean sample age ≤ 18 years), included an adolescent report of sexual communication with one or both parents, measured safer sex behavior, and were published in English.

DATA EXTRACTION AND SYNTHESIS Correlation coefficients (r) and 95% CIs were computed from studies and meta-analyzed using random-effects models.

MAIN OUTCOMES AND MEASURES Safer sex behavior, including use of contraceptives or condoms.

RESULTS Fifty-two articles, including 71 independent effects representing more than 3 decades of research on 25 314 adolescents (weighted mean age, 15.2 years) were synthesized. Across studies, there was a significant weighted mean effect ($r = 0.10$; 95% CI, 0.08-0.13) linking parent-adolescent sexual communication with safer sex behavior, which was statistically heterogeneous ($Q = 203.50$, $P < .001$, $I^2 = 65.60$). Moderation analyses revealed larger effects for communication with girls ($r = 0.12$) than boys ($r = 0.04$) and among youth who discussed sex with their mothers ($r = 0.14$) compared with their fathers ($r = 0.03$). Effects did not differ for contraceptive vs condom use or among longitudinal vs cross-sectional studies, indicating that parent sexual communication had a similar effect across study designs and outcomes. Several methodological issues were identified in the literature; future studies can improve on these issues by measuring parent-adolescent communication with robust, multi-item measures, clearly specifying the target parent, and applying multimethod longitudinal designs.

CONCLUSIONS AND RELEVANCE Sexual communication with parents, particularly mothers, plays a small protective role in safer sex behavior among adolescents; this protective effect is more pronounced for girls than boys. We discuss the implications for practice and make suggestions for future research on parent-adolescent sexual communication.

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Risky sexual behavior among US adolescents is a serious public health problem. Although adolescents make up only one-fourth of the population that is sexually active, they acquire half of all sexually transmitted infections (STIs).¹ This number amounts to 9 million STIs, including more than 8300 new cases of human immunodeficiency virus (HIV) infections, each year.¹ In addition, adolescents are at heightened risk of unintended pregnancy.^{1,2}

Parent-adolescent sexual communication has received considerable attention as one factor that could positively affect safer sex behavior among adolescents, including the use of contraception and condoms. There are practical and theoretical reasons why parents may be agents of sexual socialization for young people. From a practical perspective, parents may play a critical role in conveying sexual information and can exert significant influence on adolescents' sexual attitudes, values, and beliefs regarding risks.^{3,4} Parents may also provide a powerful model of open and honest communication about sexual health issues, which teens may emulate in their own sexual relationships.⁵

Parents' influential role on child and adolescent behavior is also widely accepted in developmental and health behavior theory. Bronfenbrenner's⁶ classic Ecological Systems Theory of human development suggests that individuals live within a series of nested systems—including the family system—that are dynamic, reciprocal, and can directly and indirectly influence behavior. Grounded in this approach, parent-adolescent sexual communication has increasingly been implicated in health behavior theories that explain sexual behavior among youth,⁷⁻⁹ such as the multisystem perspective of sexual risk behavior among adolescents.⁹

Although practical and theoretical considerations suggest that parent communication should be strongly associated with safer sex behaviors among adolescents, there is surprising inconsistency in the empirical literature.^{3,9-12} While several studies have found moderate, positive associations between parent communication and youth contraceptive or condom use,¹³⁻¹⁶ other studies have found nonsignificant or even negative effects.¹⁷⁻¹⁹ Furthermore, while it is possible that parental communication about sex can be protective for youth, open sexual communication often does not take place. Instead, embarrassment, inaccurate knowledge, or low self-efficacy may prevent some parents from engaging their children in honest and supportive conversations about sexual behavior.²⁰ These barriers may explain why nearly one-fourth of youth report that they have not discussed sexual topics with a parent^{3,21-23} and why even fewer have had meaningful, open conversations about the sexual issues that are critical to their long-term health.

The purpose of this meta-analysis was to synthesize the literature and determine the mean weighted association between parent-adolescent sexual communication and youth contraceptive and condom use. Findings from such an analysis are critical to the growing body of interventions that target adolescent-parent dyads to prevent HIV infections, STIs, and unintended pregnancies²⁴⁻²⁶ and may be of considerable interest to researchers, educators, family practitioners, and parents themselves. To our knowledge, no such meta-analysis has been published to date despite several narrative reviews and

At a Glance

- This meta-analysis examined the link between parent-adolescent communication about sex and safer sex practices among youth.
- More than 30 years of data were analyzed from 52 studies and 25 314 adolescents.
- There was a significant mean effect linking parent-adolescent sexual communication with safer sex behavior among youth.
- The association between parent communication and safer sex behavior was stronger for girls and for teens who discussed sexual topics with their mothers.

calls for better synthesis of the literature.^{3,9-12} A first goal of this meta-analysis was to estimate the magnitude of the association between parent communication and safer sex behavior among adolescents. We focused on safer sex behavior (ie, contraceptive and condom use) given the importance of these behaviors to the prevention of HIV infections, STIs, and unintended pregnancies.²⁷

Given the heterogeneity in this literature, a second goal of this meta-analysis was to examine several potential moderators of the association between communication and safer sex behaviors. Two key moderators examined were sex of the adolescent and sex of the parent. Given existing evidence, we expected to find a more robust association between communication and safer sex behavior for girls compared with boys²⁸⁻³¹ and for communication with mothers compared with fathers.^{19,32} Several additional demographic and measurement moderators were also explored. These factors have been examined in prior work and are of direct relevance to family communication interventions. They included adolescent age, race/ethnicity, study location (United States vs non-United States), study design (cross-sectional vs longitudinal), communication measurement characteristics (source, topic, format, and number of items), and safer sex outcome (use of contraceptives or condoms).

