Linking Intergenerational Associations of Status Attainment and Family Formation: The Early Transition to Adulthood among American Girls

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Acknowledgments and credits:

An earlier version of this paper was presented at the Spring 2003 meeting of the Research Committee 28 on Social Stratification and Mobility, Tokyo, Japan. This research was supported by the Center for Demography and Ecology, University of Wisconsin-Madison, which receives core support for Population Research from the National Institute for Child Health and Human Development (Grant P30 HD05876). I gratefully acknowledge the Gary Sandefur, Bob Hauser, Larry Bumpass, and Betty Thomson for their helpful comments and suggestions.

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Abstract

To better estimate the effects of family structure and socioeconomic status for a woman's early transition to adulthood, I simultaneously model her educational transitions and whether she has an early birth. Using a sample of non-Hispanic White and Black females from the National Education Longitudinal Study of 1988, I estimate bivariate probit models with correlated disturbances. The results demonstrate that family structure moderates the effects of parents' socioeconomic status. For all family types, however, the effects of socioeconomic status are greater for a daughter's education than for her fertility. In addition, parents' expectations for the daughter's education influence not only her educational transitions, but also her likelihood of having an early birth. Finally, unobserved heterogeneity influences both a daughter's early fertility and her educational transitions.

After decades of substantial change in American family formation patterns and the resulting increase in single parent and step-parent families, the intergenerational and socioeconomic consequences of these demographic changes have become increasingly important. On average, children raised in nonintact families are less successful in making the transition from adolescence to adulthood relative to children raised with both parents. For example, children from nonintact families are more likely to have a teen birth and less likely to complete high school and attend college (McLanahan & Sandefur, 1994). Children's education and fertility outcomes, however, are probably not independent from each other. In fact, the life course perspective and prior research about the transition to adulthood leads us to expect that starting a family impacts the development of one's career and vice versa (Marini, 1978).

Researchers have documented a clear link between economic decisions and family formation decisions (e.g., Becker, 1981; Marini and Fan, 1997). Fertility and family behavior have socioeconomic consequences and socioeconomic characteristics produce variation in fertility and family behavior (e.g., Bumpass and Castro Martin, 1991; Oppenheimer, 1994). Arland Thornton, in discussing the effects of socioeconomic characteristics for fertility, argues that "[c]hildren, family, work, and lifestyles form a very complex cluster that should be examined together" (1979:174).

Family background characteristics condition the transition to adulthood. Parents' socioeconomic and family behavior influences a child's educational and career trajectories, as well as her fertility and family behavior, leading to intergenerational similarities in socioeconomic status and family characteristics. Given the influence of family background

characteristics for the transition to adulthood and the life course connections between family behavior and economic behavior, the intergenerational process of status attainment may be related to the intergenerational process of family formation behavior. These intra- and intergenerational links could lead to the clustering of socioeconomic and family characteristics across generations, within families. The literatures on the intergenerational association of socioeconomic status and the intergenerational association of family formation behavior have developed in parallel; my goal is to bring them together.

The present research investigates the role of parental socioeconomic status and family structure in the simultaneous determination of two early experiences – a child's education transitions and having an early birth. By modeling these early fertility and education transitions simultaneously, we can obtain better estimates of the effects of family background characteristics on a child's early transition to adulthood. In addition, the present research begins to connect the intergenerational process of status attainment with the intergenerational process of family formation. To fully explicate these connections, however, we must clarify the decision making processes linking educational experiences to early fertility in one's life course and demonstrate how parental characteristics influence these processes. These topics will be discussed, in order, in the following sections.

FERTILITY AND EDUCATION DECISIONS IN THE TRANSITION TO ADULTHOOD

In the transition to adulthood, two key role transitions are the creation of one's own family and developing one's own career to become financially independent. The life course perspective and previous research lead us to expect that these two transitions influence each other (Hogan & Astone, 1986). Men and women tend to delay marriage until after they have

completed schooling (Hogan, 1978; Marini, 1978, 1984a, 1984b). Likewise, women postpone their fertility until after completing school (Rindfuss, Bumpass & St. John, 1980; Rindfuss, Morgan, & Offutt, 1996) and, increasingly, after solidifying their careers. Furthermore, young women develop expectations about and plan for balancing employment, marriage, and motherhood (Aronson, 1999). Therefore, education, career and family choices appear linked in the minds and behaviors of young adults.

