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Young Adults' Fertility Expectations and Events: Associations With College Enrollment and Persistence

The analyses described in this article investigated the association between adolescent fertility expectations and college enrollment (N = 7,838). They also explored the potential impact of fertility expectations and events on college persistence among 4-year (n = 2,605) and 2-year (n = 1,962) college students. The analysis, which used data from the National Longitudinal Survey of Youth 1997 cohort, showed a significant association between expectations for early parenthood and the likelihood of going to a 4-year college or 2-year college for both men and women. In addition, the authors found that pregnancies were associated with an increased risk of college dropout for women; however, if all of the estimated effect of pregnancies on the risk of dropout were causal, they would still not be a major factor contributing to educational attainment because fertile pregnancies among college women are so rare.

A growing body of research shows that the fertility patterns of women who obtain a college degree differ distinctly from those of women who attend college without earning a bachelor's degree or those who earn a high school degree but do not attend college. For example, White college-educated women in their early 40s in 2004 had an average of 1.61 births, compared to 2.06 births for women with less than a high school degree. The large majority of the difference involved unwanted or mistimed births (Musick, England, Edgington, & Kangas, 2009). College graduates also bear children at later ages, with a peak childbearing age of about age 32, compared to age 21 among women with a high school degree or less (Sullivan, 2005). Relatedly, the percentage of births that are nonmarital is substantially smaller for college graduates (7%) compared to women with just a high school diploma (53%; Mincieli, Manlove, McGarrett, Moore, & Ryan, 2007). These differences in fertility patterns are important because they shape the resources available to children and may intensify the advantages associated with maternal education.

This research applies a life course approach to better understand the social processes that link education and fertility. Prior studies have established an association between teen fertility and the likelihood of high school graduation, and these processes, which play out during adolescence, likely account for some of the

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higher levels of completed fertility among women without a high school degree. Yet we know relatively little, even descriptively, about how educational and fertility processes are linked in late adolescence and early adulthood, when some are enrolled in college and others are starting families (Amato et al., 2008). In this study, we used data from the 1997 National Longitudinal Survey of Youth (NLSY; see <http://www.bls.gov/nls/nlsy97.htm>) to investigate the association between fertility (expectations as well as behavior) and college enrollment and persistence.

An important aspect of our analyses is that whereas most prior research in this area has focused on girls and young women, our analyses also included men. We anticipated that fertility expectations and behavior may have a greater association with educational attainment for women than men, because women more often have primary child-care responsibilities. Furthermore, women are more likely than men to be raising a child on their own, yet many men are cohabiting with the mother even when the birth is nonmarital. Moreover, because of changes in child support laws and enforcement, many men have financial responsibility for children even when they do not coreside with them. Thus, fathering a child might have implications for men's school completion as well.

The analyses were structured to address three research questions. First, are expectations about early parenthood associated with whether young men and women go to college? Second, do pregnancies during college contribute much to the high postsecondary dropout rates? Finally, do these associations differ between men and women? These questions are focused on the potential contribution of fertility to educational transitions in early adulthood. A complete understanding of the links between education and fertility would also investigate how educational attainment influences fertility in the years after school completion, and in other work we have investigated these associations later in the life course (Daniels & Raley, 2010). Our focus here is on an earlier life course stage, when fertility is most likely to contribute to variation in educational attainment.

BACKGROUND

During late adolescence and early adulthood, the experiences of youth become increasingly

heterogeneous. Some begin to form families; analysis of the Add Health cohort showed that by age 21 almost one quarter had become parents (Amato et al., 2008). Some continue to pursue education. In 2008, 64% of recent high school graduates enrolled in a degree-granting institution (National Center for Education Statistics, 2010). Educational and fertility transitions are linked such that individuals continuing their educations are typically not forming families. Among Add Health respondents, there was only a small amount of overlap in the group attending college and those transitioning into parenthood (Amato et al.), but little is known about the social processes connecting educational attainment and fertility in these early adult years.

Expectations, Unanticipated Events, and Gender

Broadly speaking, there are two ways that fertility might influence educational attainment in early adulthood. One way is that a pregnancy, usually unplanned, curtails educational attainment. Parenthood increases the chances of dropping out of high school (Hofferth, Reid, & Mott, 2001; Perper, Peterson, & Manlove, 2010) and decreases the chances of college enrollment for both men and women (Teachman & Polonko, 1988). With the transition to parenthood, both men and women incur financial and care responsibilities that make continuing as a student difficult. In addition, parenthood is an adult status that is normatively incompatible with that of student (Elder, 1995; Rindfuss, Morgan, & Swicegood, 1988; Thornton, Axinn, & Teachman, 1995). This conceptualization dominates the literature on the impact of fertility on educational attainment and is consistent with the fact that the large majority of teen births are not planned, which is also true of about half of the births that take place in early adulthood (Hayford & Guzzo, 2010).

