

The Effects of Contraceptive Education On Method Use at First Intercourse

By Jane Mauldon and Kristin Luker

Despite long-standing public support for sex education in the schools, it has been difficult to show concrete effects of sex education on sexual and contraceptive behavior. Data from the 1988 National Survey of Family Growth indicate that exposure to a formal contraceptive education program increases the likelihood that a teenage woman will use a contraceptive method at first intercourse. According to the results of a multivariate analysis, the odds that a young woman will use any method and the odds that she will use a condom increase by about one-third following instruction about birth control; the effect on the likelihood of pill use, however, is nonsignificant. If contraceptive education occurs in the same year that a teenager becomes sexually active, the odds of any method use and of condom use are increased by 70–80%, and the odds of pill use are more than doubled. The results also suggest that with greater educational efforts, the proportion of teenagers who use condoms at first intercourse could increase from 52% to 59%, while the proportion using no method might decrease from 41% to 33%.

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Americans have long put their faith in education as a remedy for many of society's problems, and the question of how young people should manage their sexuality is no exception to this generalization. Public support for sex education in the schools is both long-standing and high.¹ Programs designed to teach schoolchildren about sex, reproduction and related issues date back to the earliest parts of this century.²

The content of contemporary sex education programs ranges from discussions aimed at helping students clarify their values or practice decision-making skills, to classes stressing abstinence almost exclusively, to forthright discussion of contraceptive use and availability.³ The AIDS epidemic has been an important influence on state and local educational policies. By 1989, virtually all schools included AIDS education in their curricula, sometimes together with other sex education topics and sometimes separately; AIDS education curricula are now strongly recommended or mandated in all 50 states.⁴

Opinions are sharply divided about whether and how much schools should teach students about condoms and other contraceptive methods. Some observers

believe that schools can and should influence teenagers' sexual behavior, including their contraceptive behavior, while others fear that contraceptive education encourages sexual activity among adolescents, and still others think that sex education is largely irrelevant because "nothing works."

Although several studies have documented that sex education programs result in increased knowledge about contraception and more favorable attitudes toward it,⁵ actual changes in students' behavior due to sex education have been harder to demonstrate. A 1991 survey of the research literature summarized the evaluations of several sex education curricula with what is still the conventional wisdom on the subject: "None of the educational programs evaluated... had any measurable effects on participants' sexual activity, contraceptive use, or pregnancy rates."⁶

In contrast to this pessimistic view, a 1994 summary of the findings of 23 published, peer-reviewed studies of school-based sex and AIDS education programs reported that some of these programs "did delay the initiation of intercourse, reduce the frequency of intercourse, reduce the number of sexual partners or increase the use of condoms or other contraceptives."⁷ The research presented here focuses on the last of these outcomes: whether sex education increases contraceptive use. More precisely, we investigate whether women who received formal instruction about contraception before becoming sexually active

were more likely than others to use a method when they first had sexual intercourse.

Behavior at first intercourse is an informative measure of the value of sex education for several reasons. First, for most people, the initiation of sexual activity is a memorable experience, so reports about contraceptive use at that time should be relatively reliable.

Second, investigating a respondent's first opportunity to use a method following sex education should yield the most accurate, and perhaps the highest, estimates possible of the effect of contraceptive education. Because the respondent was not sexually active previously, the potential impact of education is not contaminated by the effects of prior contraceptive behavior or by intervening sexual episodes.

Third, most young people's contraceptive behavior remains fairly consistent for at least some months following first intercourse. For example, among teenage women interviewed in 1988 who had been sexually active for about two years, 43% reported that their contraceptive behavior had been exactly the same at first intercourse and at most recent intercourse; another 23% said they had used contraceptives on both occasions but had changed methods.⁸ Five out of six respondents who had used a method at first intercourse had also used one at most recent intercourse. In contrast, one-third who had used no method initially were still not using one.

