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**EARLY ACADEMIC ABILITY, FAMILY FORMATION, AND EDUCATIONAL
ATTAINMENT: EXAMINING THE ROLE OF CHILDBIRTH AND UNION
FORMATION AMONG YOUNG WOMEN**

A Thesis In

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Abstract

Past research has shown that a number of individual and family factors are associated with educational attainment. Among these factors, marital status, union formation, and parenthood have been found to significantly impact educational attainment; however, the timing of these transitions have not been examined together to understand their impact on high school and college degree attainment. Using data derived from the National Longitudinal Study of Health (Add Health), event history techniques are used to understand the relationship between the timing of family formation and educational attainment and the characteristics associated with degree attainment for women who have experienced family formation prior to degree attainment. These relationships are further examined by race. Findings indicate that not all forms of family formation have a negative impact on college degree attainment; however, an early birth lowered the likelihood of both high school and college completion. Contrary to prior findings, the effect of first birth did not vary by race, nor were any racial differences found in the effect of resilience characteristics. For young women who engaged in early family formation, early academic potential and aspirations appeared to act as a buffer and were associated with increased likelihood of degree completion. These findings suggest that highly motivated students may find ways to overcome obstacles to degree completion.

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Introduction

The relationship between family formation and educational attainment has been an interest of family scholars for decades. Early family formation may negatively impact a young woman's life chances. Specifically, the obligations and demands associated with union formation and parenthood may reduce her success at the principal challenge of performing sufficiently well in middle and high school to earn a diploma and enroll in a four-year institution. Given the positive relationships between educational attainment and both occupational employment and later earnings trajectories (e.g., Pascarella and Terenzini, 1991; Bowen and Bok, 1998; Winship and Korenman, 1999), early family formation, because of its competing obligations impacting educational attainment, is likely to have a negative effect on later life outcomes.

There have been a number of changes in American family patterns since scholars first began to focus on the relationship between family formation and educational attainment. The increase in age at first marriage has led to a greater number of young women engaging in alternative short-term union formations and provides a greater opportunity for non-marital birth (Bianchi and Casper, 2001). Studies have examined the impact of marriage and/or fertility on degree completion; however, none appear to provide a picture of contemporary family life that included three main forms of family formation: marriage, cohabitation *and* fertility.

This study incorporates the timing of these three main forms of family formation to answer the following questions: First, how does the timing of family formation impact educational attainment? Second, what factors allow some women to succeed after early family formation while others do not? Finally, how do the consequences of early family formation vary by race? In other words, what factors impact how early marriage, cohabitation, and childbirth influence the likelihood of degree attainment for young women?

Background

Completing educational milestones are a necessary prerequisite for college degree completion. Successfully completing high school and enrolling in college requires students to be prepared academically and to be focused on completing educational goals.

Failure to complete high school may be due to one or more of a number of factors including poor grades, disciplinary problems and family financial strain. Additionally, childbirth and marriage may delay or inhibit high school graduation (Waite and Moore, 1978; Howell and Frese, 1982; Rumberger, 1983; Manlove, 1998). In their longitudinal one-city study of public school children, Alexander and his colleagues (1997) found that early family, individual, and academic characteristics impact later drop out decisions. There is, however, a large gap in educational attainment among racial and ethnic minorities. The findings of Kao and Thompson (2003) indicate that group differences in grades, test scores, and tracking influence college enrollment and completion.

Socioeconomic status may also contribute to ones decision to leave high school (Gamoran and Mare, 1989; Weber, 1988). For example, children from financially disadvantaged families may be more likely to drop out of school to find work so that they can contribute to family income (Lerman, 1972; Stroup and Robins, 1972). Adolescents may transition out of their student role to take on more 'adult' identities such as employee, parent, or spouse. A student's SES background also contributes to their likelihood of obtaining a college degree. Low SES students have fewer information sources about successfully navigating the college application and enrollment process than their higher SES counterparts (Leslie, Johnson, and Carlson, 1977; Tierney, 1980).

Marriage and Childbirth

When higher education does not seem accessible, youth may turn to family formation as an alternative pathway to adulthood. Stearns and Glennie (2006) suggest that adolescents who have low academic performance may also have low expectations for college enrollment. Seeing low promise of postsecondary education opportunities they may, in turn, view early parenthood and marriage as alternative transitions into adult roles. Higher academic performance, coupled with high expectations for college enrollment, on the other hand, provide incentive to delay early family formation. For instance, Howell and Frese (1982) found that students with higher academic ability, measured by IQ, were less likely to give birth, get married, or drop out of high school.

Using event history techniques, Glick and her colleagues (2006) examine the relationship between school engagement and the timing of marriage and childbirth for adolescents. Their findings indicate that school engagement is an important factor in delaying young women's family formation. Students with higher grades were also less likely to drop out. Students who were supported and encouraged academically were much more likely to delay early family formation.

The results, however, indicate considerable variation in family formation across racial and ethnic groups. Findings indicate that black women are significantly more likely than whites to experience early childbirth. Glick and her colleagues (2006) suggest that viewing childbirth as an alternative to school completion is only a partial explanation to the racial and ethnic variations found in the data. Similarly, Howell and Frese (1982) found that whites are more likely than blacks to drop out if they get married or have their first child during high school. Similar to the conclusion of other scholars (see, for example, Waite and Moore, 1978), these authors suggest

that the social support in black families allows young women to continue schooling in spite of new family responsibilities.

Upchurch and McCarthy (1990) found that most women who became mothers while in high school were just as likely to graduate as those who progressed through high school without becoming a parent. The probability of completing high school was .726 for women who had their first child prior to high school graduation and .772 for those young women who did not experience parenthood before graduation (see Figure 2, p.228). Booth, Rustenbach, and McHale (2008) found similar patterns in their study of the impact of early family transitions on young adult mental health. Consequences of early family formation did not follow young people into early adulthood. For some young adults, early family formation was a pathway to other positive life changes. For instance, for certain disadvantaged adolescents, early family formation may provide an opportunity to gain independence and develop responsibility in a new family.

Alternatively, in their study of the impact of early sex on educational attainment, Steward, Farkas, and Bingenheimer (forthcoming) found that, in the short haul, early family formation can have a negative impact on young women. Both marriage and childbirth prior to the expected dates of college enrollment significantly reduced the likelihood that young women would obtain a four-year degree, indicating that there may be immediate educational consequences for early family formation. Giving birth, in some cases, leads to motherhood, which brings new expectations and responsibilities that, for many women, cannot easily be reconciled with remaining in school.

Overall, findings indicate that once sociodemographic and academic characteristics are controlled the timing of family formation may impact educational attainment for only some young women. Although giving birth may or may not lead to taking on parent roles, the literature

seems to suggest a negative relationship between childbirth and educational attainment. Whether it is merely the stigma associated with young pregnancy and the time required to bring a baby to term, or the responsibilities associated with childcare and juggling the roles of both parent and student, there is something about childbirth that lowers the likelihood of degree completion for women. Marriage before high school completion may signal an alternative course to adulthood for young women. Similarly, family formation before college enrollment may divert focus away from academic goals and performance causing role competition.

Cohabitation

Although scholars have determined a number of common individual characteristics of cohabiters (e.g., Smock, 2000; Manning and Smock, 2005) as well as the impact of cohabitation on later family and individual outcomes (e.g., Mincieli et al., 2007; Booth et al., 2008), no study has examined the impact of nonmarital union formation on educational attainment. A number of scholars have, however, examined the influence of education on cohabitation (e.g., Thornton et al., 1995; Liefbroer and Corijin, 1999). Findings from both longitudinal studies indicate that as women increase their years of education they are less likely to delay cohabiting relationships. As students get older and find more of their peers successfully navigating the roles of student and partner they may be more likely to enter into some type of nonmarital union.

Although scholars have found that the amount of education a young woman has influences the timing of union formation, it is also important to examine impact of the reversed relationship for some women. If early cohabitation delays or inhibits educational attainment there may be a negative impact on the future employment opportunities for these young women. If, on the other hand, findings indicate that early cohabitation does not have the same negative educational

outcomes as early marriage we may find that, in measuring educational outcomes, cohabitation may be a positive alternative to an early marriage.

The measurement of cohabitation by social scientists is difficult for a number of reasons. First, language used to measure cohabiting relationships is often ambiguous for the respondent. In their qualitative study of cohabiting young adults, Manning and Smock (2005) found that the occurrence of cohabitation may be underestimated in national surveys because the language used to measure cohabitation is not appropriate for the way that individuals involved in these unions describe their relationship. For example, participants said that they did not often use the terms 'partner' or 'nonmarital union' when describing their relationship, yet a number of surveys use these terms when determining the number of respondents cohabiting.

