

Early Family Formation:
An Important Impediment to College Completion?

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Abstract

Substantial amounts of previous research have investigated the impact of a teen birth on high school completion. Although the effects of fertility on high school degree attainment are weaker than once believed, the general consensus is that teen fertility does have negative effects on educational attainment. Yet, we know little about the effects of fertility and family formation at higher levels on postsecondary attainment. Findings indicate that fertility expectations in late adolescence are strongly associated with college matriculation, even controlling for high school course-taking and GPA. In contrast, among those enrolled in college fertility, marriage and even cohabitation is a relatively rare event. While marriage is significantly associated with the probability of dropping out of school, fertility and cohabitation are more weakly associated with college persistence. Overall, our results indicate that fertility, particularly fertility expectations, influence the choice of whether to go to college, but have little influence on college persistence among the select group who go to a four-year institution.

Acknowledgements : The authors acknowledge support from the National Science Foundation (Grant number 0757018) and from NICHD (R 24 HD042849 & T32 HD007081).

An extensive literature investigates the impact of teen fertility on high school graduation, but much less research investigates the association between family formation plans and events and college attendance and persistence. Although the effect of having a teen birth on high school graduation is obviously important, this is a narrow window through which to view the important connections between family formation processes and educational attainment. A growing body of research shows that the family and fertility patterns of women who obtain a college degree differ distinctly from the patterns observed for women who attend college without earning a bachelor's degree or those who earn a high school degree but do not attend college. College educated women have lower lifetime levels of unwanted fertility, (Musick, England, Edgington, Kangas 2009), are less likely to have a nonmarital birth (Mincieli et al. 2007) and are less likely to cohabit in early adulthood (Kennedy and Bumpass 2008). These patterns may arise because educational attainment provides resources that facilitate stable family life, but it is also possible that early family formation competes with investments in postsecondary education.

College attainment is important from both the societal and individual perspective. The income gap between those with college degrees and those without is growing over time in large part because there is an under supply of college graduates. The low graduation rates, thus to some extent, impede the economic and technological development of society (Goldin & Katz 2009). From an individual's perspective getting a college degree is associated with substantially better life outcomes and not only because of the higher income more education brings. Net of income, higher levels of education are associated with better health, a longer life expectancy, and, as already mentioned, a more stable family life (McLanahan 2004; Rogers, Hummer, Nam 2000). Although college completion is not associated as strongly as high school completion with extreme outcomes such as poverty, it is nonetheless an important factor shaping the health and well being of individuals as well as the broader society.

This paper explores the association between family formation plans and events in early adulthood and postsecondary educational attainment using data from the 1997 NLSY. This

analysis differs from previous work in this area in multiple ways. First, whereas previous work has focused on the association between teen births and high school graduation we extend the analysis past high school graduation. Recent research suggests that the influence of teen fertility on postsecondary attainment is greater than the effects on high school graduation (Hofferth, Reid, and Moffitt 2001). Our analyses consider the potential influence of fertility subsequent to high school graduation, investigating both the association between fertility expectations and college going as well as the influence of fertility during postsecondary enrollment on the subsequent likelihood of leaving school without a degree and degree attainment (relative to maintaining enrollment). A second contribution of this research is that it investigates the influence of relationships (cohabiting and marital) and how relationship status might condition the influence of fertility. Finally, most prior research in this area has focused on girls and young women, but our analyses also includes men. We expect that fertility expectations and events 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. Moreover, because of changes in child support laws and enforcement, many have financial responsibility for children even when they do not coreside. Thus, fathering a child as well as romantic involvement might have implications for their school completion as well.

BACKGROUND AND CONCEPTUAL MODEL

Does fertility impact educational attainment? The primary line of research that addresses this question focuses on the effects of teen fertility on high school graduation. Clearly girls who become mothers as teens are less likely than those who delay motherhood to earn their high school diploma, but these girls have other characteristics that portend lower educational attainment. Researchers have employed various approaches, such as comparing girls with a teen birth to their sisters without, to identify the effect of a teen birth on high school graduation. This research indicates that once analyses have controlled for measured and unmeasured

characteristics that differentiate teen mothers from other young women, the associations between teen fertility and high school graduation are much weaker than what is observed using ordinary regression techniques. In fact, some studies conclude that there is no negative effect of a teen birth on a girl's life chances, but weaknesses of these studies likely led to an underestimate of the effects (Grogger and Bronars 1993; Geronimus and Korenman 1992). A more conservative, and better supported, conclusion is that teen fertility has negative effects on high school graduation, albeit weaker effects than once thought (Hoffman 1998). Thus, fertility does effect education attainment, at least during adolescence.