Methods

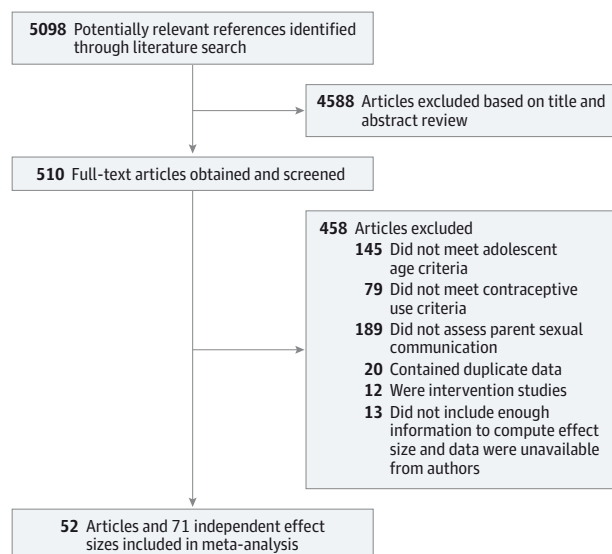
Search Methods

A detailed search was undertaken to locate relevant articles. First, comprehensive searches of the MEDLINE, PsycINFO, and Communication & Mass Media Complete databases were conducted from their inception through June 30, 2014, using the following combination of keywords: (adolescen* OR teen* OR youth OR middle school OR high school) and (communicat* OR discuss* OR negotiat* OR assert* OR talk OR influence) and (contracept* OR birth control OR condom* OR unprotected sex OR sex* risk OR safe* sex). Then, additional studies of potential relevance were located by examining review articles related to sexual communication.^{3,9-11,33-36} Analysis was conducted from July 1, 2014, to July 27, 2015.

Selection Criteria

Studies were included if they met the following criteria: they sampled adolescents, defined as a mean sample age of 18 years or younger, and no participants were older than 24 years³⁷; included an adolescent report of sexual communication with one

Figure 1. Study Flow Diagram



Screening and inclusion and exclusion criteria for studies in the meta-analysis.

or both parents (studies that focused exclusively on parent-reported communication were excluded); measured safer sex behavior, including contraceptives (sometimes referred to as *birth control*), condoms, or unprotected sex; reported an association between parent-adolescent communication and safer sex behavior (when bivariate associations were not reported, authors were directly contacted for this information); and were published in English. We excluded articles that used a composite variable for sexual risk taking whereby it was not possible to determine the outcome of contraceptive or condom use (eg, combining number of sexual partners or abstinence along with condom use into a single composite variable).^{38,39} In addition, in a few instances, there were multiple relevant articles that used the same data set; in these cases, the article with the most complete data relevant to this meta-analysis was included.

The initial search produced 5098 scientific references. After a review of titles and abstracts, this sample was reduced to 510 articles. The full text of these 510 articles were then located and reviewed. After applying all selection criteria, the final sample consisted of 52 articles (Figure 1). Within this final sample, several articles reported results separately for independent samples, including 10 studies with analyses separated by sex, 2 studies separated by race/ethnicity, and 1 study separated by country (eTable in the Supplement). Independent effect sizes were calculated for each sample in these cases, resulting in 71 independent effect sizes.⁴⁰

Most studies reported a single indicator of communication and safer sex behavior. When multiple indicators were reported, several steps were taken to avoid violating the assumption of independence that underlies the validity of meta-analyses.⁴¹ First, when studies reported contraceptive or condom use with a frequency score as well as use at first or last intercourse, we used the frequency variable to calculate an effect size because this variable is more representative of the overall pattern of con-

traceptive use.⁴² Next, when studies reported more than 1 measure of parent-adolescent sexual communication, we analyzed the data in 1 of 2 ways. For most analyses, we averaged these communication variables to maximize the use of available data and not favor one measure over another (ie, overall weighted effect size and comparisons by age, sex, ethnicity, and study location). However, for analyses that examined moderation by communication measurement characteristics, using this averaging approach would have resulted in a loss of specificity of variables and thus a loss of data. For these analyses, we used a random number generator to randomly select 1 variable for inclusion.^{37,41} The same procedure was used to handle the 3 studies that reported both general contraceptive use and condom use.^{17,43,44} Specifically, we averaged the effect of communication on these sexual health outcomes for primary analyses, but we used a random number generator to select 1 outcome variable from each study when we examined the type of outcome (contraceptive use vs condom use) as a moderator.^{37,41}

Data Extraction

Two of us (S.C.-B. and J.N.) independently coded the following data from each study: demographic and sample characteristics, sexual communication measurement characteristics (ie, communication topic, format, source, and number of items), and measurement of safer sex behavior (ie, type of safer sex behavior and measurement time frame). Communication topic was coded into 4 possible categories, including communication about contraceptive or condom use, pregnancy, STIs and/or HIV infection, or general sex-related topics (eg, discussing “sex”). Communication format was coded into 3 categories: behavioral frequency of communication (ie, ever or never, or indication of frequency of sexual communication), quality of communication (ie, perceived comfort, ease, or openness of communicating), and self-efficacy (ie, perceived confidence in ability to communicate about sexual behavior). Finally, communication source was coded based on the parent with whom the adolescent had discussed sex (mother, father, or one or both parents). Regarding safer sex behavior, the type of behavior was coded as general contraception, condom use, or unprotected sex (reverse coded to keep direction of effects consistent). The measurement of the time frame of safer sex behavior was coded as lifetime, past 6 months, past 3 months, first sexual intercourse, or last sexual intercourse. The mean percentage agreement between coders across all categories was 96%. Discrepancies between coders were resolved through discussion with the lead author (L.W.).

Calculation of Effect Sizes

A correlation coefficient (r) was used as the indicator of effect size (range, -1.0 to 1.0).⁴⁵ Effect sizes based on correlations can be interpreted as small (0.10), medium (0.25), or large (0.40).⁴⁶ When bivariate correlation coefficients were reported in an article, they were directly extracted. If correlation coefficients were not reported, then appropriate formulas were used to convert other statistics (eg, t tests, summary statistics, and odds ratios) to approximate correlation coefficients.^{45,47} When none of the statistics could be converted to a correlation coefficient or when only multivariable analyses were reported, the

study authors were contacted and appropriate raw data were requested. To keep effect sizes consistent and interpretable, values were transposed so that positive correlations always indicated a positive association between communication and safer sex behavior.