A second way that fertility might influence educational attainment, one that has received less attention, is whereby high school students' anticipated family roles in early adulthood lead them to forgo college enrollment. In general, theory and research suggest that adolescents make decisions partly on the basis of their anticipated returns for a particular course of action (Ajzen, 1991). For example, prior research has linked adolescent expectations about educational attainment to their current health behaviors, an

association that occurs perhaps because optimism about the future increases the perceived returns to healthy behavior (McDade et al., 2011). Expectations about fertility might influence adolescents' perceived returns to college attendance. For example, youth who expect to become parents soon may decide not to start working toward a degree they expect they will not have a chance to complete.

Youths' decisions of whether to invest in a college education might also be influenced by their anticipated adult family responsibilities, to the extent that these compete with full-time employment. Consequently, the influence of college expectations might vary by gender. Despite the substantial growth in maternal employment, labor force participation rates of mothers continue to lag far behind that of fathers. In 2007, among married men age 35 through 44, 95% were in the labor force. The analogous number for women is 73%, and this decreases to 62% for married mothers of children less than age 6 (U.S. Census Bureau, 2009). It is important to note that these figures understate gender differences in employment patterns in response to parenthood, because many mothers shift to part-time work while they have young children. Among married mothers of children less than age 6, only roughly one third (34.5%) are employed full time year round (Cohen & Bianchi 1999). Thus, the returns to investments in education—at least in terms of paid salary—are lower for mothers than fathers. To the extent that fertility expectations influence educational attainment by reducing anticipated future labor force attachment, we expected a stronger association between fertility expectations and educational attainment for women than for men. Providing some support for this possibility, research indicates that women who eventually become mothers have higher risks of dropping out of college than those who remain childless (Stange, 2011), but whether fertility expectations are associated with the decision to go to college, or whether this association varies by gender, remains unknown. We tested this possibility.

Most research on the effects of fertility on educational attainment has focused on the effects for women. This is partly because most researchers assume that the effects are greater for women, who are more often the primary caregivers of children. The fact that nonmarital fertility is less well reported by men than women

(Rendall, Clarke, Peters, Rangit, & Verropoulou, 1999) also contributes to a lack of research on these associations for men. Nonetheless, recent social changes may have undermined these reasons for not examining gender differences in the association between family formation and educational attainment. First, in recent years, married fathers have increased the number of hours that they spend caring for children (Sayer, Bianchi, & Robinson, 2004). Second, changes in the legal system make men financially responsible for children, even men who are not living with and have never been married to the mother. In part because of state efforts and in part because of the Child Support Performance and Incentive Act of 1998, child support settlements are more strictly enforced than they once were (Huang & Edwards, 2009). In addition, welfare reforms instituted in 1996 require that women identify the fathers of their children to be eligible for benefits (Coley, Kuta, & Chase-Lansdale, 2000). These reforms potentially increase men's awareness of the children they have fathered and may improve the quality of their reports. Recent research suggests that men's fertility histories are well reported in prospective studies such as the NLSY (Joyner et al., 2012). Although we expected that fertility expectations and events might matter for men's educational attainment, perhaps more so than in the past, we still anticipated that these associations would be stronger for women than men, in part because women are more likely than men to leave the labor force to care for children.

The Transition to College

Our first research question was whether expectations for early parenthood play an important role in variability in college attendance and the type of college attended. Enrollment in a 2-year college substantively differs from enrollment in a 4-year university in that the likelihood of earning a degree differs dramatically between these two types of schools. Almost three out of five students who start college in a 4-year institution have a bachelor's degree 6 years later. In contrast, only 11% of those who start their postsecondary educational careers in a 2-year institution obtain a bachelor's degree within 6 years (Radford, Berkner, Wheelless, & Shepherd, 2010). In addition, prior research indicates that the incompatibilities between parenthood

and education may be greater for individuals in 4-year schools. Parenthood decreases the chance of enrollment in a 4-year college more so than in a 2-year college (Teachman & Polonko, 1988), and enrollment in a 4-year college is more strongly associated with delays in fertility than is enrollment in a 2-year school (Rindfuss et al., 1988). This weaker association might arise because enrollment in a 2-year school is a smaller educational investment because some plan to obtain only an associate's degree or because the looser structure of 2-year schools is more compatible with parenthood.

It is important to note that the present analyses have controlled for high school academic performance, age at first sex, and family background, factors that likely influence both fertility expectations and college attendance. We also estimated models that controlled for high school students' expectations of earning a college degree. As mentioned above, one pathway through which we expected that expectations to become a parent in young adulthood could influence college enrollment is by shaping expectations about completing college. We were not able to shed much light on whether college expectations shape fertility expectations or vice versa, however. It seems likely that they are at least partly jointly determined. Nonetheless, we estimated models to evaluate whether fertility expectations are associated with college enrollment independently from college expectations.

College Persistence

Our second main research question was whether fertility expectations and pregnancies (we conceptualized pregnancies among college students as unanticipated events because the majority are unintended) might contribute to variability in college persistence. According to data from the Beginning Postsecondary Students Longitudinal Study, 74% of students who started college at a 4-year institution in the 2003–2004 academic year and had not yet earned a degree were still enrolled at a postsecondary institution in the spring of 2006 (i.e., junior year), and levels of persistence are even lower for those who started at 2-year institutions (Berkner & Choy, 2008). A variety of factors contribute to college dropout, including especially poor academic preparation (Adelman, 2006). We were most interested in

the potential influence of fertility expectations and pregnancies.