Another reason it is difficult to disentangle the impact of cohabitation is because it is so closely intermingled with other forms of family formation. For instance, Brien et al. (1999) found that cohabiting unions increase the likelihood of nonmarital childbirth for all women as well as the likelihood of marriage for white women. Similarly, Mincieli et al. (2007) found that Latinas and white women are more likely to have nonmarital birth inside a cohabiting relationship. Women with less than a high school education, however, are more likely to have a nonmarital birth outside of a cohabiting relationship. According to Smock (2000), for most couples cohabitation is a transitory state which ends in marriage or separation within five years. Thus, any impact of cohabitation on educational attainment may be through the anticipation of other family forms that may soon follow.

Theoretical Perspective

Researchers have relied on a number of theoretical and conceptual perspectives to explain the relationship between family formation and educational attainment; these include demographic transition theory (De Wit, 1994); rational choice theory (Ribar, 1994); the role incapability hypothesis (Thornton, Axinn, and Teachman, 1995); role strain theory (Waite and Moore, 1978); social role theory (Marini, 1984) as well as a combination of other conceptual frameworks (Marini, 1978; Upchurch and McCarthy, 1990), largely dependent on the direction in which researchers point the causal arrow.

For this study, the theoretical frameworks are life course, role strain, and resilience theories. Together, these three theories provide a comprehensive foundation for understanding how the timing of family transitions impact educational attainment. Life course theory considers the impact of the relative timing of events in individuals' lives. This theory takes into account the variation in the average time of completing family formation transitions among groups and is used to examine racial differences in the relative timing of young women's entrance into marriage, parenthood, and/or cohabitation. Role strain theory considers the implication of an individual taking on a number of competing roles. It provides a framework to understand the challenges that may arise in an attempt to juggle the role of student, mother, wife, and/or partner. The resilience framework offers an explanation for why some young women are able to surmount the obstacles of early family formation and obtain a high school and college degrees while others are not equally successful. This perspective illuminates family, community, and individual characteristics that may be associated with successful educational outcomes. Taken together, the life course, role strain, and resilience frameworks help provide a more complete

understanding of how the timing of early family formation relative to educational status during these family transitions impact the likelihood of college degree completion for young women.

Life Course

According to Elder (1994), there are four primary themes in life course theory: the interplay between human lives and historical times, the timing and sequencing of important role or status transitions, the interdependency of lives, and the role of human agency in decision-making. The timing of lives refers to the age at which transitions such as school completion and family formation take place. For example, union formation may have different meanings and consequences at age 17 than at age 27. Further, the order in which these events occur can impact life outcomes. For example, childbirth before high school graduation may have different implications than entering parenthood after degree completion. Early union formation and childbirth may delay or limit the educational attainment of young women. Waite and Moore (1978) suggest that the earlier in their educational career that women have their first child the more likely it is that parenthood will interfere with their total years of schooling. In other words, the younger a woman is when she interrupts schooling due to the role acquisitions of wife and mother, the harder it will be for her to return.

According to the life course perspective the timing and sequencing of life events matter; they take on different meanings at particular times in individuals' lives. Scholars use age grading to determine the "normal" age that a group may experience a particular life transition, and any time before or after this timing is termed "early" or "late," respectively. For example, Bianchi and Casper (2001) report that the age of marriage has risen over the past half century so that the average age of marriage for women at the end of the 1990s was 25. Marriages that take place much before this time are termed as "early" while those much after are termed as "late."

In analyzing age grading for family formation transitions, scholars have found that a large variation in the average time of entering into marriage and parenthood vary by gender, race, and SES (see Meier, 2007). Family formation transitions that may be deemed early for one group may be on-time for another. As stated above, it is the timing of the event that may influence the measured outcome; for example, because the age at first birth may be relatively lower for black females, first birth prior to high school completion may have less impact on degree completion for black women than for white women.

Role Strain

The second theoretical perspective used to frame this study is the concept of role strain. Role strain theory is based on the assumption that social structure is made up of roles and that all individuals take part in a number of different roles that require different obligations (Goode, 1960). These multiple roles may be competing and require that an individual make adjustments to fulfill role commitments. Rogers and Amato (2000) use this theoretical frame to examine how changes in gender relations in marriage impact marital quality. Working mothers must manage the demands of work and family that often pull women in opposite directions. Likewise, early childbirth may require a teenage mother to juggle multiple roles with responsibilities associated with being both a parent and student.

Howell and Frese (1982) note that an early transition into the role of parent or spouse, while at the same time still engaged in the role of student, leads to role competition. For example, instead of doing homework and preparing for exams, these young women may be burdened with the responsibilities of taking care of home and family. The greater number of competing roles a young woman has, the harder it may be for her to be successful in them all. Between family and

student roles, the role of student may be the one most socially acceptable for the young woman to disengage.

Resilience

Although family formation may delay or inhibit school completion for some young women, others seem to succeed in spite of the obstacles developed by competing roles. Scholars have termed this type of success ‘resilience.’ Luther, Cicchette, and Becker (2000) define resilience as a positive adaption to adversity. One of the major theoretical frameworks in the resilience literature is that protective processes at the community, family, and individual levels influence at-risk individuals (Werner and Smith, 1982, 1992). For instance, young women who successfully complete a post-secondary degree after engaging in some form of family formation likely had stronger social support, parental relationships, and self-efficacy than those young women who did not obtain a degree.

Study Contributions

This study examines the effect of the timing of family formation on the amount of education completed by young women. This work builds on prior research in three main ways. First, most studies that have explored how family formation mediates the relationship between academic performance and educational attainment have focused on the impact of childbirth only, or examined only its relationship with parenthood and marriage. Using data derived from the National Longitudinal Study of Adolescent Health (Add Health), this analysis includes both first birth and marriage, along with the first cohabiting relationship to measure family formation. Second, this paper examines differences in the relationship between family formation and educational attainment for blacks and whites. Finally, using a subsample of women who engaged

in early family formation, this work explores characteristics that make some young women more likely to obtain high school and college degrees than others.

The goal of the study is to test the following hypotheses:

1. Young women who experience family formation prior to the age at which they complete their high school degree will be less likely to graduate from high school.
2. High school graduates who experience family formation prior to the age of college degree attainment also will be less likely to complete their degree.
3. Multiple transitions, measured by interactions between first birth another family formation transition within the same year interval, will significantly decrease the likelihood of completing education.
4. Early childbirth will impact the educational attainment of black women significantly less than that of white women.
5. For those who engage in family formation before degree completion, early academic achievement and academic expectations increases the likelihood of degree attainment.
6. Strong efficacy and social support increase the likelihood of degree completion.
7. Family support is more often available when a young woman is close to her mother. In the case of social support associated with school completion, perceived closeness to mother increases the likelihood for degree attainment.
8. Social support will have a significantly greater impact on degree completion for blacks than whites.

Sample

Data for this study is derived from adolescent in-home interview responses in the National Longitudinal Study of Adolescent Health (Add Health). The first wave of Add Health was collected in 1994-95 with a nationally representative sample of adolescents in grades 7 through 12. During the first stage of the first wave of data collection, a stratified, random sample of US high schools was selected. The high schools were stratified into 80 clusters and 90,118 adolescents responded to in-school survey questions.

From the in-school respondents, an in-home sample of 27,000 adolescents was selected from respondents in each community. From the students selected, 20,745 participated in the in-home interviews. Adolescents completed the second wave of interviews the following year and 27 individuals were added for a genetic-only sample, making the total sample size at the second wave 20,772. The third wave was completed in 2001-02 when the majority of respondents were approximately 18 to 26 years old. During the second wave of data collection, adolescents who had graduated from high school were not interviewed. By the third wave, a vast majority of the original respondents had completed high school and the 15,197 who could be located were re-interviewed (attrition of approximately 27%).

To address issues of attrition and missing responses, the data was imputed using the ICE program for multiple imputations in STATA. In addition to the variables used in the models, a number of auxiliary variables measuring sexual experience, poverty, and early experiences with violence were included in the imputation. Due to the person-period structure of the data, only one imputed dataset was used for analysis. Of the 20,772 imputed cases, only 18,924 had grand mean sample weights from the first wave.