Once study characteristics were coded and effect sizes were extracted, a Fisher r to z transformation was performed.⁴⁵ These values then were weighted by their inverse variance and combined. We used random effects meta-analytic procedures for the primary analysis across all 71 independent effect sizes; this procedure allowed for the possibility of differing variances across studies.⁴¹ After analyses were complete, the effect sizes were transformed back to correlation coefficients for presentation. The Q statistic and I^2 were used to examine whether significant heterogeneity existed among effect sizes. Effect sizes for hypothesized moderators were calculated along with their 95% CIs, and those effect sizes were compared using the Q_b statistic. For these analyses, mixed-effects models were used to allow for the possibility of differing variances across subgroups. These models use random effects assumptions while stratifying the effect sizes by fixed factors, such as sex and study location.⁴¹ Analyses were conducted using Comprehensive Meta-Analysis software, version 2 (Biostat, Inc).

Results

Study Characteristics

The eTable in the Supplement provides a summary of the 52 studies and 71 independent effect sizes represented in this meta-analysis, including sample characteristics and moderator variables. Across the studies, 25 314 participants were included (weighted mean age, 15.2 years). Of the 71 independent effect sizes, most ($k = 52$) were based on reports of communication with one or both parents; 19 studies specified whether communication was with a mother or father. Similarly, many studies ($k = 47$) asked about general sexual communication, with 24 studies assessing more specific topics, such as condom use, HIV infection and STIs, or pregnancy. In addition, more than half the studies ($k = 36$) used single-item assessments of sexual communication; the remaining studies measured communication with 2 to 5 items ($k = 17$), 6 to 10 items ($k = 7$), or more than 10 items ($k = 8$), and 3 studies did not specify the number of items they used. Among all studies, the primary design was cross-sectional ($k = 64$); 7 studies used a longitudinal design to examine parent-adolescent sexual communication as a predictor of later contraceptive or condom use.^{4,28,31,44}

Magnitude and Direction of Effects

There was a small, significant overall weighted mean effect for the association between parent-adolescent sexual communication and safer sex behavior ($r = 0.10$; 95% CI, 0.08-0.13) (Figure 2).^{*} Funnel plots of the effect sizes were symmetrical, and the trim-and-fill analysis suggested no adjustment to

the mean effect size.⁸⁴ This finding indicated no evidence of publication bias.

Heterogeneity and Effect Size Moderators

Although the overall association between communication and safer sex was positive and significant, there was considerable heterogeneity among the effect sizes ($Q = 203.50$, $P < .001$, $I^2 = 65.60$). Thus, we examined the potential effect of several moderating variables. Studies were included in moderator analyses only if they had sufficient information to be analyzed. For example, when considering sex as a moderator, studies had to sample only boys, only girls, or both sexes but report separate analyses by sex (mixed-sex samples that did not separate analyses by sex could not be included because there was no way to distinguish the association between communication and contraceptive use for boys vs girls).

First, we examined moderators related to participant demographics and study design. As shown in the Table, there was significant moderation by sex ($k = 48$), with a stronger association between parent-adolescent communication and safer sexual behaviors with girls ($r = 0.12$) compared with boys ($r = 0.04$). The strength of this association was not found to differ significantly by adolescents' age ($k = 62$) or ethnicity ($k = 71$) or by the location of the study ($k = 70$). In addition, effect sizes did not differ significantly when comparing longitudinal and cross-sectional study designs ($k = 71$).

Next, several aspects of sexual communication were examined as potential moderators (Table). Among studies that specified the source of communication (ie, mother vs father; $k = 19$), the association between sexual communication and safer sex behaviors among youth was significantly stronger for adolescents who had discussed sexual topics with their mothers ($r = 0.14$) vs those who had discussed sexual topics with their fathers ($r = 0.03$). In fact, communication with fathers was not significantly associated with safer sex behavior among adolescents across studies ($r = 0.03$; $P = .46$). The strength of the association between communication and safer sex behaviors did not differ significantly based on the topic of conversation ($k = 71$), the format of communication measurement ($k = 70$), or the number of items used to assess communication ($k = 68$).

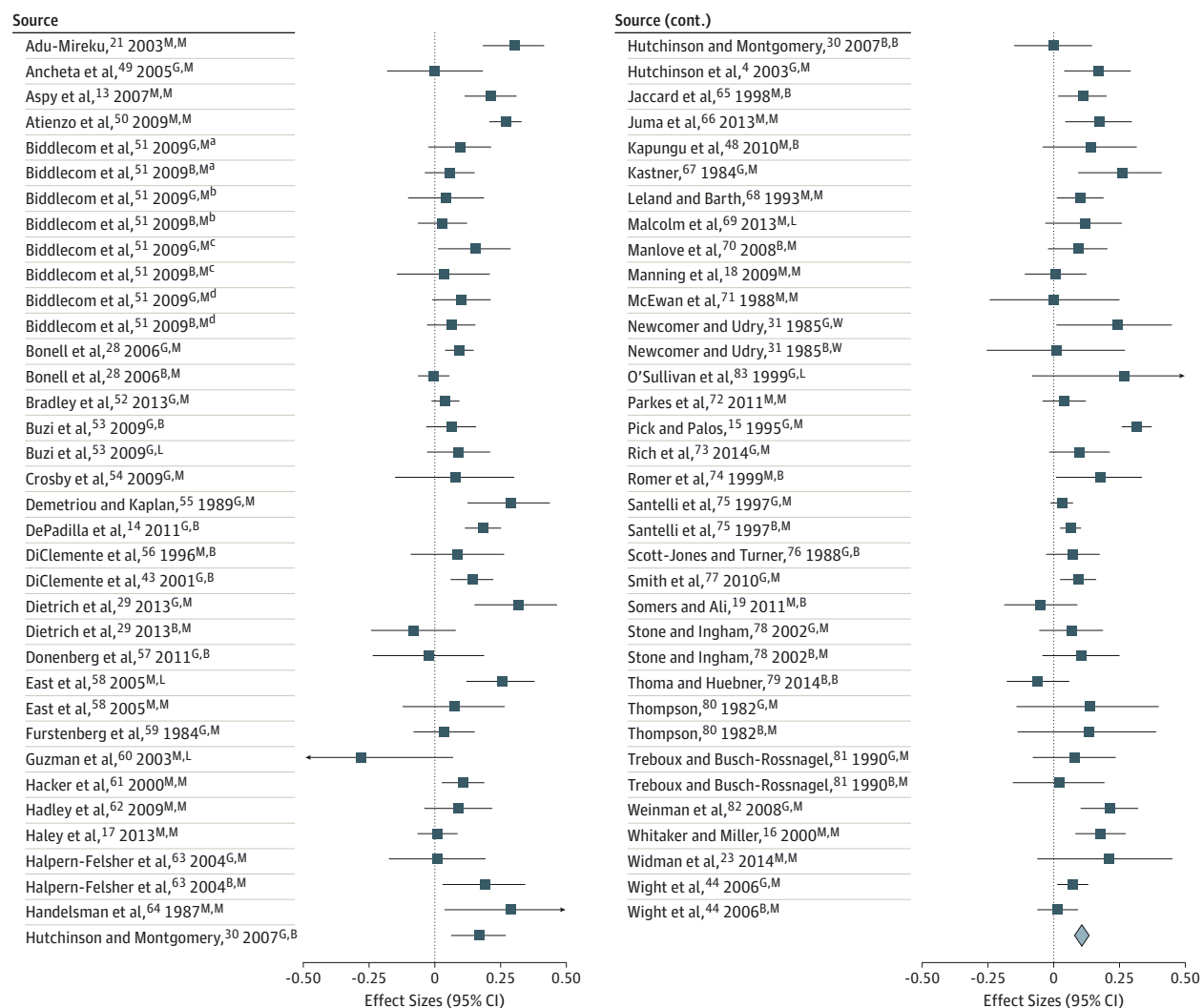
Finally, 2 factors specific to the outcome of safer sex behavior were examined as moderators, including the type of safer sex behavior and timing of safer sex examined in each study. As shown in the Table, effects did not differ based on the type of safer sex behavior ($k = 71$), with similar significant associations found for contraceptive use ($r = 0.09$) and condom use ($r = 0.12$). Effects were also consistent across the measurement time frames (ie, lifetime, past 6 months, past 3 months, first sexual intercourse, and last sexual intercourse; $k = 67$).

