

**Sex and Scholastic Success:
Cultural Narratives and Demographic Outcomes in Malawi**

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ABSTRACT

This article employs a linked set of qualitative and quantitative sources to explore the association between sexual relationships and schooling outcomes in Southern Malawi. I use data from about 100 in-depth interviews to show that teachers and students view relationships as threatening scholastic success through three narratives: diminished interest or motivation leading to poor attendance, distracting thoughts leading to poor academic performance, and pregnancy leading to school dropout. I subsequently use longitudinal survey data on 843 in-school respondents to empirically investigate whether these cultural narratives accurately describe the lived experience of students, and whether these differences remain after controlling for selection using propensity score matching and individual fixed effects. Results show that the mechanisms through which sexual relationships shape schooling trajectories differ by gender. Male students (but not female students) in relationships are more likely to be absent from school. On the other hand, female students (but not male students) who report having a sexual partner are more likely to drop out from school; this finding is partially but not fully explained by pregnancy. The statistical analysis yields no support for the pervasive cultural narrative that students who have sexual partners perform poorly in school.

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Scholars have consistently documented a negative association between adolescent sexual activity and various schooling outcomes, including academic performance, educational attainment, classroom behavior, and college aspirations (Alexander et al. 2007; Billy et al. 1988; Biddlecom et al. 2008; Bingham and Crocket 2000; Cardoso and Verner 2006; Chrissy 2006; Miller and Simon 1976; Sabia and Rees 2009; Schvaneveldt et al. 2001). Thus far, most of these studies have been located in the United States, where popular opinion on this subject has shifted markedly rightward in recent decades (Luker 2006). Schools throughout the country have turned from the comprehensive sexual education curricula popular in the 1980s towards abstinence-only policies, and the negative ramifications of adolescent sexuality have achieved “a kind of natural cultural authority” during this period (Fine and McClelland 2006:299; quoted in McCarthy and Grodsky 2011).ⁱ

Yet the degree to which this well-documented association indicates a causal relationship between sexual behavior and scholastic outcomes remains unresolved (McCarthy and Grodsky 2011; Sabia and Rees 2009). While some argue that sexual activity triggers behavioral responses resulting in poor scholastic outcomes (Chrissy 2006; Rector and Johnson 2005; Sabia and Rees 2009), others contend that the documented associations can be explained by selection, as underlying social, psychological and biological characteristics that lead to early sexual activity also shape schooling outcomes (Bingham and Crocket 2000; Halpern et al. 2000; Haynie 2003).

This study examines the associations between sexual behavior and schooling outcomes in Southern Malawi. If the view that adolescent sexual behavior threatens schooling outcomes has grown more widespread in the United States in recent decades, this idea is ubiquitous in much of sub-Saharan Africa. Due to generously funded abstinence-based sexual education programs combined with a conservative school culture dating back to the missionary roots of schooling in the region, teachers, parents, and policy makers express grave concerns about the impact of adolescent

sexuality on schooling trajectories (Frye 2012; Grant 2012; Poulin 2007). Yet these local understandings have rarely been examined empirically, and thus we have little insight into whether these cultural taboos are an indication that sexually active youth really experience differential schooling trajectories or whether instead these stringent standards reflect a type of moral panic that extends beyond the threat that sexual behavior actually poses for youth in this context. Survey data documenting both schooling outcomes and sexual relationship outcomes are scarce, and often use crude measures of time that prevent researchers from disentangling the temporal order of various adolescent transitions. Just as in the United States, scholars have questioned whether documented associations are the product of causation or correlation (Grant 2012; Lloyd and Mensch 2008).

In this paper, I revisit this thorny question armed with a uniquely rich set of qualitative sources and intensive longitudinal survey data. Using in-depth interviews and archival sources, I show that sexual relationships are locally believed to impact scholastic success through three distinct narratives: time spent with a partner leading to poor attendance, distracting thoughts leading to lower academic performance, and pregnancy leading to school dropout. I then turn to intensive longitudinal survey data to empirically examine how closely these cultural scripts correspond to typical patterns of demographic events. For the schooling outcomes that are significantly associated with prior sexual behavior, I use propensity score and fixed-effects regression models to examine whether these differences remain after controlling for selection based on observed and unobserved characteristics. Specifically, my paper asks:

- (1) How are sexual relationships culturally understood to threaten scholastic success in Malawi?
- (2) Do these cultural narratives accurately describe students' experiences as they unfold over time?
 - (2a). If so, do these patterns remain after controlling for selection?

BACKGROUND

Thus far, demographers studying the association between schooling and sexuality in sub-Saharan Africa have focused primarily on documenting how educational experiences shape patterns of sexual behavior, showing that youth who are enrolled in school wait longer to have sex for the first time (e.g. Kaufman et al. 2004; Lloyd 2005; McGrath et al. 2009) and are more likely to use condoms with their partners when they do have sex (Baker, Leon, and Collins 2010; Hargreaves et al. 2008). Recently, scholars have begun to look beyond school enrollment status and examine how variation in past schooling experiences predicts different patterns of sexual behavior: Martleto et al. (2008) found that students in Cape Town who score higher on literacy and numeracy tests are less likely to have sex, while Grant and Hallman (2008) found that girls in Kwa-Zulu Natal who experienced early schooling setbacks are more likely to become pregnant while in school.

In contrast, the extent to which sexual experiences influence schooling trajectories remains relatively understudied in this region, likely because this question requires information on the sequential timing of sexual experiences and educational outcomes over the adolescent period, a level of precision that has until recently been virtually unavailable. One aspect of the link between sexual behavior and later schooling outcomes that has been examined more thoroughly is the role that pregnancy plays in causing school dropout among girls. While early research indicated that pregnancies were a primary cause of school dropout (Meekers and Ahmed 1999), more recent work calls these findings into question. A 2001 study located in Kenya found that out of out of 243 girls who dropped out of school, only four listed pregnancy as a reason for leaving school and ten reported having become pregnant within one year of leaving school, leading the authors to conclude that pregnancy is not a major driver of school dropout in this context (Mensch et al. 2001). An analysis

using data from five francophone countries in Africa shows that pregnancy accounts for at most ten percent of school dropouts among girls (Lloyd and Mensch 2008).

While these studies both make vital contributions to our knowledge of the association between pregnancy and dropout, like most research, they suffer from some limitations, and thus unanswered questions remain. Both use cross-sectional data and therefore rely on students' retrospective recall of the timing of the events in question. In the data used for the Lloyd and Mensch (2008) study, school exit is measured in crude years of age, leading to fuzziness over the sequential ordering of pregnancy events and school dropout. While the authors take a conservative approach to interpreting the data, they admit that inconsistencies between self-reported reasons for exiting school and the recorded timing of first birth and schooling exit raise "questions about both the validity of reported reasons for leaving school and the accuracy of reporting on the timing of either of these events" (Lloyd and Mensch 2008, p. 8). The sample used for the Mensch et al. (2001) study is relatively young (aged 12-19, with only 25% of female respondents above age 16), and thus these results may not be reflective of a female student's likelihood of ever experiencing a pregnancy while in school. Finally, the data used in these two studies were collected between 1994 and 1999, before the surge in adolescent school enrollment that occurred throughout East and Central Africa over the past decade. Between 1999 and 2007, during a period in which the size of the school-aged population increased by 20 million, the total population of out-of-school youth decreased by about 13 million, or by 28% (UNESCO 2010). The relationship between pregnancy and school dropout should be reexamined in light of this dramatic change in school enrollment statistics.

Recently, Biddlecom et al (2008) take advantage of detailed survey data in four African countries to examine whether or not students who have experienced premarital sex are more likely to drop out of school. The authors find that in three out of the four countries examined, female students

who have had intercourse face an increased likelihood of leaving school. In Malawi, girls who had premarital sex were found to have almost twice the odds of dropping out of school before completing secondary school relative to their non-sexually active peers.

At the aggregate level, the scope of this study is impressive: it compares outcomes across four geographically dispersed countries in sub-Saharan Africa, and was the first published study to examine the sequential timing of sexual debut and schooling exit in sub-Saharan Africa. However, in its measurement of individual-level outcomes, its scope is somewhat narrower. The authors' window into the sexual experiences of youth is limited to whether or not a respondent has ever experienced premarital sex; they cannot distinguish between relationships that are ongoing and those that ended prior to the dropout event. And by only examining school dropout, this study does not explore the extent to which sexual experiences might alter other dimensions of schooling experiences. Finally, because this study asks youth about their schooling and sexual experiences retrospectively, the timing of the events is subject to recall bias.

If quantitative analyses of this topic are scarce, a larger number of qualitative studies have examined the norms surrounding sexuality and schooling in sub-Saharan Africa, and the cultural model of romantic love endangering schooling outcomes is relatively well documented (Frye 2012; Grant 2012; Munthali et al. 2006; Poulin 2007; Stambach 2000; Wight et al 2006). Wight et al. (2006) describe the norm of "pupil abstinence" as among the "most fundamental sexual norms" in Northern Tanzania. Using in-depth interviews with parents, Grant (2012) shows that pregnancy in particular looms large in the cultural imaginary of rural Malawi, and many parents assume that any sexual activity among girls inevitably leads to pregnancy-related school dropout, weakening their commitment to help their daughters stay in school. Poulin (2007) shows that some female students in Malawi forswear dating altogether, out of concern that having a boyfriend might "disturb their

education” (p. 2391). And Frye (2012) theorizes that young women claim ambitious future aspirations in part as a claim to the moral identity that comes with being a schoolgirl, a moral identity that is largely based around expectations of sexual purity.

While these qualitative studies together offer strong evidence that sexual activity is considered a threat to scholastic success, we lack a thorough analysis of the mechanisms through which sexual relationships are commonly understood to affect educational outcomes in this region. I seek to remedy this here, by analyzing a diverse set of qualitative sources to extract the most frequently evoked narratives describing how sexual activity threatens schooling outcomes.

STUDY CONTEXT

Throughout sub-Saharan Africa, patterns of educational attainment and adolescent sexual activity have both changed rapidly and dramatically in recent decades, as more youth stay in school through late adolescence (Lloyd 2006) and more sexual activity occurs outside of marriage (Lloyd 2008; Mensch et al. 2006). These two demographic shifts are intricately linked: increasing levels of educational attainment lead to delayed marriage and thus to an increase in the proportion of sexual debuts occurring outside of marriage (Mensch et al. 2006; Stambach 2000) and the decline in early marriage has led more students to remain enrolled in school into later adolescence (Lloyd 2005).

