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Maternal Drinking and Risky Sexual Behavior in Offspring

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Abstract

Teenage mothers are more likely to use drugs, and their children are more likely to use substances and become pregnant during adolescence. Teenage mothers' substance use may play a role in the intergenerational risk for adolescent pregnancy. Pregnant adolescents (12–18 years) were seen during pregnancy and postnatal years 6, 10, 14, and 16 ($n = 332$). Teenage mothers reported on substance use and family characteristics. The offspring reported substance use (starting at age 10) and sexual behavior (ages 14 and 16). Prenatal alcohol exposure was associated with offspring (a) having a risky first sex partner and (b) multiple sex partners in the past year. Heavy maternal drinking during childhood was associated with offspring reports of a risky first sex partner and early teenage pregnancy. Findings from this unique birth cohort have implications for alcohol prevention efforts with girls during and after a teenage pregnancy and interventions to prevent risky sex in high-risk youth.

Keywords

adolescents; maternal alcohol; pregnancy; risky sex; teenage mothers

The U.S. teen pregnancy rate exceeds that reported for any other developed country. Although it has been steadily declining since the 1950s, the U.S. teen pregnancy rate remains more than twice as high as the rate for its neighbor Canada (Darroch, Frost, & Singh, 2001; Guttmacher Institute, 2006). A primary concern about adolescent childbearing is that it perpetuates social and economic disadvantage within resource-poor families. The vast majority of these births are unplanned (Chandra, Martinez, Mosher, Abma, & Jones, 2005; Gavin et al., 2009); this is troubling because unplanned births are associated with delayed prenatal care (Chang, O'Brien, Nathanson, Mancini, & Witter, 2003), prenatal substance use (Cornelius et al., 1993; Cornelius, Geva, Day, Cornelius, & Taylor, 1994), and adverse birth outcomes such as preterm births (Shah et al., 2011).

Children of teenage mothers are more likely to become pregnant than children of adult mothers (Barber, 2001; Furstenberg, Levine, & Brooks-Gunn, 1990; Hardy, Astone, Brooks-Gunn, Shapiro, & Miller, 1998; Kahn & Anderson, 1992; Pogarsky, Thornberry, & Lizotte,

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2006), perpetuating the cycle of teenage parenting. Data from the National Longitudinal Survey of Youth showed that daughters of teenage mothers were 66% more likely to become pregnant compared with other adolescents (Meade, Kershaw, & Ickovics, 2008). Data from the Intergenerational Panel Study of Parents and Children indicated that there is also an intergenerational effect in sons and not just in daughters (Barber, 2001). Nonetheless, most children of teenage mothers reach adulthood without experiencing a teenage pregnancy (Furstenberg, 2007). It is unclear which maternal characteristics are associated with early pregnancy in offspring, but targeting the highest-risk families could aid HIV and teenage pregnancy preventative intervention efforts.

Models of intergenerational transmission of risk suggest that maternal health-risk behaviors play a role in the health-risk behaviors of adolescent offspring (Garnier & Stein, 2002; Kandel & Wu, 1995; Wickrama, Conger, Wallace, & Elder, 1999). One pathway to intergenerational risk for teenage pregnancy may be through maternal substance use, because teenage mothers tend to use more substances than older mothers both before and after pregnancy. Rather than “aging out” of substance use during young adulthood, teenage mothers continue to use substances at higher levels than other women in their 20s (Cornelius, Leech, & Goldschmidt, 2004; De Genna, Cornelius, & Donovan, 2009; Gilmore, Gilchrist, Lee, & Oxford, 2006). In a cohort of teenage mothers followed 10 years after pregnancy, half reported binge drinking and a substantial proportion (13% White mothers and 28% Black mothers) used marijuana (De Genna et al., 2009). These findings have implications for their children, who are subsequently more likely to be exposed to substance use and its negative correlates than are the children of older mothers.

There is evidence that adolescent offspring of teenage mothers engage in more risky behaviors that are associated with teenage pregnancy than the offspring of adult mothers. For example, they are more likely to smoke cigarettes, drink alcohol, and use drugs (Pogarsky et al., 2006; Shaw, Lawlor, & Najman, 2006). They are more likely to become dependent on nicotine and marijuana, even after controlling for maternal substance use (Fergusson & Woodward, 1999). Children of teenage parents are also more likely to become adolescent parents than the children of adult mothers (Pogarsky et al., 2006). Although they are at greater risk than children of adult mothers, most of these offspring will not become adolescent parents (Furstenberg, 2007). Longitudinal studies of the development of children in families headed by teenage mothers can help clarify which offspring are at the greatest risk of intergenerational transmission of adolescent parenthood.