Discussion

Pooling data from 3 decades of research with more than 25 000 adolescents, this meta-analysis found a significant positive association between parent-adolescent sexual communication

*References 4, 13-19, 21, 23, 28-31, 43, 44, 48-83

Figure 2. Forest Plot Displaying 71 Independent Effect Sizes



Each study is followed by 2 letters: the first represents the sex of the sample (B, all boys; G, all girls; and M, mixed), and the second represents the race/ethnicity of the sample (B, black; L, Latino; M, mixed; and W, white). The diamond indicates the overall weighted mean effect across all studies ($r = 0.10$; $P < .001$).

^a Sample from Uganda.

^b Sample from Malawi.

^c Sample from Ghana.

^d Sample from Burkina Faso.

and safer sex behavior among youth. This effect was robust across use of condoms and contraceptives, cross-sectional and longitudinal studies, and younger and older samples. The strength of this association was moderated by sex of the adolescent and sex of the parent, with stronger effects for girls than for boys and for communication with mothers vs fathers.

First, the association between parent communication and adolescents' contraceptive and condom use was significantly stronger for girls than for boys. This finding is consistent with past work showing that parents communicate more frequently with girls and are more likely to stress the negative consequences of sexual activity when discussing sexual activity with daughters compared with sons.^{21,23,30,48,85,86} If parents wish to exert a stronger influence on their sons' safer sex practices, they may need additional training to change the fre-

quency, content, and/or tone of the messages surrounding sexual activity that they communicate to boys.

Second, the association between communication and safer sex was also moderated by the sex of the parent. Specifically, adolescent communication with mothers was positively associated with use of protection, but there was not a significant association between father-adolescent communication and safer sex behavior. Across a variety of circumstances, men and boys are less verbally expressive, open to self-disclosure, and attuned to emotional and relational cues compared with girls and women.⁸⁷ This difficulty in sharing emotional experiences or discussing potentially embarrassing relational topics may inhibit the ability of some boys and fathers to have open and intimate conversations about sexual health. It would be ideal to examine whether specific factors related to fathers'

Table. Weighted Mean Effect Sizes by Moderator Variables^a

Variable	Sample Size, No.	k^b	r	95% CI	Between Groups Q_B
Demographic and study design variables					
Sex					
Female	12 758	32	0.12	0.09 to 0.15 ^c	13.63 ^c
Male	6385	16	0.04	0.02 to 0.07 ^d	
Total	19 143	48			
Study location					
United States	16 048	49	0.10	0.08 to 0.12 ^c	0.06
Non-United States	9203	21	0.11	0.06 to 0.16 ^c	
Total	25 251	70			
Age, mean, y					
<16	8950	29	0.11	0.08 to 0.15 ^c	0.14
≥16	10 249	33	0.10	0.06 to 0.14 ^c	
Total	19 199	62			
Race/ethnicity					
Mixed-race sample	20 754	51	0.11	0.08 to 0.13 ^c	0.61
All white	125	2	0.14	−0.10 to 0.36	
All black	3758	13	0.09	0.04 to 0.14 ^c	
All Hispanic	677	5	0.12	−0.01 to 0.25 ^e	
Total	25 314	71			
Study design					
Cross-sectional	21 078	64	0.11	0.08 to 0.13 ^c	2.31
Longitudinal	4236	7	0.07	0.02 to 0.11 ^d	
Total	25 314	71			
Communication measurement variables					
Communication source ^f					
Mother	2924	12	0.14	0.06 to 0.21 ^c	2.58 ^g
Father	2363	7	0.03	−0.05 to 0.10	
Total	5287	19			
Communication topic					
Contraception or condoms	3675	16	0.09	0.04 to 0.15 ^d	2.65
Pregnancy	989	3	0.05	−0.02 to 0.11	
HIV/STIs	6311	5	0.10	0.04 to 0.16 ^d	
General topics	14 339	47	0.11	0.07 to 0.14 ^c	
Total	25 314	71			
Communication format					
Behavior or frequency	20 495	53	0.10	0.07 to 0.13 ^c	0.78
Quality	4166	14	0.10	0.06 to 0.14 ^c	
Self-efficacy	384	3	0.17	0.01 to 0.32 ^g	
Total	25 045	70			
Items used to assess communication, No.					
1	16 442	36	0.09	0.06 to 0.11 ^c	1.85
2-5	4206	17	0.12	0.07 to 0.16 ^c	
6-10	1983	7	0.12	0.00 to 0.23 ^g	
≥11	1366	8	0.07	−0.01 to 0.15 ^e	
Total	23 997	68			

