

# Detailed Educational Pathways Among Females After Very Early Sexual Intercourse

By Nicole R. Steward, George Farkas and Jeffrey B. Bingenheimer

Nicole R. Steward is research analyst, Child Trends, Washington, DC. George Farkas is professor, Department of Education, University of California, Irvine. Jeffrey B. Bingenheimer is a postdoctoral fellow, Population Research Institute, Pennsylvania State University, University Park.

**CONTEXT:** Although studies have shown that early sex is negatively associated with high school graduation and college enrollment, no recent study has examined the extent to which early sex affects educational attainment, and the mediating mechanisms have not been established.

**METHODS:** Data from 4,613 female participants in the National Educational Longitudinal Study were used to examine the relationship between early sexual intercourse (i.e., first sex prior to age 15) and educational attainment. Logistic regression analyses that controlled for background characteristics, school performance, behavioral factors and academic aspirations were conducted to assess this association, as well as to explore the potential mediating role of early marriage and childbearing.

**RESULTS:** Young women who had had early sex had reduced odds of having graduated from high school (odds ratio, 0.4) and from college (0.5). Postsecondary enrollment was positively associated with expectations of postsecondary education (1.5) and levels of academic achievement (1.4–1.5), but not with early sex. Respondents who had married before their expected high school graduation date had reduced odds of having graduated from high school (0.1), enrolled in postsecondary school (0.4) or completed college (0.1); those who had a child before their expected high school graduation date had reduced odds of having graduated from high school (0.3) or college (0.1).

**CONCLUSION:** Programs that target early parenthood and marriage, and that provide hope for future educational opportunities, could lessen the impact of early sex for young women.

*Perspectives on Sexual and Reproductive Health, 2009, 41(4):244–252, doi: 10.1363/4124409*

Very early sexual intercourse (i.e., sexual initiation prior to age 15) may have a detrimental impact on a young woman's performance in middle school and high school. Indeed, numerous investigators have found that young women who become sexually experienced during their early teenage years are less likely than their sexually inexperienced peers to graduate from high school and to pursue postsecondary education.<sup>1,2</sup> Given the positive relationships between educational attainment and subsequent employment and earnings,<sup>3–6</sup> early sex may have a major negative effect on later life outcomes if it hinders education.

Efforts to identify the possible causal pathway between early sex and educational attainment must address two key issues: the need to take into account confounding variables and the challenge of determining the mechanisms through which early sex may affect educational outcomes. The first issue is vital because the association between early sex and subsequent educational outcomes could be spurious; it may be due to personal characteristics, family background factors or other variables that lead some young women to have early sex and that independently influence the probability of high school graduation, postsecondary enrollment and college completion.

The role of race and ethnicity provides a vivid illustration of this possibility. Researchers have long been aware

that black youth are substantially more likely than their white counterparts to initiate sex before age 15,<sup>7</sup> and considerable research has been devoted to identifying the causes of this variation.<sup>8</sup> A parallel body of literature has documented and sought explanations for large and persistent racial and ethnic disparities in educational achievement.<sup>9,10</sup> Taken together, these observations suggest that race and ethnicity itself, or factors closely associated with it, could generate a spurious statistical association between early sex and educational attainment.

Race and ethnicity is not the only possible confounding variable. Other aspects of socioeconomic status, including parents' education, occupation and income, may be related to young women's age at first intercourse and educational achievement.<sup>11–14</sup> Another possibility is that poor early academic performance, attributable either to low intelligence or to other barriers to academic success, reduces young women's chances of subsequent academic achievement while also making them more likely to initiate sex at a younger age. This would be the case if some young women, discouraged by their academic performance in grade school, reduced their academic effort during middle and high school, and focused instead on forming romantic and sexual relationships.<sup>9</sup> This possibility is consistent with the finding that poor prior academic performance predicts the initiation of sexual activity during early

adolescence.<sup>15,16</sup> More generally, aspects of temperament, such as impulsiveness, sensation seeking and delay of gratification, may generate patterns of behavior that include not only early sex and poor academic performance, but also involvement in a wide range of so-called problem behaviors.<sup>17–19</sup> Because the list of potential confounding variables is long and diverse, any effort to draw conclusions about the relationship between early sex and subsequent achievement of educational milestones must confront this issue.

If we assume that early sexual intercourse has a real impact on educational outcomes, a second issue arises: What mechanisms mediate this relationship?

One possible mechanism is early family formation. Indeed, much of the concern about early sex is related to the risk of unintended adolescent pregnancy.<sup>20</sup> Young people who have sex at an early age are less likely to use contraceptives correctly at first sex—or to use them at all—than are those who make their sexual debut at an older age.<sup>21,22</sup> Nonuse or incorrect use of contraceptives increases the likelihood of pregnancy and, in turn, motherhood, which brings new expectations and responsibilities that many young women cannot easily reconcile with remaining in school. Thus, at least to some extent, early motherhood can lead to reduced educational attainment.<sup>2,23</sup> Early marriage is also associated with a delay in educational attainment, although the direction of the relationship is much less clear.<sup>24,25</sup> Age at first marriage has risen for both men and women during the past 50 years,<sup>26</sup> and the completion of educational milestones has become a marker for adulthood for many individuals. Because marrying before completing high school or enrolling in college may require young women to delay or forgo further educational attainment, early family formation may serve as their pathway to adulthood.<sup>27</sup>

These findings raise questions about the detailed relationships among young women's social and demographic characteristics, very early intercourse and later educational outcomes. Do structural disadvantage and lack of academic achievement fully explain the relationship between early intercourse and the completion of educational milestones? To what extent does later family formation mediate this relationship? Answering these questions is the goal of this study.