For pregnancies to be an important contributor to variability in who persists in college, they have to be common, and they have to be associated with the likelihood of dropping out of school. We have no idea how common pregnancies among enrolled college students are, but on the basis of prior research, we expected that pregnancies would be more common among students enrolled in 2-year schools (Rindfuss et al., 1988). For reasons discussed above, we expected that pregnancies would be positively associated with the risk of dropping out of school.

In sum, we were interested in whether variability in educational attainment is strongly associated with expectations for early parenthood or with (fertile) pregnancies that occur among college students. We also were interested in whether these associations vary by gender, as anticipated by theories that suggest that women would be more likely to drop out because of the implications that early parenthood has for their current demands on time and energy, as well as future work patterns and their reduced returns to educational investments.

METHOD

The data for this study came from the 1997 NLSY, an annual survey of a sample of 8,984 youth ages 12 through 16 in 1997. These data contain extensive information on family background, high school academic experiences, and college enrollment. For our analysis of postsecondary enrollment, we used a sample of 7,838 NLSY respondents who did not marry or have a child prior to leaving high school and who were interviewed at least once after leaving high school. We excluded those who were married or became pregnant prior to leaving high school because we wanted to focus on how expectations for early parenthood and pregnancies are associated with postsecondary educational transitions. Because some respondents enrolled in a postsecondary institution without earning a high school diploma, we did not restrict the sample to high school completers, although our multivariate analyses did include a control for whether the respondent earned her high school diploma or GED.

For our analysis of college persistence, we split the sample members who had ever attended a postsecondary institution into two groups:

(a) those who first attended a 4-year institution and (b) those who began in a 2-year college. Our 4-year sample had 2,605 respondents, and our 2-year sample had 1,962 young men and women. These samples excluded those who had married, had a birth, or were cohabiting at the beginning of their first spell of enrollment in a postsecondary school. Only a small proportion of men and women who enrolled at a 2- or 4-year college were parents or had been in a coresidential union prior to their enrollment. Those who decided to start to attend college despite having formed a family may be especially committed to education or may have greater extended family support to facilitate enrollment. For them, the influence of a second pregnancy may be weaker than those who start college without adult family roles and become parents while enrolled.

Measures

Our outcome for the analysis of college going was a three-category variable separating those who never attended college from those who went to a 2-year institution and those who went to a 4-year college or university. Our outcome for the analyses of college persistence was a monthly indicator of whether the respondent had left school without earning a degree; short spells of nonenrollment (6 months or less) were not counted as dropping out. Note that continuous enrollment does not necessarily equate to enrollment at the same school.

For the analysis of postsecondary attendance, our primary independent variable was expectations to have a birth by age 20. In 1997, respondents ages 15 and older were asked "What is the percent chance you will become the mom/dad of a baby sometime between now and when you turn 20?" Responses ranged from 0 to 100. For respondents who were 12 to 14 in 1997 and not asked this question we used the roughly comparable item about pregnancy expectations from the Round 4 survey in 2000 when these individuals were 15 to 17 years of age. This question asked "What is the percent chance you will become/get someone pregnant in the next 5 years?" In our multivariate analysis we used a continuous version of this variable, because alternative specifications did not improve the fit of the models. Our analyses investigated whether the results are sensitive to differences in question wording across cohorts. This fertility expectations measure is a better measure than a general

fertility expectations indicator because it takes into account fertility timing. Early fertility competes more directly with college completion and has a greater impact on the lifetime returns to education than delayed fertility.

Our primary independent variable for the analysis predicting college persistence is an indicator of whether the respondent (or the partner) is pregnant with a first fertile pregnancy. This variable equals 1 starting 7 months prior to the respondent's first birth (or the transition to fatherhood) and stays 1 from that point forward. In addition, we controlled for marital and cohabitation status using NLSY-constructed measures on marital cohabitation status in each month since the first interview. For respondents who were missing data on these constructed measures we used date of first cohabitation and date of first marriage to construct marital cohabitation status indicators. Measures of employment were derived from the NLSY's event history calendar, which contains variables describing number of hours of employment in each week of each year. We used these variables to create an indicator of the average number of hours a respondent was employed in each month, which we recoded into four categories: (a) *no employment*, (b) *less than 20 hours*, (c) *20 to 34 hours*, and (d) *35 or more hours per week*.

Our measures of academic preparation were high school math coursework and grade point average (GPA). High school coursework was measured via self-reported information on math coursework, because math courses are the strongest predictors of college success (Adelman, 2006). The NLSY has both self-reported and transcript measures of coursework; we selected the self-reported measure because it had substantially fewer missing data than the transcript measure. This variable originally had nine categories: (a) no math, (b) vocational math, (c) Algebra 1, (d) geometry, (e) Algebra 2, (f) trigonometry, (g) pre-calculus, (h) other advanced math, and (i) calculus. We recoded it into three categories: (a) *geometry or less*, (b) *Algebra II through pre-calculus* (reference), and (c) *advanced math or calculus*. GPA was measured from high school transcripts as an average, weighted by the number of credits, of all of the courses that appeared on the transcript, and ranged from 4 to 0.