The timing of family formation events tends to be earlier for women than men and tends to be more consequential to women's futures. Because the oldest respondents in our study are 26 at the third wave of data collection, it is likely that more women than men in our sample have experienced these events. The final sample includes only women who had not experienced any family formation prior to the first interview date. Cases where the initial family formation transition took place prior to the wave 1 interview date were dropped from the analysis (n=1045). The variables measuring the respondents' age at the first and third interview were adjusted after the imputation to reflect the original intervals reported by Add Health, 11-19 and 18-26, respectively. Only 184 individuals reported only Native American status and these individual cases were dropped from analysis. These restrictions resulted in an unweighted sample size of 9720. The weighted N totaled to 6,966 observations.

Measures

Educational outcome. The respondent's educational outcomes were determined by their responses to the following questions: 1) *In what month (and year) did you receive your high school diploma?* 2) *In what month (and year) did you receive your associates or junior college degree?* 3) *In what month (and year) did you receive your bachelor's degree?* These responses were changed into the age at the event from century month codes using birth and interview dates for the respondent. Age at first event was adjusted for those out of reasonable range due to imputation. Using event history techniques, respondents are given a value of 0 for all ages prior to the experience of the event. At the age that the respondent experienced the event they are given a value of 1. For each age interval after the event occurs the respondent is given a missing value and are dropped out of the sample. In measuring two- and four-year college attainment a

subsample was created for only those individuals at-risk obtaining a post-secondary degree. Only at the completion of a high school degree were individuals in the sample placed at-risk of college degree attainment.

Family formation. Three variables from the third wave of interview data were used to measure young women's family formation: timing of first marriage, timing of cohabiting union formation, and timing of first childbirth. In wave 3 of Add health, respondents were asked about their pregnancies and births within the history of their romantic relationships. Some respondents failed to report on births in the contexts of cohabiting and marriage relationships that had been reported in an earlier section of the interview. As a result, Add Health's fertility information is incomplete. To correct for the incomplete birth information the process outlined by Schoen, Landale, and Daniels (2007) was used to check for incompleteness and to add births to the history that had been omitted using the household roster. Age at first birth was determined using birth and interview date information. Because this variable was created without a measure for if they ever had any live birth, the nonimputed variable was used for analysis. Using event history techniques, respondents received a 0 at each age which they did not give birth and 1 for the age at first birth and each following year through their age at the third interview.

To assess timing of marriage, respondents were asked: *How many times have you been married?* (0=*never*, 3=*three times*). For individuals that reported at least one marriage, the month and year of the first marriage, along with the birth and interview date information, were used to determine age at first marriage. Respondents received a value of 0 for each year that they did not experience marriage and a 1 for the age that they were married.

To measure cohabitation, respondents were asked: *Have you ever lived with someone in a marriage-like relationship for one month or more?* Responses were coded 0=*no/never* and

1=*yes/at least once*. Even though cohabitations tend to be of short duration and require less of the social responsibilities associated with marriage, only the date for the first cohabiting union is measured because it is likely that the first transition requires a shift in focus as well as additional partner obligations and responsibilities. Respondents received a value of 0 for each age interval prior to entry into a nonmarital union. They received a value of 1 for the age that they entered a cohabiting relationship and each year after that.

For age intervals where a respondent reported both an initial family formation transition and degree attainment, the age for the degree attainment was increased by one if the total century months for the family transition was less than the number of century months at degree attainment. On the other hand, if the age intervals were equal and the century months for the timing of family formation were greater than or equal to the century months at degree attainment then the age of family formation was increased by one. Further, for those in the sample who reported that they did not obtain a high school degree, associates degree, and/or a four-year college degree ten years was added to their imputed age at degree attainment so that they any family formation transition would be correctly coded as prior to degree attainment.

Sociodemographic factors. The race and ethnicity variable was dummied as follows: Asian, non-Hispanic black, and Hispanic/Latino. Non-Hispanic whites were used as the reference category. The respondent's age reported during the third wave is controlled.

Parent's response to questions regarding education (1=*no education*, 10=*professional training after a bachelor's degree*) and per capita income, transformed into the square root of household income multiplied by 1000 and divided by the number of total household members, were used to measure socioeconomic status. Each was standardized using z-score transformations for analysis. For parent interviews Add Health researchers initially attempted to interview the adolescent's

biological mother. Thus, parent's education measures are more likely referring to mother's education. The measure for family structure was developed from the household structure in the first wave and was coded as a dichotomous variable where 0=*two parent household* and 1=*single parent household or alternative family structure*.

Academic background. To describe young women's academic background, a measure of her academic performance, ability, and feelings about school reported in the first wave of data were used. Academic performance was measured by the cumulative GPA reported from the respondent's academic transcript. GPA was squared to normalize the distribution and standardized for analysis.

The Add Health Picture Vocabulary Test (AH_PVT), a measure of verbal intelligence, was used as a measure of vocabulary ability. The AH_PVT was adapted from the "Peabody Picture Vocabulary Test" and administered during the first wave of data collection. The adolescent's score was standardized for analysis.

Measures of school problems and attachment were used to assess how students felt about school. The following items were used to create the seven-item scale: 1) *You feel close to people at your school*; 2) *You feel like you're part of the school*; and 3) *You are happy at your school*; 4) *How often had you had trouble getting along with teachers*; 5) *How often have you had trouble paying attention at school*; 6) *How often have you had trouble getting your homework done*; and 7) *How often have you had trouble getting along with other students*. The first three items were coded so that higher values indicate higher levels of school attachment. Responses for the final four items ranged from never (1) to everyday (4). After summing and standardizing the items, the alpha reliability coefficient for this scale was 0.75.

Academic aspiration and expectation were assessed by the students response to two questions in the first wave: 1) *On a scale of 1 to 5, where 1 is low and 5 is high, how much do you want to go to college;* and 2) *On a scale of 1 to 5, where 1 is low and 5 is high, how likely is it that you will go to college.* Z-score transformations of both expectation and aspiration were performed for easy comparison of its effects on educational outcomes with those of the student's early academic achievement.

Efficacy and support. To determine additional characteristics that make some women who engage in early family formation more likely to complete their degree, measures from the first wave of a young woman's self-efficacy, perceived social support, and relationship with mother were used. To measure self-efficacy, responses to a standardized eight item scale of well-being was assessed. Responses to the following statements ranged from 1=strongly agree to 5=strongly disagree: 1) *You have a lot of energy;* 2) *You are well coordinated;* 3) *You have a lot of good qualities;* 4) *You are physically fit;* 5) *You have a lot to be proud of;* 6) *You do everything just right;* 7) *You feel socially accepted;* and 8) *You feel loved and wanted.* The alpha reliability coefficient for this scale was 0.85.

Social support was measured by the responses to five scaled items of perceived emotional care and understanding: 1) *How much do you feel adults care about you;* 2) *How much do you feel that your teachers care about you;* 3) *How much do you feel that your parents care about you;* 4) *How much do you feel that people in your family understand you;* and 5) *How much do you feel your family pays attention to you* (1=not at all, 5=very much). After summing and standardizing the items, the alpha reliability coefficient for this scale was 0.75. Closeness to mother was measured by the answer to the question: *How close do you feel to your mother/adoptive mother/stepmother/foster mother, etc?* Responses ranged from 1=not at all to

5=very much. Z-score transformations were performed for easy comparisons of the magnitude of these relationships.

Analytic Strategy

STATA 9.0 is used to estimate weighted logistic regression models examining the relationships between the timing of family formation and degree completion. Because Add Health uses a stratified multistage sampling design with unequal probabilities of selection, STATA's 'svy' command, and options therein, are used to obtain corrected point estimates and standard errors.

A series of logistic regression models were estimated to examine the relationship between first marriage, cohabitation, and childbirth and each of the three educational outcomes: high school graduation, junior college degree completion, and four-year college degree completion. Control variables were introduced into the logistic regression models in four stages. In the first stage only a small set of sociodemographic were controlled. In the second stage academic variables were added to the model. At the third efficacy and support characteristics were included. Marriage-by-childbirth and cohabitation-by-childbirth interaction terms were added to the final model to determine the impact of multiple family formation events on degree attainment.

Racial variability in the effects of the timing of family formation on educational attainment was tested for a subsample of black and white women. Hypotheses of racial differences were tested by adding race-by-timing of family formation interaction terms to earlier versions of Model 3 for each outcome.

Finally, women who experienced family formation prior to a particular degree attainment were taken from the sample and the first three models were rerun to determine common characteristics that make some women more likely to obtain degrees after family formation while others are not. Racial variability in these effects was examined as well by examining results from the previous models for female respondents who reported their primary racial identity as either black or white. For this subsample, race-by-resilience characteristics interaction terms were added to the final model for each outcome. All logistic results were reported in odds ratios.