We expect that family formation plans and events in early adulthood are also associated with postsecondary educational attainment. Regardless whether one is a teen or a young adult, having a child increases financial and caretaking obligations. A young adult might have to increase employment hours to address their greater financial responsibilities even as child care duties already reduced the time available for school work. Student loans and scholarships are available for young adults who are enrolled in college and these may alleviate the pressure for employment and reduce the negative impact of fertility on enrollment. Yet, teens also have some resources to help them continue schooling despite having a child. Teens still living with their parents may obtain assistance with housing and child care, enabling them to graduate high school. Thus, while the specific ways that some young adults manage to continue their college education after becoming parents differ from the approaches that teens and their families might employ to graduate high school, in both cases parenthood probably makes maintaining enrollment more difficult.

Not only should having a child influence postsecondary enrollment, but even expecting to have a child in the next few years may decrease the chances that one goes to college, or whether one attends a two- or four-year institution. Those who want to start a family soon may want to establish a career and start building seniority instead of spending four or more years in college, possibly building debt. Further, the returns to going to college are substantially lower if one does not complete a degree (Jaeger & Page 1996). Those expecting that they may become parents

before they could complete their schooling have diminished incentives for going to college.

Importantly an association between fertility expectations and college going might arise because those who are least well prepared to succeed in college – and therefore the least likely to go – may have higher fertility expectations because they do not plan to go to college. That is, fertility plans do not affect education, but educational opportunities affect fertility plans. To explore the possibility that college preparation accounts for the association between fertility plans and college enrollment, we estimate models that include strong controls for high school academic preparation.

Gender, similarities and differences

Most research on the effects of fertility on educational attainment has focused on the effects for women. This is partly because most 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, et al 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 care for children (Sayer, Bianchi, and Robinson 2004). Second, recent changes in the legal system make men financially responsible for children even when they are not living with and have never been married to the mother. Partly because of state efforts and partly because of the Child Support Performance and Incentive Act of 1998 child support settlements are more strictly enforced than they once were (Huang and Edwards 2009). Additionally, welfare reforms instituted in 1996 required that women identify the fathers of their children to be eligible for benefits. These reforms potentially increase men's awareness of the children they father and may improve the quality of their reports. (Nonetheless, we expect that men are still less complete in their reports than are women).

The effects of fertility on educational attainment may be similar for men as for women. With the transition to parenthood, both incur financial and care responsibilities that make

continuing postsecondary education difficult. Yet, the implications of childbearing for adult roles differ greatly for men and women. Despite the substantial growth in maternal employment, especially during the 1990s, labor force participation rates of mothers continue to lag far behind that of fathers. In 2007, among married men age 35-44, 95 percent were in the labor force. The analogous number for women is 73 percent, and this decreases to 62 percent for married mothers of children less than 6 (U.S. Census Bureau 2009). Importantly, this figure understates 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 a third (34.5%) are employed full-time year-round (Cohen and 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 impacts educational attainment by reducing anticipated future labor force attachment, we expect stronger effects of fertility and fertility expectations for women than men. We test this possibility by interacting our fertility expectations as well as our family formation variables with gender.

Marriage and Cohabitation

Only a few studies investigate the association between educational attainment and involvement in romantic relationships, including marriage and cohabitation. Most of this research focuses on how educational attainment delays union formation, especially marriage (e.g, Thornton, Axinn, & Teachman 1995; Hango and LeBourdais 2007; Glick, Ruf, White, & Goldscheider 2006). Yet research in this area widely accepts the possibility that the causal pathway runs in both directions, just as it does between fertility and educational attainment (Rindfuss, Bumpass, St. John 1980). Further, we have direct evidence that, at least in high school, romantic involvement is associated with decreased educational investments, particularly for girls (Crissey 2006). This might be because romantic relationships divert time and attention away from school or it could be because forming a romantic relationship encourages young women to view their potential adult

roles differently. Romantic involvement may be an even bigger factor in educational attainment at higher levels as the relationships tend to be more intensive, as are the demands of education.

On the other hand, committed relationships do not necessarily always compete with educational attainment. They might diminish the negative effects of fertility and/or provide support and incentive for completing a degree. Among non-traditional students marriage is sometimes associated with a faster rate of degree completion (Taniguchi and Kaufmann 2005). Those married to a supportive spouse may be better able to continue schooling than those who are single or in a more informal relationship.

To better identify the potential causal influence of child bearing and relationship formation on college degree attainment, this research controls a number of factors that potentially influence both. These include high school academic preparation (GPA and math coursework), parental education, race-ethnicity, age, and family structure in 1997. Models predicting college persistence also include a control for age at college matriculation and also examine whether the association between family formation and dropping out is reduced when controls for employment are added. A finding that the coefficients for family formation events are reduced (in absolute value) would be consistent with the idea that part of the reason why fertility increases the risk of dropping out of school is that it increases young adults' financial responsibilities.