Malawi in particular has recently experienced dramatic changes in both educational opportunities and adolescent sexual behavior. In 1994, Malawi became the first of several countries in sub-Saharan Africa to abolish primary school fees, and the total number of students registered in primary schools in Malawi increased from 1.9 million in 1993 to 3.1 million in 1994 (Al-Samarrai and Zaman 2007). Although attrition remains alarming high in Malawi (Frye 2012), school enrollment has increased substantially for adolescents as well since this policy was enacted: between

1992 and 2010, the proportion enrolled in school rose from 66% to 90% for youth aged 10-15, and from 36% to 51% for those aged 16-20 (National Statistics Office (NSO)- Macro 1992; 2010)ⁱⁱ.

At the same time as rates of educational enrollment have increased, the timing and context of first sex in Malawi has changed as well. As in much of the rest of the region, Malawian youth are now substantially more likely to experience their first sexual intercourse outside of marriage than were previous generations (Mensch et al. 2006). At the same time, young people are also waiting longer to have sex. Between 2000 and 2010, the median age at first sex for young adults aged 25-29 increased by about a third of a year for both men and women and the proportion aged 15-19 who say they never had sex rose from 43% to 56% for women and from 39% to 46% for men (NSO- Macro 2000; 2010).

This study is located in Balaka, Malawi, a rapidly growing peri-urban community and major transportation hub between the two largest cities of Blantyre and Lilongwe. All survey and in-depth interviews were conducted with respondents living within seven kilometers of the town center. Balaka is located in the southern region of Malawi, where educational attainment is lowest (UNESCO 2008) and HIV/AIDS prevalence is highest: according to recent DHS estimates, about 15% of the population aged 15-49 in the southern region was infected as of 2010, compared to 8% in the central region (NSO- Macro 2010).

ANALYTIC STRATEGY

In a recent review article on the use of mixed-methods research in sociology, Small (2011) highlights the variety of motivations and analytic perspectives that lead scholars to examine multiple forms of data in one research project. Typically, sociologists take what Small describes as a *confirmatory* approach to mixed methods research, and apply multiple methods to

the same research question in order to confirm results and triangulate findings across modes of data. A smaller group of scholars take a *complementary* approach, using one method to test hypotheses derived from the use of another method and comparing the insights gleaned from different types of sources (Small 2011; for examples see Fernandez-Mateo 2007; Kurzman and Leahy 2004; Small et al. 2008; Uzzi 1999). In this paper, I take the latter approach, and use multiple forms of data to systematically compare two ways of understanding social action: (1) the stories that people tell themselves about the social world and (2) the typical patterns of behavior and causal associations between attributes and outcomes that can be observed at the aggregate level.

These two types of social meaning have been central to the field of sociology from its inception. Weber terms (1) “adequacy with respect to meaning” and (2) “evidence of statistical uniformity”, and argues that both are essential in order for a phenomenon to be considered sociologically meaningful (1978, p. 12). Bourdieu makes a similar distinction between practical knowledge, “the truth immediately given to lived consciousness” and scientific knowledge, “the truth laboriously acquired through scientific reflection” (2008, p. 95). In contrast to Weber, however, Bourdieu posits that these two kinds of truth will rarely cohere, that most people lack the “freedom from necessity” (2001, p. 117) required to understand their social world on both an objective and subjective level (he calls this state *misrecognition*). Rather than searching for situations in which both types of meaning can be established, Bourdieu instead argues that sociologists should examine the gaps between these two types of sociological meaning, to uncover the “two-fold truth” underlying all social phenomena (2001, p. 202).

Indeed, we have no reason to expect these two types of truth to cohere with each other. Rather than being shaped by statistical *generalities*, our subjective understanding of the social world is largely informed by narrative *particularities*: our own pasts, the experiences of specific

friends or relatives, gossip overheard about neighbors or coworkers (Bruner 1991; Ewick and Silbey 2003; Shore 1998). This is particularly true when we grapple with issues that are morality-laden (Bruner 1991; Wuthnow 2002). These narratives follow a type of logic that is quite distinct from that of statistical analyses; as Bruner writes:

We organize our experience and our memory of human happenings mainly in the form of narrative—stories, excuses, myths, reasons for doing and not doing, and so on. Unlike the construction generated by logical and scientific procedures that can be weeded out by falsification, narrative constructions can only achieve verisimilitude. Narratives, then, are a version of reality whose acceptability is governed by convention and ‘narrative necessity’ rather than by empirical verification and logical requiredness” (1991, p. 4).

In this article, I use qualitative interviews with students and teachers and curricular materials to elucidate the most salient narratives explaining how sexual activity influences schooling outcomes. I then test these cultural scripts through a rigorous statistical analysis of longitudinal data. This approach to mixed-methods research allows me to examine the instances in which these two forms of sociological knowledge do not line up—when people’s subjective understandings are not aligned with statistical regularities.

Data Sources

This article uses data from Tsogolo la Thanzi (TLT, Chichewa for “Health in Future”), a longitudinal survey that began in May 2009 and will continue until May 2012.ⁱⁱⁱ TLT is designed to study how young people navigate the transition to adulthood in the midst of an AIDS epidemic, and follows a random sample of 1,504 women and 552 men aged 15-25. Respondents report every four months for follow-up, allowing for an in-depth look at how both relationship dynamics and schooling trajectories unfold over time (see Appendix 1 Table A1 for details about the timing of survey waves and sample attrition).

The analytic sample is limited to respondents who were in school at the beginning of the survey (N=843). In so doing, I am selecting only youth who stay in school into older adolescence (over the age of 15). While these findings should not be generalized to the entire population of Balaka, this narrow focus is substantively appropriate for the research questions examined here. Youth who remain in school through their later teens are a growing proportion of the population in Malawi, and it is this group for whom the cultural antinomy between sex and scholastic success poses the greatest challenges.

I examine three different schooling outcomes: absenteeism, test scores, and school dropout, and rely on slightly different analytic subsamples to investigate each outcome (see Table A2 in Appendix 1 for a side-by-side comparison of the exclusion criteria and descriptive statistics of these analytic subsamples). Most of this variation is explained by differences in the survey waves from which the variables of interest were drawn; attrition and school dropout reduce the sample sizes in predictable ways. For the analyses investigating school dropout, in order to ensure that I am capturing premature school-attrition rather than timely school-completion, I also exclude respondents who began the survey in their final year of secondary school (N=84).

The in-depth interviews were designed to complement the TLT survey data, and include 38 interviews with secondary school teachers from seven schools that survey respondents attend, conducted in 2009, and 57 interviews with in-school and recently out-of-school survey respondents, conducted in 2011. I conducted the teacher interviews in English, and transcribed each interview myself shortly after it was completed. I visited seven schools, interviewing the headmaster, the deputy headmaster, the teacher responsible for life skills education, and up to three other teachers at each school. 28 teachers were interviewed, with 10 follow-up interviews, totaling 38 interviews.

The youth interviews were conducted in Chichewa, the dominant language spoken in Balaka, by a team of four Malawian interviewers. Youth respondents were selected from a stratified sample based on their previous responses to survey questions about educational experiences, targeting respondents who were still schooling (N=24) and those who had dropped out from school during the year preceding the in-depth interview (N=33). The qualitative sub-sample includes 30 female and 27 male respondents.

To situate the interview responses within a broader cultural context, I also draw from a set of archival records, collected while visiting schools to interview teachers. These archival sources including all current and previous editions of the government-issued school curricula for “life skills” classes (7 volumes, totaling 672 pages),^{iv} as well as a set of NGO publications designed for use in the classroom, with activities and exercises encouraging students to stay in school and avoid relationships (5 volumes, totaling 132 pages).

Generating Hypotheses through Analyzing the Qualitative Data

I began my analysis by turning to the in-depth interviews and archival sources, to determine the most salient pathways through which sexual relationships are believed to threaten schooling outcomes in this context. All qualitative data sources were coded using the Atlas.ti qualitative coding software platform. I read all interviews and archival data at least three times, and coded all sections discussing either sexual relationships or schooling experiences.

I started with a preliminary list of themes related to sexual relationships and schooling outcomes, based on my initial impressions from time spent in the field and existing literature on the subject. This initial list included two out of the three pathways that are examined here (pregnancy leading to dropout and being distracted leading to poor performance), but did not include school

attendance or the desire to spend time with a partner during school hours. These themes emerged during the coding process, along with other themes such as peer pressure and the distinction between long-distance relationships and relationships between students at the same school.

The second step in my coding process was to turn this list of themes into narratives linking sexual relationships and educational trajectories; in other words, I focused on elements of sexual relationships that were explicitly described as having an effect on schooling outcomes. Themes that are salient for describing sexual relationships but are not related to schooling outcomes in the qualitative data are not discussed in this paper.

Because the purpose of the qualitative analysis presented here is to generate a set of testable hypotheses of ways that sexual relationships are thought to affect schooling outcomes, I focus on commonalities rather than differences. Following the legacy of Simmel (1959) and, more recently, Zerubavel (2007), I seek to uncover the underlying patterns that are consistently invoked across the diverse set of sources from which I draw, and the excerpts included in this paper were chosen to represent these shared themes. Future papers in this series will focus on the points of contrast that exist within and between the different types of data in terms of how students' sexual behavior is portrayed.

Testing the Hypotheses Using Longitudinal Survey Data

Armed with this set of three hypothesized links between sexual relationships and schooling outcomes, I next turn to the longitudinal survey data to empirically test these narratives, in order to determine whether they accurately describe the lived experiences of youth in Balaka. I begin my examination of the survey data with simple bivariate analyses, to see whether respondents who report being in a relationship while in school are indeed more likely to encounter adverse schooling

outcomes as the cultural narratives predict. I then move on to explore whether these patterns remain after controlling for selection. I use two methods to account for selection: fixed-effects time series logistic regression models and doubly-robust models that combine propensity score weighting and regression modeling.

To examine how relationship status affects school dropout, absenteeism, and school performance over time, I use fixed-effects time series logistic regression models.^v Fixed-effects models are useful for examining the consequences of events as they unfold over time, because they use each individual as her own control, comparing her likelihood of experiencing an event at one time under one set of conditions (i.e. when she is *not* in a sexual relationship) with her likelihood of experiencing the event at another time under a different set of conditions (when she *is* in a relationship). Because they compare observations over time for the same individual rather than focusing on differences between individuals, fixed effects models remove all variation between individuals that remains stable over time, such as intelligence, attractiveness, or early childhood experiences (Allison 1994). What makes fixed-effects models particularly powerful is that they control for both observed *and* unobserved factors, meaning that even differences that are not measured in the data are purged out of the model, as long as they don't change over time (see Appendix 2 for more information regarding the regression equations).

School dropout is a non-repeated event and should therefore be modeled using survival analysis.^{vi} The simplest method for applying fixed-effects logistic regression models to the analysis of non-repeated events uses a “case-crossover” design to compare periods in which the individual experiences the event to earlier observations of the same individual. Unfortunately, this method fails when any covariate is a monotonic function of time, because the outcome always occurs at the end of the observation period for each individual. For this reason, I examine school dropout over time using

the “case-time-control” method, which allows me to include variables that change monotonically over time and still use the fixed-effects framework (Allison and Christakis 2006). This method takes advantage of the fact that odds ratios in logistic regression models are symmetric when both dependent and independent variables are dichotomous, and involves reversing the dependent and main independent variable of interest when estimating the conditional logistic regression equation (Allison and Christakis 2006; Allison 2009).