Results

Table 1 presents descriptive statistics for educational outcomes and family formation transitions for the samples of young women used in the analysis. Similar education and family patterns were seen between the full sample and samples of women and the black-white sample. As might be expected, a lower percentage of young women who experienced early family formation completed their degree.

Table 2 provides weighted means of the control variables. The older women (those age 21 and older at the third interview date) appear to have higher early socioeconomic status and higher scores on early academic potential and aspiration measures. Women who experienced family formation prior to high school completion had markedly lower socioeconomic status and the lowest scores on measures of academic potential and aspirations, as well as on the scales of social support and self-efficacy. For those women age 21 or over with high school degree in hand, characteristics associated with those who formed a family prior to the completion of a junior college degree were similar to those who formed a family prior to obtaining their

bachelors degree. These groups of women are used throughout the analysis to examine the relationship between the timing of family formation and educational outcomes.

Early Family Formation and Educational Attainment

Table 3 provides insight for the relationship between the timing of first marriage, nonmarital union, and childbirth on high school graduation for the full sample of females. In the initial model we see that both early cohabitation and childbirth significantly decrease the likelihood of obtaining a high school degree. Being involved in a nonmarital union prior to completing high school was associated with a nearly 20 percent reduced odds of completing a degree while those who have their first birth prior to graduation have reduced odds of 0.6 of completing their degree. At the addition of the small set of sociodemographic variables in Model 2, however, a suppressor effect becomes evident for early marriage. Marriage prior to high school completion lowers the odds of obtaining a high school degree by about 25 percent. Even after the addition of sociodemographic controls, both cohabitation and childbirth still significantly lower the likelihood of high school graduation. After adding controls for early academic characteristics in Model 3 and efficacy and support factors in Model 4, only the timing of first childbirth is still found to reduce the odds of degree attainment for young women (OR=0.8). In Model 5 interaction terms to measure the impact of multiple family transitions are added to the full model. The interaction terms prove nonsignificant indicating that multiple transitions do not differentially impact high school degree attainment.

To test for racial differences between blacks and whites the sample was limited to those women who self-identified in one of those two categories. The fourth model of Table 3 was rerun for Table 4 and, for this sample, the timing of first childbirth was the only family formation transition to significantly lower the odds of obtaining a high school diploma. Young women who

had their first child prior to completing their high school degree had decreased odds of fully 19 percent of graduating with their diploma. The final model adds the interaction terms. For this sample, forming a union and having a first child within the same year had no independent effect on high school graduation. When compared with white female cohabiters, black females who cohabited prior to high school graduation had decreased odds of 0.6 of completing their high school degree.

Table 5 shows the relationship between the timing of first marriage, nonmarital union, and childbirth on junior college degree attainment for only women who have obtained their high school degree. Although the birth of a first child proves no longer significant, union formation both positively and negatively impacts the likelihood of completing a two-year college degree. Women who have obtained their high school degree and marry have increased odds of 84 percent higher likelihood of obtaining their junior college degree. On the other hand, cohabiting prior to degree completion reduces the odds of two-year college degree attainment by fully 73 percent. The odds of completing a degree after marriage only slightly decrease to 1.6, and the odds of degree completion after cohabitation only slightly rise to 0.7, when sociodemographic factors are included into the model. Models 3 and 4 show that these results stay consistent, even after controls for early school achievement and resilience factors are added to the model.

Multiple transitions, however, do not significantly impact two-year college degree attainment.

Table 6 presents the tests for racial differences in junior college degree attainment by relying on a sample of black and white females who are at-risk of junior college degree attainment after high school graduation. The model with full controls is run for this group and findings still indicate that marriage increases the odds of junior college degree attainment by 1.7 and cohabitation decreases the odds of degree attainment by 0.7. When the interactions are added in

Model 2 we see that multiple family transitions do not influence degree attainment for this group. In the same way, there are no significant interactions between the race and family formation variables.

Looking next to Table 7 we see that marriage continues to play a positive role in post-secondary educational attainment at the four-year college degree attainment level (OR=1.4), however, a first birth prior to four-year degree attainment significantly decreases the odds of obtaining a degree (OR=0.2). Adding the small set of sociodemographic factors seems to only slightly lower the size of the effect of marriage and first birth. An interesting suppressor effect appears at the addition of early academic achievement variables, once these variables are controlled, we find that entering a cohabiting relationship has a positive relationship on four-year degree attainment (OR=1.5). Counter to the findings associated with two-year degree attainment, cohabiting prior to degree attainment is an asset instead of a liability. With the addition of controls for efficacy, social support, and closeness to mother we see that family formation continues to play a significant role on four-year degree attainment. Women who marry or cohabit prior to obtaining their postsecondary degree have increased odds of 1.4 and 1.5, respectively, of completing their degree when compared with women who do not complete these transitions. On the other hand, women who have their first birth prior to degree attainment have decreased odds of 0.4 of obtaining their degree. Model 5 introduces the union*birth interaction terms. For women who experience both marriage and childbirth the odds of completing a four-year degree decrease to 0.3; these odds of degree completion associated with multiple transitions are lower than those associated with having a first birth.

The pattern appears to be consistent for the sample of black and white females. Model 1 of Table 8 indicates that marriage and cohabitation increase the likelihood of degree attainment for

this group (OR=1.4 and 1.5, respectively) while childbirth significantly decreases the likelihood of completion (OR=0.4). The addition of the interaction terms shows only one significant relationship. Black women who cohabit prior to college degree attainment have increased odds of 1.7 higher of completing their degree than white women who cohabit.

Four hypotheses about the relationship between the timing of family formation and educational attainment were tested. The first hypothesis, that young women who engaged in early family formation were less likely to complete a high school degree, was only partially supported. In the full model of Table 3 findings indicate that only the timing of first childbirth significantly lowers the likelihood of high school graduation once basic sociodemographic factors, early educational achievement, and measures of efficacy and social support are controlled. The effect of marriage and cohabitation were absorbed when controls were added for early educational achievement.

The second hypothesis suggested that the timing of family formation would decrease the likelihood of obtaining a college degree. According to the results presented above, this hypothesis was unsupported in the data. In contrast to what was expected, some forms of family formation prior to completing post-secondary education actually increased the likelihood of obtaining a college degree. The full model in Table 5 shows that, even with controls for a basic set of sociodemographic factors, early academic achievement measures, and measures for efficacy and social control, marriage prior to degree completion increases the likelihood of obtaining a junior college degree for young women who have already completed their high school degree. Table 7 expresses a similar pattern in the impact of the timing of marriage for women in predicting the likelihood of completing a four-year college degree. With the complete set of controls, cohabitation was also found to increase the likelihood of four-year degree

attainment while the timing of first birth decreased the likelihood of obtaining a degree. The strength of the relationship between timing of first family formation transition and educational attainment was much stronger in predicting four-year college, rather than high school, degree attainment.

The third hypothesis states that multiple transitions would significantly decrease the likelihood of a young woman completing her degree. This hypothesis was only partially supported in the results. The results indicate that, for this sample, multiple transitions only matter at the four-year college degree attainment level. When compared with those women married without children, women married with a child had a significantly lower likelihood of obtaining a four-year college degree.

The final hypothesis in this section dealt specifically with the sample of women who self-identified as non-Hispanic white or black. Past findings suggested that early childbirth may impact the degree completion of black women less than white women. This hypothesis was also unsupported in the data. Differences were only found in the impact of cohabitation at both the high school and four-year college level, and in the opposite direction for each. Blacks who cohabit had decreased odds of 40 percent, when compared to whites who cohabit, of completing their high school degree. At the college level, however, blacks who cohabit had increased odds of nearly 72 percent of completing their four-year college degree than their white counterparts who cohabit.

Resilience

Table 9 describes the factors that impact high school degree attainment for women who experienced some type of family formation transition prior to the third wave of data collection. Model 1 explores the sociodemographic factors that are associated with receipt of a diploma for

this group of women. Young women whose parents are more educated and have higher incomes have higher odds of graduating from high school (OR=1.4 and 1.1, respectively). Once academic background variables are added the income effect disappears and we see that early GPA (OR=1.6) and early aspiration (OR=1.2) positively impact the likelihood of high school degree attainment for young women who engage in family formation prior to completing high school. Each increase in the scale of school problems and low school attachment was associated with a more than 15 percent reduced odds in degree attainment. With early academic achievement variables in the model, social support, efficacy, and closeness to mother seem to play no significant role in the resilience of young women who experience early family formation.