DATA

Data come from the 1997 National Longitudinal Survey of Youth (NLSY). The NLSY is an annual survey of a sample of 8984 youth age 12-16 in 1997. These data contain extensive information on youth family background, high school academic experiences and college enrollment and performance. For our analysis of postsecondary enrollment, we use a sample of 7,115 NLSY respondents who completed a high school degree (or GED) prior to marriage or first childbirth. For the analysis of college persistence, we include the 2,533 young men and women who were enrolled in a four-year postsecondary institution in any October between 1998 and 2007, the most

recent survey round. This sample also excludes those who married, had a birth, or were cohabiting at the beginning of their first spell of enrollment in a postsecondary school.

Measures. We have two outcomes in our analyses. The first is a three-category indicator of whether the respondent enrolled in a two or four year postsecondary institution within two years of leaving high school. To identify the association between fertility plans and this outcome we estimate multinomial logistic regression models with each record representing one individual. The second part of the analysis investigates college persistence among those who enroll at a four-year college. Our outcome for this part is an indicator whether the respondent had left school, continued enrollment, or obtained a degree over the following 12 months. The NLSY asks respondents about spells of school enrollment and converts respondent answers into a set of variables describing enrollment status in each month. Note that continuous enrollment does not necessarily equate, in this case, to enrollment at the same school. We construct this measure by examining the respondents' enrollment status in October of each year. We selected October because whether one is enrolled in a school with a quarter or semester system, October is a month when school is in session. In addition, the NLSY asks respondents about dates of degree attainment and we use this information to indicate whether the respondent received a bachelor's degree. We combine these indicators into a single outcome variable that indicates in each year whether a degree was obtained and if not whether the respondent is enrolled.

Independent variables. For the analysis of postsecondary attendance, our primary independent variable is plans 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?" For the resulting combined variable 38 percent of respondents

indicated that there was no chance (zero percent) that they would be involved in a pregnancy over the next 5 years. An equal proportion thought that there was some chance of pregnancy, but it was less than 50/50. About one in five believed that there was better than a 50 percent chance of a pregnancy and the remaining 3 percent had unknown expectations (See Table 1).

For our analyses of college persistence, our primary independent variables are indicators of family formation, whether they have become pregnant with their first birth, have married, and whether they have cohabited. These variables are produced using the NLSY constructed measures on marital-cohabitation status in each month since the first interview. For those missing on these constructed measures, we use date of first cohabitation and date of first marriage, to construct marital-cohabitation status indicators. Our birth measure is constructed using information on the date of the respondents' first fertile pregnancy (i.e. the first pregnancy that results in a birth).

In addition, we have measures of employment derived from the NLSY's event history calendar. This calendar contains variables describing number of hours of employment in each week of each year. We used this variable to create an indicator whether the respondent was employed no weeks in the previous year. We combined this information with an indicator of the respondent's level of employment in the first week of October in each year to create a five category employment variable: not employed in the previous year, employed but not working in the first week of October, working less than 20 hours per week, working more than 20 hours per week, and missing employment information.

Our measures of academic preparation are math coursework and GPA. Our measure of high school coursework, self-reported, focuses on math coursework, as it is the strongest predictor of college success (Adelman 2006). The NLSY has both self-reported and transcript measures of coursework and we select the self-reported measure because it has substantially less missing data. This variable originally has nine categories, no math, vocational, algebra 1, geometry, algebra 2, trigonometry, pre-calculus, other advanced math, and calculus. We recoded it into five categories: no math, vocational, geometry or less, algebra II through precalculus (reference), and

advanced math or calculus. GPA is measured from high school transcripts. It is an average, weighted by the number of credits, of all of the courses that appear on the transcript and ranges from 4 to 0. We set cases missing on this variable to the mean and include a dummy flag for imputed cases in our regressions. We also test whether we obtain similar results when we delete missing cases from our analyses and find that we do.

Race-ethnicity is measured with a variable with four categories, Nonhispanic white, Nonhispanic black, Hispanic, and other. Our family structure variable indicates the respondent's household structure at the time of the first interview (usually 1997) and has four categories, two biological parent, single-mother, step-parent, and other family arrangement (including no parent and missing). Parent education has five categories, less than high school, high school, some college, and college graduate, and missing and indicates the level of education for the respondent's more highly educated parent.

