High School Dropouts and Sexually Transmitted Infections

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Abstract

People who drop out of high school fare worse in many aspects of life. We analyze whether there is an effect of dropping out of high school on the probability of contracting a sexually transmitted infection (STI). Previous studies on the relationship between dropout status and sexual outcomes have not empirically addressed unobserved heterogeneity at the individual level. Using fixed effects estimators we find strong evidence that dropping out increases the risk of contracting an STI for females. Furthermore, we present evidence that illustrates differences between the romantic partners of dropouts versus enrolled students. These differences suggest that female dropouts may be more susceptible to contracting STIs because they partner with significantly different types of people than non-dropouts. Our results point to a previously undocumented benefit of encouraging those at risk of dropping out to stay in school longer.

Keywords: Education; High school dropouts; Risky behavior; Sexually transmitted infections; Add Health

JEL Classification: I10; I20; J13

I. Introduction

People who drop out of high school do substantially worse compared to those who graduate. Dropouts earn less (Oreopoulos 2006), report lower levels of happiness (Oreopoulos 2007), commit more crimes (Lochner and Moretti 2004; Anderson forthcoming), and suffer from poorer health (Lleras-Muney 2005; van Kippersluis et al. 2011; Kemptner et al. 2011). Although the research on the consequences of dropping out is substantial, significantly less attention has been paid to the relationship between dropout status and sexual behavior. We fill this gap in the literature by examining the impact of dropping out of high school on the likelihood of contracting a sexually transmitted infection (STI).

From a policy and social perspective, it is crucial to understand the determinants of STIs because of their health and economic consequences (Eng and Butler 1997; Weinstock et al. 2004). Certain STIs can lead to cancer, infertility, or even death. Treating STIs and their complications places a substantial stress on health expenditures; the costs of STIs have been estimated at $17 billion per year (Eng and Butler 1997). A focus on young people is vital because nearly half of STIs contracted occur among individuals who are 15 to 24 years old (Weinstock et al. 2004), and teens and young adults account for nearly 30 percent of new HIV infections annually (Hall et al. 2008).

Although several studies have focused on the relationship between leaving high school early and sexual outcomes, this paper is the first to examine the effect of dropping out on the risk of STI contraction. Prior research has found that high school dropouts are more likely to lose their virginity earlier (Brewster et al. 1998), become pregnant (Manlove 1998), and give birth (Manlove et al. 2000), and are less likely to use contraception (Darroch et al. 1999). Although these studies contribute to the discussion on the consequences of dropping out, none have

empirically addressed the fact that the dropout decision is endogenously determined.[1] Our research improves upon this literature by controlling for unobserved heterogeneity at the individual level.

In addition, much of the research on the relationship between dropping out and risky behaviors has focused on issues that are relevant primarily for one gender. For example, teenage pregnancies have a much greater impact on females and males are more likely to engage in criminal activities. In fact, there is little research on the relationship between dropping out and risky behavior where the outcome of interest affects both males and females at similar rates. Focusing on STIs allows us to analyze the impact of dropping out for both sexes and to also observe potential short run effects of dropping out. Most other adverse health outcomes do not manifest until the person is much older.

To estimate the relationship between high school dropout status and the risk of contracting an STI, we employ data from the National Longitudinal Study of Adolescent Health (Add Health). Longitudinal data allow us to use a fixed effects approach to account for important sources of unobserved heterogeneity. We include individual fixed effects to control for characteristics such as individual tastes and preferences, household poverty, and parenting style that may not only predict an individual's dropout status but may also determine his or her decision to engage in risky sexual behaviors. This approach also accounts for the possibility that adolescents who grow up in disadvantaged neighborhoods may be simultaneously more likely to drop out of high school and engage in risky sex. As a result, our estimates are less likely to be biased due to sources of unobserved heterogeneity that have plagued previous studies on education and sexual behavior. Another advantage of the Add Health is the data contain

[1] The lone exception appears to be Black et al. (2008). These authors exploited variation in compulsory schooling laws to estimate the relationship between education and teenage births.

information on the characteristics of individuals. Previous studies within economics have relied on aggregated STI data, despite the fact that the choice to engage in risky sex is made at the individual level.[2]

When not controlling for unobserved individual characteristics, our results suggest that both male and female dropouts have substantially higher STI rates than those who stay in school. When we control for unobserved heterogeneity at the individual level, we still find strong evidence that dropping out increases the risk of contracting an STI for females, but not for males. A complementary analysis suggests that female dropouts face a higher STI risk because of their post-dropout choice of sexual partners. Our results illustrate that females who drop out match with significantly older partners and we find some evidence that these partners are more likely to be physically and verbally abusive.

II. Theoretical Framework

How might dropping out of high school influence an adolescent's risky sexual behavior? More specifically, what are the important mechanisms that underlie the relationship between dropping out and risky sex?

First, dropping out may impede human capital accumulation and thereby lower expected income and reduce the opportunity cost of risky behaviors, such as unprotected sex. Contraction of an STI may therefore be less costly for individuals with fewer years of schooling. While some STIs are easily treated, others have debilitating effects that can seriously impact labor market opportunities. Additionally, youth may learn important values in school that alter their tastes for engaging in risky sex (Arrow 1997).

[2] Klick and Stratmann (2003, 2008) and Girma and Paton (2011) estimated the effects of easier abortion access and emergency birth control on STI rates among young people. Chesson et al. (2000), Carpenter (2005), and Cook and Clark (2005) estimated the effects of alcohol policies on STI rates.

Second, school may have an incapacitation effect; school attendance leaves less time and opportunity for potentially detrimental activities (Jacob and Lefgren 2003; Luallen 2006; Black et al. 2008; Anderson forthcoming). As a result, we may expect the frequency of sexual intercourse to be higher for youths who face less stringent time constraints. Adolescents are also more likely to be monitored in school as opposed to elsewhere. Previous research has demonstrated that the incapacitation effects of school decrease the probability of adolescent motherhood (Berthelon and Kruger 2011).

Lastly, dropping out may change the make-up of one's social circle and thereby affect behavioral outcomes. No longer being around high school students alters the pool of available sexual partners, and the new pool of partners may be more likely to include older individuals and persons with less desirable characteristics. This may be particularly detrimental for young females as the relative age of their sexual partners has been found to be positively associated with nonvoluntary intercourse (Kaiser Family Foundation 2011). A growing literature suggests that exposure to negative peer effects is vitally important to the health outcomes of adolescents (Gaviria and Raphael 2001; Kawaguchi 2004; Lundborg 2006).