## METHODS

### Study Design

We used data from the National Educational Longitudinal Study (NELS) to analyze the relationship between early sex and three educational outcomes: graduation from high school, enrollment in postsecondary studies and attainment of a four-year college degree. The timing of, and risk factors associated with, early sex differ between males and females;<sup>28,29</sup> we focused on women, because the potential consequences of early sex, including early childbearing, are typically greater for the futures of women than of men.

We extended prior research in two ways. First, we explored the extent to which the relationship between early sex and educational attainment remains intact after family background, school performance, behavioral factors and academic aspirations are taken into account. We included both standardized test scores and grade point average (GPA) as measures of academic performance; NELS is one of the few data sets that contain data on both of these measures for young women at the ages when sexual activity typically begins.

Second, we examined the importance of the timing of first family formation in the relationship between early sex and educational attainment—an element missing from most previous studies of the impact of parenthood on educational attainment. We constructed three indicators of childbirth and marriage to represent when these events occurred relative to a young woman's expected high school graduation date, expected date of postsecondary enrollment and expected college enrollment date.

### Sample

We analyzed student and parent responses in the NELS public-use data. NELS started in 1988 with a nationally representative eighth-grade cohort. Students and parents were both interviewed during the base year. Students completed follow-up surveys in 1990, when most were in 10th grade; in 1992, when most were high school seniors; in 1994, when respondents were approximately 20 years old; and in 2000, when they were about 26 years old. We focused on the 6,362 young women who participated in the 2000 follow-up.

### Data

•**Outcome variables.** Educational outcome variables were constructed using information about respondents' high school completion date and highest level of postsecondary education by final follow-up. High school graduation was defined as receipt of a high school diploma by the 2000 interview. The measure of college enrollment includes all students who reported having had at least some postsecondary education by the 2000 interview (high school graduation with a diploma was not required to be included in this measure). Finally, we assessed whether respondents had attained a bachelor's degree by the 2000 survey.

•**Predictor variable.** Our focal independent variable was early sex. During the 1994 wave of NELS, respondents were asked "Have you ever had sexual intercourse?" If the response was affirmative, interviewers asked "When did you have sexual intercourse for the first time?" and "In what month and year was that?" We used these data and respondents' birth dates to construct a dichotomous indicator for early sex.

We excluded from our analyses 410 young women who provided no information about the timing of their first sexual experience and 181 who did not remember either the year or the month of their sexual debut; the latter were omitted because individuals who provide incomplete

responses to retrospective questions may be more likely than their peers to give inaccurate information when they respond to other retrospective questions.<sup>30</sup>

An important limitation of our early sex variable is that it did not distinguish coercive from consensual sex, because NELS did not include questions on sexual coercion. However, the relationship between coercive early sex and educational attainment may be different from that between consensual early sex and educational attainment. In previous research with young women, investigators found that the proportion of first sexual experiences that are described as coercive decreases sharply as age increases. In the National Longitudinal Study of Adolescent Health, for example, the proportion of women who reported having ever experienced forced sexual intercourse leveled off around age 12,<sup>\*31</sup> suggesting that sexual debuts prior to age 12 would have a substantially higher likelihood of being coercive than later ones. Thus, we omitted from our analyses the 17 young women who reported having experienced first sex prior to age 12. Omitting these very young sexual initiators from the analyses cannot fully resolve the problem of conflating coercive and consensual early sex, but may help mitigate it.

**•Social and demographic characteristics.** The vast majority of respondents identified themselves as Asian or Pacific Islander, Hispanic or Latino, non-Hispanic black or non-Hispanic white. The 131 respondents who provided other responses (e.g., Native American) were dropped from the analysis.

The measure for socioeconomic status was constructed from data collected from young women's parents in 1988. In the parent questionnaire, respondents reported their own and their spouse's or partner's highest level of education, which were coded on a scale from 1 (eighth grade or less) to 13 (Ph.D. or other professional degree), and their occupations, which were coded using a 17-point occupational prestige scale. Additionally, they were asked to provide their family income for 1987, which was coded on a scale from 1 (none) to 15 (\$200,000 or more). If data on these variables were missing on the parent questionnaire, information from the student interview was used. The responses to each question were standardized and summed to create the measure for socioeconomic status. Detailed information about the construction of this variable is available in the NELS codebook.<sup>32</sup>

Family structure was a dichotomous variable indicating whether the respondent lived in a two-parent household; it was constructed using student responses from the baseline interview. Sibling high school completion, measured in 1990, is represented by two dummy variables, the first indicating that the respondent had at least one older

sibling who had dropped out of high school, and the second indicating that he or she had at least one older sibling but that none had dropped out. The reference category was having no older sibling.