MODELING APPROACH

Our analyses start with a sample of young men and women who had not had a birth or married before completing high school (N=7115). We estimate a series of unweighted multinomial logistic regression models predicting whether the respondents subsequently attended a two or four year college or university. This series begins with a model including only the fertility intentions variable to identify the baseline association between fertility expectations and college-going. Subsequent models add controls for gender and family background characteristics (race, parents education, family structure) to see whether the association between fertility intentions and college-going arises due to characteristics of the family of origin. Finally, we add measures of high school academic performance, which might be both a cause or a consequence of fertility intentions. That is, students who are struggling academically might see fewer opportunity costs for having a child in the near future, or those who want to begin child bearing soon may make less effort in high school. The goal of adding these measures of high school performance is to control for any influence of

academic ability on fertility expectations. Any remaining association between fertility expectations and college going is likely a conservative estimate of the effect of fertility expectations on postsecondary enrollment.

Following our analysis of postsecondary enrollment, we examine college persistence among those who enroll in a four year institution. We focus on these students because the large majority of those who enroll do so with the intent of obtaining a four-year degree, but this is not necessarily the case for those who enroll in a two-year school. Each observation (person-year) has information on the respondents' race-ethnicity, parent education, family structure while growing up, math coursework, high school GPA, employment, marriage, cohabitation, and parenthood status in October and whether the respondent was still in enrolled or had obtained a degree the following October. Observations begin in the first October the respondent is enrolled in a postsecondary institution and end at the first October the respondent is not enrolled, has obtained a degree, or is censored due to non-interview or 2007 (the time of the most recent interview). Using this person-year data file, we estimate discrete-time proportional hazard models using multinomial logistic regression. One can interpret the coefficients that we present in the tables under the "leaving school" panels as indicating that likelihood of dropping out given that the respondent was enrolled in the previous year and had maintained enrollment since beginning his postsecondary education. Those 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. In the "earn degree" panel we have coefficients indicating the relative likelihood of getting a degree given that the respondent was enrolled in the previous semester and had maintained enrollment since beginning his postsecondary education. A negative coefficient in this column indicates that the respondent is taking longer to get a degree, probably because the rate of accumulation of credits towards the degree is slower.

Note that each observation in the person year file describes marital, cohabitation, and pregnancy status at the start of the year and enrollment status at the end of the year. This is to be

sure that family events are measured prior to the measurement of school-leaving. Some respondents will form a family and leave school in the same year and our analysis misses these “ties.” This probably leads to an underestimate of the effect of family formation on enrollment because it omits young men and women who immediately leave school upon discovering a pregnancy, marrying, or starting to cohabit.

RESULTS

Postsecondary enrollment

Table 1 presents weighted distributions on the independent and dependent variables for our sample of high school graduates. About two in five respondents had attended a four-year college or university by last observation. A roughly equal proportion had not attended any postsecondary institution and one in five had attended a two-year school. Most of the respondents, 38 percent, do not expect to become pregnant (or get someone pregnant) in the near future, but about a fifth believe that there is a 50 percent or better chance of a pregnancy. This group that expects a pregnancy is substantially less likely than those who do not expect a pregnancy to attend a postsecondary institution.

Interestingly, the right side of this panel shows that those who believe that they have a low, but non-zero chance of a pregnancy have no lower likelihood of attending a four-year college than those who think there is no chance of a pregnancy. This group also has no lower GPA and has a slightly higher level of math course-taking. In contrast, the group that perceives a high chance of pregnancy has a lower GPA and lower levels of course-taking.

Table 2 presents odds ratios from multivariate models predicting postsecondary enrollment. Model 1 shows that those with a high perceived chance of pregnancy are significantly less likely to attend a two- or four-year university, but those who perceive a low chance are no different from those who see no chance of pregnancy. The association between pregnancy expectations is stronger with four-year than two-year enrollment. Adding controls for family background does little to reduce this association, although family background is strongly associated with enrollment

patterns. High school academic performance is also strongly associated with college enrollment, and adding these controls reduces somewhat the estimated effects of pregnancy expectations. Nonetheless, those who expect a pregnancy in the near future are significantly less likely to enroll in college, especially a four-year college. We also estimated models using weighted data as well as models that deleted cases missing on any of the independent variables. The results in these alternative models were similar to those we present in Models 1 through 4 of Table 2.

Finally we examined whether pregnancy expectations have a different association with college going for women than men. We find that having high pregnancy expectations has similar associations with four-year college enrollment for both men and women. High pregnancy expectations also decreases two-year enrollment for both men and women, although this negative association was significantly greater for men than women in only models estimated with weighted data. The important point here is that regardless whether we use weighted or unweighted data, *high* pregnancy expectations were never more negatively associated with college enrollment for women than for men. Some argue that women reduce their investments in education when they plan to have children because they will have a weaker attachment to the paid labor force and thus lower returns to educational investments. Men do not reduce their labor force attachment when they have children, but we also see at least as strong negative association between high fertility expectations and college enrollment for them as for women. This suggests that the negative association between fertility plans and college enrollment does not arise because of anticipated future labor force roles.