Although we are able to provide suggestive evidence as to which underlying factors are important, we cannot pin down the exact mechanism(s) through which dropping out influences sexual behavior. We are, however, able to address to what extent the probability of STI contraction is due to (unobservable) individual characteristics.[3] Dropouts may have intrinsic characteristics that simultaneously make them more likely to drop out and engage in risky sex. If

[3] Because of the problems associated with identifying causal effects, the literature has focused on understanding the impacts of policies designed to affect the likelihood of dropping out. Researchers have, for example, studied the effects of compulsory schooling laws (Lochner and Moretti 2004; Lleras-Muney 2005; Oreopoulos 2007; Black et al. 2008; Anderson forthcoming). Policy experiments, however, do not necessarily reveal the relative importance of individual-level factors that influence future outcomes.

this is the case, dropping out serves as a marker for (potentially unobservable) characteristics, such as lower intellectual ability, a higher discount rate, or inferior social skills.

If individual characteristics are truly intrinsic and do not change with more schooling, individuals who are likely to drop out because of those characteristics will do poorly even if forced to finish high school. Addressing the importance of these individual characteristics can provide an indication of how much we might expect policies aimed at reducing dropout rates to affect risky sexual behavior and, more generally, enhance future outcomes (Eckstein and Wolpin 1999). If, instead, human capital, incapacitation, and/or peer effects are important, then policies that successfully lower the probability of dropping out will have positive social effects.

III. Data

The data used in this paper come from the National Longitudinal Study of Adolescent Health (Add Health). The Add Health is a nationally representative sample of adolescents in the United States who were in grades 7 through 12 during the 1994-95 school year. Data collection started with the identification of over 26,000 schools that included an 11^{th} grade and enrolled more than 30 students. From this sample frame, 80 high schools were selected to ensure representation of schools with respect to region of country, urbanicity, size, type, and ethnicity. Participating high schools were asked to identify feeder schools that included a 7^{th} grade and sent at least five graduates to that high school. Feeder schools chosen to participate in the study were selected with probability proportional to the number of students it contributed to the high school. After including feeders, the total number of participating schools was 132.

In wave I, data were collected from adolescents, their parents, siblings, friends, relationship partners, fellow students, and school administrators. The Add Health cohort has

been followed with three subsequent in-home surveys in 1996, 2000-2001, and 2007-2008. The data includes information on respondents' social, economic, psychological, and health status. In addition to individual-level information, the Add Health also contains contextual data on the family, neighborhood, school, and adolescents' peer networks (Udry 2003).

We use data from the in-home surveys from waves I and II because they contain information on self-reported sexual behaviors. By wave II, a substantial number of students reported having dropped out of school. We therefore use wave II for the cross-sectional analysis and incorporate wave I when exploiting the panel nature of the data. Waves III and IV were fielded when respondents were adults and are therefore not used.

We limit the sample to those aged 15 to 19 at the time of wave I. The lower limit is set at age 15 because some of the variables used in this analysis were constructed from questions that were only asked to respondents who were at least 15 years old. The upper age limit is 19 because individuals older than this were more likely to have been in high school at wave I for atypical reasons. To ensure our comparison group consists of enrolled students we exclude individuals from the sample who were out of school for reasons other than having dropped out. These reasons include the following: pregnancy, expulsion, sick, on leave, graduated, and "other." We also exclude individuals who reported having dropped out for only part of the school year. This restriction addresses some concerns about reverse causality in that it lowers the likelihood an individual was diagnosed with an STI before dropping out. Lastly, we exclude individuals who reported having been married at any time during wave I or II or who had missing information on their age, race, ethnicity, or place of birth. Based on our sample selection decisions, 398 females and 362 males who were in the 15 to 19 year age range were

dropped from the sample.[4] The final sample sizes are 4222 males and 4207 females, who we observe in both waves.

IV. Estimation strategy

Ordinary least squares

To model the effect of dropping out, this paper begins by estimating the following equation using data from wave II:

$$STI_i = \alpha + \beta_1 Dropout_i + \boldsymbol{X_i\beta_2} + c_i + \varepsilon_i, \qquad (1)$$

where *i* indexes the individual respondent.

In equation (1), *STI* refers to whether the respondent has been diagnosed with an STI between waves I and II. There was approximately one year between the two survey waves. Respondents were asked to report if they had been told by a doctor or nurse that they had any of the following STIs: chlamydia, syphilis, gonorrhea, HIV/AIDS, genital herpes, genital warts, trichomoniasis, and hepatitis B. Females were also asked if they had been diagnosed with bacterial vaginosis or non-gonococcal vaginitis.

The variable *Dropout* is a binary indicator equal to one if the individual has dropped out of high school and zero otherwise. The coefficient of interest, β_1, measures the effect of dropping out on sexual behavior. Each adolescent was asked if he/she was currently attending

[4] We compared respondent characteristics from our estimation sample with characteristics from the sample of all youths in the 15 to 19 year age range. There was little evidence to suggest that bias due to sample selection would be an issue.

school.[5] If the respondent was not attending school, the interviewer asked a follow-up question as to why the respondent was not in school. An available choice was that the individual had "dropped out." In our sample, approximately 1.6 and 3 percent of male and female high school students, respectively, reported having been diagnosed with an STI between waves I and II. In contrast, 8.1 and 14 percent of male and female dropouts, respectively, reported having been diagnosed with an STI during the same period. The problem with simple means, however, is that dropouts are potentially different from non-dropouts along dimensions other than sexual behavior.

The vector $\boldsymbol{X}$ contains the personal and family characteristics described in Table 1, whereas the variables c and ε represent unobserved individual effects and an error term, respectively. The Add Health data allow us to control for a rich set of covariates that may be associated with dropout status and sexual behavior. Table 1 describes these variables and provides descriptive statistics. The explanatory variables are grouped into three categories. The first group includes standard individual characteristics on age, ethnicity, race, and whether the respondent was born in the United States.

The second group of variables includes family attributes that are likely to be important for both the dropout decision and the decision to engage in sexual activity. These measures include whether the family moved between survey waves, whether the respondent was an only child, rates of church attendance and religious denomination, parental education and income indicators, whether the respondent's mother received public assistance (e.g. welfare),[6] whether

[5] If the respondent was interviewed in the summer, the question was worded in a retrospective manner. In this case, the respondent was able to identify if he/she had dropped out for the entire previous school year or only part of the year.

[6] Previous studies using state-level data have shown that welfare payments are positively related to rates of fertility, illegitimacy, and STIs (Ozawa 1989; Matthews et al. 1997; Clarke and Strauss 1998; Garfinkel et al. 2003; Ressler et al. 2006). While this research uniformly supports the hypothesis that higher welfare payments reduce the costs of

the respondent's biological father was living in the household at the time of the wave I interview, and whether the respondent's mother strongly disapproved of her child having sex.