Correlations in behavior between first and most recent intercourse weaken as the period between these events increases, but the results reported in this article can reasonably be thought of as reflecting behavior early in a young woman's sexual life. This is an important time; the consequences of even a few weeks or months of unprotected intercourse can be severe. One-fifth of all premarital first pregnancies among teenagers occur in the first months after they become sexually active.⁹

Researchers investigating the impact of sex education on students' contraceptive behavior early in their sexual lives have used two types of data: retrospective reports from nationally representative samples, and data generated to evaluate various types of sex

Jane Mauldon is assistant professor of public policy at the Graduate School of Public Policy, University of California, Berkeley. Kristin Luker is professor of sociology and professor in the Jurisprudence and Social Policy Program, Boalt Hall School of Law, University of California, Berkeley. The research on which this article is based was supported in part by a grant from the Spencer Foundation.

Table 1. Percentage of women aged 15–24 by measures of sexual activity, contraceptive and sex education, and contraceptive use, according to birth cohort, 1988 National Survey of Family Growth

Measure	1963–1966 (N=947)	1967–1969 (N=762)	1970–1972 (N=775)
Ever had sex	89	77	na
Before age 14	6	3	5
At age 14–15	16	17	20
At age 16–18	45	46	na†
>18 or unknown	22	11	na†
Had formal contraceptive education	70	79	na
Age			
<14	13	15	26
14–15	23	31	32
16–18	29	29	na†
Unknown	5	4	3
Timing relative to first sex			
Before	47	56	58
In same year	11	10	7
After	7	8	4
Unknown	5	4	3
Had no formal contraceptive education	30	21	28
Sexually active	26	16	11
Not sexually active	4	5	17
Other sex education			
Formal STD instruction	75	81	77
Talked to parents about contraception	48	59	58
Talked to parents about STDs	35	45	52
Contraceptive use at first sex			
Any method	45	51	59
Condom	31	41	52
Pill	11	7	6
Other	3	3	1
No method‡	55	49	41

†Most respondents had not yet reached age 18. ‡In this and subsequent tables, includes use of withdrawal and rhythm. Note: In this and subsequent tables, na=not applicable.

education curricula. Two studies of the first type found that young women exposed to contraceptive education were more likely than others to use a method at first intercourse,¹⁰ while one found no such effect on young men’s behavior.¹¹

Among seven curriculum-specific evaluations summarized in the 1994 review,¹² only three reported results comparing teenagers who were sexually experienced before receiving sex education with those who were not: Two of these found that students who began having intercourse after receiving sex education were more likely

than others to use a method,¹³ and one found that they were less likely to do so.¹⁴ For the remaining curricula, results are reported for all students’ contraceptive use after the educational exposure. Two of these programs had no significant impact on contraceptive use,¹⁵ while two yielded improvements in use.¹⁶

Data and Methods

The data used for this article are from the 1988 National Survey of Family Growth (NSFG), a nationally representative survey of 8,450 American women aged 15–44.¹⁷ The NSFG data that are relevant to this analysis are age at first intercourse; first contraceptive method used (if any); contraceptive use at first intercourse; whether, by age 18, the respondent had had “any formal instruction on methods of birth control” or sexually transmitted diseases (STDs), and whether she had ever talked to either of her parents about these topics; and the age at which she first had formal instruction about contraception.

From these data, the relative order of contraceptive education and first intercourse could be established for all women except those who had their first contraceptive education class and first intercourse at the same age. We could not establish the timing relative to first intercourse of STD education or parent-child conversations about sexual issues; therefore, we do not focus much attention on these variables. (In many schools, discussions about STDs and about contraception probably were linked once concern over the AIDS epidemic had become widespread, since condoms are used for both STD and pregnancy prevention.)

The first part of the analysis illustrates differences between cohorts in the content and timing of sex education; the data are from the 2,484 respondents aged 15–24 at the survey date (in the birth cohorts 1963–1966, 1967–1969 and 1970–1973) who had lived in the United States at age 15 and who provided complete and consistent information on the relevant characteristics.* For the second part, the analyses of contraceptive use, the sample was further restricted to the 1,479 sexually ac-

tive respondents who were unmarried teenagers at first intercourse.