Yet, we do observe one pattern of associations that may support the importance of anticipated future labor force roles. For men, those with low fertility expectations have 28% higher odds of attending a four-year university than those with no fertility expectations. We see no similar pattern for women. This could be consistent with the idea that men invest in a college education when they anticipate becoming fathers because they will be more strongly attached to the labor force. For women, the incentive to invest may be more ambiguous. We consider this finding

further in the discussion section.

College Persistence

Table 3 presents a description of college persistence by school year. At the end of the first year (the October following the respondent's first enrollment in a postsecondary institution), almost 15% are no longer enrolled. This is a higher rate of first-year attrition than the 10% observed by Adelman (2006). This difference might occur for two reasons. First, we include respondents who began enrollment at any point, not just in the first year following high school graduation. It seems likely that attrition rates would be higher for non-traditional students. Second, we are observing enrollment in October the year after the first October enrolled, while Adelman counted students as enrolled if they were enrolled in any month of the calendar year. This table also shows that the rates of leaving without a degree decline after the first year. It is also possible to calculate a cumulative proportion who maintain continuous enrollment at each duration since matriculation. At end of the first year, 85 percent are still enrolled; at the end of the third year this is down to about 67 percent; and at the end of the fourth year the proportion drops steeply to 32 percent, largely because many earn a degree in their fourth year. The proportions earning a degree increases slowly up to the October following the fourth year, when it increases substantially. Forty-six percent of those maintaining continuous enrollment earned a degree by the fifth October following school enrollment (i.e. after four years of schooling). The proportion earning a degree by the sixth October is even higher. This table also indicates that our number of observations drops quickly after the sixth October and so our multivariate analysis truncates the analysis at year six.

Table 4 presents our time-varying measures of relationship formation, childbearing, and employment by gender. Overall among both men and women there is very little fertility and the levels of cohabitation are also surprisingly low. Among men, by October in their senior year, only 3% had married and a similar proportion had cohabited in the last year. Family formation, particularly cohabitation, is slightly more common among women than men. In fall of the sophomore year, 5 percent of women had cohabited in the last year and this increases to 12

percent in the senior year. Nonetheless, pregnancy and child bearing is still rare. Only 2 percent of women enrolled in their senior year had had a child and maintained enrollment.

Part of the reason why we see so little family formation might be that few of those who marry, become pregnant, or start cohabiting maintain enrollment until the following October. We explored this possibility by looking at family status at the end of each year among those who started the year enrolled in school. Our results suggest that a small proportion of women become pregnant and leave school quickly. In each year, about 3% of women who begin an academic year are pregnant with or have their first child within the following 12 months. This analysis supports our earlier finding that few college women are getting pregnant with their first children. Interestingly, four percent of adolescent women become pregnant before age 17 and an additional five percent of women become pregnant by age 18 (Abma et al., 2004). Thus, while the proportion becoming pregnant is small, it is on a similar scale as to what is experienced by high school aged girls.

Table 4 also presents information on employment. While few students start the academic year married, cohabiting, or pregnant, most students are employed. Between 80 and 90 percent are employed at least some weeks in each year. Between 17 and 20 percent of students are employed at least 20 hours the October of their freshman year. This dips in the sophomore year and increases across subsequent years.

Table 5 presents the results from discrete-time event-history models predicting the probability of leaving school without a degree and of obtaining a degree relative to maintaining enrollment for women who begin their schooling at a four-year institution. Model 0 presents the bivariate associations with year of schooling controlled. We see that the likelihood of dropping out in the second or later years is smaller than for the first year. On the right side of the table, the pattern of results indicates that the likelihood of getting a degree increases sharply in the fourth and fifth years. Similar to previous research, we find that high school academic preparation is strongly associated with college persistence and degree attainment. Men are marginally more likely than women to leave school without obtaining a degree and they are slower to obtain their

degrees. Family background characteristics are associated with college persistence and degree attainment in unsurprising ways. For example, whites are more likely to maintain enrollment than blacks or Hispanics. We also see that blacks and Hispanics obtain their degrees more slowly than whites even when they do maintain enrollment. Our results also show strong associations between college persistence and marriage, cohabitation, and pregnancy. At the bivariate level, modest amounts of employment are associated with a higher likelihood of staying in school compared to having no employment, but more than 20 hours of employment is associated with a greater likelihood of dropping out.

In our preliminary analyses we tested interaction terms to see whether the effects of family formation varied by gender. We found that it did and thus our first multivariate model includes interaction terms. In Model 1, the main association between marriage, cohabitation and pregnancy and college persistence are all statistically significant. Those who start families are more likely to leave school than those who do not, but the effects of a pregnancy are only marginally significant. The effects of cohabitation are also only marginally significant for women (the main effect) but are significantly greater for men (interaction). The right side of the table indicates that a pregnancy significantly slows the pace of degree attainment, while marriage and cohabitation are not associated with the pace of degree attainment for women. Marriage is associated with accelerated degree attainment for men, perhaps because some men marry in anticipation of graduation.