The life course perspective also emphasizes the historical context for the transition to adulthood (Elder, 1994). Over the last thirty years, the life course has become "destandardization" or more "individualized," such that the timing and sequence of various role transitions are less structured than in previous eras (Buchmann, 1989). Although the timing of completing high school is highly structured and regulated, the timing of other role transitions is less so (Rindfuss, Swicegood & Rosenfeld, 1987). Since the 1970s, variations in the age at school completion, age at first birth, and age at first marriage have all increased (Rindfuss, 1991). Changes in family formation behavior have also contributed to the destandardization of the transition to adulthood (Shanahan, 2000). Couples frequently enter into cohabiting unions before marriage and fertility has become less tied to marriage (Teachman, Tedrow, & Crowder, 2000). The women's movement of the 1960s and 1970s has also provided a wider range of options and opportunities for women. Female labor force participation has increased dramatically, especially among married women with young children (Bianchi, 1995). And the pill has provided women with the means for controlling their fertility (Ryder & Westoff, 1972). Today, young women have more choices than their mothers, but the modern era may make the negative association between educational attainment and starting a family particularly important. After a century of increasing average

educational attainment for each successive cohort (Mare, 1995), high school completion has become a baseline of educational attainment among modern American cohorts. With declines in manufacturing employment and well-paying jobs for high school graduates, young persons have a greater demand for college degrees (Mare, 1995). Thus, fertility in the early stages of the transition to adulthood, and thus the early stages of career development, can have long-term consequences for their well-being.

When an individual's choices in the transition to adulthood are more determined by rationality and functionality than by tradition (Clausen, 1991), then underlying social psychological characteristics play a larger role in decision-making processes involved in the transition to adulthood. Shaped by their familial and structural context, internalized aptitudes and attitudes structure a young woman's orientations to work and family, as well as her expectations for her future. Expectations about educational and occupational attainment contribute to goal setting and planning for their achievement. Also, values and attitudes toward work and family underlie preferences and behavioral choices (Schuman, 1995; Eagly & Chaiken, 1998). Identity theory would suggest that anticipated identities of "worker" or "mother" and their hierarchical ordering, on the basis of salience and commitment, would influence behavioral choices and personal consistency across situations and in the face of changing circumstances (for a review, see Gecas & Burke, 1995)[1]. Finally, "planful competence," or the amalgamation of self-esteem, ego control and ego resiliency, and intellectual ability, enables adolescents to think through their career and family choices and inhibit tendencies to make unwise choices (Clausen, 1991). Adolescents need not be

[1] For clarification, the identity theory literature discusses only currently held identities and their relationship to behavior. I am asserting that anticipated, as well as current identities, would influence behavior, but this is an empirical question.

rational, but if they think through their options and opportunities they will be more successful in the transition to adulthood (Clausen, 1991). With the greater opportunities for women today, planful competence should have more "payoff value" for adolescent girls today than it did for their mothers (Clausen, 1991: 836).

A person's social psychological characteristics undergird and unify the decision-making processes leading to educational attainment and family formation behavior. In their theory of "reasoned action," Fishbein and Ajzen assert that an individual's perception of the severity of the expected outcomes for some behavior plays an important role in the formulation of behavioral intentions (Fishbein & Ajzen, 1975). Harris, Duncan, and Boisjoly hypothesize that "adolescents who express high expectations for their future health and education will perceive greater risks associated with engaging in risk behaviors and will avoid risk taking in contrast to adolescents with low expectations for their futures" (2002: 1010).

Educational continuation decisions are structured within the academic calendar and college application procedures, but early fertility can be accidental. Frequently, the processes leading up to a teen pregnancy are better characterized by a lack of proactive decisions. Most teens do not plan the initiation of sexual activity, teens are less effective contraceptors, and their pregnancies are likely to be unintended (Forrest & Singh, 1990; AGI, 1994). Although first sex might "just happen" (Thompson, 1995), what happens next is critically important. Differences in social psychological characteristics help to explain the ramifications of sexual initiation.