Fixed effects models present some limitations, which must be addressed. First, this method is no panacea, and unobserved factors that change over time and are expected to affect the likelihood of both entering into a relationship and dropping out of school are still a concern. Second, fixed effects models leave researchers unable to examine the effects of variables that can be expected to affect the outcome but remain constant over time. Third, respondents who experience no change in the outcome variable are not included in the model, leading to a reduction in sample size. For the models predicting school dropout, this reduction in sample size is substantial, because school dropout is a relatively rare event, relative to being absent from school or having trouble in school. For this reason, I complement my analysis of school dropout with a model that employs propensity score weighting to examine the effect of being in a relationship at wave one on school dropout between wave one and wave six. I also use propensity score weighting to examine the effect of being in a sexual relationship on performance on end-of-year examinations, because this question was asked only once during the observation window.

Inverse-weighted propensity scores are used in observational studies to approximate the experimental ideal, in which a respondent is randomly assigned to either a “treatment” group or a “control” group (Lunceford and Davidian 2004; Morgan and Winship 2007). In this case, the experimental ideal would be to assign a randomly selected group of students to be in sexual

relationship at wave one of the study, and then follow them to observe their schooling outcomes over time. Of course, such an experiment is both unethical and unfeasible, and thus students who are in a sexual relationship and those who are not can be expected to differ in terms of other variables that might be expected to influence schooling outcomes, including socio-economic status, age, and educational aspirations. Propensity scores create comparison groups that are more similar in terms of these and other covariates (listed below) but still differ in terms of their relationship status.^{vii}

The propensity scores are generated using the inverse conditional probabilities from a logistic regression model predicting sexual relationship status on a set of covariates (Lunceford and Davidien 2004). These propensity scores are used as weights in a regression model predicting the outcome of interest. The “doubly-robust” approach includes the propensity scores and the regression model in the same estimator, and has been shown offer a more efficient strategy than earlier propensity-score approaches (Bang and Robbins 2005; Robins, Rotnitzky, and Zhao 1994; van der Laan and Robins 2003; for equations, see Appendix 2)^{viii}.

Doubly-robust models adjust for confounding due to measured covariates, but they still suffer from the problem of unobserved variable bias. Unlike for the fixed-effects models, both time-varying and stable characteristics that are not included in the regression equations and might be expected to influence both relationship status and the schooling outcome (school dropout or test scores) could bias the results.

Variables Used in the Regression Models

Specific details regarding the wording of each variable used in the models are included in Table A3 through Table A5 in Appendix 1. To examine absenteeism, I use the question “*Were you absent from school any days last week?*”; this question was asked at each wave of the survey. To

examine school performance, I use two measures: self-reported end-of-year examination scores for mathematics and English, collected at wave four of the survey, and a more general question about school performance, which is asked at all waves except for wave one: “*In the last four months, did you have trouble in school?*” To examine school dropout, I use the question “*Are you currently enrolled in school?*” which is also asked at each wave of the survey. For the propensity score analysis of school dropout, this variable is collapsed into a composite measure indicating whether a respondent reported having dropped out from school at any time between wave one and wave six.

The dichotomous measure of relationship status used here distinguishes between those who report at least one current sexual partner and those who do not report any current sexual partners. I also conducted the same set of analyses using two alternative definitions of relationships: the first is more restrictive and considers only respondents who report having a *committed* sexual partner as being “in a relationship” and the second is less restrictive and includes all current romantic partners, whether sexual or nonsexual (see Appendix 3, Table A6). The basic findings were the same, though including nonsexual romantic partners tended to dilute the significance of the effects (see Appendix 3, Tables A7- A9). I decided to present results from the models comparing “any sexual relationship” with “no sexual relationship” for two reasons: first, the qualitative evidence shows that concerns regarding the negative effects of relationships on schooling outcomes primarily target *sexual* relationships, and second, bivariate analyses indicate that in terms of their schooling experiences, respondents who report nonsexual romantic partners are more similar to their peers who are single than they are to those who are in sexual relationships (see Table A6).

The fixed-effects models control for the following time-variant measures that might be expected to influence schooling outcomes: socioeconomic status, year in school^{ix}, employment status, a respondent’s estimated likelihood of remaining in school, and whether a respondent has

experienced difficulty paying school fees and/or declining health in the four months prior to being interviewed. The doubly-robust models control for the following variables (included in both the outcome model and the propensity score estimation): socio-economic status, age, level in school, respondents' satisfaction with her current schooling level, and two measures of expectations for future educational attainment.^x

I estimate all models separately for male and female respondents, for both substantive and statistical reasons. Substantively, adolescent sexual behavior is by nature a highly gendered experience, and we can expect being in a sexual relationship to have different effects for male versus female students. Statistically, scholars have raised concerns raised about interpreting the coefficients of interaction terms in logit models (Ai and Norton 2003; Long and Freese 2006), particularly when using fixed-effects and other panel models (Karaka-Mandic, Norton, and Dowd 2012).

RESULTS

Research Question 1: How are sexual relationships culturally understood to threaten schooling success in Malawi?

Sexual relationships are often described by teachers, students, and in educational materials as “ruining” or “destroying” students’ educational futures. The following excerpt from an interview with a male student mentions the three most common narratives connecting sexual behavior and schooling outcomes:

R: To have a relationship it is true that school does not work properly, when you are in school instead of thinking about school you can be thinking of other things like your girlfriend, and when you should go to school you can be meeting her instead, so school cannot work. And even she can get pregnant, and then you will both definitely just end there with schooling (*Male, age 19, in Form 4*)

In this section, I will draw briefly describe each of these narratives in turn: poor attendance due to a desire to spend time with a partner during the day poor academic performance due to distracting thoughts, and school dropout due to pregnancy.

The first pathway through which being in a sexual relationship is commonly described as threatening scholastic success is absenteeism. With many students living with relatives who forbid them from having sexual relationships, class time is often described as being the easiest time to sneak away to spend private time with a partner. Several teachers described noticing that two students were often absent on the same day as one way of detecting relationships among students. As one teacher describes:

R: What normally happens is, these particular students, whenever they are in an affair, there are several things that they do. For example, they may decide not to be in class for some time, going out for other issues with their boyfriend. Eh? And this particular behavior continues, and we keep on observing it, and sometimes we can notice that this girl she is always absent from class on the same days as this boy, and then we do suspect that something is happening there.

I: so you notice that that student is out of class, and her boyfriend is also out of class?

R: yes, exactly. So we try to counsel them (*Chichewa Teacher, Male, small private day school*).

When explaining why they had chosen to abstain from relationships until finishing school, or when describing why they had ended past relationships, students often brought up the academic consequences of missing class. For example, a male respondent describes how he followed his parents' advice and ended his relationship:

R: I met that girl and I told her about I am in love with her and we stayed for a long time in our relationship, and then my parents said, "Having a relationship at your age it can not help you. Your future is going to be destroyed and you should think properly. Between relationships and school which one can you choose?" and when I thought about it I knew that if I can chose school it will do me well. [...]

I: but how did you feel about [ending the relationship]?

R: ahh I felt good because I realized that [my parents] were saying the truth because in form two I passed well the JCE [Junior Secondary Level Exam].

I: So does that mean that if you were still in the relationship you could have failed to pass the JCE?

R: I believe so, because during school time I would often go away during classes while my friends were in class, so this disturbed my education (*male, age 18, dropped out in Form 3*).

As he explains, the major risk posed by continuing in the relationship was missing class to spend time with his partner, and he attributes his passing his exams to his decision to break up with his girlfriend.

A second way that being in a sexual relationship is said to threaten scholastic success is through distracting thoughts affecting academic performance. Teachers often expressed the concern that having a relationship hinders academic performance in terms of a fundamental biological incompatibility between schooling and romantic love. As one teacher states, “We know that when you mix the two, one thing will definitely suffer, especially their studies. At this age, with their bodies and brains still developing, they don’t have control over their sexual impulses. You can’t feed the heart and the brain at the same time” (*English teacher, male, government boarding school*) A headmaster makes a similar claim: “The big problem is that when one has a love affair here, she fills up three quarters of his brain with love issues. So education will be given a secondary purpose. So we will end up having under-performance in class” (*Headmaster, male, large private boarding school*). In a Life Skills textbook, a cartoon depicts a girl and a boy embracing and kissing, with hearts above their heads. In the next panel, a teacher is shown lecturing the boy, saying, “Look, your performance is getting poorer and poorer. You are playing too much” (Malawi Institute of Education 2008, p. 54).

This belief that distracting thoughts of sexual partners muddy concentration and lower academic performance was also expressed during interviews with school-aged youth. A female student explains how being distracted by a relationship caused both her and her boyfriend to fail their end-of-year examinations:

R: In standard six, that time was when I started having relationships. So most of the times, as you know if a person has a boyfriend in the same class it does not work. Most of the times when I was in class, I didn't have thoughts as if I am in class. I was only having thoughts about my boyfriend, and even when we were writing, or maybe the teacher was teaching, for me to pay attention to what the teacher was teaching was impossible because I was busy thinking about him.

I: Did your boyfriend pass the examinations?

R: We repeated together... So then I knew that, if I think about him a lot, as a result I can leave school so I stopped thinking a lot about him and I passed to standard seven (*Female, age 16, dropped out in Form 1*).

Another student describes how the performance of her peers with boyfriends is “very low, [because] most of the times, in class, they hold their notebooks to their noses and pretend like they are reading, but soon enough they put the notebooks aside like flowers while they are thinking about other stories, times they spent with their boyfriends” (*Female, age 17, in Form 3*)

The third way that being in a sexual relationship is said to detrimentally affect schooling outcomes is through pregnancy leading youth to drop out of school. Other than students being forced to stop schooling for financial reasons, school dropout was discussed almost exclusively in relation to pregnancy in all three types of qualitative sources. Although a nationwide policy requires schools to reserve a space for students so that they can return a year after giving birth, teachers and students both report that few students do. A female respondent who became pregnant while in school recounts how her brother refused to financially support her returning to school, although the headmaster at her school encouraged her to return:

R: My sister advised me when I started a relationship with my boyfriend, she told me that, “If you keep on doing these childish things you will drop out from school. What you are doing, you will cry about school and you will admire your friends who will go further than you.” So I was thinking that she was only speaking cruelly, and I didn't listen to her. It did not take much time for the relationship to reach its maximum point, the point of no return, when we started having sex together, and that is when I got pregnant and now I can see that the advice she gave was true. I have now disturbed my education, and even though my mother agreed to watch the baby next year, my brother has refused to pay for my school fees again, saying that he can't trust me and maybe it will happen again (*Female, Age 18, dropped out in Form 1*).