Data from the prospective, longitudinal Dunedin study suggest that risk for early parenthood is mediated by maternal socioeconomic status (SES) and maternal characteristics such as IQ and criminal background (Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001). Maternal substance use was not measured nor investigated as a potential mediator of intergenerational teen pregnancy in the Dunedin cohort. Pogarsky and colleagues examined lifetime maternal marijuana use and reported that maternal marijuana use was significantly associated with her child's substance use, but not with her child's risk of adolescent parenthood. Neither of these studies (Jaffee et al., 2001; Pogarsky et al., 2006) examined effects of exposure to prenatal substance use or to maternal substance use at various points across childhood on risk for early pregnancies in offspring.

The purpose of this study is to determine if maternal substance use is associated with risky sexual behavior (such as multiple sex partners) and early pregnancy in their offspring. We hypothesize the following:

- Hypothesis 1** A teenage mother's substance use while raising her child is associated with early pregnancy and risk markers for early pregnancy in her child.
- Hypothesis 2** The association between maternal substance use and risk for offspring pregnancy is statistically significant in regression models controlling for younger maternal age, lower SES, and other maternal characteristics linked to substance use (such as parenting, hostility, and depression).
- Hypothesis 3** The association between maternal substance use and risk for offspring pregnancy is statistically significant in regression models controlling for child characteristics associated with these outcomes (such as depression, early puberty, early sex, and older sex partners).

Method

Sample Selection and Study Design

Study data were taken from a large birth cohort of teenage mothers and their offspring. Pregnant adolescents were initially recruited from the Magee-Womens Hospital prenatal clinic in Pittsburgh from 1990 to 1994. All adolescents attending the prenatal clinic, who were below 19 years, were eligible for the study. They were seen during their fourth month prenatal visit and at delivery with their newborn infants. Follow-up visits were conducted with mothers and their children when offspring were ages 6 (1995–2000), 10 (2000–2005), and 14 and 16 (2005–2011). The Institutional Review Boards of the Magee-Womens Hospital and the University of Pittsburgh approved all study phases.

The pregnant adolescents were interviewed in private rooms by staff carefully trained in nonjudgmental interviewing techniques who were comfortable discussing alcohol and drug use, trained to use the instruments reliably and accurately identify the drugs used, and assess the amount of use. They were asked about their tobacco, alcohol, marijuana, and other drug use prior to becoming pregnant and during the first trimester. They were seen again 24 to 36 hours after delivery and interviewed about their substance use during the second and third trimesters. At the 6-, 10-, 14-, and 16-year follow-up visits, the mothers were interviewed about their substance use (current and past year) and demographic and psychological status. Medical histories were obtained for both mothers and their offspring. Reports on maternal substance use, growth, and behavioral outcomes of the offspring at birth, 6 years, 10 years, and 14 years have been provided elsewhere (Cornelius, De Genna, Leech, & Willford, 2011; Cornelius, Goldschmidt, Day, & Larkby, 2002; Cornelius, Goldschmidt, De Genna, & Day, 2007; Cornelius, Goldschmidt, De Genna, & Larkby, 2012; Cornelius, Taylor, Geva, & Day, 1995). The present study focuses on the offspring of this study at age 16.

Sample Description

There were 413 live-born singletons assessed at delivery for the study. Research assistants interviewed 334 women and their offspring at the 16-year follow-up phase (80% of the eligible birth cohort). There were 15 refusals, 34 lost to follow-up, 17 had moved out of the state, 7 children had died, and 6 children were adopted or living in an institution. Maternal drinking and SES did not differ significantly between the mothers and children who were seen and not seen at the 16-year follow-up.

The teenage mothers, on average, were 16.3 years old (range = 12–18) at study recruitment: 75% were 16 years or older, and 25% were less than 15 years of age. Sixty-nine percent were Black, 31% were White, and 99% were unmarried at delivery. At the 16-year follow-up, 71% were Black, 29% were White. Average monthly income for the teenage mothers was \$2,344 (range = \$0–\$11,000) and their mean educational level was 12.8 years (range = 7–18). Ninety-two percent of the teenage mothers had completed high school or received a GED, and 73% were not currently married. Seventy-nine percent of the offspring of the teenage mothers were living with their biological mothers at the 16-year follow-up; the remaining 18% were with a custodian. If a child was not living with his or her mother, the current custodian was interviewed.