Our analysis also included a control for college expectations. In 1997, the NLSY asked

respondents age 15 and over “What is the percent chance that you will have a 4-year college degree by the time you turn 30?” Unlike for the fertility expectations variable, the NLSY did not ask this question in 2000. They did ask it in 2001, but only to a random subsample of respondents, so we could not adopt an approach to this variable that exactly parallels fertility expectations. Consequently, for analyses using this variable, we restricted the sample to those age 15 and over in 1997.

Race/ethnicity was measured with a variable with four categories: (a) *Non-Hispanic White*, (b) *Non-Hispanic Black*, (c) *Hispanic*, and (d) *other*. Our family-structure variable indicated the respondent’s household structure at the time of the first interview and encompassed four categories: (a) *two biological parents*, (b) *single mother*, (c) *steparent*, and (d) *other family arrangement* (including no parent and missing). Parent education was divided into four categories—(a) *less than high school*, (b) *high school*, (c) *some college*, and (d) *college graduate*—and indicates the level of education of the respondent’s more highly educated parent. Our models also included a control for timing of first sex, coded as *before age 16*, *age 16 through 17*, and *age 18 or above* (including those who had not had sex prior to college enrollment). Age at first sex is associated with the timing of first birth and may also be associated with factors that predict college enrollment and persistence. Our models predicting college persistence controlled for age at matriculation.

Modeling Approach

Our analyses of the association between fertility expectations and the likelihood of attending a 2- or 4-year college were straightforward. We report results from multinomial logistic regression analyses that imputed missing values on the independent variables using standard multiple imputation techniques. These were similar to findings with mean substitution and with listwise deletion. In addition, to account for the nonproportional stratified sampling design, we weighted our descriptive and multivariate analyses using weights provided by NLSY. We also estimated unweighted multivariate models, and the results are substantively equivalent.

Two major analytic concerns shaped our analysis of college persistence. The first involved selection bias due to the fact that respondents

who go to college are different from those who do not. Estimating the effect of pregnancy on college persistence without adjusting for sample selection can lead to biased coefficients (Berk, 1983). Consequently, we used a two-step estimation process. We first modeled going to a 4-year college using the full NLSY sample ($N = 8,984$). In this model, we controlled for gender, race, parents’ education, family structure, measures of high school academic performance, whether the respondent had earned a high school diploma or GED, age at first sex, and fertility expectations. Then, in our models predicting college persistence, we included the hazard rate of not attending a 4-year college. We found that including this adjustment did not alter the results. Given that the selectivity of going to a 4-year college is higher than of going to a 2-year college and that adjusting for selection makes no difference in the 4-year models, we did not include this adjustment in our models predicting college persistence among those who started in a 2-year college.

A second analytic concern involved the fact that the data are right censored; at the last observation, some respondents were still enrolled in college. To account for this, we converted the data into person-month observations whereby each observation had information on the respondents’ race/ethnicity, parent education, family structure while growing up, math coursework, high school GPA, age at matriculation, age at first sex, fertility expectations, employment, marriage, cohabitation, and parenthood status in one month and whether the respondent was still in enrolled the following month. For analyses of respondents who started in a 4-year college, observations began in the first month the respondent was enrolled and ended at dropout, graduation, most recent interview, or 72 months after first enrollment. To count as having dropped out, the respondent had to not enroll in a 4-year college for 6 months or more. The data file is similar for those who started in a 2-year college, but observations are censored at 60 months because so few students were still enrolled at this duration. Using this person-month data file, we estimated discrete-time proportional hazard models using logistic regression. These models include dummy variables that allowed the baseline rate of dropping out to vary across months of duration since enrollment. One can interpret the coefficients that we present in the tables as indicating the relative likelihood of dropping

out given that the respondent was enrolled in the previous month and had maintained enrollment since beginning his or her postsecondary education. Individuals who leave school might eventually get a degree, but breaks in schooling are associated with delays in degree attainment and with a higher risk of never obtaining a degree.

RESULTS

Descriptive information about the variables used in our analyses is presented in Table 1. The first row of the table shows that 33% of respondents who did not marry or become pregnant before leaving high school attended no postsecondary institution. Below the description of college enrollment, the table provides information about our key independent variables. More than one third (38%) of the respondents did not expect to become young parents, and about one fifth of the sample believed that there was a high (greater than 50%) chance of becoming a young parent. This table also shows that most high school graduates took at least Algebra II in high school, the minimum level required for many colleges, and the average high school GPA was 2.81.

The results from a logistic regression model predicting the risk of going to a 2- or 4-year college versus not going to college are presented in Table 2. These models controlled for age at first sex, highest level of math taken in high school, high school GPA, race, parental education, and family structure in 1997. These results show that expectations for becoming a young parent were negatively associated with going to a 2- or a 4-year college. The association with 4-year attendance was significantly stronger than 2-year attendance, as tested by estimating a model with 4-year attendance as the reference category. An interaction between gender and fertility expectations was not statistically significant, leading us to conclude that the relevance of fertility expectations for college attendance was similar for men and women. We also included a control for the year that the fertility expectations question was administered, and this was not significant; neither was an interaction between year of question and level of fertility expectation (results not shown).