Teachers in Malawi spend considerable energy monitoring female students for potential pregnancy cases. Some teachers describe assigning other students to listen for rumors that students have become pregnant. When a case of suspected pregnancy occurs, the student is taken to the hospital for a pregnancy test, and, if found positive, asked to leave school immediately. One teacher describes such a scene in this excerpt:

R: Just last week we had a pregnancy case at this school. What happened, the matron [teacher in charge of the girls' boarding area] suspected something but the girl denied, so they called the parents. The girl was in Form 2. So when it was discovered by the matron that she was pregnant, it was very advanced, the baby was around 5 months old. So I think maybe it was over the holiday when she had this malpractice [had sex].

I: ok. So what happened?

R: So they called the parents, the mother came, and then the matron and the girl, they went together to the hospital where she was tested. So it was revealed to all of them at once, at the hospital, that she was pregnant. So they said, do you see what this girl has done? Take her home. Yeah.

I: ok. And do you think she will come back to school after?

R: I don't think so. [*Biology Teacher, Male, Large Private School*].

As in the interviews, almost all discussion of early school dropout in the curricular materials is related to pregnancy. A cartoon in a sexual education manual includes a cartoon showing a girl saying no to a boy sitting in front of her, with the caption, "It is easy to say 'no' to sex because I am in school and I know that once I get pregnant that is the end for me, my future is doomed" (Population Services International, n.d., p. 51). A Life Skills textbook includes a flow chart showing how pregnancy leads to dropout, with arrows connecting "love relationships" to "unplanned pregnancies" to "school dropout" to "illiteracy," "poverty," and "prostitution" (Malawi Institute of Education 2004, p. 9). The curricular materials also include several stories of students who are forced to drop out after discovering that they are pregnant. For instance, this story describes how a couple discovered that the girl was pregnant shortly before sitting for their examinations marking the end of secondary school:

Takondwa and Mphatso became friends during Form 2. Three months before writing their Malawi School Certificate Examinations, they had sexual intercourse. Now, Takondwa is three months pregnant (Ministry of Education 2008).

In the ensuing discussion, students are asked to reflect on whether Takondwa was able to sit for their examinations, and the suggested answer in the teachers' manual is no, because she is pregnant and must wait to return to school until she has delivered the baby.

For all three types of schooling outcomes, the cultural narratives primarily focus around the consequences of sexual relationships for *female* students. Almost all of the examples that teachers gave of students disciplined for being caught in a relationship concerned female students. Two quotes from teachers illustrate this emphasis on girls' vulnerability to sexual relationships:

R: Here, being a school in town, the school is surrounded by many people, more especially the men, most of them wish to come to this school and make friends with girls. So most social behavior is because of this... the girl children, they wish to get involved in bad behaviors with these men.... And once they are in a relationship, the behavior will start to change. That is the main challenge in the social behavior at this institution (*life skills teacher, male, small government school*).

R: Sometimes girls they can be a bit naïve. They can be told something, then they just follow what the friend is doing which is not good... Now, this girl, if she is not helped, when she grows at this age, there is a tendency to seek that love that she needs... So now, where does she get it? She can get it either from the friends, or sometimes now these days she can get it from the boy... In that case you find that a girl is weak in studies. (*deputy headmaster, female, large private school*).

Among the youth respondents, more female students mentioned concern over being “disturbed” by a relationship than did male students, and stories about friends succumbing to peer pressure and engaging in sexual relationships were more likely to involve girls as well.

Research Question 2: Are students with sexual partners more likely to experience the schooling outcomes discussed in the qualitative sources, and is this difference do to selection?

The qualitative evidence presented above illuminates three pathways through which being in a sexual relationship is thought to threaten scholastic success in Malawi: *absence from school* in order to spend time with a partner, *performing poorly in school* due to being mentally distracted with

thoughts about the relationship, and *dropping out of school* due to pregnancy or marriage. In this section, I will examine each of these mechanisms using longitudinal survey data, to see whether these cultural scripts are consistent with the lived experiences of adolescents. For each outcome, I begin with simple bivariate comparisons to determine whether or not students who engage in sexual relationships are more likely to experience the adverse schooling outcomes discussed in the qualitative sources. I then test whether these differences remain after adjusting for selection.

School Absence

In Table 1, I explore whether respondents who are in a sexual relationship are more likely to miss school, as the interview data suggests. The first row gives the proportion of person-waves in which a respondent reports being absent from school during the week preceding the survey interview; these results are aggregated across survey waves. Students with sexual partners are indeed more likely to report having been absent from school. This difference is significant for both men and women; the magnitude of the difference is larger for men.

[Table 1 about here]

Next, I test whether this association between sexual relationship status and school absence remains after adjusting for selection using fixed-effects models (presented in Table 2). The association between relationship status and school absence differs by gender: men are more likely to be absent from school after entering into a sexual relationship ($p < 0.05$), but there is no association between changes in sexual relationship status and reported school absence for women.

[Table 2 about here]

School Performance

The second and third rows of data in Table 1 show the average end of year examination scores in Math and English; scores range from 0 to 100. For both male and female respondents, there is no significant difference between those who were in a sexual relationship and those who were not; indeed, male respondents who reported being in a sexual relationship actually report higher math scores on average than their non-dating peers. The fourth row of Table 1 shows the proportion of person-waves in which a respondent reports having had trouble in school. There is no significant difference in likelihood of reporting having had trouble in school over the past four months between students who reported having a sexual partner and those with no sexual partners during the previous wave.

To ensure that other factors, such as socioeconomic status or level of school, are not masking the effect of being in a relationship, I also conducted multivariate analyses for both measures of school performance. Table 3 presents both OLS regression models and doubly-robust propensity score models predicting test scores for math and English. The right-hand columns of Table 2 present results of fixed-effects logistic regression models predicting reporting having trouble in school. As might be expected from the null findings in the bivariate analysis, there are no significant associations between relationship status and academic performance in any of these models. Taken together, these findings suggest that the cultural narrative that students who are in a relationship are likely to be distracted and thus perform poorly in school is not reflective of the lived experience of students in Balaka.

[Table 3 about here]

School Dropout

In the bivariate analyses, students who were in a relationship during the previous wave are significantly more likely to report dropping out of school than are students who were single; this is particularly true for female respondents (Table 1). I compare the association between relationship trajectories and school dropout in more detail in Table 4. This table shows that students who begin the survey period in a relationship are more likely to have left school by the end of the study period two years subsequent; this difference is particularly striking for female students. This table also shows that having a relationship while in school is an unstable status—most students do not remain in this category four months later at wave 2, but either end their relationship (the most common pathway) or drop out of school.

[Table 4 about here]

In Table 5, I explore the reasons given for leaving school during waves two through six, to see whether the cultural script emphasizing the peril of schoolgirl pregnancy is consistent with the trends that we see in the aggregate-level data. Over one third of female respondents (34%) who reported leaving school attribute their departure to pregnancy, and an additional 9% cite marriage as their reason for leaving school. This table confirms what teachers and students reported in the interviews: pregnancy does indeed appear to be a significant pathway through which sexual relationships interrupt schooling outcomes for women of this age range.

[Table 5 about here]

Table 6 shows the results of case-time-control models exploring how changes in relationship status and other time-varying characteristics at one wave predict school dropout at the next wave, an average of four months later. The first column shows the results for the full sample of women; we

can see that women are highly significantly more likely to drop out of school after entering into a relationship ($p < 0.001$). In the second column, I explore whether these significant results can be explained by those female respondents who attribute their school dropout to pregnancy, by excluding from the sample respondents who experience a pregnancy while enrolled in school. Sexual relationship status remains a marginally significant predictor of school dropout for this “non-pregnant” subsample ($p = 0 < 0.10$). For men, there is no significant association between changes in relationship status and school dropout.

[Table 6 about here]

The results of the doubly-robust models, presented in the bottom panel of Table 6, largely confirm the findings from the fixed-effects models. The first column provides the results for all women, and with all variables included, female respondents who were in a relationship in wave 1 are 22% more likely to end the observation period out of school ($p < 0.01$). The effect of being in a relationship on schooling outcomes is smaller for the “non-pregnant” subsample presented in column 2, but remains significant; respondents who begin the survey period in a relationship are 15% less likely to have dropped out by the end of the observation period ($p < 0.05$). The third column shows there is no significant effect of being in a relationship for men, after controlling for confounding.

When we compare the results of the doubly-robust models to the descriptive statistics displayed in Table 4, we can determine the degree to which the difference in likelihood of school dropout between students who begin the study with a sexual partner and those who do not is attributable to selection on the observed characteristics included in the propensity score models. Table 4 shows that women who begin the study in a sexual relationship are 33% more likely to drop out by wave six than their peers who begin the study with no sexual partner. When we examine the predicted probabilities given in Table 6, which adjust for selection using the doubly-robust

methodology, this difference in the probability of dropout is reduced to 22%, an attenuation of one third. For men, Table 4 shows that men who begin the study with a sexual partner are 11% more likely to drop out of school with no adjustment for selection, and this difference in probability is reduced to 6% in the results presented in Table 6, an attenuation of 45%. These comparisons tell us that selection on the observed characteristics included in the doubly-robust models accounts for some but not all of the association between relationship status and school dropout observed in the transition probabilities displayed in Table 5.

Collectively, these results provide evidence of gender dissimilarities in the ways that being in a sexual relationship alters schooling outcomes: men (but not women) are more likely to report having been absent from school if they are in a sexual relationship, while women (but not men) are more likely to leave school if they report having a sexual partner, after controlling for selection on observed and unobserved characteristics. The strong association between being in a relationship and leaving school for women is only partially attenuated when respondents who became pregnant while enrolled in school are removed from the sample, suggesting that even women who do not experience pregnancies are more likely to drop out if they are in a sexual relationship. There is no evidence of differences in academic performance between students who report sexual partners and those who do not.

DISCUSSION AND CONCLUSIONS

Three points of friction between the qualitative analysis and statistical results warrant further reflection. First, while the cultural narratives predict that female students will be more vulnerable to all three types of negative schooling outcomes, in the multivariate models, only school dropout is significantly associated with relationship status for women, and in fact it is *male* respondents are

more likely to be absent from school if they have a sexual partner. Second, while the qualitative sources discuss school dropout almost exclusively through the lens of schoolgirl pregnancy, when the survey sample is limited to students who do *not* experience a pregnancy, having a sexual partner remains a significant predictor of school dropout in the doubly-robust models; this result is marginally significant in the fixed-effects models. And third, I find no significant effect of being in a relationship on academic performance, despite the prominent position that the narrative of relationships leading to poor performance occupies in local understandings of the association between sexual behavior and schooling outcomes.