Table 10 presents the resilience factors for the sample of black and white women. In the initial model of sociodemographic factors parents' education and income seem to increase the likelihood of obtaining a high school diploma (OR=1.4 and 1.1, respectively). Early grade point average and aspirations impact the likelihood of obtaining a high school degree and seem to both remove the income effect and reveal a slight age effect (OR=1.1). Early school problems and low school attachment reduces the odds of degree attainment by 0.8. The individual and social factors again appear to have no effect with early achievement already added to the model. The final model takes a closer look at these efficacy and social support variables with race interaction terms. There appears to be no significant effect between blacks and whites on the impact of these variables on high school completion.

For women who experience at least one family transition prior to the completion of a post-secondary degree and already have already graduated from high school, only age, parent's education increases the likelihood of completion of a two-year college degree (OR=1.2 and 1.3, respectively) in model 1 of Table 11. With the addition of early academic achievement variables

both sociodemographic variables, age and parent's education continue to increase the odds of the young woman's degree attainment. Similar to the results of high school attainment, the addition of social support, efficacy, and closeness to mother provide no significant contribution to the model.

Table 12 describes these resilience factors specifically for the subsample of black and white females who had completed their high school degree. We find that when specifically looking at blacks and whites, being black decreases the odds of obtaining a junior college degree by more than half. Even after the addition of early academic achievement variables, being black still matters. The odds of completed a junior college degree for a black woman are 0.4 compared to those of a white woman with similar social and educational backgrounds. The addition of measures of social support and efficacy prove to play no significant role in the model while being black still significantly lowers the likelihood of attaining a two-year college degree even after these factors are controlled. The final model, testing for interactions between race and social support prove insignificant at the junior college level as well.

Table 13 describes factors that make some young women who engage in early family formation more likely to attain a college degree than others. Model 1 shows that being older increases the odds that these women will graduate with a four-year college degree by 39 percent. Young women whose parents are more educated, who come from two parent households, and who have higher income backgrounds also have higher odds of degree completion (OR=2.0, 1.5, and 1.4, respectively). Even with the addition of measures for early academic achievement in model 2, we see that age and early socioeconomic factors still play a role in four-year college completion. Each increase in the PVT increases the odds of degree attainment by 1.4 and a unit on the GPA scale increases the odds of degree attainment by 2.4. Similarly, each unit increase on

the college aspiration scale is associated with an increase of 3.6 times in the odds of degree completion. Introducing the efficacy and social support variables in model 3 does not add anything to the model itself but even with these controls age, early family socioeconomic status, cumulative grade point average, PVT exam scores, and early aspiration all increase the likelihood of four-year college degree attainment for these women.

Table 14 describes these results for the sample of black and white women who have engaged in some sort of family formation and have already completed their high school degree. Model 1 indicates that both age (OR=1.8) and early socioeconomic factors (parent's education OR=1.9, income OR=1.4) play a role in predicting the likelihood of degree completion for these women. At the addition of early academic characteristics in model 2 we see that black women who have engaged in early family formation have odds nearly two times higher than white women of completing their four-year college degree. Additionally, early grades, standardized exam scores, and the young woman's early aspiration for postsecondary education increase her likelihood of degree completion. For instance, a unit increase in the scale for wanting to attend college increased the odds of completing by 3.4 times by the wave 3 interview date. Similar to the findings predicting likelihood of high school graduation or two-year degree completion, the addition of self-efficacy and social support provided little contribution to the model. The race by efficacy and social support interaction terms showed no significant results.

Another four hypotheses were formed from the literature to ascertain which factors made some women more likely to complete their degree once engaging in early family formation while others are not. The first hypothesis states that early academic achievement and expectation act as a buffer for these women to increase the likelihood of degree attainment. This hypothesis was

supported by the data. For both high school and four-year college attainment both GPA and early aspirations significantly increased the likelihood of degree attainment.

The second hypothesis states that strong efficacy and social support increase the likelihood of degree completion and the third suggests that closeness to mother would also increase the likelihood of degree attainment. These hypotheses were not supported by the data. Further, the addition of these variables often negatively impacted the overall fit of the model. The final resilience hypothesis suggests that social support will matter more for blacks than whites but these interaction terms also proved insignificant at every level of degree attainment.

Discussion and Conclusion

Some research and theory suggest that, for young women, early family transitions may delay or inhibit educational opportunities. Although the relationships between marriage, cohabitation, childbirth and educational attainment have been examined separately, no previous work has taken the timing of these three family transitions together to explore their impact on degree completion. Using data derived from Add Health, event history techniques were employed to determine how the timing of first marriage, cohabitation, or childbirth effect high school graduation, junior college completion, and four-year degree attainment. For early family formers, a number of predictors of academic success were established. These relationships are further examined by race.

Not all family formation was found to have a negative impact on degree completion but first birth consistently hurt young women. First childbirth decreases the likelihood of both high school and four-year college degree completion. For young women who engaged in early family formation, early academic potential and aspirations appeared to act as a buffer and were

associated with increased likelihood of degree completion. Self-efficacy, social support, and closeness to mother however, did not effect educational attainment at any level. That highly motivated students find ways to complete their degree, regardless of social support and self-efficacy, may indicate that these women may be taking advantage of other routes to success. For instance, high achieving women select into union formation rather than childbirth, they may forgo parenthood responsibilities through outside means such as adoption, or that they may find other creative ways to juggle the competing roles of mother and student. In contrast to expectations, the effect of childbirth did not vary by race, nor were any racial differences found in the non-effect of resilience characteristics.

The results of this study indicate that having a baby decreases the likelihood of high school and four-year college degree attainment for young women. Whether it is merely the time and stigma associated with pregnancy and childbirth, or the demanding responsibilities associated with childcare, there is something about giving birth that impacts a young woman's educational trajectory. After high school union formation, on the other hand, can actually increase the likelihood of degree attainment. Women with high school diplomas who choose to marry or cohabit may be more settled and responsible, increasing their likelihood of college degree attainment. At the four-year college level, however, marriage and childbirth during the same age interval significantly decreases the odds of BA attainment, making them lower than the odds of just having a child. The low odds of degree attainment found with the marriage*childbirth interaction support using role strain theory as an explanation for this relationship, indicating that multiple competing roles may indeed impact educational outcomes.

For this study, measures of efficacy and support played no significant role in predicting degree completion. Both sociodemographic factors and academic background seemed to buffer

early family formation decisions. For young women who experienced family formation prior to degree attainment, measures of GPA and college aspirations may indicate drive and ambition that allow these women to overcome the obstacles associated with balancing family and student roles.

This study is not without limitations. First, although the intent of the study was to predict high school and college completion, low Wald tests suggest these models are not a good predictor of junior college degree attainment. Two- and four-year colleges have different requirements and attract different types of students. A separate study should be done to determine factors specifically impacting two-year college students as this path may be an alternative education option for young women with family responsibilities. Second, the use of the first birth measure created by Schoen, Landale, and Daniels (2007) impacted data imputation since the set of variables did not include a measure for if a young woman ever had a live birth. Measures were available in Add Health to measure if a young woman ever married, cohabited, or received a degree so these were included in the imputation to create the final family and education measures, however, although century month calculation for age at first childbirth was included in the imputation, the imputed form was not used for analysis. A final issue that should be addressed is that the current analysis does not include if the respondent is currently living with the child or if they stayed in the union. There is a possibility that some of the women who succeeded in obtaining a degree were those that cut the family formation ties. Since findings indicate that childbirth matters, future researchers should take full advantage of event history techniques to determine if early birth itself lowers the likelihood of degree attainment or if it is the primarily the roles associated with parenthood that impact high school and college completion.

Future researchers should also include additional measures of resilience to determine other factors that allow some women to complete their degree after family formation while others do not. Early academic potential and aspirations proved to act as a buffer for young women who engaged in early family formation but future research should examine if this relationship also varies by race. Scholars have clearly outlined a difference in grades, test scores, and college completion for racial and ethnic minorities (see, for example, Kao and Thompson, 2003) so it is important to see if this buffer holds among different groups.