One way to consider the potential substantive impact of expectation for early parenthood on whether and what type of college attendance

Table 1. Description of Main Variables (N = 7,838)

Variables	%
Postsecondary enrollment	
None	33
2-year college	29
4-year college	38
Fertility expectations	
None	38
Low (less than 50/50)	36
High (greater than 50%)	22
Missing	4
Age at first sex	
15 and below	30
16 and 17	30
18 and above	40
Female	47
Race/ethnicity	
Non-Hispanic White	68
Non-Hispanic Black	14
Hispanic	12
Other	5
Family structure	
Both original parents	57
Single mother	18
Stepfamily	22
Other family	4
Parent's education	
Less than high school	11
High school	30
Some college	25
College graduate	29
Missing	4
Completed high school (GED, diploma)	90
Highest math	
Geometry and below	18
Algebra II or pre-calculus	48
Calculus	33
Missing	1
High school GPA	2.81

Note: All values are weighted. Sample includes cases of individuals who were never married or pregnant before leaving/completing high school. The college-eligible category includes respondents whose highest math completed was Algebra II or pre-calculus and above, had a high school GPA 3.0 or higher, and completed high school.

is to estimate predicted probabilities. With everything else set to the mean, we estimated that 57% attend a 4-year college among those who completed Algebra II or pre-calculus, had a high school GPA of 3.0, and had no expectations of becoming a parent. Among otherwise-similar

Table 2. Multinomial Logistic Regression Estimates From Model Predicting 2- or 4-Year College Attendance (N = 7,838)

Variables	2 Year			4 Year		
	B	SE	RRR	B	SE	RRR
Fertility expectation ^a	-0.05**	0.01	0.96	-0.09***	0.02	0.91
Age at first sex (ref.: 15 and below)						
16 and 17	-0.01	0.09	0.99	0.31**	0.11	1.36
18 and above	0.22*	0.09	1.25	0.69***	0.11	2.00
Male	-0.51***	0.07	0.60	-0.58***	0.08	0.56
Race/ethnicity (ref.: non-Hispanic White)						
Non-Hispanic Black	0.10	0.09	1.11	0.55***	0.11	1.73
Hispanic	0.45***	0.10	1.56	0.09	0.12	1.09
Other	0.79***	0.21	2.20	0.68**	0.22	1.97
Parent's education (ref.: high school)						
Less than high school	-0.29*	0.11	0.75	-0.53**	0.15	0.59
Some college	0.59***	0.09	1.81	0.74***	0.11	2.09
College	1.14***	0.11	3.13	1.90***	0.12	6.67
Family structure (ref.: both biological parents)						
Stepfamily	-0.14	0.10	0.87	-0.46***	0.11	0.63
Single mother	0.01	0.09	1.01	-0.40***	0.11	0.67
Other family	-0.40*	0.19	0.67	-0.87***	0.23	0.42
High school math (ref.: Algebra II or pre-calculus)						
Geometry and below	-0.75***	0.09	0.47	-1.56***	0.16	0.21
Calculus	0.13	0.10	1.14	1.30***	0.10	3.67
High school GPA (centered to 3)	0.54***	0.07	1.71	1.35***	0.10	3.87
GED or high school diploma	2.23***	0.17	9.33	2.90***	0.34	18.23
Constant	-1.81***	0.20		-3.01***	0.36	

Note: Analysis is weighted. RRR= relative risk ratio; ref. = reference.

^aFertility expectations are scaled so that the coefficient represents the estimated impact of a 10% point change in the probability of becoming a parent by age 20.

*p < .05. **p < .01. ***p < .001.

adolescents who believed that they had a 50% chance of becoming a young parent, 45% were predicted to enroll in a 4-year college. High fertility expectations were not unusual, with 22% of adolescents thinking that there was an even chance or better that they would become parents in early adulthood. These results suggest that fertility expectations play an important role in who goes to college. Of course, our analyses did not control for all potential extraneous variables and so we cannot be certain of the causal influence of fertility expectations.

To test the robustness of the association between fertility expectations and college enrollment we also estimated a model controlling for college expectations. We expected that one way that fertility expectations might influence college enrollment is by reducing the perceived likelihood of completing a college degree. It is also possible, however, that fertility expectations are partly determined by college expectations. The

results from models predicting college enrollment using the sample of respondents age 15 and over in 1997 (i.e. eligible to answer the college expectations question) are shown in Table 3. Similar to the results in Table 2, fertility expectations were negatively associated with 4-year college enrollment. In the model with expectations of earning a college degree by age 30, the coefficient for the fertility expectations variable was reduced but still significant.