(continued)

Table. Weighted Mean Effect Sizes by Moderator Variables^a (continued)

Variable	Sample Size, No.	k^b	r	95% CI	Between Groups Q_B
Safer sex behavior variables					
Type of safer sex behavior					
Contraception	14 910	35	0.09	0.06 to 0.13 ^c	2.22
Condom use	8860	29	0.12	0.08 to 0.16 ^c	
Unprotected sex	1544	7	0.06	−0.03 to 0.15	
Total	25 314	71			
Safer sex behavior time frame					
Lifetime	7211	29	0.10	0.05 to 0.14 ^c	1.77
Past 6 mo	1048	5	0.07	−0.06 to 0.20	
Past 3 mo	1310	6	0.13	0.08 to 0.19 ^c	
First sexual activity	3876	6	0.09	−0.00 to 0.18 ^e	
Last sexual activity	10 308	21	0.09	0.06 to 0.13 ^c	
Total	23 753	67			

Abbreviations: HIV, human immunodeficiency virus; *k*, number of studies; STI, sexually transmitted infection.

^a Mixed-effects models are presented for moderator analyses.

^b When groups do not total 71, it is because 1 or more studies was missing the appropriate information to be included in that analysis.

^c *P* < .001.

^d *P* < .01.

^e *P* < .10.

^f Moderator analyses by communication source compared communication with mother vs communication with father; the mean weighted effect of communication with "parent(s)" was *r* = 0.10, *P* < .001 across studies.

^g *P* < .05.

communication—such as how often fathers are communicating with their sons or daughters and the specific content or comfort level of these conversations—might amplify the effect of communication on adolescents' safer sex practices; unfortunately, there are currently too few studies of father communication to examine these fundamental questions. This remains a ripe area for future inquiry.

Taken together, our results confirm that, across more than 50 studies, parent-adolescent sexual communication is positively associated with adolescents' use of contraceptives and condoms regardless of communication topic or format. However, this effect explained a relatively small proportion of the variance in safer sex behavior. Thus, results underscore the importance of understanding parent communication—likely a more distal predictor—in the context of more proximal factors that contribute to sexual decision making. Building on preliminary models of parent-adolescent communication,^{7,8,10} future theoretical and empirical work should examine how parent communication affects individual-level factors (eg, attitudes and self-efficacy)⁸⁸ as well as couple-level factors (eg, partner communication and negotiation processes)^{37,89} and how these and other factors may mediate the association between parent-child communication and safer sex. In line with family systems theory,⁹⁰ it is also possible that alternative parenting constructs, such as parent-adolescent relationship quality, parental monitoring, or the marital relationship itself, may interact with communication to predict sexual behavior among youth.³⁹ Future work will benefit from in-depth analyses of the role that parental communication may play in adolescent sexual decision making within these multiple domains of influence.

Methodological Considerations

Several methodological issues were identified in this literature review that may have obscured the detection of more robust effects and are worthy of future research attention. Addressing these study design issues may elucidate why several expected communication measurement characteristics (ie,

topic and format)^{37,89} did not emerge as significant moderators of the association between communication and behavior.

First, many studies assessed sexual communication with unspecified parents. In these cases, it was not possible to know if youth were reporting communication with mothers, fathers, or both parents. Given the current findings that sex of the parent was a moderator, as well as previous research demonstrating more frequent communication about sexual issues with mothers than with fathers,⁹¹ the overall association we found may be driven mostly by communication with mothers. Additional research is needed to better understand this issue.

Second, more than half the studies used single-item assessments of parent-adolescent communication. This finding is not ideal from a measurement perspective because single-item assessments are unlikely to capture the nuance and complexity of the communication process. It is clear that the quality and timing of communication can have important implications for sexual decision making among youth.⁹² Given that many parents misjudge when their adolescents begin sexual activity, communication about sex may begin after the initiation of sexual activity and limit the potential effect of these discussions.^{22,93} To further our understanding of communication among adolescents and their parents, we need to use not only brief measures of the content or frequency of communication but also in-depth measures of the timing, tone, and style of these sexual discussions.^{10,36,94} This approach may require mixed-methods longitudinal studies in which quantitative reports are collected alongside qualitative interviews, perhaps using ecological momentary assessments to capture communication soon after it occurs. It would also be useful to obtain reports of communication from both adolescents and their parents to identify discrepancies in the frequency or quality of communication that each individual reports.¹³

Finally, of the 71 independent effects identified, only 7 used longitudinal designs. While there were no significant differences in the effect sizes drawn from cross-sectional vs longitudinal studies, additional work should use multi-wave lon-

gitudinal designs to determine the effect that timing of communication has on contraceptive behavior.

Implications for Intervention Efforts

Results of this study confirm that parent-adolescent sexual communication is a protective factor for youth, and a focus on communication remains justified in future intervention efforts. Because conversations about sexuality can be uncomfortable or embarrassing for both parents and adolescents, educational efforts may be most successful if they provide clear, practical instruction and help parents optimize the timing and language used in their approach.²⁵ In addition to formal intervention programs with parents, physicians and other health care professionals who interact with parents and youth are in a unique position to encourage healthy communication about sexual topics. Specifically, physicians can have clear and honest conversations about sexual health issues in professional settings to model sexual communication skills,⁹⁵ perhaps helping families ini-

tiate these conversations. They can also urge parents and adolescents to have such conversations at home, as well as provide resources to parents on when and how to discuss sensitive sexual health topics.

Conclusions

This study fills a critical gap in the literature by meta-analyzing the association between parent-adolescent sexual communication and safer sex behavior among youth. Across more than 3 decades of research and 25 314 adolescents, this meta-analysis suggests that communication with parents—particularly among mothers and girls—has a protective effect on adolescent contraceptive and condom use. Further research using more sophisticated assessments, longitudinal designs, and mixed-methods approaches are needed to advance this literature and to better understand the effect parents have on the health of their adolescents.

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Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Widman, Choukas-Bradley, Garrett.

Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: Widman.