We estimated two multivariate models to predict contraceptive use: a binomial logistic regression predicting the use of any method (excluding rhythm and withdrawal) at first intercourse; and a multinomial logit model comparing use of the condom (alone or with spermicide or other methods), the pill and no method. Respondents who used some other method at first intercourse (35 women) were excluded from the final model because the cell sizes for these women were too small for analysis with a multinomial logit model. The models were estimated using mainframe SAS and fit by the method of maximum likelihood. The regressions and cross-tabulations were adjusted by the sample weights on the tape, scaled by the mean of the weights.[†]

Some selectivity bias is possible, since our analyses are based on women who had become sexually active by the time of the survey—about 90% of the oldest cohort (women born in 1963–1966), but only 40% of the youngest (those born in 1970–1972). We have tried to correct for this selectivity by controlling for both age at and year of first intercourse in the multivariate models.[‡]

Exposure to contraceptive education prior to first intercourse is a function both of the respondent’s behavior (whether she waited to begin sexual activity until receiving contraceptive education) and of her school’s curriculum (whether it included contraceptive education, and at what grade level). Certain characteristics that may prompt a young woman to delay intercourse until after she has received sex education may also be correlated with her inclination to use a contraceptive method. Similarly, a school may offer contraceptive education in an early grade because many of its students become pregnant young or because the community it serves is socially liberal.

The controls for respondents’ characteristics included in the multivariate models help to correct for individual-level selectivity in exposure to contraceptive education, but we have no controls for school-

*The residence restriction excluded 2% of otherwise eligible respondents; the data quality restriction excluded another 6%.

†Because of the clustered sampling design of the survey, standard errors on the parameters in the regression tend to be underestimated. Special software is needed to correct for possible correlations between geographically clustered observations, and this software is not readily available in a format compatible with multinomial logistic regression. Alternatively, a conservative correction is to mul-

tiple the standard errors by 1.414 (or multiply the variance by two), and adjust t-ratios accordingly. For most variables, this procedure would actually be an overcorrection. Generally, coefficients significant at the 1% level in the analysis reported here would retain significance at least at the 5% level were a conservative correction of this type applied to the results. The t-ratios and levels of significance reported in Tables 4 and 5 have not been adjusted in this fashion.

‡Members of the later cohort who are excluded from this analysis because they postponed first intercourse until

ages 16–19 may have responded in significantly different ways to contraceptive education than did members of the earlier cohort who similarly delayed initiation of intercourse (and are included in the study); we have not been able to control for this possibly confounding selectivity. When we reran the logistic regression models with only the cohorts born before 1970, we found an effect of prior exposure to contraceptive education with the predicted sign, but it did not achieve statistical significance at the 5% level.

level characteristics.* Consequently, our results may either understate or overstate the impact of early contraceptive education, depending on the characteristics of students who were most likely to be exposed to it.

Results

Cohort Differences

Sex education in the home and at school saw several changes during the late 1970s and early 1980s. More schools began to teach students about birth control methods, and those classes were often given to young teenagers, rather than only to students nearing completion of high school (Table 1). Between the 1963–1966 and 1970–1972 cohorts, the proportion of young people having formal education about contraception before age 14 increased from 13% to 26%, and the proportion receiving such instruction at age 14 or 15 grew from 23% to 32%.

Consequently, while the proportion of respondents who became sexually active by age 16 rose modestly (from 22% to 25%) across the three cohorts, the proportion who started having intercourse *after* learning about contraception grew from 47% to 58%. Meanwhile, the proportion who initiated sexual activity without having received contraceptive education dropped from 33% to 15%.[†]

Other types of sex education also became more prevalent in the late 1970s and early 1980s. A substantially larger proportion of the youngest than of the oldest cohort reported having talked with their parents about contraception or STDs, even though half of the women born in 1970–1972 were only 15 or 16 years old at the survey date.