Prior research has suggested that good students are less likely to enter into early family formation. For instance, Glick and her colleagues (2006) showed that school engagement delays childbirth. This study indicates that this same advantage of early academic potential may also be important for women who have already engaged in some form of early family formation. The findings of this study indicate that early academic potential matters, and that, perhaps, nurturing this potential early on provides a buffer even if young women engage in early marriage, cohabiting union, and possibly even childbirth. This study has shown that childbirth hurts the likelihood of degree attainment, at least in the short-haul. These findings support those of Steward, Farkas, and Bingenheimer (forthcoming) who found that both marriage and childbirth prior to high school, and childbirth prior to college degree attainment, significantly decreased the likelihood of both high school and college completion in data from the National Education Longitudinal Study (NELS).

This is one of the first studies to bring cohabitation along with marriage and childbirth in predicting the odds of educational attainment. Most previous studies examining the relationship between cohabitation and educational attainment explored how education worked to delay union formation rather than the role of union formation in predicting educational advancement. The

findings from this study indicate that in predicting the likelihood of BA attainment, both cohabitation and marriage have similar positive outcomes. Similarly, marriage and cohabitation have similar negative effects prior to the completion of high school. For cohabitation, this relationship is exacerbated by race – black women who cohabit have lower odds of completing high school than white women who cohabit while, at the college level, black women who cohabit have greater odds of completing their four-year degree than white women who cohabit.

This study also requires that researchers take a deeper look at previous research suggesting social support provides resilience for black women. Howell and Frese (1982) suggest that social support in black families allows for black women to continue schooling despite these new family responsibilities. This study suggests, however, that at least in the short-haul, support and closeness to mother play no significant role in predicting the likelihood of degree attainment for black women who have engaged in early family formation.

Appendix: Tables

Table 1. Percent of Observations for Educational Outcomes and Family Formation Transitions for Person-Period Data

	All Women ¹	Age 21+ ²	All Women ³	Age 21+ ⁴	All Women ⁵	Age 21+ ⁶	Age 21+ ⁷
Educational Outcomes	%	%	% BW Sample	% BW Sample	% FF < HS	% FF < AA	% FF < BA
High School Degree	10.2	--	10.4	--	6.7	--	--
High School Degree_Dropped ⁸	45.2	--	45.6	--	19.0	--	--
Two-Year College Degree	--	1.7	--	1.8	--	1.3	--
Two-Year College Degree_Dropped ⁹	--	3.8	--	4.0	--	2.4	--
Four-Year College Degree	--	3.0	--	3.1	--	--	1.9
Four-Year College Degree_Dropped ¹⁰	--	3.8	--	3.9	--	--	1.8
Family Formation Transitions							
Marriage	11.5	15.4	11.4	15.4	19.6	19.8	20.1
Cohabitation	23.6	28.8	23.9	29.7	48.7	41.2	41.2
Childbirth	15.5	17.6	15.2	17.5	46.7	27.1	27.4
Number of women	5531	767	4668	666	2665	5906	5910
Number of cases (person-period)	92456	26945	36072	20869	20176	47336	47456

Source: Add Health

1. Descriptives for all women in the sample
2. Descriptives for women age 21 and older at risk of attaining college degree (i.e., high school graduate)
3. Descriptives for subsample of black and white women
4. Descriptives for subsample of black and white women at risk of attaining college degree
5. Descriptives for all women who experienced family formation prior to high school graduation
6. Descriptives for women at risk of attaining college degree who experienced family formation prior to two-year college degree completion
7. Descriptives for women at risk of attaining college degree who experienced family formation prior to four-year college degree completion
8. Person-period interval at which high school degree already completed
9. Person-period interval at which two-year college degree already completed
10. Person-period interval at which four-year college degree already completed

Table 2. Weighted Means of the Control Variables¹

	All Women ²	Age 21+ ³	All Women ⁴	Age 21+ ⁵	Age 21+ ⁶
	n=92456 %	n=26945 %	FF < HS n=20176 %	FF < AA n=47336 %	FF < BA n=47456 %
Sociodemographic Factors					
Race/Ethnicity					
Black	15.8	15.3	16.6	12.1	13.0
Asian	3.9	5.9	2.1	4.4	4.5
Latino	11.2	7.2	15.4	7.5	8.1
White	69.1	71.7	65.7	76.0	74.4
Age	21.927 (1.928)	24.178 (0.656)	21.696 (1.732)	24.217 (0.619)	24.201 (0.630)
Parent's Education	5.439 (2.398)	5.825 (2.262)	4.633 (2.165)	5.719 (2.290)	5.673 (2.255)
Two-Parent Household	74.4	77.6	64.0	75.5	73.9
Income Per Capita	114.981 (54.334)	125.652 (3.377)	98.822 (49.480)	125.416 (52.727)	122.074 (51.420)
Academic Potential and Aspirations					
Cumulative GPA	7.939 (4.331)	9.196 (3.737)	5.198 (3.784)	8.935 (3.584)	8.705 (3.455)
AH_PVT Standardized Test	101.109 (15.358)	105.488 (12.808)	96.736 (14.123)	105.488 (12.110)	104.968 (12.258)
School Problems and Low Attachment Scale ⁷	-0.0426 (0.650)	-0.019 (0.580)	0.155 (0.691)	-0.010 (0.573)	0.004 (0.577)
College Aspiration Scale	4.272 (1.142)	4.607 (0.920)	3.855 (1.242)	4.563 (0.998)	4.536 (1.019)
College Expectation Scale	4.495 (1.008)	4.593 (0.832)	4.253 (1.133)	4.556 (0.865)	4.524 (0.883)
Resilience Characteristics					
Social Support Scale ⁷	0.024 (0.719)	0.014 (0.656)	-0.161 (0.765)	-0.041 (0.683)	-0.033 (0.693)
Self-Efficacy Scale ⁷	-0.130 (0.742)	-0.147 (0.663)	-0.263 (0.762)	-0.168 (0.646)	-0.165 (0.651)
Closeness to Mother Scale	4.453 (0.869)	4.370 (0.876)	4.377 (0.919)	4.310 (0.893)	4.337 (0.858)

Source: Add Health

- Standard deviations in parentheses
- Descriptives for all women in the sample used to predict high school degree attainment
- Descriptives for women in the sample age 21 and older at risk of attaining college degree (i.e., high school graduate)
- Descriptives for all women in the sample who experienced family formation prior to high school degree attainment
- Descriptives for women in the sample age 21 and older at risk of attaining college degree who experienced family formation prior to two-year college completion
- Descriptives for women in the sample age 21 and older at risk of attaining college degree who experienced family formation prior to four-year college completion
- Scaled items standardized

Table 3. Odds Ratios for the Discrete-Time Logit Models Predicting High School Graduation for Young Women (n=24493)

	Model 1	Model 2 ¹	Model 3 ²	Model 4 ³	Model 5 ³
Family Formation Prior to High School Degree Completion					
Marriage	0.827	0.739 *	0.788	0.790	0.133
Cohabitation	0.815 *	0.759 **	0.915	0.913	0.088
Childbirth	0.645 ***	0.687 ***	0.802 *	0.803 *	0.104
Marriage*Childbirth					1.018
Cohabitation*Childbirth					0.800
Wald	13.70 ***	53.48 ***	41.81 ***	42.02 ***	37.36 **

Source: Add Health

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

1. Controls: Sociodemographic factors

2. Controls: Sociodemographic factors and academic potential and aspirations

3. Controls: Sociodemographic factors, academic potential and aspirations, and resilience characteristics

Table 4. Odds Ratios for the Discrete-Time Logit Models Predicting High School Graduation for Black and White Women (n=19102)

	Model 1 ^a	Model 2 ^a
Family Formation Prior to High School Degree Completion		
Marriage	0.760	0.711
Cohabitation	0.085	1.050
Childbirth	0.810 *	0.729
Marriage*Childbirth		1.290
Cohabitation*Childbirth		0.915
Black*Marriage		0.736
Black*Cohabitation		0.584 *
Black*Childbirth		1.372
Wald	46.17 ***	36.34 ***

Source: Add Health

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

^aControls: Sociodemographic factors, academic potential and aspirations, and resilience characteristics

Table 5. Odds Ratios for the Discrete-Time Logit Models Predicting Two-Year College Completion for Young Women (n=25734)

	Model 1	Model 2 ¹	Model 3 ²	Model 4 ³	Model 5 ³
Family Formation Prior to High School Degree Completion					
Marriage	1.839 ***	1.653 ***	1.654 ***	1.654 **	1.753 **
Cohabitation	0.735 *	0.708 *	0.725 *	0.714 *	0.725 *
Childbirth	0.923	1.018	1.073	1.073	1.240
Marriage*Childbirth					0.812
Cohabitation*Childbirth					0.905
Wald	6.18 ***	4.84 ***	4.14 ***	3.89 ***	3.67 **