Measures

Substance Use

Maternal substance use: Prenatal alcohol, marijuana, and tobacco use were measured for each trimester using self-report. Questions were developed to accurately reflect both the pattern and level of use (Day & Robles, 1989). At every assessment, the mothers were interviewed in a private setting by interviewers who were comfortable discussing alcohol and drug use, trained to use the instrument reliably, accurately identify the drugs used, and assess the amount of use. For substance use during pregnancy, calendar landmarks were used to indicate time periods that corresponded with conception, recognition of pregnancy, and each trimester. For this study, first trimester use was considered in the analyses because there was more substance use than in later trimesters, and because previous studies have demonstrated effects of first trimester use on behavior in offspring (Larkby, Goldschmidt, Hanusa, & Day, 2011; Sayal, Heron, Golding, & Emond, 2007).

Quantity and frequency of the usual, maximum, and minimum use of each alcoholic beverage reported by the teenage mother were assessed. The average daily number of alcoholic drinks was calculated from these data. Marijuana, hashish, and sinsemilla use were transformed into average daily joints: a blunt of marijuana was converted to four joints, and a hashish cigarette or bowl was counted as three joints, based on the relative amount of delta-9-THC in each (Gold, 1989). To assess daily cigarette use, the teenage mothers were asked, “How many cigarettes do you smoke on a typical day?” Average daily drinks, joints, and cigarettes were the continuous measures used in our analyses. We also created a dichotomous variable to represent heavy drinking (heavy/ none) during childhood, where heavy was defined as an average of 1.99 alcoholic drinks per day. Maternal substance use was queried during pregnancy and at each follow-up phase (when offspring were 6, 10, 14, and 16 years old).

Child substance use: Children who responded in the affirmative to any of the substance use items asking about cigarette, alcohol, marijuana, and other substances were asked to report the quantity and frequency of use at the age 10 and age 14 follow-up visits. Lifetime cigarette use was defined as more than just a puff; lifetime alcohol use was defined as more than just a sip of alcohol; and lifetime marijuana use was defined as ever having tried marijuana. Three dichotomous (yes/no) variables were created indicating the use of any of these substances before the child's 15th birthday. These early use variables were entered in the models to determine if the effect of maternal substance use on risky sexual behavior and early pregnancy remained statistically significant after controlling for early child substance use.

Outcome Measures: At the latest assessment when offspring were 16 years old, the children were asked additional questions about their sexual and reproductive history. Three items were used in the current analyses to assess risky first sexual intercourse (risky first sex), risky sexual intercourse in the past year (recent risky sex), and early pregnancy.

Nonrisky first sex: Adolescents were asked how they would characterize their first sexual partner. If they were not virgins, the response choices were the following: a boyfriend or girlfriend or romantic partner, a casual partner, or a one-night stand. For these analyses, virgins and those who reported a romantic first sexual partner were grouped together as having a "nonrisky first sex partner," consistent with other studies that consider romantic sexual partners as less risky (e.g., Manlove, Ryan, & Franzetta, 2007; Manning, Longmore, & Giordano, 2000; Scott et al., 2011). Adolescents who reported casual sex partners and one-night stands were grouped as having had "risky first sex partners."

Risky recent sex: Adolescents were asked how many sex partners they had in the past year. Consistent with prior research (Ellickson, McCaffrey, & Klein, 2009; Rodgers & McGuire, 2012; Scott et al., 2011), we used a "two or more sex partners" to represent higher-risk sexual behavior.

Early pregnancy: Adolescents were asked if they had ever been pregnant (girls) or ever gotten anyone pregnant (boys). This dichotomous variable was used in the logistic regression determining risk factors for early teen pregnancy.

Covariates

Demographics: Several demographic variables were included in the multivariate analysis, including race of mother, age of the teenage mother during the index pregnancy, and sex of the adolescent offspring.

Maternal hostility: The State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) was used to assess dispositional (i.e., trait) anger of the mothers. Each 10-item scale was analyzed as a continuous variable. The psychometric properties of the STAI have been demonstrated in a variety of populations (Spielberger et al., 1970).