At the same time, teenagers' contraceptive use improved markedly. The proportion who used a barrier, hormonal or spermicidal contraceptive method the first time they had intercourse rose from 45% of the earliest cohort to 59% of those born later. Virtually all of this change can be attributed to a 21-percentage-point increase in condom use at first intercourse, while the fraction of respondents relying on the pill or other methods declined.[‡]

Table 2 shows several important differences between teenagers who had contraceptive education prior to initiating sexual activity, those who had it in the same year as or following first intercourse and those who had no contraceptive education. Women in the first group typically were about one and one-half years older than women in the second group when they started having intercourse (ages 17.2 and 15.6, respectively), and were about

Table 2. Mean age of sexually active respondents at first intercourse and at contraceptive education, and percentage distribution of sexually active respondents by contraceptive use at first intercourse, according to type and timing of contraceptive education

Type and timing of education	N	Mean age at first sex	Mean age at contraceptive education	Contraceptive use at first sex (%)				
				Condom	Pill	Other	None	Total
Total	1,479	16.5	14.7	39	9	2	50	100
Had contraceptive education before first sex***	681	17.2	14.2	44	10	2	44	100
Had contraceptive education in same year as or after first sex***	427	15.6	15.7	37	7	1	54	100
No contraceptive education***	371	16.3	na	33	8	4	55	100
Talked to parents about contraception	875	16.5	14.6	41	11	2	46	100
Did not talk to parents about contraception	604	16.6	14.9	37	6	3	54	100
Had contraceptive education before first sex and talked to parents about contraception	454	17.1	14.1	43	12	3	42	100
Had no contraceptive education before first sex and did not talk to parents about contraception	379	16.1	na	31	6	4	59	100

***Within these categories, differences in contraceptive use are significant at $p < .001$.

one and one-half years younger when they had contraceptive education (14.2 vs. 15.7). In short, having had contraceptive education before first intercourse may be a consequence of later age at first intercourse, earlier sex education or both.

Prior contraceptive education is significantly correlated with method use. At first intercourse, 44% of sexually active respondents who had had formal instruction about contraception used a condom, and 10% used the pill. By contrast, among women who had contraceptive education in the same year as or after they had first intercourse, or who had not had formal contraceptive education by the survey date, 33–37% used a condom, and 7–8% used the pill.

Talking to parents about birth control is also correlated with using either a condom or the pill, and respondents who neither had formal education about contraception nor discussed it with their parents reported the lowest levels of condom and pill use. Respondents who had received school-based contraceptive education also tended to have talked to their parents about birth control, suggesting that when young people are in formal contraceptive education classes, either they or their parents may be encouraged to initiate conversations about sex. (The correlation might also indicate differential recall: Respondents who remember having a class about contraception may also recall a conversation at home about it.)

Although the apparent relationships between parent-child conversations and birth control use are tantalizing, the directions of causality are not clear, because the order of events is unknown. For some respondents, a specific conversation about birth control might have preceded first in-

tercourse and encouraged contraceptive use. On the other hand, conversations with parents might have consisted of requests to acquire contraceptives and in any case might have occurred after first intercourse. Because of this ambiguity, we have not included conversations with parents as an independent variable in the multivariate models.

The striking correlations between contraceptive education and subsequent method use do not necessarily indicate a causal relationship between the two. Contraceptive use among teenagers is influenced by

*If students attending the same school resemble each other in behavior such as age at first intercourse or contraceptive use, and differ from students in other schools, then school-specific decisions on the timing and content of sex education will compromise studies that use national data to estimate the impact of sex education on sexual behavior. For example, if schools attempt to offer contraceptive education classes just before many students initiate sexual activity, then we might expect to find that receipt of sex education predicts first intercourse, even in the absence of a real association between them. School-level data from randomized trials are probably more appropriate than national data for assessing the impact of contraceptive education on the timing of first intercourse.

†The sequence of instruction and first intercourse cannot be determined for the roughly 10% of the sample who learned about birth control in the same year they became sexually active and the 4% who did not report the age at which they learned about contraception. Although the experiences of the youngest cohort are censored, we note that the large majority have had contraceptive education; thus, only 17% were at risk of having intercourse prior to contraceptive education. Consequently, the increase in proportions of teenagers having contraceptive education before first intercourse will surely still hold once the experience of the youngest cohort is complete.