Gender differences in partner characteristics may explain why men (but not women) are more likely to be absent from school if they are in a relationship. According to the TLT survey data, female students reporting relationships more often date partners who are currently out of school (37% of female students with partners versus 12% for male students). Among female respondents reporting sexual partners, about one in five have partners who are formally employed, while only about one percent of male students who are in a relationship have partners who are formally employed. Female in-school respondents also more frequently report having partners who live outside of Balaka district than do their male peers (24% versus 13% for men). Together, these statistics indicate that male students are more likely to have partners who are potentially available during school hours, either fellow students who can miss class with them or women who are not working and can be visited at home. On the other hand, female students more frequently date men who are formally employed or who live outside of Balaka district, making daytime visits more difficult.

Another potential explanation for why school absence is significantly associated with relationship status for men and not for women is that in Malawi, men are expected to regularly

provide their partners with financial support in the form of small gifts or sums of money (Swidler and Watkins 2007), and among adolescent boys, this social expectation often poses a substantial financial burden (Poulin 2007). In addition to gifts, young men are expected to pay transportation costs to visit their partner and cell phone credits to text and call their girlfriends. While the models presented in this paper account for whether a respondent reports being either formally or informally employed, it is possible that male respondents who are in relationships take on short-term jobs to make extra money to spend on their partners (jobs that may be too fleeting for them to mention them when asked about their current employment status during the survey), which lead them to miss school more frequently than their non-dating peers.

As predicted in the qualitative sources, pregnancy is a substantial driver of school dropout for young women in the survey data: over one third of all cases of school dropout among girls were attributed to pregnancy. Yet when the sample is limited to students who do not experience a pregnancy during the observation period, sexual relationship status remains a significant predictor of school dropout for women. Why are female students more likely to leave school if they are in a sexual relationship even among those who do not experience a pregnancy? One possible explanation is that the parents of female students may force them to stop schooling when they learn that they have a sexual partner; Grant (2012) shows that parents often assume that all schoolgirl relationships will result in unplanned pregnancies, and are thus likely to preemptively take their daughter out of school if they suspect that she is (or may soon become) involved in a relationship.

Alternatively, the finding that even women who do not become pregnant are more likely to leave school if they report being in a relationship may have to do with the contingent nature of future planning in sub-Saharan Africa. While the models presented here include measures of future aspirations and expectations related to schooling, Johnson-Hanks has shown that imagined futures

are highly susceptible to change and continually reshaped by the “socially structured zone of possibilities” that emerge at each moment (Johnson-Hanks 2006, p. 22). A young woman who expresses confidently at one moment that she will stay in school until finishing college and wait to marry until her late 20s may have a different outlook after meeting an attractive partner, and may only a short time later decide just as confidently to stop schooling and get married. In other words, the association between relationship status and school dropout among women could represent a changing calculus of choice, whereby women agentially decide that their previous commitment to staying in school no longer makes sense after they meet a promising potential life partner. Women are more likely to make this choice because men tend to marry later and are thus less likely to consider marriage a desirable alternative to schooling in this age range. Further, with men typically expected to shoulder the financial responsibilities of supporting a family in Malawi, men may be less likely to decide to stop schooling before finishing secondary school in order to pursue a promising relationship.

I find no significant effect of being in a relationship on academic performance in either the bivariate or multivariate analyses. This is somewhat surprising, considering the pervasive cultural narrative that having a boyfriend or girlfriend will distract students from their studies and lead them to score lower on exams. One potential explanation for the unexpected null finding in terms of test scores is that end-of-year examination scores are highly erratic and do not accurately reflect the academic abilities of students. In the qualitative interviews, several respondents mentioned scoring at the top of their class one year and failing their exams the next, and some students seemed convinced that test scores were often determined more by teachers’ subjective opinions and random chance than they were by academic knowledge. This belief that test scores are largely unpredictable is consistent with the results of the ordinary least squares regression models predicting examination scores (Table

3). The only measure that significantly predicted exam scores was schooling level, with students in secondary school less likely to score high on math exams (but not English exams). Otherwise, there were no significant associations between test scores and several covariates that would be expected to predict test scores, including age, socioeconomic status, and future expectations related to education. In other words, the fact that relationship status was not predictive of test score results might reflect the fact that examination scores are a poor measure of learning.

Yet the fact that no association was detected between relationship status and the more subjective measure of school performance – respondents reporting that they had “trouble in school” – suggests a deeper incongruity between the cultural narrative of sexual relationships leading to poor school performance and the demographic outcomes observed in these data. This is not surprising, considering that out of the three narratives linking sexual behavior and scholastic outcomes, school performance is the least visible to others. While anyone can look around the room and determine whether or not a student is present in the classroom, it is more difficult to perceive whether another student has aced her examinations or is having trouble in school. In the schools where I conducted interviews, even students who fail their end-of-year examinations are passed on to the next year, and thus the end-of-year examinations have no visible consequences for schooling trajectories.^{xi}

In addition to being more concealable, performance in school also involves a different type of deviation from the pattern of action proscribed in the cultural narratives. While absenteeism and dropping out are both the result of a series of deliberate actions resulting in an alternative pattern of behavior, unsatisfactory performance results from unsuccessfully continuing with the same course of action. An important element of the cultural antinomy of sex and schooling is that the negative schooling outcomes are undesired: students who have sexual relationships are portrayed as helplessly succumbing to the temptations of peer pressure and hormonal surges, throwing their future ambitions

out the window to pursue fleeting moments of pleasure. In contrast, except in cases where pregnant students are forced to leave school temporarily according to school policy, both dropout and absenteeism are the result of deliberate decisions.^{xii} Students who are in a relationship do not differ in terms of their ability to successfully carry out their actions, but rather in terms of which actions they engage in.

To summarize, this analysis reveals that students who engage in sexual relationships are indeed more likely to experience negative schooling outcomes, a finding that is of key interest to scholars and policy-makers concerned with improving educational attainment in the region. I also find that the cultural narratives and demographic outcomes are only partially consistent with each other. While the cultural narratives primarily focus on female students, the statistical analysis reveals gender differences across schooling outcomes: women are more likely to drop out from school while men are more likely to be absent from school. No differences were detected for either gender in terms of school performance, a primary focus of concern in the qualitative sources. These findings indicate that some of the efforts directed at sexual behavior among students may be misdirected. The results show that boys as well as girls are more likely to experience negative schooling outcomes if they are engaged in a sexual relationship, calling into question the emphasis that teachers and school curricula place on girls' vulnerability. And rather than focusing on the extent to which sexual relationships weaken students' academic performance, teachers, parents, and policy makers should focus on encouraging students with sexual partners to stay in the classroom.

NOTES

ⁱ While consensus around the negative effects of adolescent sexual activity increased over the 1990s and 2000s, this view was far from unanimous, as Fields (2005) shows in her analysis of a local school board debate over abstinence-only sexual education.

ⁱⁱ Analyses not shown, but the Demographic and Health Survey (DHS) data are available to download free of cost at <http://www.measuredhs.com>. Estimates are weighted to be nationally representative.

ⁱⁱⁱ TLT is designed by Jenny Trinitapoli and Sara Yeatman and funded by a grant (R01-HD058366) from the National Institute of Child Health and Human Development. For more information, visit <https://projects.pop.psu.edu/tlt>.

^{iv} The “life skills” approach to HIV/AIDS education includes broader messages about interpersonal skills and psychosocial health in addition to more specific information such as risk factors and prevention methods.

^v Fixed effects models are presented here in preference to random-effects models because the random effects models did not pass the Hausman test of the independence of unobserved individual-specific effects.

^{vi} While dropping out, going back to school, and then dropping out again is possible, this pattern was not observed in these data.

^{vii} See appendix 4 (Tables A10 through A14) for a comparison of the two groups for the weighted and unweighted samples. The propensity-score weighting removes all statistically significant differences between the treatment and control groups in terms of all covariates included in the models.

^{viii} Following advice from Morgan and Harding (2006), I tried several other matching techniques, including nearest neighbor ($n=5$), radius ($r=0.05$), and kernel (Gaussian and Epanechnikov). The results did not change substantively depending on matching algorithm used.

^{ix} The Malawian education system consists of 8 years of primary school (Standard 1-8) and 4 years of secondary school (Form 1-4).

^x These variables were measured at wave one for the model predicting school dropout between waves one and six, and at wave 3 for the model predicting test scores at wave 4.

^{xi} Only the three national-level examinations—taken after standard 8 (primary school completion), form 2 (“junior level” secondary school diploma), and form 4 (secondary school completion)—serve as gates through which failing students are not permitted to pass.

^{xii} Though as Grant (2012) shows, these decisions are often made by parents and not by the students themselves.

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Table 1: Schooling Outcomes by Sexual Relationship Status

	Female		Male	
	Single	In a Relationship	Single	In a Relationship
Absent from School ^a (%, Person-waves)	29%**	37%**	30%***	40%***
Mean Test Score (s.d.) ^b				
English	54.19 (15.30)	52.17 (16.27)	55.01 (14.24)	54.77 (19.30)
Math	48.53 (17.46)	44.18 (16.69)	53.21 (19.95)	57.04 (17.16)
Trouble in School ^b (%, Person-waves)	36%	40%	25%	23%
School Dropout ^b (%, Person-waves at risk)	5%***	22%***	5%*	8%*
<i>N</i> (at wave 1)	377	95	199	88

Note: †=0.10, *=0.05, **=0.01, ***=0.001; stars indicate significant results using a one-tailed t-test.

^a Because the absence measure specifically refers to the week immediately preceding the survey interview, relationship status is measured at the same wave as absence (not lagged).

^b Relationship status is lagged one wave.

Table 2: Fixed Effects Time Series Logistic Regression Models Predicting School Absence and Having Trouble in School, Waves 2-6

	School absence during week preceding interview ^a		Trouble in school during four months preceding interview ^b	
	Female OR/(se) (1)	Male OR/(se) (2)	Female OR/(se) (3)	Male OR/(se) (4)
Respondent was in a sexual relationship	0.97 (0.19)	1.51 (0.30)*	0.87 (0.25)	1.16 (0.32)
Socio-economic Status	1.03 (0.06)	1.17 (0.10)†	0.99 (0.08)	1.33 (0.16)*
Current Year in School	1.02 (0.08)	1.06 (0.11)	1.39 (0.16)**	1.39 (0.18)*
Trouble paying school fees over past 4 months	1.28 (0.22)	1.44 (0.30)†	1.11 (0.17)	1.23 (0.21)
Decline in health over past 4 months	1.07 (0.33)	1.75 (0.85)	1.07 (0.43)	1.37 (0.22)†
Probabilistic estimate of being in school in 1 year	0.98 (0.02)	1.04 (0.04)	0.99 (0.03)	1.03 (0.05)
Employed	2.24 (1.19)	1.11 (0.76)	2.77 (2.70)	0.30 (0.37)
Observations (Respondents)	1663 (345)	1138 (225)	899 (208)	635 (145)

Notes: †=0.10, *=0.05, **=0.01, ***=0.001.