The third group of variables is comprised of additional individual-level characteristics. Here, we include the respondent's score on the Add Health Picture and Vocabulary Test to serve as a proxy for cognitive ability. Variables for college aspirations and life expectancy are also included because they may reflect levels of future orientation. Lastly, we control for impulsive behavior by considering a measure for whether the respondent generally goes with his/her "gut feeling" and does not think about consequences before making a decision.

Equation (1) is estimated with ordinary least squares (OLS) for ease of interpretation and standard errors are corrected for clustering at the school level.[7] Correcting the standard errors for clustering at the school level is conservative because it takes into account any dependence of errors within schools. All regressions use the sample weights provided by Add Health.

If dropping out of high school was an exogenous process, then simple OLS regressions would yield consistent estimates of the influence of dropping out on the probability of STI contraction. Clearly, the assumption of exogeneity is unrealistic. Two possible sources of endogeneity exist when estimating equation (1). First, there may be unobserved factors in the error term that are correlated with dropout status and sexual behavior. For example, an adolescent that discounts the future heavily may choose not to invest in education while concurrently caring little about the potential consequences of risky sexual behavior.

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nonmarital fertility and risky sex, there is significant variation regarding the size of the effect. Horvath-Rose et al. (2008) found evidence suggesting that welfare reform policies are endogenous to state-level nonmarital birth rates. There is less evidence from individual-level studies that welfare policies have had detectable effects on sexual behavior. Ribar (1994) found little evidence that monthly state AFDC benefits influenced the likelihood a female gave birth before the age of 20. Lundberg and Plotnick (1995) showed that higher welfare benefits increased rates of premarital childbearing for white females but not for blacks.

[7] Estimating equation (1) with a probit model to explicitly account for the dichotomous nature of the dependent variable yielded qualitatively similar results to the OLS estimates. These results are available from the authors on request.

Alternatively, one can imagine how home or school environments might simultaneously increase the likelihood a youth drops out and engages in sexual activity. Second, structural endogeneity in the form of reverse causality is a concern. Students who engage in risky sex and incur the costs associated with their actions may be more likely to leave school than their classmates who abstain from such behaviors.

We take several approaches to control for endogeneity. First, we include in our models a rich set of covariates designed to capture important personal characteristics and to account for home and family environment. We compare models with and without these variables to gauge the extent to which the relationship between dropping out and STI contraction is influenced by contextual and background factors. Second, we employ fixed effects models to eliminate time-invariant unobserved heterogeneity. Lastly, we consider the robustness of our results to alternative sample selection decisions and discuss the issue of reverse causality.

Individual fixed effects

While the Add Health data allow us to control for a rich set of characteristics, our results may still be biased due to family- or individual-level heterogeneity. Adolescents from poor family environments with parents who place less value on education may be more prone to engage in risky behaviors. Individuals with high rates of time preference, low expectations of positive future outcomes, or a lack of motivation for academic pursuits may also be more likely to engage in risky behaviors. In addition, systematic differences in the ability to recognize STI symptoms or tendency to seek medical diagnosis may exist. To account for these sources of bias, we use Add Health data from waves I and II and employ an individual fixed effects method that amounts to estimating the following equation:

$$STI_{it} = \alpha + \beta_1 Dropout_{it} + \boldsymbol{X_{it}\beta_2} + \lambda_i + \varepsilon_{it}. \qquad (2)$$

Equation (2) is the preferred specification because it focuses on the changes in STI status that occur between waves I and II, the period we observe individuals dropping out. Because Add Health respondents are observed in multiple survey waves, we are able to include individual fixed effects, λ_i, on the right-hand-side of equation (2). In other words, equation (2) estimates the impact of dropping out after controlling for time-invariant individual-specific characteristics that are correlated with dropping out of high school and the contraction of an STI. As above, these regressions are weighted by the sample weights provided by Add Health and standard errors are corrected for clustering at the school level.

It is important to note that this fixed effects strategy does not purge our estimates of bias due to unobserved time-variant heterogeneity. Because waves I and II were only one year apart, it is likely that most unobserved characteristics correlated with STI and dropout status are constant over this period. Despite this, we consider the issue of time-varying omitted variables in the robustness and falsification checks below. Another identifying assumption of equation (2) is that the contraction of an STI does not induce an individual to drop out of high school. This issue is also discussed below.[8]

Lastly, it is important to highlight a limitation to the estimation of equation (2). The dependent variable captures whether the respondent had been diagnosed with at least one STI

[8] An instrumental variables strategy could, in principle, be used to control for reverse causality and unobserved time-varying heterogeneity. This approach was attempted. However, given the Add Health data, identifying a valid set of instruments was difficult. Following other research (Campolieti et al. 2010), we used county and local unemployment rates as instruments, but these variables performed poorly in predicting dropout status in the first stage. We also considered county- and local-level industry composition rates, government expenditures on education, labor force participation rates by age, proportions of the population with high school diplomas, and lagged school-level dropout rates. None of these variables predicted adolescent dropout status sufficiently enough to avoid the problems common to weak instruments (Bound et al. 1995; Staiger and Stock 1997).

before the beginning of the wave I survey and whether the respondent had been diagnosed with at least one STI *between* waves I and II. Hence, our definition of the variable *STI* means that it is possible to be counted as infected in period 1 and not in period 2. Ideally, in a fixed effects analysis, the time period covered by the question of interest would be the same. Fortunately, in our case, this discrepancy would cause our estimates to be biased downward. We experimented with excluding individuals from the sample who were infected in the first period but not the second. Under this construction, the time period covered in both waves is implicitly the same. The estimates from this alternative specification were generally larger in magnitude and measured with more precision, providing further support for the conclusions we reach below. These results are available from the authors upon request.

V. Results

OLS results

Table 2 presents the baseline OLS estimates for males and females from wave II. Each cell represents a separate regression and only the coefficient estimate on the variable of interest, *Dropout*, is reported. The full results are shown in Appendix Table 1. To inspect the extent to which background characteristics explain the association between dropout and STI status, we examine increasingly rich specifications.

Columns (1) and (2) show models controlling only for the baseline covariates listed in Table 1. These estimates illustrate a positive and statistically significant relationship between dropout and STI status. Males and females who drop out of high school are 6.3 and 14.6 percentage points more likely to report having been diagnosed with an STI, respectively. The

estimate for males is statistically significant at the 0.05 level, while the estimate for females is statistically significant at the 0.01 level.

A similar pattern of results emerges in columns (3) through (6) when the family-level and additional individual-level covariates are included on the right-hand side of the estimating equation. In these specifications, the coefficient estimates remain positive in sign, large in magnitude, and statistically significant.