‡Part of the apparent switch between condoms and the pill is due to the younger average age at first intercourse among sexually active women in the latest cohort. Women in the 1970–1972 cohort who initiated sexual activity after the 1988 survey may have had higher rates of pill use because they were older at first intercourse.

Table 3. Percentage of sexually active respondents who had contraceptive education, and percentage who used a contraceptive method at first intercourse, by selected characteristics

Characteristic	N	Had contraceptive education		Used a method at first sex
		Ever	Before first sex	
Mother's education				
<high school	470	71	41	43
High school	617	73	46	52
Some college	392	79	56	57
Race or ethnicity†				
White	777	76	50	52
Black	560	76	42	50
Hispanic	109	63	42	35
Age at first sex				
≤14	270	68	17	37
15–17	911	76	48	50
≥18	298	75	71	62
Year of first intercourse				
1972–1980	225	66	22	28
1981–1984	666	76	48	49
1985–1988	588	75	56	59

†Calculations exclude the 33 respondents of other racial or ethnic groups.

many factors, including the norms about family formation, reproduction and intimacy that young people encounter in their families and in the broader cultures of which they are members. Table 3 demonstrates that the young women whose background characteristics, age at first intercourse and calendar year of first sexual experience suggest they are likely to have used a contraceptive at first intercourse also tended to have had contraceptive education in school. Likewise, the women from backgrounds or cohorts that predisposed them not to use a method tended also not to have had formal instruction about birth control.

Young women whose mother had at least some college education were more likely than those whose mother had not graduated from high school to have had any contraceptive education (79% vs. 71%) and to have had it before first intercourse (56% vs. 41%); there is a corresponding gap between these groups in their use of birth control at first intercourse (57% vs. 43%).

Some 76% of white women had had any formal birth control education, and 50% had had it before initiating sexual activity; 52%

*Because the 1988 NSFG oversampled blacks, other analysts have reported separate models for black women and women of other races. We initially estimated such models and found the coefficient estimates for white women to be essentially the same as those we report here for the pooled model. The small number of black women, however, meant that the model for blacks had no statistically significant coefficients. (Weighted race-specific models are available from the authors.)

†The estimated effect on any contraceptive use is smaller than the effect on either condom use or pill use because the model predicting any use includes women who used some other contraceptive method at first intercourse, and contraceptive education did not increase their numbers.

had used a method at first intercourse. The proportions were roughly the same among black women, but were considerably lower among Hispanics—63%, 42% and 35%, respectively.

The relationship with age at first intercourse is particularly noticeable: Among women who initiated intercourse at age 14 or younger, 17% had had classes about contraception and 37% used a method; among those whose first sexual experience was at age 18 or older, the proportions were 71% and 62%, respectively.

Multivariate Models

In the following regression models, we investigate whether differences in age and timing of first intercourse or in the women's background characteristics reduce or even completely overwhelm the apparent association between contraceptive education and contraceptive use. We report in Table 4 the results of a binomial logistic regression model predicting contraceptive use at first intercourse, and in Table 5 a multinomial model predicting probabilities of condom use, pill use and no contraceptive use. The tables show the odds ratio and its associated t-ratio for each covariate. We report results only for pooled models including women of all races.*

The statistically significant coefficients on the calendar-year variable in Table 4 and the last two columns of Table 5 emphasize the increases in condom (but not pill) use in the 1980s that have been reported by several researchers.¹⁸ Calculations based on the regression estimates suggest that the odds of using a condom rather than using nothing at first intercourse increased about fourfold in nine years. Indeed, between the mid-1970s and the mid-1980s, the frequency of condom use at first intercourse increased from 21% to 49%, and the frequency of nonuse of any contraceptive method declined from 72% to 41%.