We tested whether the association between pregnancy and enrollment is modified by marital or cohabitation status. For men, there is no evidence that the effect of a pregnancy is weaker or stronger if they are married or cohabiting. For women, marriage does not reduce the positive association between pregnancy and dropping out of school, but an interaction term with cohabitation is marginally significant ($p < .10$), indicating that cohabitation might reduce the negative effects of pregnancy. Moreover, once this interaction term is included in the models, the main effect of pregnancy (for women who are neither married nor cohabiting) becomes solidly

significant ($p < .05$). The interaction, however, is not significant in weighted models. Given that only one interaction term is marginally significant and this disappears in weighted models, we tentatively conclude that marital and cohabitation status does not modify the estimated effect of a pregnancy.

Model 2 adds measures of employment to see whether the estimated effects of family formation events are due to an association between family formation and employment. For example, young adults who marry or have children may stop receiving support from their parents and have to begin employment to support themselves. Alternatively, those who are employed may have fewer constraints on forming relationships (e.g. they aren't concerned about losing parental support, or they have transitioned into an adult identity). Either way, family formation events may be positively associated with employment. Adding the controls for employment reduces the marriage, cohabitation and pregnancy coefficients, suggesting that there is a positive correlation between family formation and employment. Yet, adding the measures of employment does not reduce the coefficients by much suggesting that the reason why family formation increases the risk of dropping out of school is not because it increases the pressures for employment.

DISCUSSION

This study expands on previous research on the association between fertility and educational attainment in three ways. First, it investigates the potential impact for men as well as women. Overall, we find surprising similarity between men and women in the patterns of association. For both men and women, fertility plans are associated with the likelihood of college enrollment. For both, high fertility expectations were significantly associated with low rates of enrollment, particularly in four-year colleges. In addition, fertility had similar negative effects on college persistence for men and women. Yet there is a gender difference in the effect of fertility that is consistent with economic theory. For men, but not women, those with no fertility expectations have a lower probability of four-year college enrollment than men who have low fertility expectations. This might arise because men with low fertility expectations anticipate being

fathers someday relatively soon (but not as soon as men with high fertility expectations). In the face of these future plans of fatherhood, these men go to college to increase their earnings capacity. We see no similar pattern for women, for whom low pregnancy expectations have no association with college enrollment. Of course, this pattern of association might arise for other reasons. It might be that men with low pregnancy expectations are just being more realistic about their chances of accidentally getting someone pregnant than those who say that there is no chance of getting someone pregnant. Yet, this does not explain why we do not observe the same pattern for women. Nonetheless it is important to put this gender difference in the effects of fertility expectations in perspective. Overall, most of the effects of the gender interactions we tested did not show stronger effects of family formation for women than men.

The second innovation of this analysis was the exploration of whether the effects of a pregnancy were moderated by marital or cohabitation status – an analysis that makes more sense for young adults than for teens. Although we found weak evidence that the association between pregnancy and dropping out of school is weaker for cohabiting women than for single women. This result is not robust and disappears in weighted analysis. Thus we generally conclude that any effect of pregnancy on college persistence is not modified by union status.

Finally, it extended the analysis of the potential influence of fertility on educational attainment beyond high school. A long-established line of research shows a strong association between education and fertility (Hofferth 1984; Marini 1984; Rindfuss, Bumpass, St. John 1980), and recent studies have concluded that some of this association is due to a causal effect of fertility on high school graduation (Hoffman 1998). Taking the analysis beyond high school, our results indicate about one in four high school graduates believe that there is a high likelihood that they will become parents in the years immediately following high school graduation. These expectations are strongly associated with the probability of attending college. Importantly, this association persists net of controls for high school academic performance, indicating that this association is not due to the fact that students who are less well prepared for college are more likely to expect a

pregnancy. This strongly suggests that fertility expectations are encouraging some youth to truncate their educational careers, adding to the evidence that fertility and family formation influence educational attainment.

While we find evidence that fertility expectations are potentially important determinants of educational attainment, we find less support for the idea that fertility events during college are important impediments to degree attainment. Only a small proportion of students enrolled in four-year colleges become pregnant with their first child. This is probably partly because college students are so highly selected for not expecting a pregnancy in the near term. Additionally, 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 to college graduates or women with only a high school degree while pregnancy rates are low (Jones et al. 2002), suggesting that many of the small set of women enrolled in college who become pregnant elect to terminate their pregnancies. Yet, even pregnancies that result in a birth are not highly predictive of college persistence. In our models, once family background characteristics, high school academic performance, and age at first college enrollment are controlled, the estimated effect of a pregnancy on the chance of leaving school is only marginally significant. Adding controls for college performance and school attachment would likely weaken this association even further. The association between teen fertility and high school graduation and the coefficients are almost always statistically significant even in sibling models that control for unmeasured differences across families (Hofferth, Reid, and Moffit 2001). One reason why the effects of a pregnancy on high school graduation might be stronger than the effects for women and men enrolled in a four-year college is that the families of college students have more resources to help their children stay in school.