Individual fixed effects results

Table 3 shows the fixed effects results based on the estimation of equation (2) using the data from waves I and II of the Add Health. We present estimates from models with and without a set of time-varying controls. For males, dropping out of high school is associated with an increase in the likelihood of STI contraction by 1.9 to 2.3 percentage points. However, these estimates are nowhere near statistically significant. For females, dropping out of high school is associated with an increase in the likelihood of STI contraction by 9.5 to 9.8 percentage points, and these estimates are statistically significant at the 0.10 level. The results from Table 3 are intuitive because we expect unobserved heterogeneity to bias the OLS estimates upward. Because contracting an STI requires having had sex, we also considered models where virgins were excluded from the analysis. The results changed little under this specification.

Robustness of individual fixed effects

In Table 4 we analyze the robustness of the individual fixed effects results. The preferred estimates from Table 3 are shown in the first row for reference.

In the second and third rows, we consider alternative sample restrictions based on age and grade. When no age restrictions are made, the results change little from the preferred estimates. When we restrict the sample to individuals 15 to 18 years of age and who are enrolled

in grades 9 through 12 at the time of wave I, we again see little change in the estimates. For females, dropping out is associated with a 9.7 percentage point increase in the likelihood of STI contraction, but this estimate is not statistically significant at conventional levels (p-value = 0.118).

In the fourth row, we exclude those who are infected with HIV/AIDS from the sample. This is done primarily to address concerns regarding reverse causality. Though evidence suggests that increases in sexual activity can have adverse impacts on academic performance (Sabia 2007; Sabia and Rees 2009; Sabia and Rees 2011; Sabia and Rees 2012), we believe it is unlikely that being diagnosed with a less serious STI would cause a youth to leave school entirely. Of the individuals in wave II of the Add Health who tested positive for an STI, roughly 65 percent were diagnosed with an STI that is curable with antibiotics. Roughly 20 percent tested positive for herpes or genital warts. While not curable, herpes and warts are treatable and can be managed effectively. Dropping out of high school may be a more likely outcome for an individual who has contracted an STI such as HIV. We cannot, however, entirely rule out this source of endogeneity as a potential concern because the data do not allow us to precisely sort out the timing of events. When we exclude those from the sample who were infected with HIV/AIDS, the result for females remains large in magnitude and implies that dropping out is associated with a 7.9 percentage point increase in the likelihood of STI contraction, but this estimate is not statistically significant at conventional levels (p-value = 0.121).

In the fifth row, we alter the baseline sample by including those individuals who had dropped out for only part of the school year as opposed to the entire year.[9] For females, the

[9] As stated above, these individuals were omitted from the sample for the baseline specification.

coefficient estimate remains positive and relatively large in magnitude, but is measured with less precision than our preferred estimate.

In the sixth row, we exclude individuals who were dropouts at the time of the wave I interview. This restriction ensures that individuals are the same with respect to dropout status at baseline. An identifying assumption of the individual fixed effects model is that those who drop out and those who stay continuously enrolled share common unobserved time trends. This assumption may be violated if the effects of dropping out are cumulative. Under this specification, dropping out is associated with a 9.1 percentage point increase in the likelihood of STI contraction for females, but this estimate is not statistically significant at conventional levels (p-value = 0.110).

Finally, we estimate equation (2) conditional on the respondents having had sexual intercourse. Because STI contraction requires sexual activity, limiting the sample to those who report having had sex may be more appropriate than considering the sample in its entirety. It is important to note, however, that many of the STIs we study can be transmitted through means other than vaginal sex (e.g. oral sex). When making this restriction, the result for females is again similar to our preferred estimate, but is measured with less precision.[10]

While many of the results for females in Table 4 are measured less precisely than our preferred estimate, all are positive in sign and large in magnitude. Overall, these results provide supporting evidence that females who drop out are at a heightened risk for contracting an STI. The Table 4 estimates for males are, with one exception, positive but are small in magnitude and nowhere near statistically significant.

Dropping out and other risky behaviors

[10] We also considered a robustness check where we constructed the counterfactual based on a propensity score matching technique. Our results were robust to this alternative method, but were omitted for the sake of brevity. These estimates are available from the authors upon request.

The identifying assumption underlying our individual fixed effects procedure is that $E(\varepsilon_{(t+1)} - \varepsilon_t \mid Dropout_{(t+1)} - Dropout_t) = 0$. This assumption is violated if there are time-varying unobservable characteristics that are correlated with dropout status and the likelihood of STI contraction. As mentioned above, because waves I and II were conducted only one year apart, it is likely that most unobserved personal characteristics that are correlated with sexual behavior and dropout status are relatively constant over this period. In Table 3, we observed that the results were robust to the inclusion of a set of time-varying controls. The possibility remains, however, that the association between dropping out and STI contraction is explained by an overall change in recklessness.

To address this issue further, we present results from fixed effects models on the relationship between dropout status and other risky behaviors in Table 5. In particular, we consider the following binary outcomes: cigarette use in the past month, alcohol use in the past year, heavy alcohol use in the past year, drug use in the past month, and whether the respondent had a regrettable sexual encounter that was due to alcohol in the past year. Not surprisingly, estimates from OLS models show positive and often statistically significant relationships between dropout status and the risky behaviors listed above.[11] When controlling for individual-level unobserved heterogeneity, only heavy alcohol use by males and cigarette use by females share a positive and statistically significant relationship with dropout status. In fact, the majority of the estimates in Table 5 are negative. Of particular interest are the negative and statistically insignificant results for regrettable sexual encounters. If our relationship of interest is explained by an overall change in recklessness, then we would expect this outcome to be particularly sensitive to dropping out. Overall, the results in Table 5 suggest that we are measuring the true

[11] These results are available from the authors upon request.

impact of dropping out on STI contraction, and not observing a positive association that is explained by a general change in behavior.[12]

Potential mechanisms

Our results show that female dropouts are more likely to contract STIs, even after controlling for unobservable individual characteristics, whereas there is little evidence of an effect for males. In this section, we consider several possible mechanisms that could be driving these findings. We outlined three possible theoretical explanations above. First, the lower human capital of dropouts makes it less costly to engage in risky sex. Second, no longer being in school means that adolescents are less likely to be supervised and have more time and opportunity for risky behavior. Third, the make-up of a dropout's social circle changes and the new pool of potential partners may increase the probability of STI contraction.

One way to examine whether human capital or incapacitation effects matter is to estimate how dropping out impacts an adolescent's sexual behavior. The top panel of Table 6 illustrates individual fixed effects results of dropping out on whether the respondent used a condom during last intercourse and whether the respondent had sex during the three months before each survey round. If lower human capital leads to more risky sex, we would expect to see a decrease in condom use as a result of dropping out. The coefficient estimates on condom use are actually negative in sign, but neither the effect for males nor females is measured with precision.[13] If being in school leads to an incapacitation effect or more supervision, we would expect dropouts to be more likely to engage in sex. Although both coefficient estimates on recent sexual intercourse are positive, neither the effect for males nor females is measured with precision.