Source: Add Health

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

1. Controls: Sociodemographic factors

2. Controls: Sociodemographic factors and academic potential and aspirations

3. Controls: Sociodemographic factors, academic potential and aspirations, and resilience characteristics

Table 6. Odds Ratios for the Discrete-Time Logit Models Predicting Two-Year College Completion for Black and White Women (n=19523)

	Model 1	Model 2
Family Formation Prior to High School Degree Completion		
Marriage	1.729 ***	1.893 **
Cohabitation	0.673 **	0.692 *
Childbirth	1.054	1.143
Marriage*Childbirth		0.804
Cohabitation*Childbirth		1.083
Black*Marriage		0.622
Black*Cohabitation		0.492
Black*Childbirth		1.039
Wald	3.54 ***	3.06 ***

Source: Add Health

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

*Controls: Sociodemographic factors, academic potential and aspirations, and resilience characteristics

Table 7. Odds Ratios for the Discrete-Time Logit Models Predicting Four-Year College Completion for Young Women (n=25718)

	Model 1	Model 2 ¹	Model 3 ²	Model 4 ³	Model 5 ³
Family Formation Prior to High School Degree Completion					
Marriage	1.440 *	1.369 *	1.378 **	1.391 **	1.570 ***
Cohabitation	1.090	1.118	1.470 **	1.481 **	1.524 ***
Childbirth	0.185 ***	0.221 ***	0.352 ***	0.348 ***	0.900
Marriage*Childbirth					0.284 *
Cohabitation*Childbirth					0.478
Wald	13.01 ***	31.28 ***	35.16 ***	28.73 ***	27.05 ***

Source: Add Health

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

1. Controls: Sociodemographic factors

2. Controls: Sociodemographic factors and academic potential and aspirations

3. Controls: Sociodemographic factors, academic potential and aspirations, and resilience characteristics

Table 8. Odds Ratios for the Discrete-Time Logit Models Predicting Four-Year College Completion for Black and White Women (n=19482)

	Model 1	Model 2
Family Formation Prior to High School Degree Completion		
Marriage	1.448 **	1.682 ***
Cohabitation	1.501 **	1.454 **
Childbirth	0.361 ***	0.761
Marriage*Childbirth		0.357
Cohabitation*Childbirth		0.456
Black*Marriage		0.657
Black*Cohabitation		1.719 *
Black*Childbirth		1.385
Wald	27.82 ***	24.05 ***

Source: Add Health

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

*Controls: Sociodemographic factors, academic potential and aspirations, and resilience characteristics

Table 9. Odds Ratios for the Discrete-Time Logit Models Predicting High School Graduation for Young Women who have Experienced Family Formation Prior to Degree Completion (n=9282)

	Model 1	Model 2	Model 3
Sociodemographic Factors			
Race/Ethnicity			
Black	0.969	1.157	1.138
Asian	0.945	0.931	0.943
Latino	0.116	0.829	0.834
White	1.000	1.000	1.000
Age	1.028	1.098 *	1.100 *
Parent's Education	1.366 ***	1.143 **	1.142 *
Two-Parent Household	1.040	0.923	0.919
Income Per Capita	1.134 **	1.058	1.057
Academic Potential and Aspirations			
Cumulative GPA		1.558 ***	1.558 ***
AH_PVT Standardized Test		1.110 *	1.109 *
School Problems and Low Attachment Scale		0.837 **	0.853 *
College Aspiration Scale		1.150 *	1.143 *
College Expectation Scale		0.982	0.984
Resilience Characteristics			
Social Support Scale			1.006
Self-Efficacy Scale			1.057
Closeness to Mother Scale			0.978
Wald	9.93 ***	16.65 ***	13.58 ***

Source: Add Health

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

Table 10. Odds Ratios for the Discrete-Time Logit Models Predicting High School Graduation for Black and White Women who have Experienced Family Formation Prior to Degree Completion (n=7045)

	Model 1	Model 2	Model 3	Model 4
Sociodemographic Factors				
Black	0.969	1.145	1.112	1.105
Age	1.048	1.115 *	1.121 *	1.120 *
Parent's Education	1.418 ***	1.182 **	1.180 **	1.179 **
Two-Parent Household	1.057	0.920	0.912	0.913
Income Per Capita	1.111 *	1.038	1.034	1.034
Academic Potential and Aspirations				
Cumulative GPA		1.565 ***	1.566 ***	1.565 ***
AH_PVT Standardized Test		1.095	1.097	1.099
School Problems and Low Attachment Scale		0.811 **	0.846 *	0.847 *
College Aspiration Scale		1.129 *	1.113	1.113
College Expectation Scale		0.980	0.981	0.980
Resilience Characteristics				
Social Support Scale			1.036	1.011
Self-Efficacy Scale			1.088	1.103
Closeness to Mother Scale			0.972	0.978
Race*Resilience Interaction Terms				
Black*Social Support				1.142
Black*Self-Efficacy				0.945
Black*Closeness to Mother				0.959
Wald	11.70 ***	15.82 ***	12.5 ***	10.78 ***

Source: Add Health

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

Table 11. Odds Ratios for the Discrete-Time Logit Models Predicting Two-Year College Completion for Young Women who have Experienced Family Formation Prior to Degree Attainment (n=14715)

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Sociodemographic Factors			
Race/Ethnicity			
Black	0.426 *	0.401 **	0.391 **
Asian	0.623	0.539	0.536
Latino	1.100	1.028	1.026
White	1.000	1.000	1.000
Age	1.226 *	1.218 *	1.223 *
Parent's Education	1.278 *	1.284 *	1.286 *
Two-Parent Household	1.147	1.088	1.097
Income Per Capita	0.735 *	0.747 *	0.749 *
Academic Potential and Aspirations			
Cumulative GPA		1.147	1.157
AH_PVT Standardized Test		0.836	0.83
School Problems and Low Attachment Scale		0.896	0.876
College Aspiration Scale		1.040	1.032
College Expectation Scale		1.111	1.147
Resilience Characteristics			
Social Support Scale			0.790
Self-Efficacy Scale			1.131
Closeness to Mother Scale			1.026
Wald	2.50 *	2.12 *	1.84 *

Source: Add Health

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

Table 12. Odds Ratios for the Discrete-Time Logit Models Predicting Two-Year College Completion for Black and White Women who have Experienced Family Formation Prior to Degree Attainment (n=11438)

	Model 1	Model 2	Model 3	Model 4
Sociodemographic Factors				
Black	0.438 *	0.393 **	0.380 **	0.385 **
Age	1.147	1.141	1.150	1.152
Parent's Education	1.148	1.245	1.240	1.243
Two-Parent Household	1.236	1.137	1.139	1.144
Income Per Capita	1.201	0.783	0.785	0.789
	0.766		1.185	
Academic Potential and Aspirations				
Cumulative GPA		1.175	1.185	1.186
AH_PVT Standardized Test		0.768	0.761	0.763
School Problems and Low Attachment Scale		0.830	0.821	0.816
College Aspiration Scale		1.038	1.039	1.038
College Expectation Scale		1.090	1.110	1.108
Resilience Characteristics				
Social Support Scale			0.800	0.762
Self-Efficacy Scale			1.188	1.219
Closeness to Mother Scale			1.002	1.010
Race*Resilience Interaction Terms				
Black*Social Support				1.510
Black*Self-Efficacy				0.775
Black*Closeness to Mother				0.958
Wald	2.21	2.19 *	1.81 *	1.57

Source: Add Health

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

Table 13. Odds Ratios for the Discrete-Time Logit Models Predicting Four-Year College Completion for Young Women who have Experienced Family Formation Prior to Degree Attainment (n=26280)

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Sociodemographic Factors			
Race/Ethnicity			
Black	1.057	1.906 **	1.834 **
Asian	1.209	1.092	1.161
Latino	0.673	1.085	1.066
White	1.000	1.000	1.000
Age	2.373 ***	2.245 ***	2.265 ***
Parent's Education	1.987 ***	1.291 *	1.292 *
Two-Parent Household	1.539 **	1.023	1.019
Income Per Capita	1.397 ***	1.229 ***	1.212 **
Academic Potential and Aspirations			
Cumulative GPA		2.424 ***	2.241 ***
AH_PVT Standardized Test		1.422 ***	1.417 **
School Problems and Low Attachment Scale		1.036	3.588
College Aspiration Scale		3.628 ***	1.341 ***
College Expectation Scale		1.363	1.191
Resilience Characteristics			
Social Support Scale			1.036
Self-Efficacy Scale			1.191
Closeness to Mother Scale			0.971
Wald	22.07 ***	30.22 ***	25.57 ***