These striking changes in contraceptive use over time were, we suspect, the result of several developments in the 1980s: more visible and widely available sales of condoms, concern about preventing AIDS, fairly candid public discussions about sexual behavior (particularly in the context

of AIDS) and, perhaps, changing preferences among most young people toward later and smaller families. These interpretations are only speculative, however; we tested some of them using very weak indicators for the social factors concerned (the best trend data we could locate for knowledge of AIDS, legal restrictions on contraceptive availability and advertising, and fertility preferences among young adults), but found nothing.

The relationship between contraceptive use and age at first intercourse is well-known and was strongly apparent in our data. We set age 15 at 0 in the model and included the square of age to allow its effect to be nonlinear. The odds of using either the pill or a condom at first intercourse increased steadily with each year of age; the impact on condom use leveled off slightly at the oldest ages.

Prior contraceptive education had a moderate, statistically significant effect on contraceptive use. The odds of using any contraceptive method were estimated to increase by one-third following contraceptive education, with somewhat different effects on condom use and on pill use: The odds of using a condom over using nothing increased by 35%; the odds of using the pill increased by 59%, but this change was not significant.[†]

The coefficients for contraceptive education before first intercourse imply that if about 6% of teenagers would use the pill, 52% would use a condom and 41% would use nothing (the behavior of the most recent cohort) without such education, then with contraceptive education, the rates for similar teenagers would change to 8% using the pill, 59% using the condom and 33% using nothing (not shown).

Table 4. Odds ratios (and t-ratios) predicting use of a contraceptive method at first intercourse, by selected characteristics (N=1,479)

Characteristic	Odds ratio
Calendar year of first sex	1.14*** (5.99)
Age at first sex	1.14** (2.72)
Age squared	0.99 (-0.45)
Contraceptive education before first sex	1.34* (2.25)
Contraceptive education in same year as first sex	1.75*** (3.33)
Black	1.14 (0.88)
Hispanic	0.57** (-2.74)
Other race	0.83 (-0.56)
Jewish	1.98 (1.03)
Mainline Protestant†	1.36* (2.38)
Mother's yrs. of education	1.09*** (3.67)
Intercept	0.001*** (-6.72)

*p<.05. **p<.01. ***p<.001. †Episcopalian, Lutheran, Methodist or Presbyterian. Notes: In this table and Table 5, the reference categories are as follows: no contraceptive education before first sex; white, non-Hispanic; and other or no religion. For age at first intercourse, age 15 is set at 0. Mother's years of education is coded in single years, beginning with 0.

These changes are smaller than the ones we observe in the raw (uncontrolled) data, but are still substantial.

Having a contraceptive education class in the same year as initiating intercourse leads to an even higher likelihood of method use; the odds ratios are 1.75 for condom use and 2.38 for pill use. Assuming that sex education preceded first intercourse for half of these women and followed first intercourse for half, these results suggest that learning about birth control immediately before first intercourse greatly increases the likelihood of using a method.

Race, ethnicity and family background also influence contraceptive use at first intercourse. Young black women are much more likely than those of other ethnic groups to use the pill at first intercourse, and are as likely as whites to use condoms. Hispanic women are much less likely than others to use condoms. The precise reasons for these differences await further study; we know that cultural norms surrounding sex and fertility, access to medical care, perceptions of the risks and benefits of different contraceptives and other factors vary across these populations.¹⁹

Mother's level of education is highly significant in the model. (Comparable information for fathers was not reported.) Four or five years of additional maternal education have the same estimated effect on contraceptive use as prior exposure to sex education. The "real" effect reflected in this coefficient may be primarily economic, in that better-educated mothers are also more affluent, and teenagers from more affluent families are more likely to practice contraception. Alternatively, the variable may capture indirectly the aspirations for further education that the respondent inherited from her mother, or perhaps better-educated mothers teach their daughters to "manage" their first sexual experience successfully and avoid pregnancy.

Previous studies have documented a strong relationship between contraceptive use and religious affiliation. Two analyses found fundamentalist Protestants to be relatively unlikely to use a contraceptive at first intercourse,²⁰ but we were unable to replicate that result. Rather, we observed that Jews and mainline Protestants (Episcopalians, Lutherans, Methodists and Presbyterians) were more likely than others to use a method. Jewish women were much more likely than others to use the pill at first intercourse. (This result should be interpreted with skepticism, however, as it is based on 15 Jewish respondents in the survey.) Mainline Protestants, on the other hand, were more like-

ly than others to use condoms.