[12] Appendix Table 2 presents descriptive statistics for the outcomes in Table 5.

[13] The results for recent condom use are conditional on previously having had sex.

To further examine what drives the increase in STIs, the bottom panel of Table 6 presents results where the following outcome variables are regressed on dropout status: number of reported sexual partners since wave I, number of sexual partners since wave I (conditional on having had sex), average age of romantic partner, and whether the respondent reports being physically or verbally abused by their romantic partner.[14] Because of wave I data limitations, individual fixed effects analyses were not possible for these outcomes. The results are therefore from simple OLS regressions based on outcomes measured during wave II. Of course, these results come with the caveat that the effect of dropping out may be biased due to unobserved heterogeneity at the individual level.

The bottom panel of Table 6 indicates that female dropouts have roughly one more sexual partner than females who stay enrolled. However, this result loses statistical significance when conditioning on prior sex; as we saw above, female dropouts are no more likely to have been sexually active over the last three months. For males, it appears there is little difference in the number of sexual partners for dropouts versus enrolled students.

The bottom panel of Table 6 also highlights that female dropouts' partners are nearly one and a half years older than those of female high school students, and this estimate is statistically significant at the 0.01 level. Dropping out is also associated with a 7.2 percentage point increase in the likelihood a female reports being physically or verbally abused by her romantic partner, but this estimate is not statistically significant at conventional levels. While all estimates are

[14] Ideally, we would like to directly observe how a dropout's peer group changes upon leaving school. While the Add Health allows each respondent to nominate peers, data are only available for peers that are themselves apart of the survey. As a result, it is not possible to observe the characteristics of a peer if that individual is a high school dropout who did not attend a school in the Add Health sample or is too old to show up in the sample even if not a dropout.

positive in sign for males, none are measured with any precision.[15] The apparent lack of change in sexual behavior for male dropouts supports their null findings on STI status.

Although the OLS results for sexual and romantic partner outcomes are descriptive in nature, they indicate that female dropouts engage in romantic relationships with significantly different types of people. Their partners are not only older on average but also more likely to be abusive. STI rates are increasing in age for this group and previous research has documented that females in abusive relationships are more worried about contracting STIs (Wingood and DiClemente 1997). These results indicate a possible explanation for the disparity in STI status between female dropouts and female high school students.

VI. Conclusion

This paper makes three important contributions to the literature. First and foremost, it enhances our understanding of the consequences of dropping out of high school by focusing on the risk of STI contraction, an outcome that has not been previously studied. Using longitudinal data, we are able to estimate fixed effects models that control for unobserved heterogeneity at the individual level. Second, our research highlights a previously unexplored pathway through which dropping out can affect future prospects, that of sexual partner choice and availability. Third, we contribute to the economic literature on the determinants of STIs by focusing on the link between education and risky sexual behavior and by using individual-level reports of STI status rather than relying on aggregated state-level rates.

[15] The sample sizes for the models estimated in the bottom two rows of Table 6 are greatly reduced because the "Relationship Information" module in the Add Health data set is fraught with missing data. In addition, numerous individuals reported not having been in a romantic relationship. Appendix Table 3 illustrates descriptive statistics for the outcomes in Table 6.

Both male and female dropouts exhibit substantially higher rates of contracting an STI than those who stay in school if unobserved heterogeneity is ignored. Using individual fixed effects to eliminate unobservable individual characteristics that are simultaneously correlated with the risk of dropping out and risky sexual behavior, we find that female dropouts still face a significantly higher risk of contracting a sexually transmitted infection, whereas there appears to be no effect of dropping out on STI risk for males. Overall, the results indicate that dropping out increases the likelihood that a female student will contract an STI by roughly 9 to 10 percentage points. This implies that over 70 percent of the difference in the mean rate of STI status between female dropouts and females who stay in school can be explained by dropping out.

What accounts for the difference in effects between males and females? One explanation is that females are more likely to see a doctor regularly for OB-GYN check-ups and infections are therefore more likely to be detected. This explanation, however, is unlikely to account for the large differences we observe. A more compelling hypothesis is that peer groups change and dropouts enter into significantly different romantic relationships than non-dropouts. We find evidence to support this argument. Female dropouts match with substantially older males and are also more likely to be in abusive relationships, although this latter effect is not statistically significant at conventional levels. Both of these effects have potentially large detrimental impacts on future life outcomes. Additionally, these differences suggest that romantic partner and peer effects are important mechanisms underlying the relationship between dropping out and the risk of STI contraction. To the extent that sexual behavioral outcomes either directly or through other pathways affect future prospects, our results indicate an important role for public policy in inducing those at risk from dropping out to remain in school longer.

What do these results imply for the scope and effectiveness of policies aimed at reducing dropout rates? Eckstein and Wolpin (1999) argued that the effect of individual characteristics for high school dropouts is so strong that even very restrictive policies will not materially impact graduation rates or other outcomes. They concluded that policies that do not affect individual traits will have little impact on future labor market outcomes of youths who are kept in school. Contrary to Eckstein and Wolpin (1999) and taken at face value, our results indicate that most of the effect of dropping out for females can be explained by causal factors; for females there is little difference between the estimated risk of contracting an STI with and without controlling for unobservable individual characteristics. For males the opposite is the case; when we control for unobservable characteristics there is no difference between dropouts and those who stay in school in terms of STI risk.[16]

Our estimates highlight that policies aimed at reducing dropout rates have important heterogeneous effects. Given our findings, we expect that policies focusing on keeping students in school will be substantially more effective for females than for males in preventing STI contraction. To the extent these effects translate to other outcomes, future research on dropout policies should consider the differences between males and females as well as other potentially important sources of heterogeneity. Future research will also benefit from identifying factors that lead to the differential effects between genders.

[16] It is clear, however, that there is still a strong individual-characteristics effect for male dropouts on the risk of contracting an STI. Furthermore, it is possible that these results mask a causal decrease in human capital for males.