**•Academic achievement.** To measure academic achievement, we constructed two variables. The first was an average of all self-reported grades from English, math, social studies and science from sixth to eighth grade, using the base year responses. For our analyses, we transformed this composite GPA into a z-score. Prior studies have shown that self-reported grades are highly correlated with students' actual grade point average.<sup>33</sup>

GPA is largely predicted by the combination of the student's standardized test scores and school work effort.<sup>34</sup> It does not, by itself, fully reflect the student's academic performance, because in schools where the average academic performance is high, a greater absolute performance is required to achieve the same GPA that a lesser student may achieve at a less challenging school. Nevertheless, it is an important variable to include in our analysis, since it is the primary form of feedback on academic performance that teachers provide to students and their parents. It may also be the best available measure of student interest and effort in schooling.

The second measure was based on results from the NELS math and English exam, given to respondents during the base year. We combined the math and reading scores; we then standardized this variable so that we could compare its relationship to early sex with that of GPA.

**•Academic expectations.** To assess students' baseline educational expectations, the survey asked "How sure are you that you will graduate from high school?" and "How sure are you that you will go further than high school?" Possible responses, coded from 1 to 4, were "very sure won't," "probably won't," "probably will" and "very sure will." We used a z-score transformation for this scale in our analyses.

**•Behavioral characteristics.** We included six behavioral measures, all of which were assessed during the base-year survey. Unattended time at home was used as a measure of parental supervision. Respondents who reported being at home alone after school with no adult supervision for an average of three or more hours per day were coded as having weak parental monitoring.

Early tobacco use may be an indicator of other deviant and problem behaviors.<sup>35</sup> In the NELS questionnaire, respondents were asked "How many cigarettes do you usually smoke per day?" The five response options ranged from "don't smoke" to "two or more packs a day." We recoded these responses into a dichotomous variable to indicate whether adolescents smoked at least one cigarette a day.

We also included a measure intended to capture school behavioral issues from the student's perspective. Youth were asked how many times in the first semester of the current school year they had been sent to the school office for misbehaving, and whether their parents had been

\*Forty-four percent of young women who reported their age at first sex as 10 or younger also reported having ever been forced to have sex; forced sex was also reported by 37% of young women who first had sex at age 11; by 22% of those who first had sex at age 12; by 28% of those who first had sex at age 13; by 23% of those who first had sex at age 14; and by 17% of those who first had sex at age 15.

notified about their behavior. Response options varied from never to two or more times. These items were standardized and scaled ( $\alpha=0.77$ ).

School attendance and class attendance were measured using student responses. Youth were asked how many times in the first semester of the current school year their parents had received a warning about their attendance; responses were coded on a scale from 0 (never) to 2 (more than twice). They were also asked how often (with no time frame specified) they skipped class; the four possible responses were coded from 0 (never/almost never) to 3 (daily).

Finally, both students and parents were asked if the student had ever been held back a grade. The responses were recoded into a single dichotomous measure in which students were classified as having been held back if they, their parents, or both gave an affirmative response.

•**Mediators.** We created a series of dichotomous family formation variables using dates of marriage and childbirth obtained during the final wave of data collection. Respondents were classified as having married before their expected high school graduation date or as having had a baby before their expected graduation date if those events occurred before June 1992, the timely graduation date for this cohort. Similarly, the measures for marriage and childbirth between expected high school graduation and expected postsecondary enrollment dates indicate whether respondents reported having married or having had a child between July 1992 and August 1994. These measures allowed a window of two years for enrollment because some young people do not enroll in the months immediately after high school graduation; lower income students, for example, often defer college for a year or two in order to work to pay for school.<sup>36</sup> Finally, young women were classified as having married or having had a child before the expected date of college graduation if they reported that those events had occurred between September 1994 and August 1998. Although these dates allow a young woman six years after the average high school graduation year to complete her college degree, the measure may count women who formed a family after completing their degree. Women who gave birth in 1997, for example, were classified as having had a baby before their expected college graduation date, even though many would have already attained a college degree.

### Analytic Strategy

We began by examining descriptive differences in educational, social, demographic and behavioral variables between females who had engaged in early sex and those who had not. We used chi-square tests to assess differences in categorical variables, and two-sample t tests for differences in continuous variables.

Next, we used STATA 9.0 to estimate weighted logistic regression models examining the relationships of early sexual behavior with high school graduation, postsecondary enrollment and college completion. Because NELS

used a stratified multistage sampling design with unequal probabilities of selection, we used STATA's "svy" command and related options to obtain corrected point estimates and standard errors. Suitable postestimation tests for weighted data and the "svy" command in STATA are lacking, so we used Fisher's Wald statistic to assess model fit. These analytic techniques did not allow us to make a reliable estimate of explained variance.