^a Because the absence measure specifically refers to the week immediately preceding the survey interview, all independent variables were recorded during the same wave as the outcome (not lagged).

^b All independent variables are lagged by one survey wave, so that variables measured at each point in time predict having trouble in school over the next four months.

Table 3: OLS and Doubly-Robust Propensity Score Models Predicting Examination Scores (Percents)

OLS Regression Models	Female		Male	
	English Coeff./ <i>(se)</i> (1)	Math Coeff./ <i>(se)</i> (1)	English Coeff./ <i>(se)</i> (3)	Math Coeff./ <i>(se)</i> (3)
In a Sexual Relationship	-3.00 (2.97)	-2.42 (3.08)	0.17 (3.20)	2.52 (3.75)
Background Characteristics				
Age	-1.17 (0.70)	-1.11 (0.73)	-1.16 (0.70)†	-0.59 (0.82)
Socio-economic status	0.59 (0.36)	-0.03 (0.36)	-0.47 (0.50)	0.37 (0.60)
Level of School				
Lower Primary (Standard 2-5)	-4.75 (3.52)	5.30 (0.36)	-5.13 (4.18)	0.70 (5.12)
Upper Primary (Standard 6-8)	---	---		
Lower Secondary (Form 1-2)	-3.94 (2.17)†	-7.71 (2.26)**	-2.45 (2.63)	-12.81 (3.27)***
Upper Secondary (Form 3)	3.10 (2.85)	-12.47 (2.90)***	5.13 (3.33)	-10.92 (4.15)**
Attitudes and Expectations Related to Education				
Respondent would feel “very unsatisfied” if he/she left school	10.36 (3.28)	12.32 (9.06)	20.09 (15.04)	11.06 (18.04)
Probabilistic estimate of being in school in 1 year	0.28 (0.30)	-0.03 (0.32)	0.11 (0.48)	-0.37 (0.57)
Plans to attend college	0.96 (1.99)	2.22 (2.10)	1.49 (1.51)	-0.97 (3.02)
R ²	0.07	0.13	0.06	0.13
Doubly Robust Propensity Score Models^a				
Average predicted value if no respondents were in a relationship at wave 3	54.67	48.31	54.89	53.74
Average predicted value if all respondents were in a relationship at wave 3	50.55	47.06	51.90	55.04
Difference in predicted values (estimate of effect size of sexual relationship status on tests scores)	-4.11 (2.68)	-1.25 (2.83)	-2.99 (2.90)	1.30 (3.11)
<i>N</i>	347	347	214	214

Notes: †=0.10, *=0.05, **=0.01, ***=0.001.

^a The doubly-robust models account for the same list of cofounders as the OLS model results (described in Appendix 1, Table A5). All covariates were observed at wave 3 (one wave before test scores were recorded).

Table 4: Schooling and Relationship Transitions, Waves 1-6

Origin State (Wave 1)	Destination State	Wave 2	Wave 4	Wave 6
FEMALE				
In school, Single N=377	In school, single	92%	84%	60%
	In school, in relationship	6%	6%	9%
	Out of school, single	0%	3%	15%
	Out of school, in relationship	1%	7%	16%
	Total	100%	100%	100%
	Attrition	16	19	25
In school, In Relationship N=95	In school, single	54%	34%	23%
	In school, in relationship	38%	24%	14%
	Out of school, single	4%	11%	14%
	Out of school, in relationship	4%	31%	50%
	Total	100%	100%	100%
	Attrition	8	2	5
MALE				
In school, Single N=199	In school, single	87%	80%	67%
	In school, in relationship	9%	8%	9%
	Out of school, single	3%	9%	21%
	Out of school, in relationship	1%	2%	3%
	Total	100%	100%	100%
	Attrition	4	12	7
In school, In Relationship N=88	In school, single	48%	64%	43%
	In school, in relationship	45%	25%	23%
	Out of school, single	4%	6%	19%
	Out of school, in relationship	3%	5%	16%
	Total	100%	100%	100%
	Attrition	5	3	5

Notes: Respondents who previously attrited from the sample are not included in the proportions for each wave.

Table 5: Reasons Given for Leaving School During Waves 2-6

	Female	Male
Reason for Leaving School		
Lack of interest in school	6%	9%
Financial constraints/lack of supplies	43%	78%
Illness of Respondent/family member	3%	2%
Pregnancy	34%	0%
Marriage	8%	2%
Other	6%	9%
Total	100%	100%
N	135	80

Table 6: Case-Time-Control and Doubly-Robust Propensity Score Models Predicting School Dropout

	Female	Female Non-Pregnant Subsample	Male
Case-Time Control Models^a (Fixed-Effects for Nonrepeatable Events)	OR/(se) (1)	OR/(se) (2)	OR/(se) (3)
Respondent was in a sexual relationship	3.63 (1.16)***	2.01 (0.79)†	1.69 (0.79)
Observations (Respondents)	648 (127)	404 (93)	598 (109)
Doubly-Robust Propensity Score Models^b			
Predicted probability of dropping out if no respondents were in a relationship at wave 1	0.27	0.20	0.18
Predicted probability of dropping out if all respondents were in a relationship at wave 1	0.49	0.35	0.24
Difference in predicted probabilities (estimate of effect size of sexual relationship status on school dropout)	0.22 (0.07)**	0.15 (0.07)*	0.06 (0.06)
<i>N</i>	384	339	246

Notes: †=0.10, *=0.05, **=0.01, ***=0.001.

^a The case-time-control models include the following time-variant covariates (described in Appendix 1, Table A5): socio-economic status, current year in school, difficulty paying school fees, declining health, educational expectations, employment status, and dummy variables indicating survey wave. All independent variables are lagged by one survey wave.

^b The doubly-robust models account for the following covariates (described in Appendix Table A5): age, socioeconomic status, current level of school, and attitudes and expectations related to education. These covariates were all used to estimate both the propensity scores and the outcome model, and were measured at wave one.

Appendix 1: Supplementary Figures and Tables

Table A1: Timing of TLT Survey Waves and Sample Attrition

Wave	Time Period	Total Random Sample N (% of W1 Sample)	Subsample: In School at Wave 1 N (% of W1 Subsample)
1	June to August, 2009	2,045 (100%)	843 (100%)
2	October to December, 2009	1,952 (95%)	814 (97%)
3	February to April, 2010	1,895 (93%)	777 (92%)
4	June to August, 2010	1,855 (91%)	757 (90%)
5	October to December, 2010	1,752 (86%)	709 (84%)
6	February to April, 2011	1,708 (84%)	686 (81%)

Table A2: Comparison of the Analytic Subsamples Used to Examine Each Schooling Outcome

Outcome of Interest	School Absence	School Performance	School Performance	School Dropout	School Dropout
Dependent Variable Measure	Absence	Test Scores	Trouble in School	Dropout over time, waves 2-6	Dropout between wave 1 and wave 6
Statistical Model	Fixed Effects Time Series Logistic Regression (Table 2)	OLS regression with and without doubly-robust propensity scores (Tables 3)	Fixed Effects Time Series Logistic Regression (Table 2)	Fixed Effects Time Series Logistic Regression (Table 6)	Logistic regression with and without doubly-robust propensity scores (Table 6)
Sample Exclusions	• None	<ul style="list-style-type: none"> • 86 respondents who were lost to follow-up or had migrated by wave 4 • 132 respondents who dropped out of school by wave 4 • 44 respondents who were asked but did not provide test scores • 8 respondents with missing values for explanatory variables 	• None	<ul style="list-style-type: none"> • 84 respondents in their final year of secondary school at wave 1 	<ul style="list-style-type: none"> • 84 respondents in their final year of secondary school at wave 1 • 120 respondents who were lost to follow-up or migrated between wave 1 and wave 6 • 8 respondents with missing values for explanatory variables
Descriptive Statistics					
N	843	573	843	759	631
Male	37%	38%	37%	38%	39%
Average Age (s.d.)	16.7 (1.7)	16.4 (1.6)	16.7 (1.7)	16.5 (1.6)	16.4 (1.6)
Average SES Score (s.d.)	0.57 (2.64)	0.43 (2.56)	0.57 (2.64)	0.28 (2.47)	0.07 (2.31)
Education at Wave 1					
Lower Primary	13%	15%	13%	14%	15%
Upper Primary	43%	47%	43%	48%	50%
Lower Secondary	26%	25%	26%	28%	28%
Upper Secondary	18%	13%	18%	9%	7%
In a relationship, wave 1	30%	20%	30%	24%	23%

Table A3: Survey Questions Used to Construct Variables Measuring Schooling Outcomes

Variable Name	Survey Waves	Text of Question	Coding of Responses	Notes
Absence	1-6	<i>Were you absent from school any days last week?</i>	0: No 1: Yes	If the interview took place during a school vacation, respondents were asked to respond based on their last week of scheduled classes.
Test Scores	4	<i>Now I'm going to ask you about how well you scored on your end-of-term school examinations for the most recent term for which you have already received your scores. For each subject, please tell me if you sat for examinations in this subject, and what your score was. If you don't remember the exact number, please give your best estimate.</i>	Percents ranging from 0 to 100.	This question was timed to coincide with the end-of-year examination period.
Trouble in School	2-6	<i>Over the past four months, have you had trouble in school?</i>	0: No 1: Yes	
School Dropout	2-6	<i>Are you currently enrolled in school?</i>	0: Yes (no dropout event) 1: No (dropout event)	

Table A4: Survey Questions Used to Construct Relationship Status Variable

Variable Name	Survey Waves	Text of Question	Coding of Responses	Notes
Opening Script		<i>Think about the last three romantic relationships you have had, including your current spouse or partner. By romantic, I mean any relationship that was sexual as well as any relationship where you felt affectionate towards someone even if it was not a sexual relationship. Please tell me about these partners, beginning with your most recent partner.</i>		
Sexual Behavior	1-6	<i>Have you had sex in the past 4 months? (For wave 1, question asks about past 12 months)</i>	0: No 1: Yes	
Current Relationship Status	1-6	<i>What is your current relationship status with [Partner's Name]?</i>	0: <i>Our relationship has completely ended</i> 1: <i>Still in a relationship</i> 1: <i>Our relationship is confusing, we might see each other again.</i>	This question was analyzed only for relationships that were coded "1" for the above question on sexual behavior
Relationship Type (Used only for Tables A6-A10)	1-6	<i>What type of relationship do/did you have with [Partner's Name]?</i>	No relationship: No Partners Reported Nonsexual Romantic Partner: <i>Nonsexual boyfriend/girlfriend</i> Casual Relationship: <i>New boyfriend/girlfriend, Infrequent partner, One-night-stand</i> Committed Relationship: <i>Steady boyfriend, promise-to-marry (PTM), Live-in partner</i>	This question was used only for the analyses presented in Appendix Tables 2-6, where I present the two alternative dichotomous measures of relationship status.