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Table 1. Descriptive statistics

Variable	Description	Males (N = 4222) Mean	Males (N = 4222) SD	Females (N = 4207) Mean	Females (N = 4207) SD
Dependent variable					
STI	Equal to 1 if respondent has been diagnosed with an STI, 0 otherwise	0.018	0.134	0.046	0.209
Baseline respondent characteristics					
Dropout	Equal to 1 if respondent has dropped out of high school, 0 otherwise	0.040	0.197	0.036	0.185
Age 15	Equal to 1 if respondent is 15 years old, 0 otherwise	0.039	0.193	0.033	0.179
Age 16	Equal to 1 if respondent is 16 years old, 0 otherwise	0.330	0.470	0.362	0.481
Age 17	Equal to 1 if respondent is 17 years old, 0 otherwise	0.321	0.467	0.325	0.468
Age 18	Equal to 1 if respondent is 18 years old, 0 otherwise	0.225	0.418	0.213	0.409
Age 19	Equal to 1 if respondent is 19 years old, 0 otherwise	0.075	0.263	0.062	0.241
Hispanic	Equal to 1 if respondent is Hispanic, 0 otherwise	0.125	0.330	0.116	0.321
Black	Equal to 1 if respondent is black, 0 otherwise	0.163	0.369	0.174	0.380
White	Equal to 1 if respondent is white, 0 otherwise	0.732	0.443	0.724	0.447
Other non-white	Equal to 1 if respondent is of an other non-white race, 0 otherwise	0.147	0.354	0.139	0.346
U.S. born	Equal to 1 if respondent was born in the United States, 0 otherwise	0.939	0.240	0.921	0.269
Family characteristics					
Moved	Equal to 1 if family moved between waves I and II, 0 otherwise	0.055	0.228	0.057	0.232
Only child	Equal to 1 if respondent is an only child, 0 otherwise	0.193	0.394	0.195	0.396
Only child missing	Equal to 1 if only child information is missing, 0 otherwise	0.006	0.076	0.005	0.068
No religion	Equal to 1 if respondent has no religion, 0 otherwise	0.157	0.364	0.131	0.338
Baptist	Equal to 1 if respondent is Baptist, 0 otherwise	0.207	0.405	0.221	0.415
Christian church	Equal to 1 if respondent attends Christian church (Disciples of Christ), 0 otherwise	0.089	0.285	0.082	0.274
Mormon	Equal to 1 if respondent is Mormon, 0 otherwise	0.011	0.103	0.013	0.112
Methodist	Equal to 1 if respondent is Methodist, 0 otherwise	0.054	0.226	0.060	0.237
Catholic	Equal to 1 if respondent is Catholic, 0 otherwise	0.254	0.436	0.250	0.433
Jewish	Equal to 1 if respondent is Jewish, 0 otherwise	0.009	0.092	0.010	0.102
Protestant	Equal to 1 if respondent is Protestant, 0 otherwise	0.038	0.192	0.025	0.157
Other religion	Equal to 1 if respondent is of another religion, 0 otherwise	0.180	0.384	0.208	0.406
Religion missing	Equal to 1 if religion information is missing, 0 otherwise	0.005	0.070	0.005	0.068
Church attendance 1	Equal to 1 if respondent did not attend church last year, 0 otherwise	0.269	0.443	0.220	0.414
Church attendance 2	Equal to 1 if respondent went to church less than once per month last year, 0 otherwise	0.183	0.386	0.194	0.396
Church attendance 3	Equal to 1 if went to church at least once per month last year, 0 otherwise	0.525	0.499	0.571	0.495
Church attend. missing	Equal to 1 if church attendance information is missing, 0 otherwise	0.023	0.151	0.015	0.122
Mother's education 1	Equal to 1 if mother has less than a high school degree, 0 otherwise	0.143	0.350	0.168	0.374
Mother's education 2	Equal to 1 if mother has high school degree or GED, 0 otherwise	0.323	0.468	0.329	0.470
Mother's education 3	Equal to 1 if mother has more schooling than a high school degree, 0 otherwise	0.419	0.494	0.419	0.493
Mother's educ. missing	Equal to 1 if mother's education information is missing, 0 otherwise	0.116	0.320	0.084	0.278

Father's education 1	Equal to 1 if father has less than a high school degree, 0 otherwise	0.107	0.309	0.112	0.315
Father's education 2	Equal to 1 if father has high school degree or GED, 0 otherwise	0.224	0.417	0.225	0.418
Father's education 3	Equal to 1 if father has more schooling than a high school degree, 0 otherwise	0.363	0.481	0.336	0.472
Father's educ. missing	Equal to 1 if father's education information is missing, 0 otherwise	0.306	0.461	0.326	0.469
Father present	Equal to 1 if biological father was present at the time of wave I, 0 otherwise	0.529	0.499	0.519	0.500
Father present missing	Equal to 1 if information on biological father's presence is missing, 0 otherwise	0.117	0.321	0.126	0.331
Parental income 1	Equal to 1 if total household income is less than 40k, 0 otherwise	0.379	0.485	0.381	0.486
Parental income 2	Equal to 1 if total household income is between 40k and 80k, 0 otherwise	0.308	0.462	0.291	0.455
Parental income 3	Equal to 1 if total household income is greater than 80k, 0 otherwise	0.097	0.297	0.105	0.306
Parental income missing	Equal to 1 if total household income information is missing, 0 otherwise	0.215	0.411	0.223	0.416
Public assistance	Equal to 1 if mother receives public assistance, such as welfare, 0 otherwise	0.099	0.299	0.100	0.300
Public assistance missing	Equal to 1 if information on public assistance is missing, 0 otherwise	0.014	0.119	0.004	0.067
Sex disapproval	Equal to 1 if respondent thinks mother strongly disapproves of him/her having sex, 0 otherwise	0.382	0.486	0.551	0.498
Sex disapproval missing	Equal to 1 if information on mother's disapproval is missing, 0 otherwise	0.070	0.255	0.053	0.225
Additional respondent characteristics					
PVT score	Add Health Picture and Vocabulary Test score	97.33	25.36	96.35	24.50
PVT score missing	Equal to 1 if Picture and Vocabulary Test score is missing	0.045	0.208	0.040	0.197
College goals	Scale of respondent's college aspirations (1 = low aspirations, 5 = high aspirations)	4.047	1.405	4.163	1.432
College goals missing	Equal to 1 if college aspirations information is missing, 0 otherwise	0.033	0.179	0.053	0.223
Life expectancy	Scale of odds respondent thinks he/she will live to 35 (1 = almost no chance, 5 = almost certain)	4.229	0.941	4.331	0.883
Life expectancy missing	Equal to 1 if life expectancy information is missing, 0 otherwise	0.003	0.055	0.004	0.061
Gut feeling	Scale reflecting if respondent makes decisions based on a "gut feeling" without thinking about the consequences (1 = strongly agrees he/she goes with "gut feeling", 5 = strongly disagrees he/she goes with "gut feeling")	2.957	1.155	3.187	1.156
Gut feeling missing	Equal to 1 if "gut feeling" information is missing, 0 otherwise	0.003	0.057	0.004	0.061

Note: All variables are from wave II of the National Longitudinal Study of Adolescent Health with the exception of the dummies for whether the respondent is an only child, parental education, presence of the adolescent's biological father, parental income, public assistance, and the PVT score. These variables are from the wave I survey.