Our approach to model specification was driven by the need to address an important limitation of using NELS to

**TABLE 1. Selected characteristics of young women participating in the 2000 wave of the National Educational Longitudinal Study (NELS), according to whether they had engaged in early sex**

Characteristic	Early sex (N=379)	No early sex (N=4,234)
<b>Education</b>		
Graduated from H.S.	63.9**	86.8
Enrolled in college	67.1**	83.3
Graduated from college	17.0**	38.5
<b>Social and demographic</b>		
Race and ethnicity		
White	68.7†	82.5
Hispanic	13.5	11.7
Black	17.1	10.2
Asian	0.7	2.7
Socioeconomic status (mean z-score)	-0.35 (0.70)**	-0.05 (0.78)
Two-parent household	65.4**	82.5
Older sibling dropped out of H.S.		
Yes	3.3	5.2
No	5.3	6.1
No older sibling	91.4	88.8
<b>Academic achievement</b>		
NELS exam (mean z-score)	-0.22 (0.85)**	0.03 (0.94)
Grade point average (mean z-score)	-0.27 (1.00)**	0.11 (1.00)
<b>Academic expectations</b>		
Will complete H.S. (mean z-score)	-0.18 (1.02)**	0.07 (0.88)
Will continue beyond H.S. (mean z-score)	-0.20 (1.01)**	0.12 (0.94)
<b>Behavioral</b>		
Weak parental monitoring	14.4	11.4
Early tobacco use	14.6**	4.4
Behavioral problems in school (mean z-score)		
School attendance (mean)	0.12 (0.87)**	-0.22 (0.68)
Class attendance (mean)	0.21 (0.45)**	0.09 (0.35)
Class attendance (mean)	0.16 (0.40)**	0.08 (0.33)
Ever held back in school	19.0*	11.6
<b>Family formation</b>		
Before expected H.S. graduation date		
Married	15.0**	5.2
Had child	8.2*	4.3
Between expected H.S. graduation and college enrollment dates		
Married	9.2	11.1
Had child	7.6	4.7
Between expected college enrollment and graduation dates		
Married	17.7*	27.5
Had child	21.0	17.7

\* $p < .05$ . \*\* $p < .01$ . †Overall percentage distribution differs at  $p < .05$ . Notes: Data are weighted percentages unless otherwise noted. Values in parentheses are standard deviations. All measures were assessed at baseline (1988), except early sex (1994) and education (2000). Expected dates of H.S. graduation, college enrollment and college graduation were June 1992, August 1994 and August 1998, respectively. Percentage distributions may not total 100.0 because of rounding. H.S.=high school.

study early sex—namely, that the first round of data collection occurred when the young women were in the eighth grade and typically 13 years old. Thus, for some participants, early sexual initiation may have occurred prior to the assessment of control variables, in which case the control variables would be potential mediators rather than confounders. To address this issue, we introduced the control variables into our logistic regression models in three stages, according to the likelihood that these variables played confounding rather than mediating roles. In the first stage (model 1 for each outcome), we controlled only for the social and demographic characteristics, which are highly unlikely to vary across time or to have been influenced by early sex; thus, their role (if any) in the association between early sex and educational attainment would be as confounders rather than as mediators. In the second model for each outcome, we added the two academic achievement measures, which we believe primarily reflect innate ability, learning and academic performance occurring prior to the initiation of early sex, but which could reflect the influences of early sex for some young women. In the third model, we added the behavioral characteristics and measures of academic expectations—

variables for which mediating rather than confounding roles seem more plausible.

For each outcome, we also estimated a fourth model, which incorporated the indicators of childbearing and marriage at different points in time. The purpose of these models was to examine whether childbearing and marriage mediate the relationship between early sex and educational attainment.

In preliminary analyses, we added terms for the interaction of race and early sex to earlier versions of model 3 for each outcome. These interaction terms were not statistically significant, indicating that the relationships between early sex and educational outcomes are similar for Asian, black, Hispanic and white respondents. Therefore, the interaction terms were not included in the multivariable models, and we do not report results according to race and ethnicity.

**RESULTS**

**Sample Characteristics**

After we excluded an additional 1,010 respondents for whom information was lacking on study variables, the final sample consisted of 4,613 young women. To examine whether these exclusions altered the makeup of our sample, we compared the characteristics of young women in the analytic sample with those of young women in the original full sample; the two groups were relatively similar, although they did differ slightly on some measures.\*

Overall, 10% of young women in our analytic sample had had sex for the first time before age 15 (not shown). Respondents who had had early sex differed sharply in educational attainment from those who had not (Table 1, page 247). Whereas 87% of young women who had not had early sex had graduated from high school by the final survey, only 64% of those who had had early sex had done so. Similarly, young women who had not had early sex were more likely than those who had had early sex to have enrolled in a postsecondary program (83% vs. 67%) and to have graduated from college (39% vs. 17%).

The two groups also differed on numerous background variables. Asians and whites were underrepresented in the early sex group, while blacks were overrepresented. The average socioeconomic status of young women who had engaged in early sex was lower than that of respondents who had not had early sex (mean z-scores, -0.35 vs. -0.05). The substantial difference on this measure indicates that on average, the families of young women who had engaged in early sex had had much fewer resources than those of young women who had not engaged in early sex. Likewise, respondents who had engaged in early sex were

**TABLE 2. Odds ratios from logistic regression analysis examining associations between selected characteristics and high school completion**