Source: Add Health

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

Table 14. Odds Ratios for the Discrete-Time Logit Models Predicting Four-Year College Completion for Black and White Women who have Experienced Family Formation Prior to Degree Attainment (n=11382)

	Model 1	Model 2	Model 3	Model 4
Sociodemographic Factors				
Black	1.106	1.951 ***	1.912 **	1.849 **
Age	1.838 ***	1.793 ***	1.805 ***	1.798 ***
Parent's Education	1.902 ***	1.344 *	1.347 *	1.340 *
Two-Parent Household	1.394	1.054	1.054	1.048
Income Per Capita	1.376 ***	1.243 **	1.234 **	1.236 *
Academic Potential and Aspirations				
Cumulative GPA		2.036 ***	2.026 ***	2.030 ***
AH_PVT Standardized Test		1.400 **	1.400 **	1.406 *
School Problems and Low Attachment Scale		0.796	1.036	1.051
College Aspiration Scale		3.369 ***	3.333 ***	3.323 ***
College Expectation Scale		1.398	1.386	1.394
Resilience Characteristics				
Social Support Scale			1.035	1.394
Self-Efficacy Scale			1.108	1.085
Closeness to Mother Scale			1.002	0.948
Race*Resilience Interaction Terms				
Black*Social Support				0.904
Black*Self-Efficacy				1.140
Black*Closeness to Mother				1.453
Wald	15.34 ***	24.28 ***	20.53 ***	16.87 ***

Source: Add Health

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

References

- Alexander, Karl L., Doris R. Entwisle, and Carrie S. Horsey. 1997. "From First Grade Forward: Early Foundations of High School Dropout." *Sociology of Education* 70:87-107.
- Amato, Paul R., Nancy Landale, Tara Habasevich, Alan Booth, David Eggebeen, Susan McHale, and Robert Schoen. 2007. "Structural and Developmental Precursors of Family Formation Trajectories in Early Adulthood."
- Bianchi, Suzanne M., and Lynne M. Casper. 2001. "American Families." *Population Bulletin* 55.
- Booth, Alan, Elisa Rustenbach, and Susan McHale. 2008. "Early Family Transitions and Depressive Symptom Changes From Adolescence to Early Adulthood." *Journal of Marriage and the Family* 70:3-14.
- Bowen, William G., and Derek Bok. 1988. *Shape of the River: Long-Term Consequences of Considering Race in College and University Admissions*. Princeton: Princeton University Press.
- Brien, Michael J., Lee A. Lillard, and Linda J. Waite. 1999. "Interrelated Family-Building Behaviors: Cohabitation, Marriage, and Nonmarital Conception." *Demography* 36:535-551.
- Buchmann, Claudia, and Thomas A. DiPrete. 2006. "The Growing Female Advantage in College Completion: The Role of Family Background and Academic Achievement." *American Sociological Review* 71:515-41.
- De Wit, Margaret L. De. 1994. "Educational Attainment and the timing of Childbearing among Recent Cohorts of Canadian Women: A Further Examination of the Relationship." *Canadian Journal of Sociology* 19:499-512.

- Elder, Glen H., Jr. 1994. "Time, Human Agency, and Social Change: Perspectives on the Life Course." *Social Psychology Quarterly* 57:4-15
- Gamoran, Adam, and Robert D. Mare. 1989. "Secondary School Tracking and Educational Inequality: Compensation, Reinforcement or Neutrality?" *American Journal of Sociology* 94:1146-1183
- Glick, Jennifer E., Stacey D. Ruf, Michael J. White, and Frances Goldscheider. 2006. "Educational Engagement and Early Family Formation: Differences by Ethnicity and Generation." *Social Forces* 84:1391-1415.
- Goode, William J. 1960. "A Theory of Role Strain." *American Sociological Review* 25:483-496.
- Howell, Frank M., and Wolfgang Frese. 1982. "Early Transition into Adult Roles: Some Antecedents and Outcomes." *American Educational Research Journal* 19:51-73.
- Kao, Grace, and Jennifer S. Thompson. 2003. "Racial and Ethnic Stratification in Educational Achievement and Attainment." *Annual Review of Sociology* 29:417-42.
- Lerman, Robert I. 1972. "Some Determinants of Youth School Activity." *Journal of Human Resources* 7:366-383.
- Leslie, Larry L., Gary P. Johnson, and James Carlson. 1977. "The Impact of Need-Based Student Aid upon the College Attendance Decision." *Journal of Education Finance* 2:269-285.
- Liefbroer, Aart C., and Martine Corijin. 1999. "Who, What, Where, and When? Specifying the Impact of Educational Attainment and Labour Force Participation on Family Formation." *European Journal of Population* 15:45-75.
- Manning, Wendy D., and Pamela J. Smock. 2005. "Measuring and Modeling Cohabitation: New Perspectives from Qualitative Data." *Journal of Marriage and the Family* 67:989-1002.

- Marini, Margaret Mooney. 1978. "The Transition to Adulthood: Sex Differences in Educational Attainment and Age at Marriage." *American Sociological Review* 43:483-507.
- . 1984. "Women's Educational Attainment and the Timing of Entry into Parenthood." *American Sociological Review* 49:491-511.
- Meier, Ann M. 2007. "Adolescent First Sex and Subsequent Mental Health." *American Journal of Sociology* 112:1811-47.
- Mincieli, Lisa, Jennifer Manlove, Molly McGarrett, Kristin Moore, and Suzanne Ryan. 2007. "The Relationship Context of Births Outside of Marriage: The Rise of Cohabitation." *Child Trends*.
- Pascarella, Ernest T., and Patrick T. Terenzini. 1991. *How College Affects Students*. San Francisco: Jossey-Bass.
- Ribar, David C. 1994. "Teenage Fertility and High School Completion." *The Review of Economics and Statistics* 76:413-424.
- Rindfuss, Ronald R., Craig St. John, and Larry L. Bumpass. 1984. "Education and the Timing of Motherhood: Disentangling Causation." *Journal of Marriage and the Family* 46:981-984.
- Rogers, Stacy J., and Paul R. Amato. 2000. "Have Changes in Gender Relations Affected Marital Quality?" *Social Forces* 79:731-753.
- Rumberger, Russell W. 1983. "Dropping out of High School: The Influence of Race, Sex, and Family Background." *American Educational Research Journal* 20:199-220.
- Schoen, Robert, Nancy S. Landale, and Kimberly Daniels. 2007. "Family Transitions in Young Adulthood." *Demography* 44:807-820.
- Smock, Pamela J. 2000. "Cohabitation in the United States: An Appraisal of Research Themes, Findings, and Implications." *Annual Review of Sociology* 26:1-20

- Stearns, Elizabeth, and Elizabeth J. Glennie. 2006. "When and Why Dropouts Leave High School." *Youth and Society* 38:29-56.
- Steward, Nicole R., and George Farkas. 2008. "Detailed Educational Pathways After Very Early Sexual Intercourse for Females." Department of Sociology and Population Research Institute, Pennsylvania State University.
- Stroup, Atlee, and Lee N. Robbins. 1972. "Elementary School Predictors of High School Dropout among Black Males." *Sociology of Education* 45:212-222.
- Tierney, Michael L. 1980. "The Impact of Financial Aid on Student Demand for Public/Private Higher Education." *Journal of Higher Education* 51:527-545.
- Thornton, Arland, William G. Axinn, and Jay D. Teachman. 1995. "The Influence of School Enrollment and Accumulation on Cohabitation and Marriage in Early Adulthood." *American Sociological Review* 60:762-774.
- Upchurch, Dawn M., and James McCarthy. 1990. "The Timing of a First Birth and High School Completion." *American Sociological Review* 55:224-234.
- Waite, Linda J., and Kristin A. Moore. 1978. "The Impact of an Early First Birth on Young Women's Educational Attainment." *Social Forces* 56:845-864.
- Weber, James M. 1988. "Dropout Rates for Students in Different High School Curricula – Another Look." *Journal of Vocational Education Research* 13:35-49.
- Winship, Christopher, and Sanders Korenman. 1999. "Economic Success and the Evolution of Schooling and Mental Ability." in *Earning and Learning: How Schools Matter*, edited by Susan E. Mayer and Paul E. Petersen. Washington, DC: Brookings.