In any event, these results argue against the idea that the strong correlations between education and family formation patterns arise because of family formation during college. Instead, the models using fertility expectations to predict college enrollment suggest that the influence of fertility plans and expectations on educational attainment happens earlier in youths' decision whether to enroll in a four-year college. Put another way, we find substantial evidence that part of the reason why the family formation patterns of high school graduates differ from those of college graduates is that many a substantial minority of high school graduates decides not to pursue higher education in favor of starting families. Yet, we find at best weak support for the idea that early family formation causes those with some college to leave school early. If true, then most of the differences in marriage, cohabitation, and fertility between those 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. This provides yet more evidence of the value of a college degree for one's life chances, not just for income and health but also for aspects of family stability.

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Table 1. Sample Description. Weighted percentage distributions and mean.

Dependent Variable	Percent			
	Total	Fertility Expectations		
		None	< 50/50	50%+
Dependent Variable				
Postsecondary Enrollment				
None	38	27	26	46
2-Year	22	29	25	29
4-year	40	45	49	25
Total	100	100	100	100
Independent Variables				
Highest Math Taken				
None	1	0	1	1
Vocational	3	4	2	5
Geometry	19	18	17	27
Typical	56	57	55	54
Calculus	21	21	25	13
Missing	0	1	0	1
Total	100	100	100	100
		Mean		
H.S. GPA	2.89	2.93	2.95	2.68
	Percent			
Fertility expectations				
None	38			
Low (less than 50/50)	38			
High (greater than 50%)	21			
Missing	3			
Female	48			
Race-ethnicity				
Non-Hispanic White	73			
Non-Hispanic Black	14			
Hispanic	12			
Other	1			
Family Structure				
Both Original Parents	60			
Single Mother	20			
Step Family	17			
Other Family	3			
Parent's Education				
Less than High School	27			
High School	38			
Some College	14			
College Graduate	21			

Table 2. Odds Ratios Predicting Postsecondary Enrollment in 2 or 4 year school compared to no enrollment

	Model 1		Model 2		Model 3		Model 4		Model 5	
	2-year	4-year	2-year	4-year	2-year	4-year	2-year	4-year	2-year	4-year
Expectation of parenthood at 20										
No chance	.---	.---	.---	.---	.---	.---	.---	.---	.---	.---
Low (less than 50/50)	.98	1.03	1.01	1.08	1.00	1.06	1.00	1.07	1.10	1.28*
	.61**	.33**								
High (greater than 50%)	*	*	.64***	.36***	.64***	.37***	.69***	.46***	.65***	.50***
Gender and race/ethnicity										
Female			1.62**	1.95**	1.66**	2.09**	1.51**	1.58**	1.58**	1.85**
			*	*	*	*	*	*	*	*
White			.---	.---	.---	.---	.---	.---	.---	.---
Black			.77***	.60***	.90	.95	.94	1.28**	.94	1.28**
Hispanic			1.11	.44***	1.24**	.55***	1.27**	.67***	1.26**	.67***
Other race			1.82+	1.05	1.70	.97	1.87+	1.35	1.84	1.33+
Family Structure and Parent Education										
Two bio parents					.---	.---	.---	.---	.---	.---
Single mom					.85*	.43***	.91	.54***	.92	.54***
Stepfamily					.70***	.36***	.72***	.44***	.73***	.44***
Other Family					.54***	.32***	.58**	.38***	.58**	.38***
Less than High School					.86+	.87+	.88	.92	.88	.92
High School					.---	.---	.---	.---	.---	.---
Some College					1.18	1.53**	1.19	1.46**	1.20	1.46**
College					1.71**	2.87**	1.69**	2.58**	1.69**	2.57**
					*	*	*	*	*	*
High School coursetaking and GPA										
Low hs math							.22***	.05***	.22***	.05***
medium low hs math							.58***	.18***	.58***	.18***
medium hs math							.---	.---	.---	.---
high hs math								2.11**		2.11**
								*		*
High school gpa							1.01**	1.02**	1.01**	1.02**
							*	*	*	*
Interactions for Gender and Expectations										
Female* Low Pregnancy Chance									.79	.68*
Female* High Pregnancy Chance									1.14	.87