Characteristic	Model 1	Model 2	Model 3	Model 4
<b>Early sex</b>	0.32***	0.34***	0.37***	0.42**
<b>Social and demographic</b>				
Race and ethnicity				
White (ref)	1.00	1.00	1.00	1.00
Hispanic	0.86	0.91	0.87	0.79
Black	1.24	1.28	1.13	0.92
Asian	5.84***	4.62**	5.99**	5.38**
Socioeconomic status‡				
Two-parent household	2.89***	2.24***	1.91***	1.80***
Older sibling dropped out of H.S.				
Yes	0.42***	0.47**	0.59*	0.58*
No	1.23	1.74	1.28	1.47
No older sibling (ref)	1.00	1.00	1.00	1.00
<b>Academic achievement</b>				
NELS exam score‡	na	1.22	1.11	1.15
Grade point average‡	na	2.45***	1.95***	1.80***
<b>Academic expectations</b>				
Will complete H.S.‡	na	na	1.03	1.09
Will continue beyond H.S.‡	na	na	1.20*	1.25**
<b>Behavioral</b>				
Weak parental monitoring	na	na	0.69	0.63
Early tobacco use	na	na	0.85	1.02
Behavioral problems in school‡	na	na	0.86	0.89
School attendance‡	na	na	0.65*	0.61**
Class attendance‡	na	na	0.68	0.68
Ever held back in school	na	na	0.26***	0.36***
<b>Family formation</b>				
Before expected H.S. graduation date				
Married	na	na	na	0.14***
Had child	na	na	na	0.26**
<b>Wald statistic</b>	21.78***	33.49***	18.58***	21.73***

\*p<.05. \*\*p<.01. \*\*\*p<.001. ‡Continuous variable. Notes: All measures are dichotomous unless otherwise indicated. Odds ratios for continuous variables represent changes in odds per one-unit increase in the measure. H.S.=high school. NELS=National Educational Longitudinal Study. na=not applicable.

\*In two-sample t tests, the groups differed on college enrollment; college graduation; socioeconomic status; NELS exam scores; GPA; early tobacco use; behavioral problems; and expectations of completing high school and pursuing education beyond high school.

less likely than other respondents to have come from a two-parent household (65% vs. 82%).

Early sexual initiators also had lower NELS test scores, GPAs and educational expectations than others. In addition, they were more likely to report having ever used tobacco or having ever been held back a grade, and they had poorer school and class attendance. These differences reinforce concerns that the associations between early sex and educational attainment could be spurious.

We also found differences between the groups in family formation variables. Fifteen percent of young women who had engaged in early sex married prior to their expected high school graduation date, whereas only 5% of those who had not had early sex married before then. Similarly, those who had engaged in early sex were more likely than those who had not to have a baby before their expected high school graduation date (8% vs. 4%), although they were less likely than those who had not had early sex to marry between their expected college enrollment and graduation dates (18% vs. 28%). The two groups were similar for the other family formation outcomes—marriage or childbirth between expected high school graduation and college enrollment dates, and childbirth between expected college enrollment and college graduation dates—suggesting that a strong association between early sex, marriage and parenthood occurs mainly prior to high school graduation.

### Multivariate Analyses

The first logistic regression model showed that the relationship between early sex and high school graduation withstood statistical controls for time-invariant background characteristics (Table 2). Even after we controlled for race and ethnicity and socioeconomic status, the odds of high school graduation among young women who had engaged in early sex were only 32% of those among women who had not had early sex.

In the second model, GPA was positively associated with high school graduation (odds ratio, 2.5), but the addition of this and the NELS score to the model barely altered the relationship between early sex and graduation.

The third model revealed that the odds that a young woman completed high school were reduced among respondents who had had poor school attendance (odds ratio, 0.6) or had been held back a grade (0.3). The odds were elevated, however, among those who had had a more favorable attitude toward the possibility of pursuing education beyond high school (1.2 for each one-unit increase in the scale score). When these possible confounders were added to the model, the odds of completing high school for young women who had had early sex changed only slightly and remained statistically significant (0.4).

The final model added measures of marriage and childbearing prior to the expected high school graduation date. Both were associated with reduced odds of high school graduation (odds ratios, 0.1–0.3). With these variables in the equation, the odds of graduation among young women

**TABLE 3. Odds ratios from logistic regression analysis examining associations between selected characteristics and enrollment in postsecondary school**

Characteristic	Model 1	Model 2	Model 3	Model 4
<b>Early sex</b>	0.53**	0.59*	0.67	0.70
<b>Social and demographic</b>				
Race and ethnicity				
White (ref)	1.00	1.00	1.00	1.00
Hispanic	1.64**	1.81**	1.80**	1.77**
Black	1.77*	2.01**	1.48	1.18
Asian	7.71***	6.39***	7.12***	7.00***
Socioeconomic status‡				
Two-parent household	1.14	1.12	1.06	1.11
Older sibling dropped out of H.S.				
Yes	0.51**	0.58**	0.67	0.66
No	1.25	1.31	1.37*	1.35*
No older sibling (ref)	1.00	1.00	1.00	1.00
<b>Academic achievement</b>				
NELS exam score‡	na	1.49**	1.44**	1.46**
Grade point average‡	na	1.73***	1.44***	1.41***
<b>Academic expectations</b>				
Will complete H.S.‡	na	na	1.03	1.06
Will continue beyond H.S.‡	na	na	1.48***	1.45***
<b>Behavioral</b>				
Weak parental monitoring	na	na	0.96	0.99
Early tobacco use	na	na	0.75	0.81
Behavioral problems in school‡	na	na	1.01	1.00
School attendance‡	na	na	0.72	0.70
Class attendance‡	na	na	0.99	1.00
Ever held back in school	na	na	0.60**	0.69
<b>Family formation</b>				
Before expected H.S. graduation date				
Married	na	na	na	0.35***
Had child	na	na	na	1.40
Between expected H.S. graduation and college enrollment dates				
Married	na	na	na	0.40***
Had child	na	na	na	0.80
<b>Wald statistic</b>	<b>47.33***</b>	<b>44.17***</b>	<b>25.22***</b>	<b>24.78***</b>

\*p<.05. \*\*p<.01. \*\*\*p<.001. ‡Continuous variable. Notes: All measures are dichotomous unless otherwise indicated. Odds ratios for continuous variables represent changes in odds per one-unit increase in the measure. H.S.=high school. NELS=National Educational Longitudinal Study. na=not applicable.

who had engaged in early sex remained substantially lower than those among young women who had not had early sex (0.4). We conclude that early academic performance, behavior, marriage and childbearing explain only a modest share of the association between early sex and high school graduation.