In a different model, we found Catholics significantly less likely to use condoms than other women, but not less likely to use the pill (not shown). These apparent effects of religion probably are chiefly a consequence of other background characteristics of adherents rather than a consequence of theological beliefs.

We tested a variety of indicators of social relationships and social status that other research has shown to predict aspects of sexual behavior (region of residence, family structure at age 14, mother's age at first birth and religiosity), but found none of them significant at the 5% level when added to this model.* Nor did their addition to the model alter the statistical significance or the general magnitude of the coefficients on the contraceptive education variables.

We also investigated the impact of other sex education variables in these models, although since we did not know if this education occurred before or after first intercourse, these variables were of weak theoretical interest and are not included in the final models reported here. Information about STDs, whether from school or parents, was not associated with contraceptive behavior. In contrast, talking to parents about contraception was positively and significantly related to pill use at first intercourse, but had no relationship with condom use. This disjuncture suggested that the conversations with parents may have been, in many cases, requests for help in acquiring the pill. If so, the variable is not a cause but a consequence of a young woman's intention to use a contraceptive and should be excluded from the model.

Finally, we tested for significant interactions between contraceptive education and such variables as age and race or ethnicity, to see whether birth control instruction had different impacts for younger and older teenagers, or for black and Hispanic teenagers. None of these explorations yielded significant differences between groups.

Discussion

A significant association exists between exposure to formal education about contraception and subsequent use of birth control at first intercourse. The relation-

Table 5. Odds ratios (and t-ratios) predicting pill and condom use at first intercourse, by selected characteristics (N=1,444)

Characteristic	Pill vs. no method	Condom vs. no method	Condom vs. pill
Calendar year of first sex	1.01 (0.27)	1.18*** (6.93)	1.17*** (3.66)
Age at first sex	1.24* (2.37)	1.12* (2.10)	0.90 (-1.05)
Age squared	1.04 (1.41)	0.97 (-1.63)	0.99* (-2.36)
Contraceptive education before first sex	1.59 (1.91)	1.35* (2.19)	0.85 (-0.65)
Contraceptive education in same year as first sex	2.38** (2.87)	1.75** (3.16)	0.74 (-1.00)
Black	2.26*** (3.41)	0.96 (-0.22)	0.43*** (-3.46)
Hispanic	0.62 (-1.18)	0.61* (-2.21)	1.00 (-0.01)
Other race	0.61 (-0.70)	0.96 (-0.12)	1.57 (0.63)
Jewish	6.44* (2.39)	1.32 (0.37)	0.20* (-2.28)
Mainline Protestant	1.01 (0.03)	1.50** (2.95)	1.49 (1.64)
Mother's yrs. of education	1.10* (2.31)	1.09*** (3.70)	1.00 (-0.09)
Intercept	0.01 (-1.37)	0.00*** (-7.70)	0.00** (-3.05)

*p<.05. **p<.01. ***p<.001. Note: This sample excludes respondents who used some method other than the pill or condom, as well as women whose method was unknown.

ship persists when confounding variables are held constant. How one reads this striking result depends in large measure on how one interprets the contraceptive education variable. The simplest hypothesis is that formal education about birth control methods really does change contraceptive behavior, at least at first intercourse. Before pursuing this hypothesis, we consider other possible explanations.

One is that since the NSFG data are based on retrospective reports, they are affected by recall bias. For instance, it may be that the women who reported having had contraceptive education prior to initiating sexual activity remember it because they used the information when they first had intercourse. Women similarly exposed to contraceptive education who did not use the information may not remember having the class or may remember it as occurring later than it did.

Another alternative is that the women who learned about contraception in school before they became sexually active may have differed in unmeasured ways from those who did not. For example, they may have been raised by liberal parents who tolerated this type of schooling for their daughters, and the home climate in these more liberal families may have independently predisposed daughters to use contraceptives.