Educational expectations motivate girls to take precautions against early fertility. Congruent with the hypothesis of Harris, Duncan, and Boisjoly (2002), girls with higher

educational expectations are more likely to have sex at a later age, more likely to use effective contraception, more likely to abort a pregnancy, and more likely to give the child up for adoption (Abrahamse, Morrison & Waite, 1988; Thompson, 1995; Luker, 1996; Forest & Singh, 1990). Girls who have more to lose by having an early birth take more precautions against it. Cutright (1973) suggests that a lack of motivation leads to both low educational attainment and early childbearing. Furthermore, girls with planful competence, in addition to high expectations, are more likely to perceive their contraceptive options, be more effective in their contraception use, and react to an unexpected pregnancy with their career plans in mind.

In addition, a girl's value orientations toward family life and career color her response to an early pregnancy. Even with expanded opportunities, some girls value family life over their career and, for them, a teen pregnancy is less threatening to their future plans. In fact, some teens intentionally choose to become pregnant. A small (and declining) percentage of teen births do occur within a marital union and these births are more likely to be intended (AGI, 1994). Some unwed teen mothers intentionally become pregnant to maintain their relationship with their boyfriend or to find meaning and attachment in their life with a child (Luker, 1996; Dash, 1989). In fact, Geronimous and Korenman (1992) suggest that for some low-income girls wanting a pregnancy is normative and a rational response to their economic constraints and the perception that they can obtain more social support as a young mother.

Under this conceptualization of the decision-making process, whereby underlying social psychological characteristics influence both fertility and education, the timing of various role transitions may not reflect the underlying causal processes or the sequence of

decisions. Instead, individuals anticipate and plan their family and career trajectories simultaneously or decide one transition based on the anticipation of the other (Marini, 1984). With this conceptualization, simultaneous models of fertility and education are preferable because the underlying decisions are made jointly, regardless of the timing of the actual events.

Alternatively, some have conceptualized the decision-making process as a sequence of choices reflecting prior experiences. This conceptualization places less emphasis on plans, expectations, and future-oriented thinking and more emphasis on the person's present conditions and previous choices. The sequence of events is assumed to reflect the sequence of decisions. If one assumes this decision-making process, then one of the following two modeling strategies is preferable. First, event history models can estimate the timing and sequence of particular events in the transition to adulthood. Second, models can estimate the consequences for having a particular event, such as a teen pregnancy, for later outcomes.

Previous research estimating the interplay between education and fertility within one generation can be categorized into the following three groups: (1) research estimating event-history models predicting the timing and sequencing of educational and fertility transitions; (2) research estimating simultaneous equation models predicting the joint determination of these two processes; and (3) research estimating the likelihood of educational and labor market success among women who have an early birth. My review of the literature will focus on the first two areas of research, but it is important to note that women who have an early birth have lower levels of educational attainment and fewer resources in adulthood (e.g., Teachman & Polonko, 1988; Astone & Upchurch, 1994; Maynard, 1997; for exceptions, see review by Hoffman, 1998).

Upchurch and McCarthy (1990) estimate event-history models to determine the relationship between the timing of a first birth and high school completion based on data from the National Longitudinal Survey of Youth. They find that a first birth influences high school graduation, but only among those students who have already dropped out of high school. Those students who have a child while still enrolled in school are just as likely to graduate as those who do not have a child (Upchurch & McCarthy, 1990). While the authors do not attribute a causal sequence to the processes modeled, the models are identified through the timing of the measured events. It is important to note that in a comment to this research, Anderson refutes Upchurch and McCarthy's conclusions, arguing that their data instead support the conclusion that childbirth, regardless of whether it occurs after dropout or during high school enrollment, reduces the likelihood that a woman will graduate from high school (Anderson, 1993). Although I find Anderson's reanalysis convincing, the primary conclusion I draw from these two analyses of the same data is that the results depend upon how the researcher frames the ordering of events. Therefore, I find event history models less satisfying for understanding the influence of education and fertility on each other.

For simultaneous equation models to arrive at estimates of the joint determination of fertility and education, researchers have to make strong theoretical assumptions about the causal relationships among variables in the model. Previous research using simultaneous equations has made different exclusionary restrictions and arrives at different conclusions. Rindfuss, Bumpass, and St. John (1980) found that education has stronger effects on fertility than fertility has on education. These authors use father's occupation as an instrument for education and they use a measure of fecundity as an instrument for fertility (Rindfuss, Bumpass, & St. John, 1980). On the other hand, Hofferth and Moore (1979) conclude that