Having examined who goes to college, we then investigated who drops out of college without earning a degree. A weighted description of 2- and 4-year college students across years is provided in Table 4. Starting with 4-year college students, this table shows that a substantial proportion of students dropped out each year. We estimated, using a life-table approach, that about 1.40% of 4-year college students dropped out of college each month in their first year. Although the dropout rate is fairly high, this table

Table 3. Multinomial Logistic Regression Estimates From Model Predicting College Attendance (2 or 4 Year vs. No Attendance) Among Those Age 15 or Older in 1997 (n = 3,062)

Variables	Without College Expectation						With College Expectation					
	2 Year			4 Year			2 Year			4 Year		
	B	SE	RRR	B	SE	RRR	B	SE	RRR	B	SE	RRR
Fertility expectation ^a	-0.03	0.02	0.97	-0.11**	0.03	0.89	-0.01	0.02	0.99	-0.07*	0.03	0.93
College expectation ^a							0.16***	0.02	1.17	0.28***	0.03	1.32
Age at first sex (ref.: 15 and below)												
16 and 17	-0.08	0.14	0.92	0.14	0.18	1.15	-0.10	0.15	0.91	0.12	0.18	1.13
18 and above	0.10	0.14	1.10	0.49**	0.17	1.62	0.08	0.14	1.08	0.45*	0.17	1.57
Male	-0.48***	0.12	0.62	-0.64***	0.13	0.53	-0.35**	0.12	0.71	-0.45**	0.14	0.64
Race/ethnicity (ref. non-Hispanic White)												
Non-Hispanic Black	0.03	0.14	1.03	0.52**	0.17	1.69	-0.11	0.15	0.89	0.33	0.18	1.39
Hispanic	0.40*	0.16	1.50	-0.01	0.20	0.99	0.31	0.16	1.37	-0.10	0.20	0.90
Other	0.75*	0.32	2.12	0.44	0.33	1.55	0.60	0.32	1.82	0.26	0.34	1.30
Parent's education (ref.: high school)												
Less than high school	-0.26	0.17	0.77	-0.49	0.25	0.61	-0.26	0.18	0.77	-0.52	0.26	0.59
Some college	0.71***	0.14	2.04	0.89***	0.18	2.43	0.63***	0.14	1.88	0.76***	0.18	2.15
College	1.15***	0.17	3.16	2.10***	0.19	8.19	0.92***	0.18	2.51	1.79***	0.19	6.00
Family structure (ref.: two biological parents)												
Stepfamily	0.01	0.15	1.01	-0.18	0.18	0.83	0.02	0.15	1.02	-0.18	0.18	0.84
Single mother	-0.01	0.14	0.99	-0.51**	0.17	0.60	-0.00	0.15	1.00	-0.52*	0.18	0.59
Other family	-0.27	0.30	0.76	-0.98*	0.36	0.37	-0.16	0.32	0.86	-0.87*	0.39	0.42
High school math (ref.: Algebra II or pre-calculus)												
Geometry and below	-0.85***	0.14	0.43	-1.85***	0.25	0.16	-0.69***	0.14	0.50	-1.59***	0.25	0.20
Calculus	0.23	0.16	1.25	1.52***	0.16	4.57	0.10	0.17	1.10	1.34***	0.16	3.81
High school GPA (centered to 3)	0.46***	0.10	1.58	1.21***	0.17	3.36	0.42***	0.10	1.52	1.13***	0.17	3.11
GED or high school diploma	2.32***	0.27	10.17	2.62***	0.56	13.77	2.32***	0.27	10.18	2.55***	0.59	12.86
Constant	-1.89***	0.32		-2.65***	0.59		-3.04***	0.36		-4.68***	0.68	

Note: Analyses are weighted. RRR = relative risk ratio; ref. = reference.

^aFertility and college expectations are scaled so that the coefficient represents the estimated impact of a 10% point change in the perceived probability of becoming a parent by age 20 (or of having a college degree by age 30).

* $p < .05$. ** $p < .01$. *** $p < .001$.

makes clear that only a very small percentage of students enrolled in a 4-year college were pregnant (or have gotten someone pregnant) with their first child. This is especially true in the first year of college, when only a fraction of a percent (0.33%) had become pregnant with their first child. (Note that pregnancy differs from dropping out in that someone can be coded as pregnant in more than one month, so this percentage actually reflects the percentage of person-months pregnant with first birth or had first child). As students accumulate years in college, the proportion of those who were ever-pregnant or had a child increases, but even in

the senior year under 3% reported having been pregnant with their first birth.

It is of not much surprise that marriage was also rare, given norms about the economic independence of married couples and the fact that many college students are still at least partially dependent on their parents. It may be more surprising to find that cohabitation was also fairly rare. Even by the fourth year of college, only about 5% of 4-year students were cohabiting in any given month.