Child depression: The Children's Depression Inventory (Kovacs, 1992) is a self-report instrument that was adapted from the Beck Depression Inventory and designed to assess

depressive symptoms in children aged 8 to 17 years. The 27 items measure distress and general psychopathology rather than clinical depression. Internal consistency is reported as .86; test–retest reliability is .82 (Kovacs, 1992).

Authoritative parenting: Parenting style was measured at the age 14-year follow-up with the “My Parents” questionnaire. This measure has 27 items measuring three dimensions of parenting: parental acceptance and involvement, autonomy-granting, and strictness-supervision (Steinberg, Lam-born, Dornbusch, & Darling, 1992). Scores from the parental involvement scale ($\alpha = .72$), the autonomy-granting scale ($\alpha = .82$), and the strictness-supervision scale ($\alpha = .76$) were summed to create composite scores. An ordinal authoritative parenting score (range = 0–3, $M = 1.4$, $SD = 0.9$) was generated using the method described by Steinberg et al. (1992).

Early first sexual intercourse: At the age 14, the child was asked, “Have you ever had sexual intercourse?” This dichotomous variable was used as a measure of early first sexual intercourse in the multivariate models predicting multiple sex partners in the past year at age 16 and early teen pregnancy.

Older first sex partner: At age 16, the child was asked to report on the age of their first sex partner. A dichotomous variable for first sex partners who were 2 or more years older than the child’s age at first sexual intercourse was created. This was used as a covariate in the early teen pregnancy regression model.

Statistical Analysis

Bivariate analyses identified significant covariates for the multivariate analyses. Logistic regressions were conducted to determine which variables contributed independently to these three outcomes: nonrisky first sex partner, two or more sex partners in the past year, and early teenage pregnancy. The Cox and Snell R^2 was used to estimate the amount of variance associated with each logistic regression model. Predictors were entered in chronological order, beginning with demographic characteristics and then prenatal substance use. Next, maternal psychological characteristics and substance use during childhood were entered into the equation. Variables from the 14-year follow-up were entered next, including authoritative parenting and child’s own substance use. Child’s early first sexual intercourse and older first sex partner were entered into the last step.

Results

Descriptive Statistics

Teenage Mothers’ Substance Use—Roughly half of the teenage mothers used tobacco throughout the pregnancy, half used alcohol, and one in five used marijuana during the first trimester. On average, alcohol and marijuana use decreased significantly after the first trimester, with less than 10% reporting use of either substance by the third trimester. One in 10 mothers were heavy alcohol users at 10 and 14 years postpartum (Figure 1). Tobacco and marijuana use were more common in this sample than in the general population of American

women: one in five teenage mothers reported using marijuana and half used tobacco at these follow-up periods.

Risky Sex and Pregnancy in Offspring—Nearly one in four (23%) of the adolescents reported a risky sex partner for their first experience with sexual intercourse; 77% were either still virgins or reported that their first time was with a serious romantic partner. Thirty-seven percent reported two or more sex partners in the past year, and 9% reported that they had already either been pregnant (girls) or gotten someone pregnant (boys).

Inferential Statistics

Table 1 summarizes the fit of the final logistic regression on the offspring's risky first sexual partner. This model accounted for 27% of the variance in risky first sex partners in this sample ($\chi^2 = 80.79, p < .0001$). Maternal prenatal tobacco and alcohol use were independent predictors of a risky first sex partner, such as a casual partner or one-night stand. Maternal heavy drinking at the age 10 follow-up was also a risk factor for the child reporting a riskier first sex partner. These effects remained significant in the final model, even after controlling for child's own early substance use.

Table 2 summarizes the fit of the final logistic regression model for the offspring having two or more sex partners in the past year at the age 16 follow-up. The final model accounted for 34% of the variance in multiple recent sex partners in this sample ($\chi^2 = 98.08, p < .0001$). Maternal pre-natal alcohol use remained an independent predictor of two or more sex partners in the final model. Heavy drinking by the teenage mother when her child was 10 years old was a risk factor for the child reporting more recent sex partners when the child was 16 years old. These effects remained significant in the final model, even after controlling for child's own early alcohol use and early sexual debut. Children who were prenatally exposed to alcohol were more likely to have risky sex as teens (risky first sex partner and multiple sex partners in the past year) than those who were not exposed (Figure 2).