fertility has stronger effects on education than education has on fertility. In fact, among women who have their first child at age 18 or younger, the relationship between fertility and education is recursive, whereby fertility only affects education. But among women who have their first child after age 18, there is a simultaneous relationship, but the effects of fertility on education are stronger than the effects of education on fertility. Hofferth and Moore (1979) use an index of the home and school environment and the number of siblings as instruments for education and use age at marriage and whether the woman's family was intact at age 14 as instruments for fertility. Marini (1984) also estimates simultaneous equation models, but one that also controls for selection into having a birth. Marini uses fecundity to identify the education equation and she uses both enrollment in a college prepatory curriculum and grade point average to identify the age at first birth equation. She estimates large effects in both causal directions, but finds that the dominant direction of causality is from educational attainment to age at first birth.

I see two problems with the previous research using simultaneous equation models and some of my concerns have also been expressed by others. First, each study utilizes problematic instrumental variables. Hofferth and Moore's use of age at first marriage as an instrument for fertility is questionable because age at first marriage is endogenous to this process (Marini, 1984). Contrary to the assumptions made by Hofferth and Moore, recent research finds that family structure influences a child's educational attainment (Manski, et al., 1992; McLanahan & Sandefur, 1994). Furthermore, the number of siblings one has could reflect orientations to family (Marini, 1984). Rindfuss and his colleagues use father's occupation as an instrument for education, but more resent research concludes that a father's occupation (and other measures of socioeconomic status) influence the likelihood a female

has an early and nonmarital birth (Wu, 1996; Mayer, 1997). Thus, father's occupation is not a good instrumental variable for the child's education. Finally, Marini's instruments for education could be problematic to the extent that high school grade point average and placement in the college prepatory track reflect motivation and commitment to school relative to other options for self-fulfillment. Since these exclusionary restrictions identify their results, their findings and conclusions are questionable.

Second, all of the studies conceptualize and measure educational experiences by their end product – educational attainment. When education is measured as eventual attainment, allowances should be made for individuals who complete their schooling at later ages. Marini (1984) argues that Hofferth and Moore underestimate the effect of education on fertility because their sample is truncated at age 27, leading to a selectivity bias. The previous analyses using simultaneous equations investigate the timing of a first birth relative to the end product of a series of educational choices and transitions. Rindfuss and his colleagues note that

> the observed relationship between completed education and completed family size is the cumulative outcome of a complex process that involves attitudes and decisions about both education and fertility that may change as time passes or as the woman moves from one stage to the next, and that it is necessary to examine empirically the various stages in the process. (1980: 433)

Their research, however, does not model each stage in the process. In this project, I analyze one stage in the process – the early transition to adulthood when a young woman passes from the years of mandatory schooling to higher education. With a focus on this early phase in the transition to adulthood, we can better understand the relationship between education and fertility at this stage and, therefore, what facilitates a successful transition to adulthood.

In a recent and ambitious article, Upchurch, Lillard and Panis (2002) combine event-history analysis with a simultaneous equation approach, estimating the simultaneous determinants of the timing of nonmarital fertility, education, marriage, marital dissolution, and marital fertility. Using data from the National Longitudinal Survey of Youth, they model the processes that generate nonmarital fertility jointly with these other life course events, accounting for the sequencing of events and the unobserved correlations across processes. Upchurch and her colleagues find that the risk of nonmarital conception increases immediately after leaving school, but the educational effects are less pronounced for Black women than for other women. Their results indicate that it is important to account for unobserved heterogeneity because women with a higher unobserved propensity for conceiving nonmaritally also have a lower unobserved propensity for continuing in school.

To identify these models, the authors make the strong assumption that unobservable factors that affect both nonmarital fertility and other life course events are woman-specific and invariant with respect to age, time, and prior life course experiences and that they are jointly normally distributed. As the authors note, if changes in unobservable factors affect multiple life course events, then the coefficient estimates will be biased. Given the ages under consideration, this strong assumption is not tenable. The life course perspective and the literature on the transition to adulthood would suggest that several unobserved factors, such as home-leaving and labor force participation, will change over the ages under consideration and would influence multiple life course events (Goldscheider & Goldscheider, 1999; Rindfuss, Swicegood, & Rosenfeld, 1987). Although I admire the researchers for undertaking such a complex research design for a very important topic, I think the results are biased due to the fact that the violation of their primary assumption is extremely likely for the

ages under consideration. One would expect home-leaving and labor force participation to change over these ages, influencing the life course events that are in the models. Furthermore, high school completion and the first enrollment in post-secondary schooling is very age-graded in the United States, leaving limited monthly variation in the timing of high school completion or college attendance that is not merely a reflection of the academic calendar. The paper by Upchurch and her colleagues covers lots of ground and improves our understanding of these life course events occurring in one generation, but these models still rely on the sequence of events for identification.