Repeating this analysis for postsecondary enrollment revealed that most of the social and demographic variables were associated with enrollment in the first model (Table 3). The odds of enrollment were lower among young women who had had early sex than among those who had not (odds ratio, 0.5), although the magnitude of the reduction was not as large as it was in the corresponding model for high school graduation.

Many of the variables in models 2, 3 and 4 were associated with postsecondary enrollment, and controlling for these variables diminished the relationship between early sex and enrollment. By model 3, early sex was no longer a significant predictor of postsecondary enrollment, and the relationship remained nonsignificant in model 4. However,

**TABLE 4. Odds ratios from logistic regression analysis examining associations between selected characteristics and college graduation**

Characteristic	Model 1	Model 2	Model 3	Model 4
<b>Early sex</b>	0.42***	0.46***	0.50**	0.52**
<b>Social and demographic</b>				
Race and ethnicity				
White (ref)	1.00	1.00	1.00	1.00
Hispanic	0.64**	0.74	0.74	0.76
Black	0.89	0.98	0.92	0.88
Asian	1.85**	1.62**	1.82**	1.54
Socioeconomic status†	4.17***	2.98***	2.74***	2.40***
Two-parent household	1.28	1.15	1.06	1.10
Older sibling dropped out of H.S.				
Yes	0.33***	0.43***	0.52**	0.57**
No	0.95	1.12	1.16	1.11
No older sibling (ref)	1.00	1.00	1.00	1.00
<b>Academic achievement</b>				
NELS exam score‡	na	1.45***	1.40***	1.32***
Grade point average‡	na	2.73***	2.32***	2.24***
<b>Academic expectations</b>				
Will complete H.S. (z-score)‡	na	na	1.24**	1.31**
Will continue beyond H.S. (z-score)‡	na	na	1.28***	1.23**
<b>Behavioral</b>				
Weak parental monitoring	na	na	0.78	0.73*
Early tobacco use	na	na	0.53	0.58
Behavioral problems in school‡	na	na	0.88	0.89
School attendance‡	na	na	0.83	0.80
Class attendance‡	na	na	0.76	0.74
Ever held back in school	na	na	0.36***	0.41***
<b>Family formation</b>				
Before expected H.S. graduation date				
Married	na	na	na	0.13***
Had child	na	na	na	0.10***
Between expected H.S. graduation and college enrollment dates				
Married	na	na	na	0.18***
Had child	na	na	na	0.11***
Between expected college enrollment and graduation dates				
Married	na	na	na	0.81
Had child	na	na	na	0.26***
<b>Wald statistic</b>	<b>71.26***</b>	<b>70.75***</b>	<b>37.23***</b>	<b>29.56***</b>

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . †Continuous variable. Notes: All measures are dichotomous unless otherwise indicated. Odds ratios for continuous variables represent changes in odds per one-unit increase in the measure. H.S.=high school. NELS=National Educational Longitudinal Study. na=not applicable.

expectations of pursuing postsecondary education and the two measures of academic achievement were associated with elevated odds of college enrollment (1.4–1.5), while marriage before the expected high school graduation date and between the expected dates of high school graduation and college enrollment were associated with reduced odds (0.4 for each).

Finally, the same sequence of models revealed that early sex was associated with reduced odds of completion of a bachelor's degree (odds ratio, 0.4—Table 4). As with the other outcomes, each group of variables added to the equation explained a portion of the relationship. In the final model, the estimated odds of having received a bachelor's degree among young women who had had early sex were half those among respondents who had not engaged in early sex (0.5). Among the other variables, the ones most positively associated with elevated odds of college

graduation in model 4 were socioeconomic status (2.4) and GPA (2.2); the strongest negative associations were with having had a baby during any of the three time intervals before the expected college graduation date (0.1–0.3) or having married before the expected high school graduation or college enrollment date (0.1–0.2).

## DISCUSSION

Previous research has linked early sexual activity with poor academic performance, a propensity for risk and early transition into adult roles. Using NELS data, we found a small but statistically significant association between early sex and both high school and college completion. Only small proportions of these relationships were explained by behavioral factors or by the lower socioeconomic status, educational performance and educational expectations of young women who engage in early sex.

We also found that marriage and childbearing explain a portion of the relationships between early sex and educational attainment, and thus may be regarded as partial mediators of these associations. Young women who believe they have few educational resources may view early sex as part of an alternative pathway to adulthood—a pathway that also often includes early childbearing or marriage. However, once again, only modest portions of the associations between early sex and educational attainment were explained by these mediators.