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Administrative, technical, or material support: Choukas-Bradley, Nesi, Garrett.

Study supervision: Widman, Noar.

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REFERENCES

1. Centers for Disease Control and Prevention. Sexual risk behaviors: HIV, STD, & teen pregnancy prevention. <http://www.cdc.gov/healthyyouth>

/sexualbehaviors. Updated September 1, 2015. Accessed September 24, 2015.

2. Hamilton BE, Martin JA, Ventura SJ. Births: preliminary data for 2009. *Natl Vital Stat Rep*. 2010;59(3):1-19.

3. Dilorio C, Pluhar E, Belcher L. Parent-child communication about sexuality. *J HIV AIDS Prev Educ Adolesc Child*. 2003;5:7-32.

4. Hutchinson MK, Jemmott JB III, Jemmott LS, Braverman P, Fong GT. The role of mother-daughter sexual risk communication in reducing sexual risk behaviors among urban adolescent females: a prospective study. *J Adolesc Health*. 2003;33(2):98-107.

5. Whitaker DJ, Miller KS, May DC, Levin ML. Teenage partners' communication about sexual risk and condom use: the importance of parent-teenager discussions. *Fam Plann Perspect*. 1999;31(3):117-121.

6. Bronfenbrenner U. Contexts of child rearing: problems and prospects. *Am Psychol*. 1979;34:844-850.

7. Beadnell B, Wilsdon A, Wells EA, Morison DM, Gillmore MR, Hoppe M. Intrapersonal and interpersonal factors influencing adolescents' decisions about having sex: a test of sufficiency of the Theory of Planned Behavior. *J Appl Soc Psychol*. 2007;37:2840-2876.

8. Hutchinson MK, Wood EB. Reconceptualizing adolescent sexual risk in a parent-based expansion of the Theory of Planned Behavior. *J Nurs Scholarsh*. 2007;39(2):141-146.

9. Kotchick BA, Shaffer A, Forehand R, Miller KS. Adolescent sexual risk behavior: a multi-system perspective. *Clin Psychol Rev*. 2001;21(4):493-519.

10. Jaccard J, Dodge T, Dittus P. Parent-adolescent communication about sex and birth control: a conceptual framework. *New Dir Child Adolesc Dev*. 2002;97(97):9-41.

11. Guilamo-Ramos V, Bouris A, Lee J, et al. Paternal influences on adolescent sexual risk behaviors: a structured literature review. *Pediatrics*. 2012;130(5):e1313-e1325.

12. Miller KS, Kotchick BA, Dorsey S, Forehand R, Ham AY. Family communication about sex: what are parents saying and are their adolescents listening? *Fam Plann Perspect*. 1998;30(5):218-222, 235.

13. Aspy CB, Vesely SK, Oman RF, Rodine S, Marshall L, McLeroy K. Parental communication and youth sexual behaviour. *J Adolesc*. 2007;30(3):449-466.

14. DePadilla L, Windle M, Wingood G, Cooper H, DiClemente R. Condom use among young women: modeling the theory of gender and power. *Health Psychol*. 2011;30(3):310-319.

15. Pick S, Palos PA. Impact of the family on the sex lives of adolescents. *Adolescence*. 1995;30(119):667-675.

16. Whitaker DJ, Miller KS. Parent-adolescent discussions about sex and condoms: impact on peer influences of sexual risk behavior. *J Adolesc Res*. 2000;15:251-273.

17. Haley T, Puskas K, Terhorst L, Terry MA, Charron-Prochownik D. Condom use among sexually active rural high school adolescents: personal, environmental, and behavioral predictors. *J Sch Nurs*. 2013;29(3):212-224.

18. Manning WD, Flanigan CM, Giordano PC, Longmore MA. Relationship dynamics and consistency of condom use among adolescents. *Perspect Sex Reprod Health*. 2009;41(3):181-190.

19. Somers CL, Ali WF. The role of parents in early adolescent sexual risk-taking behavior. *Open Psychol J*. 2011;4:88-95.

20. Hockenberry-Eaton M, Richman MJ, Dilorio C, Rivero T, Maibach E. Mother and adolescent knowledge of sexual development: the effects of gender, age, and sexual experience. *Adolescence*. 1996;31(121):35-47.

21. Adu-Mireku S. Family communication about HIV/AIDS and sexual behaviour among senior secondary school students in Accra, Ghana. *Afr Health Sci*. 2003;3(1):7-14.

22. Miller KS, Levin ML, Whitaker DJ, Xu X. Patterns of condom use among adolescents: the impact of mother-adolescent communication. *Am J Public Health*. 1998;88(10):1542-1544.