I would strongly argue, however, that while the actual events may not occur simultaneously, the decisions for both educational attainment and fertility are made jointly. I believe that teens are aware that having a child while in school will have important consequences for their future educational attainment and career. And while some teens may romanticize having a child or not fully understand the short-term and long-term consequences (Aronson, 1999; Luker, 1996), it is very doubtful that they consider a birth to be inconsequential for their life, on par with routine daily decisions. Highly motivated or high achieving students are probably particularly sensitive to the risks of an early birth, as they try to plan for college and successful careers. Poor performing students might consider having an early birth as an alternative route to adulthood and an alternative life path relative to continuing their education (Thompson, 1995; Luker, 1996). Finally, I argue for modeling these outcomes with simultaneous equations because we are interested in them as events. Having a child before age 20 is not a good event for the life course of the young mother or her child, regardless of whether it occurs before or after high school completion. For their

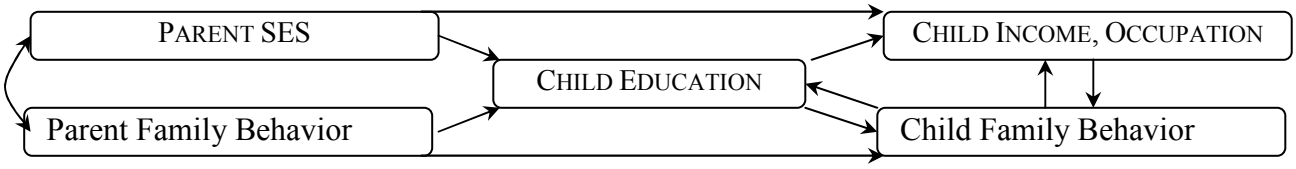
future life course and well-being, we care more about these experiences as events than we do about their relative timing.

INTERGENERATIONAL PROCESSES AND THE EARLY TRANSITION TO ADULTHOOD

Social structures "can facilitate or hinder transitions, and important questions can be raised about what structures do so, how they do so, and with what consequences" (Stryker & Statham, 1985: 339). An individual's family of origin conditions the transition to adulthood, yet there is still more to learn about how that occurs. Because socioeconomic and family formation transitions are linked for both the children and the parents within each life courses, intergenerational analyses of these transitions should considerer them jointly. Parental socioeconomic status may influence a child's status through its impact on the offspring's family and fertility behavior. Likewise, parents' family structure and fertility histories may influence the child's family formation behavior through its impacts on the child's socioeconomic outcomes, especially education.

Graphically, I am interested in the components of the following model:

Figure 1. Theoretical Relationships between the Intergenerational Processes of Socioeconomic Status and Family Formation



The arrows represent paths through which these parental characteristics affect the offspring's characteristics. In Figure 1, parents' socioeconomic status can have both direct

and indirect effects on offspring's socioeconomic status. Likewise, parental family and fertility behavior can have both direct and indirect effects on offspring's socioeconomic status. The offspring's family formation behavior both affects and is affected by their education and career decisions. Presently, I am investigating the family background effects on a daughter's family formation behavior, as measured by having an early birth, and on her education, as measured by her education transition. At this point, I am unable to model the nonrecursive model to estimate effects of education on fertility and fertility on education because of problems in finding appropriate instrumental variables. The present research does, however, model these two outcomes simultaneously, accounting for the effects of unobserved heterogeneity.

What is the role of the family for educational and fertility decisions? The family helps to shape their daughter's own expectations, values and attitudes toward work and family life through socialization processes and role modeling (Glass, Bengtson & Dunham, 1986; Iversen & Farber, 1996; Barber, 2000; Fan & Marini, 2000; Johnson, 2002; Halaby, 2003). Children also seek out their parents' opinions for important decisions regarding educational options and resolving an unintended pregnancy (e.g., Rosen, 1980). Parental monitoring and control are important for teen pregnancy and intact families are better able to monitor their adolescent's behavior (Luster & Small, 1994; Thomson, Hanson & McLanahan, 1994; Wu & Thomson, 2001). For many reasons, including differences in socialization, role modeling, parental control, and experiences of stress, children in nonintact families are more likely to engage in sexual activity, become pregnant, drop out of high school, and forgo college attendance (Amato & Keith, 1991; Wu & Martinson, 1993; McLanahan & Sandefur, 1994; Wu & Thomson, 2001; Biblarz & Raftery, 1999).