Table A5: Survey Questions Used to Construct Variable Included as Controls in the Models

Variable Name	Survey Waves	Text of Question	Coding of Responses	Notes
Age	1	<i>In what year were you born?</i>	Measured in years	
		<i>What type of roof do you have on your house?</i>	0: grass thatched 1: other	
		<i>What kind of toilet does your house have?</i>	0: No facility or mud-brick pit latrine 1: Cement pit latrine or flush toilet	
		<i>What is the main flooring material in your house?</i>	0: earth, dung 1: other floor material	
		<i>Does your house have electricity, a generator, or solar panels?</i>	0: No 1: Yes	
		<i>What is the main source of water for your household?</i>	0: Community water supply 1: Personal pipe or tap	
Socioeconomic Status	1-6	<p><i>Does your household own a working:</i></p> <ul style="list-style-type: none"> • <i>bed with mattress</i> • <i>television</i> • <i>radio</i> • <i>land line or mobile phone</i> • <i>refrigerator</i> • <i>bicycle</i> • <i>motorcycle</i> • <i>animal-drawn cart</i> • <i>car/truck</i> • <i>bible/Koran</i> <p><i>Do you personally own:</i></p> <ul style="list-style-type: none"> • <i>watch</i> • <i>mobile phone</i> • <i>a pair of jeans</i> • <i>luggage</i> • <i>a working bicycle</i> 	<p>For each item: 0: No 1: Yes</p> <p>For each item: 0: No 1: Yes</p> <p>0: 0 or 1 pair of shoes 1: 2 or more pairs of shoes</p>	For each wave, an SES variable was constructed using principal components analysis with all measures included.
		<i>How many shoes do you personally own?</i>	0: 0 or 1 pair of shoes 1: 2 or more pairs of shoes	

Variable Name	Survey Waves	Text of Question	Coding of Responses	Notes
Level of school	1-6	<i>In what standard or form are you currently enrolled?</i>	Std. 1-5: Lower Primary Std. 6-8: Upper Primary Form 1-2: Lower Secondary Form 3-4: Upper Secondary	“standard” refers to primary school grades (1-8); “form” refers to secondary school grades (1-4)
Economic and Health Shocks	2-6	<i>We are interested in learning more about the changes our respondents experience in their lives during the course of this study. Sometimes we experience changes that improve our lives and some bring hardship. Please tell me whether or not these things have happened to you in the past 4 months (since we last met).</i> <ul style="list-style-type: none"> • <i>Have you had problems paying your school fees?</i> • <i>Has your health declined?</i> 	0: No 1: Yes	
Employed	1-6	<i>Is your current occupation piecework, temporary employment, or a steady job?</i>	0: No occupation or piecework 1: temporary employment or steady job	
Probabilistic Estimate of Being in School in 1 Year	1-6	<i>Next, I would like to ask you a few questions about what you expect in the future. I know that nobody knows for sure what the future may bring, but lets just talk about your best guess. How likely is it that you will be enrolled in school one year from now?</i>	Responses range from 0 (no chance) to 10 (certainty).	Respondents answer this question using a handful of 10 beans. It is one of several questions that they answer using this technique.
Plans to attend college	1-3	<i>What level of schooling do you plan to attain?</i>	0: secondary diploma or lower 1: college or other post-secondary credentials	
Satisfaction with current schooling level	1-3	<i>If you had to stop schooling right now, how would you feel about the level of education you have attained?</i>	0: Very Satisfied 0: Somewhat satisfied 0: Satisfied 0: Somewhat unsatisfied 1: Very unsatisfied	

Appendix 2: Regression Model Equations

Doubly Robust Propensity Score Models: Table 3, 6

First, I denote an individual, i , from a sample of size N to have received a binary exposure, A_i [$i=1$ for treatment (respondent reported having a current sexual partner at wave 1), $i=0$ for control (respondent did not report a sexual partner at wave 1)]. Let $Y_{i,1}$ and $Y_{i,0}$ be the counterfactual posttest outcomes (whether or not the respondent has dropped out of school by wave 6) under treatment and control, respectively. Which outcome is observed ($Y_{i,1}$ versus $Y_{i,0}$) depends on the treatment variable A_i . \underline{X}_i is a vector of all baseline variables. I am interested in estimating Δ , or the average change in outcome given the treatment, which is estimated as the difference in expected value of the outcome for those receiving the treatment compared to those receiving the control, or $E(Y_{i,1}|\underline{X}_i) - E(Y_{i,0}|\underline{X}_i)$.

The propensity score component of the model is defined as the probability of experiencing the treatment given the subject's observed characteristics \underline{X}_i , or $\pi_i = \Pr(A_i = 1|\underline{X}_i)$. The doubly robust method uses the inverse probability of treatment weight (IPTW) method, in which propensity scores \hat{p}_i , which are the predicted values from a logistic regression model predicting A_i based on \underline{X}_i , are used to specify inverse probability of treatment weights (IPTWs). The inverse weights are equal to $1/\hat{p}_i$ if $A_i=1$ and $1/(1-\hat{p}_i)$ if $A_i=0$.

The IPTW propensity score estimation of Δ is:

$$\hat{\Delta}_{IPTW} = \frac{1}{N} \sum_{i=1}^N \left(\frac{A_i Y_i}{\hat{p}_i} \right) - \frac{1}{N} \sum_{i=1}^N \left\{ \frac{(1 - A_i) Y_i}{1 - \hat{p}_i} \right\}.$$

The doubly robust model also incorporates a term specifying the predicted values from regressions of the outcome on the baseline covariates, in this article either logistic regression predicting school dropout between wave 2 and wave 6 or ordinary least squares regression predicting test scores at wave 4 based on \underline{X}_i , where the regressions are carried out separately for each treatment group ($A_i=1$ versus $A_i=0$). This term is defined as $m_A(\underline{X}_i) = E(Y_i|A_i = A, \underline{X}_i)$ for $A=0$ or $A=1$.

The doubly robust estimator of Δ , as defined by Lunceford and Davidian (2004) and designed for Stata by Emsley et al (2008) is:

$$\hat{\Delta}_{DR} = \frac{1}{N} \sum_{i=1}^N \left\{ \frac{A_i Y_i - (A_i - \hat{p}_i) m_1(\underline{X}_i)}{\hat{p}_i} \right\} - \frac{1}{N} \sum_{i=1}^N \left\{ \frac{(1 - A_i) Y_i + (A_i - \hat{p}_i) m_0(\underline{X}_i)}{1 - \hat{p}_i} \right\}$$

These models were estimated using the dr command in Stata10.

Fixed Effects Models: Tables 2 and 6

First, I define the following terms:

π_{it} = Probability that individual i experiences the outcome at time t .

\underline{X}_{it} = A vector of observed individual characteristics that vary over time

\underline{z}_i = A vector of variables that vary over individuals but are constant over time

α_i = Unobserved individual characteristics that are constant over time

u_{it} = Error term

The fixed-effects model is defined as:

$$\ln\left(\frac{\pi_{it}}{1 - \pi_{it}}\right) = \beta\underline{X}_{it} + \gamma\underline{z}_i + \alpha_i + u_{it}$$

Because the fixed-effects model predicts changes in the outcome variable based on changes in predictor variables, all time-invariant terms in the model, including \underline{z}_i and α_i , will drop out. Thus, fixed-effects models control for all observed and unobserved individual-level variation that is fixed over time.

For cases with more than two observations per individual, fixed-effects logistic regression models are estimated using conditional maximum likelihood estimation (Allison 2009; Treiman 2009). These models are estimated in this article using the xtlogit, fe command in Stata 10.

Appendix 3: Bivariate and Multivariate Analysis Using Two Alternative Measures of Relationship Status

Table A6: Schooling Outcomes by Relationship Type

	Single	Committed Sexual Relationship	Casual Sexual Relationship	Non-Sexual Romantic Partner
Female Respondents				
Absent from School ^a (%, Person-waves)	29%	34%*	44%*	30%
Mean Test Score (s.d.) ^b				
English	49.35(16.47)	44.73 (14.84)*	47.31 (18.39)	49.74 (18.43)
Math	54.09 (15.39)	53.47 (13.25)	50.33 (14.22)†	56.26 (15.49)
Trouble in School ^b (%, Person-waves)	26%	24%	25%	22%
School Dropout ^b (%, Person-waves at risk)	21%	42%***	50%***	23%
<i>N</i>	292	124	30	82
Male Respondents				
Absent from School ^a (%, Person-waves)	30%	39%*	40%*	28%
Mean Test Score (s.d.) ^b				
English	54.02 (20.11)	55.81 (16.93)	53.00 (16.89)	53.24 (18.14)
Math	53.79 (14.20)	55.56 (14.92)	57.88 (17.14)	56.96 (13.89)
Trouble in School ^b (%, Person-waves)	36%	42%†	38%	35%
School Dropout ^b (%, Person-waves at risk)	15%	21%*	26%*	12%
<i>N</i>	187	50	43	35

Notes: †=0.10, *=0.05, **=0.01, ***=0.001; stars indicate significant results when compared to single respondents using a one-tailed t-test

^a Because the absence measure specifically refers to the week immediately preceding the survey interview, relationship status is measured at the same wave as absence (not lagged).

^b Relationship status is lagged one wave.

Table A7: Odds Ratios for Relationship Status Variables, Fixed Effects Time Series Logistic Regression Models Predicting School Absence and Having Trouble in School, Waves 2-6

	School absence during week preceding interview ^a		Trouble in school during four months preceding interview ^b	
	Female OR/(se) (1)	Male OR/(se) (2)	Female OR/(se) (3)	Male OR/(se) (4)
Committed Sexual Relationships ^c	0.80 (0.17)	1.54 (0.38) [†]	1.04 (0.35)	1.47 (0.48)
All Sexual and Nonsexual Relationships ^c	0.98 (0.15)	1.29 (0.23)	0.75 (0.38)	0.99 (0.24)
Observations (Respondents)	1663 (345)	1138 (225)	899 (208)	635 (145)

Notes: [†]=0.10, *=0.05, **=0.01, ***=0.001.

^a Because the school absence specifically refers to the week immediately preceding the survey interview, the independent variables were recorded during the same wave as the outcome (not lagged).

^b All independent variables are lagged by one survey wave, so that variables measured at each point in time predict having trouble in school over the next four months.

^c All models include the following time-variant characteristics (described in Appendix 1, Table A5): socio-economic status, current year in school, difficulty paying school fees, declining health, educational expectations, and employment status.