Table 2. Dropping out and sexually transmitted infections (OLS results)

	(1) Males	(2) Females	(3) Males	(4) Females	(5) Males	(6) Females
Dropout	0.063**	0.146***	0.053*	0.123**	0.053*	0.110**
	(0.030)	(0.054)	(0.028)	(0.052)	(0.028)	(0.052)
N	4222	4207	4222	4207	4222	4207
Baseline covariates	Yes	Yes	Yes	Yes	Yes	Yes
Family covariates	No	No	Yes	Yes	Yes	Yes
Additional individual-level covariates	No	No	No	No	Yes	Yes

Notes: (1) Each cell represents a separate OLS regression and all regressions are weighted by the sample weights provided by Add Health. (2) Standard errors are in parentheses and are clustered at the school level. (3) Sample sizes are in brackets. (4) The control variables are described in Table 2. (5) *, significant at 10% level; **, significant at 5% level; ***, significant at 1% level.

Table 3. Dropping out and sexually transmitted infections (Individual fixed effects results)

	Individual fixed effects without time varying controls		Individual fixed effects with time varying controls	
	Males	Females	Males	Females
Dropout	0.019	0.095*	0.023	0.098*
	(0.040)	(0.056)	(0.041)	(0.056)
N	8444	8414	8444	8414

Notes: (1) Each cell represents a separate individual fixed effects regression and all regressions are weighted by the sample weights provided by Add Health. (2) Standard errors are in parentheses and are clustered at the school level. (3) The time-varying controls include church attendance, whether the respondent moved, sentiment of mother towards sexual behavior, college aspirations, life expectancy, and an indicator for making decisions based on a "gut feeling." (5) *, significant at 10% level; **, significant at 5% level; ***, significant at 1% level.

Table 4. Dropping out and sexually transmitted infections (Robustness checks)

	Males	Females
1.) Preferred estimates from Table 4	0.023	0.098*
	(0.041)	(0.056)
	[8444]	[8414]
2.) No age restrictions	0.024	0.094*
	(0.039)	(0.056)
	[12200]	[12804]
3.) Restrict sample to respondents 15 to 18 years of age and who are enrolled in grades 9 through 12 at the time of wave I	0.017	0.097
	(0.039)	(0.062)
	[7722]	[7894]
4.) Exclude cases of HIV/AIDS from the sample	-0.014	0.079
	(0.035)	(0.051)
	[8380]	[8394]
5.) Include those that dropped out for only part of the year	0.017	0.083
	(0.039)	(0.052)
	[8516]	[8472]
6.) Exclude those who were dropouts at wave I	0.024	0.091
	(0.042)	(0.057)
	[8398]	[8370]
7.) Conditional on having had sex	0.009	0.095
	(0.051)	(0.065)
	[3258]	[3164]

Notes: (1) Each cell represents a separate individual fixed effects regression and all regressions are weighted by the sample weights provided by Add Health. (2) Standard errors are in parentheses and are clustered at the school level. (3) Sample sizes are in brackets. (4) All models include the time-varying controls listed in the note to Table 4. (5) *, significant at 10% level; **, significant at 5% level; ***, significant at 1% level.

Table 5. Dropping out and other risky behaviors

	Males	Females
Cigarette use in past month	-0.017	0.122**
	(0.040)	(0.050)
	[8460]	[8444]
Alcohol use in past year	-0.159***	-0.052
	(0.055)	(0.058)
	[8530]	[8506]
Heavy alcohol use in past year	0.066*	0.034
	(0.036)	(0.026)
	[8530]	[8506]
Drug use in past month	-0.036	-0.090
	(0.064)	(0.066)
	[8158]	[8270]
Gotten into a regrettable sexual	-0.034	-0.039
situation due to drinking in past year	(0.068)	(0.044)
	[8580]	[8532]

Notes: (1) Each cell represents a separate individual fixed effects regression and all regressions are weighted by the sample weights provided by Add Health. (2) Standard errors are in parentheses and are clustered at the school level. (3) Sample sizes are in brackets. (4) All models include the time-varying controls listed in the note to Table 4. (5) *, significant at 10% level; **, significant at 5% level; ***, significant at 1% level.

Table 6. Potential mechanisms

	Males	Females
Individual fixed effects results for sexual behavior outcomes		
Condom use during last intercourse	0.013	0.040
	(0.086)	(0.089)
	[2520]	[2608]
Sex during last 3 months	0.022	0.047
	(0.064)	(0.068)
	[7798]	[8008]
OLS results for sexual and romantic partner outcomes		
Number of sexual partners since wave I interview	0.345	0.991**
	(0.469)	(0.463)
	[4218]	[4259]
Number of sexual partners since wave I interview (conditional on having had sex)	0.134	0.923
	(0.626)	(0.648)
	[1596]	[1580]
Average age of romantic partner	0.059	1.427***
	(0.178)	(0.401)
	[2790]	[3133]
Physically or verbally abused by romantic partner	0.058	0.072
	(0.059)	(0.054)
	[2813]	[3141]

Notes: (1) Each cell represents a separate regression and all regressions are weighted by the sample weights provided by Add Health. (2) Standard errors are in parentheses and are clustered at the school level. (3) Sample sizes are in brackets. (4) The OLS models include the controls listed in Table 2. The individual fixed effects models include the time-varying controls listed in the note to Table 4. (5) *, significant at 10% level; **, significant at 5% level; ***, significant at 1% level.

Appendix Table 1. Dropping out and sexually transmitted infections (Full OLS results)