Academic and policy discussions about the possible consequences of early sex for educational attainment have generally focused on nonmarital parenthood.<sup>37,38</sup> Our findings indicate that early marriage has a strong negative association with educational attainment. Family policy researchers should investigate how to encourage and support young married women in their pursuit of higher education.

Like Spriggs and Halpern,<sup>2</sup> we found no racial and ethnic variation in the relationship between early sex and educational attainment. Black females may engage in first intercourse slightly earlier than their white peers,<sup>8,39</sup> but this difference seems to play no significant role in educational outcomes.

In general, our findings suggest that early sexual decisions may have long-term consequences—a conclusion consistent with the observation that successful sex education programs target youth early.<sup>40</sup> Similarly, prevention and intervention programs that focus on encouraging informed decision making, as well as providing hope for future educational and employment opportunities, should be implemented early in students' educational career. Young women need to believe that means are available for them to pursue such opportunities.

## Limitations

This study has a number of limitations. First, retrospective, self-reported data on topics such as age at first sex may be inaccurate or incomplete. We addressed the retrospective nature of our data in our construction of the

early sex variable. In an analysis of data from the National Longitudinal Survey of Youth, Wu and colleagues found that although many women provided inconsistent reports across waves concerning their age at first intercourse, the inconsistencies were generally quite small.<sup>41</sup> Additionally, Bernard and colleagues argue that people tend to underestimate the amount of time that has passed since an event's occurrence.<sup>30</sup> Together, these studies suggest that errors in reporting, though inevitable, are probably small, and that the ages at first intercourse reported by respondents will likely be higher than their true age at the time, making our measure of early sex more conservative.

A second limitation is that the control variables were assessed after some young women had already initiated intercourse. This means that we cannot determine if the characteristics and situations captured by our control variables preceded or followed first intercourse. In the former case, they should be regarded as potential confounders and statistically controlled; in the latter case, they would more properly be regarded as mediators along the pathway from early sex to educational attainment, and should be omitted from our models. For instance, after a young woman has begun having intercourse, she may change her priorities and aspire less to obtaining a higher education. We attempted to address temporal and causal ambiguity by estimating a series of logistic regression models. The fact that the association between early sex and graduation from high school or college remained intact in all of our models is consistent with the view that early sex has a real and independent effect on educational outcomes.

Finally, the NELS data set did not include every possible confounding variable. However, we believe that by including in our analyses measures of course grades, test scores, social and demographic characteristics, selected behaviors and educational expectations, we have likely picked up a large portion of the variation in educational skills and ambitions shown by young adolescents. Future research should consider how both academic potential and risk-taking interact with early sex to predict educational outcomes.

## Conclusion

Overall, our findings indicate that engaging in early sex is associated with altered educational outcomes in ways that the variables in our model do not fully explain. What might the other mechanisms be? One possibility is that young women who engage in early sex may develop behaviors and time-use patterns that detract from their subsequent academic performance and desire for educational attainment. These may include forms of peer group association that reduce their enrollment in, and level of effort toward, college preparatory courses. Ultimately, a holistic prevention or early intervention program may be able to address these and other putative factors. Testing this hypothesis, and investigating the details of such behavioral and attitudinal change, are other key topics for future research.

## REFERENCES

1. Frisco ML, Adolescents' sexual behavior and academic attainment, *Sociology of Education*, 2008, 81(3):284–311.
2. Spriggs AL and Halpern CT, Timing of sexual debut and initiation of postsecondary education by early adulthood, *Perspectives on Sexual and Reproductive Health*, 2008, 40(3):152–161.
3. Jencks C et al., *Inequality: A Reassessment of the Effect of Family and Schooling in America*, New York: Harper & Row, 1972.
4. Pascarella ET and Terenzini PT, *How College Affects Students: Findings and Insights from Twenty Years of Research*, San Francisco: Jossey-Bass, 1991.
5. Bowen WG and Bok D, *The Shape of the River: Long-Term Consequences of Considering Race in College and University Administration*, Princeton, NJ: Princeton University Press, 1998.
6. Winship C and Korenman S, Economic success and the evolution of schooling and mental ability, in: Mayer SE and Petersen PE, eds., *Earning and Learning: How Schools Matter*, Washington, DC: Brookings Institution Press, 1999, pp. 49–78.
7. Furstenberg FF, Jr., et al., Race differences in the timing of adolescent intercourse, *American Sociological Review*, 1987, 52(4):511–518.
8. Browning CR, Leventhal T and Brooks-Gunn J, Neighborhood context and racial differences in early adolescent sexual activity, *Demography*, 2004, 41(4):697–720.
9. Stearns E and Glennie EJ, When and why dropouts leave high school, *Youth & Society*, 2006, 38(1):29–57.
10. Kao G and Thompson JS, Racial and ethnic stratification in educational achievement and attainment, *Annual Review of Sociology*, 2003, Vol. 29, pp. 417–442.
11. Miller BC and Bingham CR, Family configuration in relation to the sexual behavior of female adolescents, *Journal of Marriage and the Family*, 1989, 51(2):499–506.
12. Hogan DP and Kitagawa EM, The impact of social status, family structure, and neighborhood on the fertility of black adolescents, *American Journal of Sociology*, 1985, 90(4):825–855.
13. Scott-Jones D and White AB, Correlates of sexual activity in early adolescence, *Journal of Early Adolescence*, 1990, 10(2):221–238.
14. Maruyama G, Disparities in educational opportunities and outcomes: What do we know and what can we do? *Journal of Social Issues*, 2003, 59(3):653–676.
15. Moore KA et al., *Adolescent Sex, Contraception, and Childbearing: A Review of Recent Research*, Washington, DC: Child Trends, 1995.
16. Santelli JS et al., Initiation of sexual intercourse among middle school adolescents: the influence of psychosocial factors, *Journal of Adolescent Health*, 2004, 34(3):200–208.
17. Coker AL et al., Correlates and consequences of early initiation of sexual intercourse, *Journal of School Health*, 1994, 64(9):372–377.
18. Costa FM et al., Early initiation of sexual intercourse: the influence of psychosocial unconventionality, *Journal of Research on Adolescence*, 1995, 5(1):93–121.
19. Tubman JG, Windle M and Windle RC, The onset and cross-temporal patterning of sexual intercourse in middle adolescence: prospective relations with behavioral and emotional problems, *Child Development*, 1996, 67(2):327–343.
20. Hayes C, ed., *Risking the Future: Adolescent Sexuality, Pregnancy, and Childbearing*, Vol. 1, Washington, DC: National Academy Press, 1987.
21. Manning WD, Longmore MA and Giordano PC, The relationship context of contraceptive use at first intercourse, *Family Planning Perspectives*, 2000, 32(3):104–110.
22. Jones RK, Darroch JE and Henshaw SK, Contraceptive use among U.S. women having abortions in 2000–2001, *Perspectives on Sexual and Reproductive Health*, 2002, 34(6):294–303.