Table A8: OLS Regression Coefficients and Doubly-Robust Estimates Predicting End of Year Examination Scores Using Two Alternative Measures of Relationship Status

	English (%)		Math (%)	
	Female	Male	Female	Male
OLS Regression Coefficients	Coeff./<i>(se)</i>	Coeff./<i>(se)</i>	Coeff./<i>(se)</i>	Coeff./<i>(se)</i>
Committed Sexual Relationships ^{a,b}	-1.83 (3.67)	7.09 (4.46)	3.46 (4.07)	6.33 (5.34)
All Sexual or Romantic Relationships ^{a,b}	-0.76 (2.09)	1.89 (2.86)	1.96 (2.31)	1.84 (2.26)
Doubly Robust Propensity Score Model Results				
Committed Sexual Relationships ^{a,b,c}				
Average predicted value if no respondents were in a relationship at wave 3	54.40	54.75	47.57	53.23
Average predicted value if all respondents were in a relationship at wave 3	57.19	58.97	54.78	57.63
Difference in predicted values (estimate of effect size of sexual relationship status on test scores)	2.79 (2.55)	4.22 (2.72)	7.21 (5.55)	4.40 (4.13)
All Sexual or Romantic Relationships ^{a,b,c}				
Average predicted value if no respondents were in a relationship at wave 3	54.25	54.72	47.35	48.56
Average predicted value if all respondents were in a relationship at wave 3	53.34	56.46	54.78	49.37
Difference in predicted values (estimate of effect size of sexual relationship status on test scores)	-0.91 (1.85)	1.75 (2.96)	7.42 (5.55)	0.81 (2.16)
<i>N</i>	347	214	347	214

Note: †=0.10, *=0.05, **=0.01, ***=0.001.

^a All models in Table A8 account for the following covariates (described in Appendix Table A5): age, socioeconomic status, current level of school, and attitudes and expectations related to education.

^b All covariates were measured at wave 3 (one wave before test scores were recorded).

^c These covariates were all used to estimate both the propensity scores and the outcome model.

Table A9: Case-Time-Control and Doubly-Robust Propensity Score Models Predicting School Dropout Using Two Alternative Measures of Relationship Status

Case-Time Control Models ^a (Fixed-Effects for Nonrepeatable Events)	Female	Female Non-Pregnant Subsample	Male
Case-Time-Control Models	OR/(se)	OR/(se)	OR/(se)
Committed Sexual Relationship	6.31 (2.38)***	4.74 (1.81)***	1.40 (0.28)
Observations (Respondents)	509 (99)	408 (98)	382 (70)
Any sexual or romantic relationship	2.35 (0.64)**	1.69 (0.44)*	1.48 (0.61)
Observations (Respondents)	1113 (210)	899 (208)	797 (145)
Doubly-Robust Propensity Score Models ^b			
Committed Sexual Relationship			
Predicted probability of dropping out if no respondents were in a relationship at wave 1	0.28	0.21	0.20
Predicted probability of dropping out if all respondents were in a relationship at wave 1	0.44	0.36	0.16
Difference in predicted probabilities (estimate of effect size of sexual relationship status on school dropout)	0.16 (0.07)*	0.15 (0.08)*	-0.04 (0.06)
Any Sexual or Romantic Relationship			
Predicted probability of dropping out if no respondents were in a relationship at wave 1	0.26	0.20	0.19
Predicted probability of dropping out if all respondents were in a relationship at wave 1	0.42	0.34	0.21
Difference in predicted probabilities (estimate of effect size of sexual relationship status on school dropout)	0.16 (0.05)**	0.14 (0.06)*	0.03 (0.05)
<i>N</i>	384	339	246

Note: †=0.10, *=0.05, **=0.01, ***=0.001.

^a The case-time-control models include the following time-variant characteristics (described in Appendix 1, Table A5): socio-economic status, current year in school, difficulty paying school fees, declining health, educational expectations, employment status, and dummy variables indicating survey wave. All independent variables are lagged by one survey wave.

^b The doubly-robust models account for the following potential confounders (described in Appendix Table A5): age, socioeconomic status, current level of school, and attitudes and expectations related to education. These covariates were all used to estimate both the propensity scores and the outcome model, and were measured at wave one.

Appendix 4: Variable Balance for Propensity Score Analysis

Table A10: Variable Balance Before and After Propensity Score Weighting, Female Respondents, End-of-Year Examination Scores in Math and English

	Unweighted		Weighted	
	Single	In a Relationship	Single	In a Relationship
Education Level at Wave 1				
Lower Primary (Standard 2-5)	0%	0%	0%	0%
Upper Primary (Standard 6-8)	42%	33%	41%	36%
Lower Secondary (Form 1-2)	30%†	44%†	31%	27%
Upper Secondary (Form 3)	29%	22%	28%	33%
Average Age (s.e.)	16.15 (0.07)†	16.62 (0.15)†	16.19 (0.08)	15.99 (0.21)
Average SES Score (s.e.)	0.92 (0.16)	0.27 (0.38)	0.84 (0.16)	1.51 (0.86)
Attitudes and expectations related to education				
Respondent would feel “very unsatisfied” if he/she left school	80%*	89%*	85%	87%
Average Probabilistic estimate of being in school in 1 year (s.e.)	8.81 (0.12)*	7.98 (0.39)*	8.71 (0.13)	9.08 (0.26)
Plans to attend college	58%	56%	58%	57%

Notes: †p=0.10, *p=0.05, **p=0.01, ***p=0.001.

All p-values reflect the results of Wald tests comparing single respondents to those in a relationship. The weighted results compare the estimates generated using the inverse propensity scores as survey weights.

Table A11: Variable Balance Before and After Propensity Score Weighting, Male Respondents, End-of-Year Examination Scores, Math and English

MATH SCORES	Unweighted		Weighted	
	Single	In a Relationship	Single	In a Relationship
Education Level				
Lower Primary (Standard 2-5)	7%	8%	7%	7%
Upper Primary (Standard 6-8)	43%*	34%*	40%	40%
Lower Secondary (Form 1-2)	28%*	37%*	31%	32%
Upper Secondary (Form 3-4)	22%	20%	21%	21%
Average Age (s.e.)	16.74 (0.14)*	17.33 (0.22)*	16.96 (0.17)	17.04 (0.21)
Average SES Score (s.e.)	0.28 (0.20)	0.01 (0.25)	0.19 (0.16)	0.13 (0.19)
Attitudes and expectations related to education				
Respondent would feel “very unsatisfied” if he/she left school	85%	83%	84%	84%
Average Probabilistic estimate of being in school in 1 year (s.e.)	8.97 (0.09)	8.70 (0.24)	8.88 (0.16)	8.81 (0.24)
Plans to attend college	63%	65%	65%	65%

Notes: †p=0.10, *p=0.05, **p=0.01, ***p=0.001.

All p-values reflect the results of Wald tests comparing single respondents to those in a relationship. The weighted results compare the estimates generated using the inverse propensity scores as survey weights.

Table A12: Variable Balance Before and After Propensity Score Weighting, Female Respondents

	Unweighted		Weighted	
	Single	In a Relationship	Single	In a Relationship
Education Level at Wave 1				
Lower Primary (Standard 2-5)	16%**	7%**	15%	17%
Upper Primary (Standard 6-8)	49%	49%	51%	51%
Lower Secondary (Form 1-2)	23%*	35%*	24%	23%
Upper Secondary (Form 3)	12%	10%	9%	9%
Average Age (s.e.)	16.01 (0.07)**	16.77 (0.15)**	16.07 (0.09)	16.03 (0.13)
Average SES Score (s.e.)	0.22 (0.14)	0.13 (0.22)	0.19 (0.15)	0.16 (0.30)
Attitudes and expectations related to education				
Respondent would feel “very unsatisfied” if he/she left school	80%*	68%*	77%	77%
Average Probabilistic estimate of being in school in 1 year (s.e.)	8.94 (0.09)*	8.30 (0.24)*	8.92 (0.13)	8.86 (0.19)
Plans to attend college	51%	48%	54%	45%

Notes: †p=0.10, *p=0.05, **p=0.01, ***p=0.001.

All p-values reflect the results of Wald tests comparing single respondents to those in a relationship. The weighted results compare the estimates generated using the inverse propensity scores as survey weights.

Table A13: Variable Balance Before and After Propensity Score Weighting, Female Respondents, Pregnancy-related Dropouts Removed

	Unweighted		Weighted	
	Single	In a Relationship	Single	In a Relationship
Education Level at Wave 1				
Lower Primary (Standard 2-5)	15%	9%	15%	16%
Upper Primary (Standard 6-8)	48%	50%	51%	52%
Lower Secondary (Form 1-2)	25%†	34%†	25%	22%
Upper Secondary (Form 3)	12%†	7%†	9%	10%
Average Age (s.e.)	16.11 (0.07)*	16.55 (0.18)*	16.07 (0.08)	16.06(0.18)
Average SES Score (s.e.)	0.50 (0.24)	0.13 (0.14)	0.21 (0.14)	0.17 (0.31)
Attitudes and expectations related to education				
Respondent would feel “very unsatisfied” if he/she left school	79%†	69%†	76%	75%
Average Probabilistic estimate of being in school in 1 year (s.e.)	8.88 (0.09)	8.30 (0.24)	8.86 (0.11)	8.71 (0.25)
Plans to attend college	54%	49%	50%	49%

Notes: †p=0.10, *p=0.05, **p=0.01, ***p=0.001.

All p-values reflect the results of Wald tests comparing single respondents to those in a relationship. The weighted results compare the estimates generated using the inverse propensity scores as survey weights.

Table A14: Variable Balance Before and After Propensity Score Weighting, Male Respondents

	Unweighted		Weighted	
	Single	In a Relationship	Single	In a Relationship
Education Level at Wave 1				
Lower Primary (Standard 2-5)	17%	16%	17%	17%
Upper Primary (Standard 6-8)	47%	46%	47%	47%
Lower Secondary (Form 1-2)	29%	31%	29%	29%
Upper Secondary (Form 3)	7%	7%	7%	7%
Average Age (s.e.)	16.77 (0.12)**	17.40 (0.18)**	16.96 (0.08)	17.02 (0.16)
Average SES Score (s.e.)	0.11 (0.16)	-0.18 (0.19)	-0.14 (0.15)	-0.17(0.20)
Attitudes and expectations related to education				
Respondent would feel “very unsatisfied” if he/she left school	83%†	71%†	81%	81%
Average Probabilistic estimate of being in school in 1 year (s.e.)	8.84 (0.09)	8.70 (0.24)	8.85 (0.14)	8.85 (0.22)
Plans to attend college	63%	67%	63%	63%

Notes: †p=0.10, *p=0.05, **p=0.01, ***p=0.001.

All p-values reflect the results of Wald tests comparing single respondents to those in a relationship. The weighted results compare the estimates generated using the inverse propensity scores as survey weights.