Table 3 summarizes the fit of the final logistic regression model on early teenage pregnancy in offspring. The final model accounted for 12% of the variance in early teen pregnancy ($\chi^2 = 35.25, p < .001$). Maternal heavy alcohol use at the age 14 follow-up independently predicted early teenage pregnancy (by age 16) in the final model. Figure 3 depicts the likelihood of an early teenage pregnancy as a function of maternal heavy drinking. Children whose mothers were heavy drinkers at age 14 were more than three times more likely to experience a pregnancy by age 16.

Discussion

This is the first study to examine the effects of maternal substance use on the intergenerational risk for teenage pregnancy. The findings supported our hypotheses that maternal substance use may place some vulnerable offspring of teenage mothers at greater risk of early teenage pregnancy. Of the three common substances, maternal alcohol use emerged as a risk marker for early teenage pregnancy in offspring. Heavy maternal drinking during childhood was associated with riskier first sex partners, multiple sex partners in the

past year, and pregnancy by age 16 in offspring. This effect was independent of the maternal and child characteristics that were assessed in the present study and have been linked to adolescent teenage pregnancy and risky behavior. These findings are consistent with other studies reporting a link between maternal health-risk behaviors and health-risk behaviors in adolescent offspring (Garnier & Stein, 2002; Kandel & Wu, 1995; Wickrama et al., 1999).

Maternal alcohol use during the first trimester was also positively associated with risky sex in offspring, even after controlling for heavy maternal postnatal alcohol use and the child's own early substance use. Exposure to prenatal cigarette smoking was also associated with having a risky first sex partner. Prenatal exposure to legal substances such as tobacco and alcohol has been linked to other behavior problems in offspring during adolescence, such as substance use (Cornelius, Leech, Goldschmidt, & Day, 2005; Menezes, Hallal, & Horta, 2007; Miles & Weden, 2012), delinquency (Larkby et al., 2011), and conduct disorder (Disney, Iacono, McGue, Tully, & Legrand, 2008). Thus, it is important for studies examining correlates of maternal substance use to also consider the potential role of gestational exposure.

Gestational alcohol exposure has been implicated in central nervous system dysfunctions that are expressed as having poor social judgment, trouble learning from experience, failure to consider consequences of behaviors (Carmichael, Sampson, Barr, Streissguth, & Bookstein, 1998; Streissguth et al., 1991), and lower moral maturity and increased delinquency among exposed offspring (Schonfeld, Mattson, & Riley, 2005). Similarly, prenatal cigarette smoking has consistently been associated with neurobehavioral deficits in exposed offspring, expressed as dysregulatory behaviors such as aggression, conduct problems, and impulsivity (Cornelius & Day, 2009). Consequently, it is possible that the underlying mechanism between gestational alcohol and cigarette smoke exposure and risky sexual behavior is through the central nervous system pathway.

The results of previous intergenerational studies of maternal substance use suggest several possible pathways or mediators linking maternal substance use and risky behavior in adolescent offspring. For example, Garnier and Stein (2002) report that maternal drug use when children were 6 years old predicted greater drug use in peers when the children were 18 years old. Concurrent peer drug use was the best predictor of drug use in offspring at age 18. A large Australian twin study found evidence for transmission of a genetic liability for externalizing behavior problems in offspring of alcoholic parents (Waldron, Martin, & Heath, 2009). Other studies suggest that there may be different pathways from parental substance use to risky behavior in boys and girls (Kandel & Wu, 1995; Wickrama et al., 1999).

In the current study, boys were more likely to report risky first sex partners and two or more sex partners in the past year than girls, consistent with data from national U.S. samples (Meier & Allen, 2000; Nkansah-Amankra, Diedhiou, Agbanu, Harrod, & Dhawan, 2011). Girls were more likely than boys to report that they had experienced pregnancy. This finding may reflect a measurement artifact if boys were unaware of any pregnancies experienced by their former sex partners. In the literature on the children of teenage mothers, sons and daughters are equally likely to become teenage parents. However, sons appear to be more

vulnerable to a wider variety of negative outcomes than do daughters (Furstenberg, 2003, 2007; Grogger, 1997; Pogarsky et al., 2006). Additionally, gender may moderate the effects of parenting and other risk and protective factors (e.g., Kincaid, Jones, Sterrett, & McKee, 2012).