In the bottom portion of Table 4 we present the characteristics of college students who started in a 2-year college by year. Students

Table 4. Description of College Enrolled Students by College Type, Year, and Gender

Variables	School Year					
	1	2	3	4	5	6
	4-year college					
Average monthly dropout rate (%)	1.40	1.07	0.90	0.81	1.55	2.81
% Dropping out each year	15.52	12.00	10.21	7.66	11.33	19.99
Ever pregnant (%)	0.33	0.83	1.51	2.16	4.38	7.58
Had a child (%)	0.05	0.44	0.91	1.56	3.47	6.41
Currently cohabit (%)	0.83	2.78	4.21	5.27	8.61	12.77
Currently married (%)	0.18	0.78	1.57	3.53	6.53	11.92
Total no. person-months (<i>n</i>)	28,963	24,200	20,927	15,394	6,127	1,972
	2-year college					
Average monthly dropout rate (%)	4.00	3.36	3.03	2.81	2.16	
% Dropping out each year	38.45	33.04	30.50	28.13	20.35	
Ever pregnant (%)	2.41	4.20	5.68	6.95	10.19	
Had a child (%)	0.69	2.39	4.23	5.18	8.08	
Currently cohabit (%)	2.55	4.91	6.12	7.07	6.92	
Currently married (%)	0.56	1.73	4.13	7.30	11.04	
Total no. person-months (<i>n</i>)	18,524	10,923	6,831	4,400	2,600	

Note: All percentages are weighted.

were considered continuously enrolled if they stayed in a 2-year college or transferred to a 4-year college. This table shows that 4.0% of students dropped out each month in the first year. In addition, only 2.4% of the person-months in the first year were spent pregnant with or parenting a first child, although among students who started their postsecondary education in a 2-year college and were still enrolled in a college 3 years later, about 7% of the person-months enrolled involved pregnancy or birth.

Coefficients from multivariate models predicting the likelihood of dropping out of college among those who started in a 4-year institution are presented in Table 5. These models also controlled for race, parent’s education, family structure, and age at first enrollment. Age at first sex was a significant predictor of college persistence, with respondents who had not had sex at the start of college significantly less likely to drop out than those who had had sex. In Model 1, fertility expectations were positively associated with the risk of dropping out.

Model 2 added our key independent variable, pregnancy. The results suggest that having a pregnancy significantly increased the risk of dropping out of college. In Model 3, adding controls for marriage, cohabitation, and employment—factors that might accompany pregnancy and affect college persistence—reduced the estimated impact of a pregnancy, but it remained

significant. Finally, Model 4 tested an interaction between gender and pregnancy and found that it was statistically significant. The size of the interaction coefficient suggests that pregnancies might have influenced college persistence for women, but not for men.

To further explore whether pregnancies cause an increased risk of college dropout for women, we attempted to estimate a two-stage least squares model but could not find an adequate instrument. It is important to note that an understanding of the contribution of pregnancies during college on the population-level association between family patterns and educational attainment does not depend solely on our ability to determine the causal impact of pregnancy on college persistence; the prevalence of pregnancy and its magnitude of association also can provide substantial insights. Table 4 indicates that only 0.33% of the person-months of freshmen enrolled in a 4-year college involved a pregnancy. Thus, the dropout rate of 1.4% per month largely reflected the experience of students who were not pregnant and not gotten anyone pregnant. Table 5 indicates that the odds of dropping out were about 2.12 the odds for not-pregnant students ($\exp 0.75 = 2.12$), which corresponds to a dropout rate of 4.1% per month. To get a substantive grasp on the potential effect of pregnancy on the risk of dropping out of college, we combined the life-table estimate of

Table 5. Logistic Regression Estimates of 4-Year College Dropout Without a Degree (n = 2,605 Individuals, 96,871 Person-Months)

Variables	Model 1			Model 2			Model 3			Model 4		
	B	SE	OR									
Male	0.09	0.06	1.09	0.11	0.06	1.12	0.10	0.06	1.11	0.14*	0.06	1.15
Age at first sex (ref.: 16 and below)												
17, Prior to college enrollment	-0.24**	0.09	0.79	-0.25**	0.09	0.78	-0.24**	0.09	0.79	-0.24**	0.09	0.79
No sex before college enrollment	-0.43***	0.09	0.65	-0.41***	0.09	0.66	-0.38***	0.09	0.68	-0.38***	0.09	0.68
Fertility expectations ^a	0.04*	0.02	1.04	0.03*	0.02	1.03	0.03	0.02	1.03	0.03	0.02	1.03
Marriage							0.59***	0.17	1.80	0.60***	0.17	1.83
Cohabitation							0.35**	0.13	1.42	0.35**	0.13	1.42
Pregnancy				0.75***	0.14	2.13	0.51***	0.15	1.67	0.74***	0.17	2.09
Employment (ref.: no work)												
Less than 20 hours per week on average							-0.12	0.09	0.88	-0.12	0.09	0.88
20 and less than 35 hours per week on average							-0.10	0.09	0.90	-0.09	0.09	0.91
35 and above							0.46***	0.08	1.58	0.46***	0.08	1.59
Male × (partner) pregnancy										-0.78*	0.31	0.46
Hazard rate of no enrollment in 4-year college	-0.46	0.28	0.63	-0.48	0.28	0.62	-0.49	0.28	0.61	-0.50	0.28	0.61
Constant	-5.41***	0.94		-5.18***	0.94		-4.90***	0.94		-4.95***	0.94	
χ^2		1,200.53			1,225.72			1,303.37			1,310.24	
df		92			93			98			99	

Note: Controls are month, race/ethnicity, parent's education, family structure, highest math, high school GPA, age at first enrollment, and missing flags (data omitted from the table). OR = odds ratio; ref. = reference.