23. Widman L, Choukas-Bradley S, Helms SW, Golin CE, Prinstein MJ. Sexual communication between early adolescents and their dating partners, parents, and best friends. *J Sex Res*. 2014;51(7):731-741.
24. Brown LK, Hadley W, Donenberg GR, et al. Project STYLE: a multisite RCT for HIV prevention among youths in mental health treatment. *Psychiatr Serv*. 2014;65(3):338-344.
25. Schuster MA, Corona R, Elliott MN, et al. Evaluation of Talking Parents, Healthy Teens, a new worksite based parenting programme to promote parent-adolescent communication about sexual health: randomised controlled trial. *BMJ*. 2008;337:a308.
26. Akers AY, Holland CL, Bost J. Interventions to improve parental communication about sex: a systematic review. *Pediatrics*. 2011;127(3):494-510.
27. Noar SM, Zimmerman RS. Safe sex. In: Reis HT, Sprecher S, eds. *Encyclopedia of Human Relationships*. Thousand Oaks, CA: Sage; 2009:1395-1397.
28. Bonell C, Allen E, Strange V, et al. Influence of family type and parenting behaviours on teenage sexual behaviour and conceptions. *J Epidemiol Community Health*. 2006;60(6):502-506.
29. Dietrich J, Sikkema K, Otjombe KN, et al. Multiple levels of influence in predicting sexual activity and condom use among adolescents in Soweto, Johannesburg, South Africa. *J HIV AIDS Soc Serv*. 2013;12(3-4):404-423.
30. Hutchinson MK, Montgomery AJ. Parent communication and sexual risk among African Americans. *West J Nurs Res*. 2007;29(6):691-707.
31. Newcomer SF, Udry JR. Parent-child communication and adolescent sexual behavior. *Fam Plann Perspect*. 1985;17(4):169-174.
32. Thompson E. Socialization for sexual and contraceptive behavior: moral absolutes versus relative consequences. *Youth Soc*. 1982;14(1):103-128.
33. Buhi ER, Goodson P. Predictors of adolescent sexual behavior and intention: a theory-guided systematic review. *J Adolesc Health*. 2007;40(1):4-21.
34. Short MB, Yates JK, Biro F, Rosenthal SL. Parents and partners: enhancing participation in contraception use. *J Pediatr Adolesc Gynecol*. 2005;18(6):379-383.
35. Commendador KA. Parental influences on adolescent decision making and contraceptive use. *Pediatr Nurs*. 2010;36(3):147-156, 170.
36. Lefkowitz ES, Stoppa TM. Positive sexual communication and socialization in the parent-adolescent context. *New Dir Child Adolesc Dev*. 2006;112(112):39-55.
37. Widman L, Noar SM, Choukas-Bradley S, Francis DB. Adolescent sexual health communication and condom use: a meta-analysis. *Health Psychol*. 2014;33(10):1113-1124.
38. Holtzman D, Robinson R. Parent and peer communication effects on AIDS-related behavior among US high school students. *Fam Plann Perspect*. 1995;27(6):235-240, 268.
39. Huebner AJ, Howell LW. Examining the relationship between adolescent sexual risk-taking and perceptions of monitoring, communication, and parenting styles. *J Adolesc Health*. 2003;33(2):71-78.
40. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. *Introduction to Meta-Analysis*. West Sussex, UK: John Wiley and Sons, Ltd; 2009.
41. Lipsey MW, Wilson DB. *Practical Meta-Analysis*. Thousand Oaks, CA: Sage; 2001.
42. Noar SM, Cole C, Carlyle K. Condom use measurement in 56 studies of sexual risk behavior: review and recommendations. *Arch Sex Behav*. 2006;35(3):327-345.
43. DiClemente RJ, Wingood GM, Crosby R, Cobb BK, Harrington K, Davies SL. Parent-adolescent communication and sexual risk behaviors among African American adolescent females. *J Pediatr*. 2001;139(3):407-412.
44. Wight D, Williamson L, Henderson M. Parental influences on young people's sexual behaviour: a longitudinal analysis. *J Adolesc*. 2006;29(4):473-494.
45. Rosenthal R. *Meta-Analytic Procedures for Social Research*. Newbury Park, CA: SAGE; 1991.
46. Cohen J. A power primer. *Psychol Bull*. 1992;112(1):155-159.
47. Bonett DG. Transforming odds ratios into correlations for meta-analytic research. *Am Psychol*. 2007;62(3):254-255.
48. Kapungu CT, Baptiste D, Holmbeck G, et al. Beyond the "birds and the bees": gender differences in sex-related communication among urban African-American adolescents. *Fam Process*. 2010;49(2):251-264.
49. Ancheta R, Hynes C, Shrier LA. Reproductive health education and sexual risk among high-risk female adolescents and young adults. *J Pediatr Adolesc Gynecol*. 2005;18(2):105-111.
50. Atienzo EE, Walker DM, Campero L, Lamadrid-Figueroa H, Gutiérrez JP. Parent-adolescent communication about sex in Morelos, Mexico: does it impact sexual behaviour? *Eur J Contracept Reprod Health Care*. 2009;14(2):111-119.
51. Biddlecom A, Awusabo-Asare K, Bankole A. Role of parents in adolescent sexual activity and contraceptive use in four African countries. *Int Perspect Sex Reprod Health*. 2009;35(2):72-81.
52. Bradley H, Leichter JS, Gift TL. Does discussing sexually transmissible infections or HIV with a parent increase condom use among young women using other contraceptive methods? *Sex Health*. 2013;10(1):82-90.
53. Buzi RS, Smith PB, Weinman ML. Parental communication as a protective factor in increasing condom use among minority adolescents. *Int J Adolesc Med Health*. 2009;21(1):51-59.
54. Crosby RA, Hanson A, Rager K. The protective value of parental sex education: a clinic-based exploratory study of adolescent females. *J Pediatr Adolesc Gynecol*. 2009;22(3):189-192.
55. Demetriou E, Kaplan DW. Adolescent contraceptive use and parental notification. *Am J Dis Child*. 1989;143(10):1166-1172.
56. DiClemente RJ, Lodico M, Grinstead OA, et al. African-American adolescents residing in high-risk urban environments do use condoms: correlates and predictors of condom use among adolescents in public housing developments. *Pediatrics*. 1996;98(2, pt 1):269-278.
57. Donenberg GR, Emerson E, Mackesy-Amiri ME. Sexual risk among African American girls: psychopathology and mother-daughter relationships. *J Consult Clin Psychol*. 2011;79(2):153-158.
58. East P, Reyes B, Contreras B, Wu RC, Contreras R. Positive adolescent sexuality as evident in consistent and reliable contraceptive use: a study of sexually active Latino and non-Latino youths' contraceptive behavior. *Sex Res Soc Policy*. 2005;2:42-53.
59. Furstenberg FF Jr, Herceg-Baron R, Shea J, Webb D. Family communication and teenagers' contraceptive use. *Fam Plann Perspect*. 1984;16(4):163-170.
60. Guzmán BL, Schlehofer-Sutton MM, Villanueva CM, Delo Stritto ME, Casad BJ, Feria A. Let's talk about sex: how comfortable discussions about sex impact teen sexual behavior. *J Health Commun*. 2003;8(6):583-598.
61. Hacker KA, Amare Y, Strunk N, Horst L. Listening to youth: teen perspectives on pregnancy prevention. *J Adolesc Health*. 2000;26(4):279-288.
62. Hadley W, Brown LK, Lescano CM, et al; Project STYLE Study Group. Parent-adolescent sexual communication: associations of condom use with condom discussions. *AIDS Behav*. 2009;13(5):997-1004.
63. Halpern-Felsher BL, Kropp RY, Boyer CB, Tschann JM, Ellen JM. Adolescents' self-efficacy to communicate about sex: its role in condom attitudes, commitment, and use. *Adolescence*. 2004;39(155):443-456.
64. Handelsman CD, Cabral RJ, Weisfeld GE. Sources of information and adolescent sexual knowledge and behavior. *J Adolesc Res*. 1987;2:455-463.
65. Jaccard J, Dittus PJ, Gordon VV. Parent-adolescent congruency in reports of adolescent sexual behavior and in communications about sexual behavior. *Child Dev*. 1998;69(1):247-261.
66. Juma M, Alaii J, Bartholomew LK, Askew I, Van den Borne B. Risky sexual behavior among orphan and non-orphan adolescents in Nyanza Province, Western Kenya. *AIDS Behav*. 2013;17(3):951-960.
67. Kastner LS. Ecological factors predicting adolescent contraceptive use: implications for intervention. *J Adolesc Health Care*. 1984;5(2):79-86.
68. Leland NL, Barth RP. Characteristics of adolescents who have attempted to avoid HIV and who have communicated with parents about sex. *J Adolesc Res*. 1993;8:58-76.
69. Malcolm S, Huang S, Cordova D, et al. Predicting condom use attitudes, norms, and control beliefs in Hispanic problem behavior youth: the effects of family functioning and parent-adolescent communication about sex on condom use. *Health Educ Behav*. 2013;40(4):384-391.
70. Manlove J, Ikramullah E, Terry-Humen E. Condom use and consistency among male adolescents in the United States. *J Adolesc Health*. 2008;43(4):325-333.
71. McEwan B, Aukett R, Hills MD. High school students' attitudes towards and use of contraceptives. *N Z Med J*. 1988;101(842):142-145.
72. Parkes A, Henderson M, Wight D, Nixon C. Is parenting associated with teenagers' early sexual