	(1) Males	(2) Females	(3) Males	(4) Females	(5) Males	(6) Females
Dropout	0.063**	0.146***	0.053*	0.123**	0.053*	0.110**
	(0.030)	(0.054)	(0.028)	(0.052)	(0.028)	(0.052)
Age 16	-0.007	-0.004	-0.011	-0.003	-0.010	-0.004
	(0.012)	(0.017)	(0.013)	(0.017)	(0.013)	(0.017)
Age 17	0.002	0.010	-0.001	0.009	0.001	0.009
	(0.014)	(0.017)	(0.014)	(0.018)	(0.014)	(0.018)
Age 18	-0.013	0.029	-0.015	0.026	-0.012	0.028
	(0.012)	(0.019)	(0.012)	(0.019)	(0.013)	(0.019)
Age 19	0.005	0.016	-0.001	0.010	0.001	0.017
	(0.019)	(0.022)	(0.019)	(0.023)	(0.021)	(0.027)
Hispanic	0.006	-0.004	-0.004	-0.013	-0.006	-0.017
	(0.009)	(0.017)	(0.010)	(0.017)	(0.010)	(0.018)
Black	0.023**	0.056***	0.020*	0.047***	0.013	0.042***
	(0.011)	(0.013)	(0.011)	(0.012)	(0.011)	(0.013)
Other non-white	-0.001	0.020	0.001	0.021	-0.000	0.022
	(0.009)	(0.018)	(0.009)	(0.017)	(0.009)	(0.017)
U.S. born	0.005	0.022	0.003	0.024*	0.009	0.026*
	(0.010)	(0.013)	(0.010)	(0.014)	(0.010)	(0.016)
Moved	---	---	-0.026***	0.018	-0.025***	0.014
			(0.008)	(0.024)	(0.008)	(0.024)
Only child	---	---	0.002	0.028**	0.004	0.030**
			(0.007)	(0.013)	(0.007)	(0.013)
Only child missing	---	---	-0.023*	0.042	-0.025*	0.037
			(0.013)	(0.051)	(0.013)	(0.052)
Baptist	---	---	-0.011	0.004	-0.013	0.005
			(0.020)	(0.020)	(0.020)	(0.020)
Christian church	---	---	-0.011	0.019	-0.013	0.022
			(0.015)	(0.021)	(0.015)	(0.021)
Mormon	---	---	-0.012	-0.008	-0.014	-0.004
			(0.015)	(0.021)	(0.015)	(0.021)
Methodist	---	---	-0.001	0.002	-0.001	0.004
			(0.024)	(0.023)	(0.024)	(0.023)
Catholic	---	---	-0.009	0.007	-0.010	0.010
			(0.015)	(0.023)	(0.015)	(0.020)
Jewish	---	---	-0.013	-0.005	-0.007	0.006
			(0.014)	(0.023)	(0.013)	(0.024)
Protestant	---	---	-0.004	-0.016	-0.005	-0.015

			(0.024)	(0.021)	(0.024)	(0.021)
Other religion	---	---	-0.009	0.012	-0.010	0.015
			(0.017)	(0.021)	(0.017)	(0.021)
Religion missing	---	---	-0.030	0.023	-0.016	0.009
			(0.031)	(0.033)	(0.032)	(0.033)
Church attendance 2	---	---	0.002	0.019	0.003	0.020
			(0.009)	(0.015)	(0.009)	(0.015)
Church attendance 3	---	---	-0.005	-0.000	-0.004	0.000
			(0.008)	(0.012)	(0.008)	(0.012)
Church attendance missing	---	---	-0.002	-0.055***	-0.007	-0.043**
			(0.026)	(0.020)	(0.027)	(0.017)
Mother's education 2	---	---	-0.021*	-0.010	-0.020*	-0.008
			(0.012)	(0.015)	(0.012)	(0.015)
Mother's education 3	---	---	-0.034**	-0.011	-0.030**	-0.007
			(0.013)	(0.015)	(0.012)	(0.015)
Mother's education missing	---	---	-0.039**	0.049*	-0.039**	0.048*
			(0.018)	(0.028)	(0.017)	(0.028)
Father's education 2	---	---	0.008	-0.002	0.008	-0.001
			(0.012)	(0.017)	(0.012)	(0.017)
Father's education 3	---	---	0.008	-0.012	0.011	-0.007
			(0.013)	(0.016)	(0.013)	(0.016)
Father's education missing	---	---	0.022	0.003	0.021	0.005
			(0.016)	(0.017)	(0.016)	(0.017)
Father present	---	---	0.004	0.012	0.004	0.012
			(0.008)	(0.015)	(0.008)	(0.015)
Father present missing	---	---	-0.026*	0.007	-0.023	0.006
			(0.015)	(0.021)	(0.014)	(0.021)
Parental income 2	---	---	-0.004	0.002	-0.003	0.003
			(0.007)	(0.011)	(0.007)	(0.011)
Parental income 3	---	---	0.001	-0.005	0.003	-0.002
			(0.008)	(0.015)	(0.008)	(0.016)
Parental income missing	---	---	0.017	-0.005	0.014	-0.006
			(0.014)	(0.015)	(0.014)	(0.015)
Public assistance	---	---	0.011	0.024	0.009	0.021
			(0.014)	(0.018)	(0.014)	(0.018)
Public assistance missing	---	---	-0.031***	-0.041**	-0.033	-0.045***
			(0.009)	(0.019)	(0.009)	(0.016)
Sex disapproval	---	---	0.001	-0.024**	0.003	-0.020**
			(0.006)	(0.011)	(0.006)	(0.010)
Sex disapproval missing	---	---	0.029	-0.021	0.028	-0.015

			(0.019)	(0.037)	(0.019)	(0.038)
PVT score/10	---	---	---	---	-0.005**	-0.001
					(0.002)	(0.004)
PVT score missing	---	---	---	---	-0.062**	-0.046
					(0.027)	(0.041)
College goals	---	---	---	---	0.003	-0.010
					(0.002)	(0.007)
College goals missing	---	---	---	---	0.002	-0.061
					(0.015)	(0.039)
Life expectancy	---	---	---	---	-0.008**	-0.008
					(0.004)	(0.006)
Life expectancy missing	---	---	---	---	-0.053**	-0.086***
					(0.023)	(0.026)
Gut feeling	---	---	---	---	-0.005**	-0.004
					(0.002)	(0.004)
Gut feeling missing	---	---	---	---	-0.033**	-0.072***
					(0.014)	(0.025)
N	4222	4207	4222	4207	4222	4207

Notes: (1) Each column represents a separate OLS regression and all regressions are weighted by the sample weights provided by Add Health. (2) Standard errors are in parentheses and are clustered at the school level. (3) *, significant at 10% level; **, significant at 5% level; ***, significant at 1% level.

Appendix Table 2. Descriptive statistics for the outcomes in Table 5

	Males		Females	
Variable	Mean	SD	Mean	SD
Cigarette use in past month	0.345	0.475	0.339	0.473
Alcohol use in past year	0.522	0.500	0.516	0.500
Heavy alcohol use in past year	0.054	0.225	0.034	0.026
Drug use in past month	0.193	0.395	0.164	0.370
Gotten into a regrettable sexual situation due to drinking in past year	0.096	0.294	0.098	0.297

Appendix Table 3. Descriptive statistics for the outcomes in Table 6

	Males		Females	
Variable	Mean	SD	Mean	SD
Condom use during last intercourse	0.660	0.474	0.529	0.499
Sex during last 3 months	0.301	0.459	0.341	0.474
Number of sexual partners since wave I interview	1.286	3.006	0.887	1.698
Number of sexual partners since wave I interview (conditional on having had sex)	2.498	4.177	1.780	2.250
Average age of romantic partner	15.85	1.642	17.49	2.434
Physically or verbally abused by romantic partner	0.123	0.329	0.131	0.337