*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1, analyses are unweighted

Table 3. Percentage distribution by status at end of year

Status at End of Year	school year							
	1	2	3	4	5	6	7	8
Not Enrolled	15	11	8	7	11	21	26	53
Enrolled	85	89	89	48	35	38	49	41
Earned Degree	0	0	3	46	54	41	25	6
Cumulative % enrolled	85	76	67	32	11	4	2	1
Cumulative % still enrolled among those w/o degree	85	76	70	65	58	46	34	16
Total unweighted N	2,526	2,085	1,787	1,430	533	137	29	6

Table 4. Percentage experiencing a family formation event among 4-year college enrollees as of the start of the year by year and gender, weighted

	School Year					
	1	2	3	4	5	6
	Men					
Cohabitation during Previous year	1	1	3	3	7	12
Ever Married	0	1	1	3	4	7
Sexual partner ever pregnant	0	0	1	1	2	5
Employment						
Any Employment	83	85	85	88	84	90
More than 20 hours	17	14	18	24	29	41
	Women					
Cohabitation during Previous year	1	4	7	11	13	28
Ever Married	0	1	1	4	7	11
Had a child	0	0	0	2	4	7
Ever pregnant	1	1	1	2	6	7
Employment						
Any Employment	88	90	92	92	91	93
More than 20 hours	20	14	22	26	36	50

Table 5. Discrete-Time Proportional Hazard Estimates of College Persistence and Degree Attainment

	Leave School vs Stay Enrolled			Get Degree vs Stay Enrolled		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
	Odds Ratios					
Constant		0.02 ***	0.03 ***		0.00 ***	0.00 ***
Year in School						
Second	0.69 ***	0.73 ***	0.74 ***	2.59	2.58	2.53
Third	0.54 ***	0.58 ***	0.58 ***	18.07 ***	18.13 ***	18.18 ***
Fourth	0.78 *	0.80 †	0.76 *	455.31 ***	498.57 ***	513.68 ***
Fifth	1.73 ***	1.56 **	1.46 **	743.60 ***	920.33 ***	972.06 ***
Sixth	3.07 ***	2.46 ***	2.20 ***	605.59 ***	821.95 ***	901.32 ***
H.S. Math (Standard)						
vocational	1.14	0.64	0.63	0.19	0.18	0.18
Geometry	2.23 ***	1.62 ***	1.63 ***	0.70	0.80	0.78
Calculus	0.68 ***	0.83 *	0.83 *	1.38 ***	1.28 **	1.26 **
Missing	0.72	0.75	0.75	6.41 †	5.98 †	5.47
H.S. GPA	0.99 ***	0.99 ***	0.99 ***	1.00 ***	1.00 †	1.00
MisGPA	1.08	1.06	1.06	1.17	1.17	1.17
Male	1.14 †	0.69	0.69	0.83 *	1.51	1.64
Race-ethnicity (Non-Hispanic White)						
Black	1.42 ***	0.96	0.98	0.55 ***	0.63 ***	0.63 ***
Hispanic	1.32 **	1.04	1.03	0.57 ***	0.60 ***	0.61 ***
Other	0.76	0.75	0.76	1.18	1.17	1.13
Parent Education (H.S.)						
< HS grad	1.21 *	1.07	1.07	0.74 **	0.92	0.91
Some college	1.01	1.09	1.11	0.99	0.93	0.93
College grad	0.83 †	0.92	0.93	0.98	0.93	0.92
Missing	1.20	1.13	1.13	0.85	0.95	0.95
Family Structure (Two-Parent)						
Single Mom	1.56 ***	1.32 **	1.32 **	0.66 ***	0.80 †	0.81 †
Step Family	1.72 ***	1.40 ***	1.38 **	0.73 *	0.80 †	0.82
Other Family	1.81 **	1.55 *	1.54 *	0.64	0.68	0.69
Age@1st Enroll'd	1.41 ***	1.26 ***	1.24 ***	1.26 ***	1.33 ***	1.34 ***
Married	3.07 ***	2.44 **	2.32 **	1.25	0.72	0.77
Cohabited	2.07 ***	1.42 †	1.38 †	0.90	0.76	0.80
Pregnancy	2.76 ***	1.57 †	1.55 †	0.64 †	0.52 *	0.50 *
Male*Married		1.00	1.05		2.72 *	2.57 †
Male*Cohabited		1.68 †	1.68 †		1.47	1.38
Male*Pregnancy		1.52	1.52		0.46	0.42
Employment (Not Employed the previous year)						
Some	0.72 **		0.90	1.15		1.11
Less than 20 hrs	0.73 **		0.94	1.18		1.07
More than 20 hrs	1.26 *		1.33 *	0.77 †		0.75 †
Missing	1.03		1.29	1.01		0.94

*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1, analyses are unweighted. Note: Zero order models include dummy variables for year.