^aFertility expectations are scaled so that the coefficient represents the estimated impact of a 10% point change in the perceived probability of becoming a parent by age 20.

* $p < .05$. ** $p < .01$. *** $p < .001$.

the proportion who dropped out each month by year, the proportion of person-months pregnant each year, and the relative risk of dropping out of respondents who were pregnant versus those who were not. We found that 15.52% of freshman who started in a 4-year school dropped out in the first year. This implies that, out of a cohort of 10,000 freshman, 1,552 drop out in the first year. When we combined information on the proportion of becoming pregnant, the dropout rate of not-pregnant students, and the relative dropout rate of pregnant students, we determined that even if all of the estimated effects of pregnancy were truly causal, only 11 out of 1,552 dropouts would be due to pregnancy.

In their junior year, more students experienced a pregnancy, but the dropout rate declined.

Again assuming that all of the associations between pregnancy and college persistence were due to the causal effect of pregnancy and not other unmeasured covariates, out of a hypothetical cohort of 10,000 juniors, 1,021 would drop out in their third year. Of these, only 21 would have dropped out because of a pregnancy. When we conducted the same calculations for Years 2 and 4, we found that about 3.4% of the dropouts in the first 4 years of college are due to pregnancy. Clearly, fertile pregnancies among college students are not a major contributor to the high proportions who leave college without a degree, especially considering the fact that the estimated association between pregnancy and the risk of dropping out is probably not all due to the causal effect of pregnancy.

We did a similar analysis of students who first enrolled in a 2-year college (results not shown) and found that pregnancy was significantly associated with an increased risk of dropping out. As was the case for students who started in a 4-year institution, the association between pregnancy and the risk of dropping out was greater for women than men. After conducting calculations similar to the ones described above for 4-year college enrollees, we estimated that about 9% of dropouts were potentially due to pregnancy. It is important to note, however, this estimate probably overstates the effect of pregnancy because unmeasured factors are correlated with both pregnancy and the risk of dropping out. Overall, we found that pregnancies contribute only a small amount to the college dropout rate.

DISCUSSION

Recent research shows that fertility patterns continue to vary substantially by levels of educational attainment, in terms of levels of completed fertility, fertility timing, and marital status at birth. The goal of this research was to better understand the social processes that connect education and fertility. These social processes are likely to vary across the life course. Our focus here was on the transition to adulthood, a time when youth make decisions regarding whether to go to college and whether to stay in college if they do go.

Whereas most research on the potential impact of fertility on educational attainment conceptualizes fertility as an unplanned event that disrupts education, in this study we also considered how expectations link education and fertility; specifically, we investigated whether fertility expectations were associated with the likelihood of going to college, and we found that they were, for both men and women. It is not necessarily the case that fertility expectations are the same as fertility plans, but nonetheless they are associated with future educational decisions even controlling for timing of first sex, family background, and college preparation and expectations. Other research suggests that some women may drop out of college in anticipation of motherhood, even when they will not become mothers for years (Stange, 2011). This suggests that there may be a planful process whereby future fertility shapes educational decisions earlier in the life course, and it is consistent with the idea that

adolescents make decisions based on anticipated returns to a course of action (Ajzen, 1991).

The second part of our analyses suggested that, once youth decide to attend college, pregnancies do not make a substantively important impact on college persistence. For men who start their postsecondary education at a 4-year college, pregnancies were not associated with the risk of dropping out. For women who started in a 4-year college, pregnancy was associated with an increased risk of dropping out, but only a small proportion of women enrolled in 4-year colleges become pregnant with their first child. This is probably partly because 4-year college students are so highly selected for not expecting a pregnancy in the near term. In addition, some of those who become pregnant decide to terminate their pregnancies, and this keeps levels of fertility low. We were unable to study the influence of all pregnancies on college persistence because pregnancies not carried to term are severely underreported in survey data (Alan Guttmacher Institute, 1997). Abortion rates are relatively high among women with some college compared with college graduates or women with only a high school degree, whereas pregnancy rates are low (Jones, Darroch, & Henshaw, 2002), suggesting that many of the small set of women enrolled in college who become pregnant elect to terminate their pregnancies. These terminated pregnancies may influence college persistence, and this could represent a way that unexpected reproductive events shape educational attainment. In any event, fertile pregnancies are so rare that they do not substantively raise the college dropout rate among the majority of students who begin their education in a 4-year college. Even among those starting in a 2-year college, pregnancies contribute less than 10% to the dropout rate.

This research investigated only one stage in the life course: the transition into adulthood. For other life course stages, the processes linking educational attainment and fertility are likely to be different. Nonetheless, we found suggestive evidence that part of the reason why the fertility patterns of high school graduates differ from those of college graduates is that a substantial minority of high school graduates decide not to pursue higher education in favor of starting families. At the same time, we found less support for the idea that pregnancies are a major contributor to the likelihood that a college student will drop out of school. If

true, then most of the differences in fertility between individuals with some college and those with a college degree are likely due to the influence of education (or unmeasured correlates of education) on family formation patterns. Future studies should further explore the processes that link education and fertility after leaving school.

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