While these competing hypotheses remain possibilities, the patterns of contraceptive education reported in the survey limit their plausibility. First, the data do not seem particularly skewed by selective recall. The change over time that appears in respondents' reports of contraceptive education is entirely consistent with in-

*Other researchers have found that intact family structure at age 14 predicts condom use (see reference 11). We found no effect on condom use and a marginally significant negative impact on pill use (p=.07).

dependent evidence that sex education has become both more prevalent and more comprehensive. Second, sex education is increasingly common for children from diverse backgrounds. Moreover, in our multivariate models, we have controlled for some of the differences that predispose teenagers to use contraceptives.

We suspect that we are finding effects of sex education where other studies have not because the 1988 NSFG did not ask respondents merely "Did you have sex education?" but more specifically, "Did you have a formal program of education about contraceptive methods?" Sex education programs that did not discuss contraception would not be included in this measure.

Assuming that contraceptive education changes the behavior of a substantial number of teenagers, the question arises: Whose behavior does it affect? Other researchers have found that having sex education influences young men's use of condoms.²¹ The puzzle here is to understand how it is that a young woman's experience of sex education might not only affect her behavior, but more important, lead to her partner's using a condom the first time she has sexual intercourse.

Designers of AIDS prevention and other sex education programs wrestle with this conundrum as they seek to increase rates of condom use among sexually active young women (or, more precisely, among their partners). However, the NSFG data offer no insights: The survey did not gather information about the details of a respondent's contraceptive education (the program's length, type of teacher providing instruction, pedagogical style or course content) or about the young woman's first sexual partner. Lacking data, one can only speculate. One explanation is simply that contraceptive education curricula have begun to emphasize heavily the advantages of the condom. With the advent of AIDS, schools have begun to stress the dual function of the condom, as a prophylactic against both disease and pregnancy.²² Presumably, in some cases, a young woman who had learned this information in the classroom discussed it with her partner, and the two of them decided to use condoms.

But the information included in contraceptive education programs is probably only half of the story. From evaluations of specific curricula,²³ we know that effective sex education programs focus on behavior as well as on information. They allow students to practice skills as simple as buying condoms or as complex as persuading a partner to use a condom. A

young woman's education could have an impact on her partner's behavior if it not only taught her about the importance of condoms and how to acquire and use them, but also helped her develop negotiation and assertiveness skills, or even skills for choosing boyfriends.

The contrasts we observe in teenagers' contraceptive choices over time should alert us to the fact that contraception is a multidimensional phenomenon. The pill has consistently been a relatively unpopular means of contraception at first intercourse, while use of the condom has increased considerably. Young couples who use condoms are choosing a different set of experiences—in the bedroom, in the health care system and in the marketplace—than are those who rely on the pill. One implication for research is that analyses focusing only on whether teenagers use contraceptives, and not on the specific method they use, are conflating different types of behavior, which have different meanings for individuals, as well as different health and reproductive consequences.

How young people assess contraceptive methods and how easily they can acquire them are important elements in the story we have told. Condoms are sold in many venues, packaged appealingly, touted in youth-oriented media and even distributed in schools. Since the 1980s, manufacturers have targeted the female market in their promotions. Opinion surveys among women of all ages showed favorable assessments of the condom rising sharply during the 1980s.²⁴ Nevertheless, although some young women carry condoms and claim that this is "their" method of birth control, the most recent national data on teenagers' contraceptive use suggest that among adolescents, males rather than females typically provide the condoms.²⁵

Important and encouraging changes in the contraceptive behavior of teenagers have occurred since 1978, in the direction of increased condom use. Although sex education explains very little of the trends we observe, it seems to have played a part in influencing adolescent behavior. The discouraging aspect of the story is that large numbers of teenagers still engage in intercourse with no protection against either pregnancy or STDs. But if teenagers have changed their behavior with only the modest official encouragement from school sex education programs common in the 1970s and 1980s, greater change through other types of educational campaigns seems achievable.

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