23. Upchurch DM and McCarthy J, The timing of a first birth and high school completion, *American Sociological Review*, 1990, 55(2):224–234.
24. Glick GE et al., Educational engagement and early family formation: differences by ethnicity and generation, *Social Forces*, 2006, 84(3):1391–1415.
25. Marini MM, The transition to adulthood: sex differences in educational attainment and age at marriage, *American Sociological Review*, 1978, 43(4):483–507.
26. Bianchi SM and Casper LM, American families, *Population Bulletin*, 2000, Vol. 55, No. 4.
27. Shanahan MJ, Pathways to adulthood in changing societies: variability and mechanisms in life course perspective, *Annual Review of Sociology*, 2000, Vol. 26, pp. 667–692.
28. Udry RJ and Billy JOG, Initiation of coitus in early adolescence, *American Sociological Review*, 1987, 52(6):841–855.
29. Crockett LJ et al., Timing of first sexual intercourse: the role of social control, social learning, and problem behavior, *Journal of Youth and Adolescence*, 1996, 25(1):89–111.
30. Bernard HR et al., The problem of informant accuracy: the validity of retrospective data, *Annual Review of Anthropology*, 1984, Vol. 13, pp. 495–517.
31. Abma J, Driscoll A and Moore K, Young women's degree of control over first intercourse: an exploratory analysis, *Family Planning Perspectives*, 1998, 30(1):12–18.
32. National Opinion Research Center, University of Chicago, NOPeXtract codebook, <<http://sodapop.pop.psu.edu/codebooks/nels/nelsf4.txt>>, accessed Oct. 13, 2009.
33. Crockett LJ, Schulenberg JE and Petersen AC, Congruence between objective and self-report data in a sample of young adolescents, *Journal of Adolescent Research*, 1987, 2(4):383–392.
34. Farkas G et al., Cultural resources and school success: gender, ethnicity, and poverty groups within an urban school district, *American Sociological Review*, 1990, 55(1):127–142.
35. DuRant RH et al., The relationship between early age of onset of initial substance use and engaging in multiple health risk behaviors among young adolescents, *Archives of Pediatrics & Adolescent Medicine*, 1999, 153(3):286–291.
36. Cabrera AF, Burkum KR and La Nasa SM, Pathways to a four year degree: determinants of transfer and degree completion, in: Seidman A, ed., *College Student Retention: A Formula for Student Success*, Westport, CT: Praeger, 2005, pp. 155–209.
37. Hofferth SL, Reid L and Mott FL, The effects of early childbearing on schooling over time, *Family Planning Perspectives*, 2001, 33(6):259–267.
38. Hoffman SD, Foster EM and Furstenberg FF Jr., Reevaluating the costs of teenage childbearing, *Demography*, 1993, 30(1):1–13.
39. Meier AM, Adolescent first sex and subsequent mental health, *American Journal of Sociology*, 2007, 112(6):1811–1847.
40. Manlove J et al., Preventing teenage pregnancy, childbearing, and sexually transmitted diseases: what the research shows, *Research Brief*, Washington, DC: Child Trends, 2002.
41. Wu LL, Martin SP and Long DA, Comparing data quality of fertility and first sexual intercourse histories, *Journal of Human Resources*, 2001, 36(3):520–555.

### Acknowledgments

The authors acknowledge the support of the Penn State Population Research Institute, Pennsylvania State University. A version of this paper was presented at the annual meeting of the Population Association of America, New Orleans, Apr. 17–19, 2008. The authors thank Michelle Frisco for her comments on an early version of the manuscript.

**Author contact:** [nsteward@childtrends.org](mailto:nsteward@childtrends.org)