In terms of childhood risk factors, higher childhood depression scores were associated with a riskier first sex partner. In the Add Health study, in contrast, higher previous depressive symptoms did not predict earlier sex—but early sex did predict future depressive symptoms (Jamieson & Wade, 2011). Greater levels of maternal hostility during childhood in this study were associated with child's reporting two or more recent sex partners, above and beyond the contribution of exposure to prenatal alcohol and the child's own substance use. As reported by other researchers, the results of the present study confirm that a child's early substance use and early sexual debut is associated with risky sexual intercourse and early pregnancy.

Implications for Practitioners

These results have several implications for health care practitioners and community providers who come into contact with teenage mothers and their families. At prenatal visits, more support and information could be provided to teenage mothers who appear to be using tobacco and alcohol during their pregnancy, or who report abusing alcohol prior to discovering their pregnancy. These young mothers should be provided with the resources to quit and stay quit, including social support and mental health assessment to address problems that may contribute to substance use in adolescents and pregnant women. Pediatricians can also be aware of the associations between maternal alcohol use, maternal and child mental health problems, and risky behavior in offspring, and address issues with both mother and child.

Limitations

There were several limitations that suggest caution in the interpretation of results. All the measures of substance use and sexual behavior were self-report. Biological measures of substance use also have disadvantages, measuring use for only a short window of time. In contrast, questionnaire data can elicit patterns of substance use over time. Another limitation of the study is the use of variables such as nonromantic first sex partner and multiple sex partners as a proxy for risky sex. Future work should concentrate on contraceptive use, because there is some evidence that individuals in romantic partnerships are less likely to consistently use contraception than individuals with new or casual sex partners (Cooper, Agocha, & Powers, 1999; Hock-Long et al., 2013; Santelli et al., 1996). However, adolescent relationships are qualitatively different than adult relationships and the results of longitudinal analyses on the National Longitudinal Study of Adolescent Health support the use of these proxy variables in adolescents. For example, Scott et al. (2011) report that having a nonromantic sex partner during adolescence is associated with more sex partners in the past year during young adulthood. Similarly, Manlove et al. (2007) found that adolescents who have more romantic relationships are more likely to consistently use contraception.

We included a broad selection of maternal and child factors in the regression models. Nevertheless, it is possible that our findings could be explained by unmeasured factors such as parental, peer, or sibling attitudes toward sex or adolescent knowledge about risky sex consequences (Shneyderman & Schwartz, 2012). Another limitation of this study is that we did not consider the contribution of paternal substance use, although there is evidence that maternal substance use is a better predictor of child risky behavior than paternal substance use (e.g., Kandel & Wu, 1995). Future work should also consider the role of kinship support, peer influences, and contraceptive use in the offspring. Finally, the results of this study may not generalize to families headed by teenage mothers with different demographic profiles (i.e., rural families, families headed by Latina mothers, and other Black or White teen mothers from different parts of the country).

Conclusions

We were able to evaluate the associations among maternal substance use, risky sex in offspring, and early teenage pregnancy in this unique birth cohort. Specifically, maternal drinking (pre- and postpartum) was a significant and consistent correlate of offspring sexual behavior, even after controlling for many other variables in multivariate regression models. Although we included many covariates that may also help explain the association between maternal drinking and child risky sex, there were some domains that we did not assess (e.g., contraceptive use; parental, peer, sibling, and child attitudes about sex). Future research could use computer assisted interviewing and Timeline Followback techniques to enhance the quality and quantity of self-report data. Nonetheless, the current findings provide a key and easily determined risk marker and point for intervention to determine which at-risk children are most vulnerable, and therefore most likely to perpetuate the cycle of disadvantage across generations. Our results make a strong case for identifying and counseling mothers who were pregnant as teenagers about the potential negative role of their continued substance use during the childrearing years.

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Figure 1.
Percentage of teenage mothers engaging in tobacco use, heavy alcohol use, and marijuana use.

Figure 2.
Risky sex during adolescence as a function of prenatal exposure to alcohol.

Figure 3.
Early teenage pregnancy as a function of maternal heavy drinking in childhood.

Table 1Final Step of Logistic Regression Model Predicting Nonrisky First Sex Partner ($n = 254$).