- risk-taking, autonomy and relationship with sexual partners? *Perspect Sex Reprod Health*. 2011;43(1):30-40.
73. Rich SL, Robertson AA, Wilson JK. Having "the talk": individual, family, and partner factors on unprotected sex among female adolescent offenders. *Deviant Behav*. 2014;35:311-322.
 74. Romer D, Stanton B, Galbraith J, Feigelman S, Black MM, Li X. Parental influence on adolescent sexual behavior in high-poverty settings. *Arch Pediatr Adolesc Med*. 1999;153(10):1055-1062.
 75. Santelli JS, Warren CW, Lowry R, et al. The use of condoms with other contraceptive methods among young men and women. *Fam Plann Perspect*. 1997;29(6):261-267.
 76. Scott-Jones D, Turner SL. Sex education, contraceptive and reproductive knowledge, and contraceptive use among black adolescent females. *J Adolesc Res*. 1988;3:171-187.
 77. Smith PB, Buzi RS, Weinman ML. Mental health screening in family-planning clinics: a sexual risk-reduction opportunity. *J Sex Marital Ther*. 2010;36(3):181-192.
 78. Stone N, Ingham R. Factors affecting British teenagers' contraceptive use at first intercourse: the importance of partner communication. *Perspect Sex Reprod H*. 2002;191-197.
 79. Thoma BC, Huebner DM. Parental monitoring, parent-adolescent communication about sex, and sexual risk among young men who have sex with men. *AIDS Behav*. 2014;18(8):1604-1614.
 80. Thompson E. Socialization for sexual and contraceptive behavior: moral absolutes versus relative consequences. *Youth Soc*. 1982;14(1):103-128.
 81. Treboux D, Busch-Rossnagel NA. Social network influences on adolescent sexual attitudes and behaviors. *J Adolesc Res*. 1990;5:175-189.
 82. Weinman ML, Small E, Buzi RS, Smith PB. Risk factors, parental communication, self and peers' beliefs as predictors of condom use among female adolescents attending family planning clinics. *Child Adolesc Social Work J*. 2008;25:157-170.
 83. O'Sullivan LF, Jaramillo BMS, Moreau D, Meyer-Bahlburg HFL. Mother-daughter communication about sexuality in a clinical sample of Hispanic adolescent girls. *Hisp J Behav Sci*. 1999;21:447-469.
 84. Duval S, Tweedie R. Trim and fill: a simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*. 2000;56(2):455-463.
 85. Darling CA, Hicks MW. Parental influence on adolescent sexuality: implications for parents as educators. *J Youth Adolesc*. 1982;11(3):231-245.
 86. O'Sullivan LF, Meyer-Bahlburg HFL, Watkins BX. Mother-daughter communication about sex among urban African American and Latino families. *J Adolesc Res*. 2001;16:269-292.
 87. Brizendine LBA. Are gender differences in communication biologically determined? In: Slife B, ed. *Clashing Views on Psychological Issues*. 16th ed. New York, NY: McGraw Hill; 2010:72-88.
 88. Fishbein M, Ajzen I. *Predicting and Changing Behavior*. New York, NY: Taylor & Francis; 2009.
 89. Noar SM, Carlyle K, Cole C. Why communication is crucial: meta-analysis of the relationship between safer sexual communication and condom use. *J Health Commun*. 2006;11(4):365-390.
 90. Nichols M, Schwartz R. *Family Therapy: Concepts and Methods*. Needham Heights, MA: Allyn and Bacon; 1998.
 91. Dilorio C, Kelley M, Hockenberry-Eaton M. Communication about sexual issues: mothers, fathers, and friends. *J Adolesc Health*. 1999;24(3):181-189.
 92. Mueller KE, Powers WG. Parent-child sexual discussion: perceived communicator style and subsequent behavior. *Adolescence*. 1990;25(98):469-482.
 93. Beckett MK, Elliott MN, Martino S, et al. Timing of parent and child communication about sexuality relative to children's sexual behaviors. *Pediatrics*. 2010;125(1):34-42.
 94. Martino SC, Elliott MN, Corona R, Kanouse DE, Schuster MA. Beyond the "big talk": the roles of breadth and repetition in parent-adolescent communication about sexual topics. *Pediatrics*. 2008;121(3):e612-e618.
 95. Miller KS, Wyckoff SC, Lin CY, Whitaker DJ, Sukalac T, Fowler MG. Pediatricians' role and practices regarding provision of guidance about sexual risk reduction to parents. *J Prim Prev*. 2008;29(3):279-291.