Predictors	Beta	SE	Wald	Exp(B)	Confidence intervals
Race of mother (White)	-2.05	0.70	8.64**	7.78	1.98–30.53
Age of mother at pregnancy	-0.28	0.16	3.16	1.33	0.97–1.81
Sex of adolescent (Male)	-1.38	0.41	11.23**	0.25	0.11–0.56
Prenatal tobacco—first trimester	0.08	0.04	5.48*	0.92	0.86–0.99
Prenatal alcohol—first trimester	0.54	0.18	9.04**	0.58	0.41–0.83
Prenatal marijuana—first trimester	-0.18	0.21	0.77	1.20	0.80–1.80
Maternal hostility (6-year phase)	0.06	0.04	2.08	0.94	0.86–1.02
Child depressive scores (10-year phase)	-0.06	0.03	5.12*	1.06	1.01–1.12
Maternal marijuana use (10-year phase)	0.13	0.13	0.95	0.33	0.68–1.14
Maternal heavy drinking (10-year phase)	1.10	0.56	3.83*	0.34	0.11–1.00
Authoritative parenting (14-year phase)	0.11	0.24	0.22	0.89	0.56–1.43
Child early tobacco user	0.44	0.53	0.68	0.64	0.23–1.83
Child early alcohol user	0.75	0.60	1.56	0.47	0.15–1.53
Child early marijuana user	1.68	0.52	10.26**	0.19	0.07–0.52

*
 $p < .05$.**
 $p < .01$.

Table 2
Final Step of Logistic Regression Model Predicting 2+ Sex Partners in Past Year ($n = 236$).

Predictors	Beta	SE	Wald	Exp(B)	Confidence intervals
Race of mother (White)	-0.74	0.50	2.22	0.48	0.18–1.26
Age of mother at pregnancy	-0.29	0.16	3.37	0.75	0.56–1.02
Sex of adolescent (Male)	1.09	0.37	8.53**	2.96	1.43–6.13
Prenatal tobacco—first trimester	0.01	0.03	0.04	1.01	0.95–1.07
Prenatal alcohol—first trimester	0.43	0.18	5.74*	1.53	1.08–2.17
Prenatal marijuana—first trimester	0.21	0.32	0.44	1.24	0.66–2.31
Maternal hostility (6-year phase)	0.12	0.04	10.86**	1.13	1.05–1.22
Child depressive scores (10-year phase)	-0.04	0.02	2.76	0.96	0.92–1.01
Maternal marijuana use (10-year phase)	0.01	0.14	0.01	1.01	0.78–1.32
Maternal heavy drinking (10-year phase)	1.14	0.61	3.46	3.13	0.94–10.38
Authoritative parenting (14-year phase)	0.27	0.21	1.64	1.31	0.87–1.99
Child early tobacco user	1.15	0.47	5.96*	3.16	1.25–7.94
Child early alcohol user	1.21	0.57	4.57*	3.36	1.11–10.23
Child early marijuana user	0.86	0.53	2.64	2.37	0.84–6.70
Child early sexual intercourse	1.66	0.51	10.54**	5.25	1.93–14.29

*
 $p < .05$.

**
 $p < .01$.

Table 3Final Step of Logistic Regression Model Predicting Early Teenage Pregnancy ($n = 247$).

Predictors	Beta	SE	Wald	Exp(B)	Confidence intervals
Race of mother (White)	-0.39	0.74	0.27	0.68	0.16-2.89
Age of mother at pregnancy	-0.18	0.26	0.47	0.84	0.51-1.39
Sex of adolescent (Male)	-1.80	0.71	6.56**	0.17	0.04-0.66
Prenatal tobacco—first trimester	0.02	0.04	0.18	1.02	0.94-1.10
Prenatal alcohol—first trimester	0.08	0.31	0.06	1.08	0.58-2.00
Prenatal marijuana—first trimester	-0.00	0.34	0.00	1.00	0.51-1.95
Maternal marijuana use (10-year phase)	-2.64	1.68	2.48	0.07	0.01-1.91
Maternal heavy drinking (14-year phase)	1.75	0.72	5.99*	5.75	1.42-23.32
Child early tobacco user	1.54	0.69	5.02*	4.68	1.21-18.07
Child early alcohol user	-0.44	0.82	0.29	0.65	0.13-3.22
Child early marijuana user	-0.45	0.81	0.31	0.58	0.13-3.14
Child early sexual intercourse	0.46	0.77	0.36	1.59	0.35-7.14
Child's first sex partner 2+ years older	1.91	0.61	9.75**	6.74	2.04-22.31

* $p < .05$.** $p < .01$.