The family's socioeconomic resources play an important role in both a daughter's education and fertility experiences. With regard to education, parents' socioeconomic status shapes the daughter's own expectations for her career and status (Sewell, Haller & Ohlendorf, 1970) and finances her educational expenses (Treiman & Hauser, 1977). Parental socioeconomic status protects against teen pregnancy across the sequence of events leading to a teen birth. Children in economically disadvantaged families are more likely to have sex at an earlier age, are less effective contraceptors, are less likely to have an abortion after a teen pregnancy, and are less likely to give their child up for adoption (Hogan & Kitagawa, 1985; Wu, 1996; for a review, see Singh, Darroch, & Frost, 2001). Finally, in an era when an abortion is expensive and geographically limited (Henshaw, 1991), higher income parents can better provide for an abortion for their daughter's unintended pregnancy[2].

I am primarily interested in understanding a multi-generational process. I seek to arrive at better estimates of the role of family background for a child's transition to adulthood, focusing on education and fertility, by accounting for unobserved heterogeneity affecting both outcomes. To fully model these intergenerational processes together at this early stage of the life course, I model these dependent variables jointly using a sample of non-Hispanic White and non-Hispanic Black females from the National Education Longitudinal Study of 1988.

DATA AND METHODS

Data

The National Education Longitudinal Survey of 1988 (NELS:88) provides the

[2] Three-fourths of unintended pregnancies among high income teens are aborted, but only one half of unintended pregnancies to poor or low-income teens are (AGI, 1994).

necessary information on both the parents' family and socioeconomic characteristics and the child's early adult behavior to adequately test the proposed linkages across education and fertility processes. NELS:88 is a nationally representative, two-stage stratified cluster sample representative of persons in the eighth grade in the United States in 1988. The students, including those dropping out of school, were resurveyed in 1990, 1992, 1994, and 2000, while their parents were surveyed in the 1988 and in 1992. The final survey was fielded six years after the expected date of high school completion and when most respondents were 26 years old. The analysis utilizes data from all but the last wave of the survey for the longitudinal cohort. Sample attrition could bias the results because African Americans, dropouts, students in the West, those enrolled in vocational or technical programs, and those in the lowest quartile for the cognitive tests had higher nonresponse rates (Thurgood, et al. 2003). To help account for sample attrition bias, the analysis utilizes nonresponse-adjusted survey weights.

To arrive at the final sample, I make a series of restrictions. The analysis is restricted to females. This exclusion reflects a desire to carefully theorize gendered differences in the transition to adulthood and gendered differences in parental effects (e.g., role modeling, information, monitoring) for this transition. In addition, this exclusion reflects the empirical finding that females better report their fertility and relationship histories. Finally, given the gendered norms for childrearing, the impact of an early birth is likely to have greater consequences for a girl's educational experiences than for a boy's. This analysis is also restricted to non-Hispanic Blacks and Whites and, thereby, the findings generally reflect the experiences of native-born females. At this point, I find it difficult to adequately model the experience of immigration and differences in cultural attitudes regarding education and

fertility. Future research will extend these analyses to males and members of other groups and test for group differences in these processes.

The parents' family formation behavior is measured by (1) the family's structure when the student is in the 8th grade and (2) whether there is a change in family structure between the 8th and 12th grades. The 8th grade measure of family structure is defined according the parents' reports of family composition, their relationship to the student, and the spouse/partner's relationship to the student[3]. Due to small cell sizes for particular categories of families, family composition has been collapsed into (1) two-parent biological families, (2) single parent families, (3) step-parent families, and (4) other relative or non-relative families[4]. In the models, two-parent biological families are omitted. NELS:88 does not provide information on the family's history before the 8th grade, but family transitions after the child's 8th grade year can be measured from student surveys fielded in 1990 and 1992. Family structure change between 8th and 12th grades is measured with one indicator. The indicator is coded equal to one if the student reports that a parent divorced or separated, remarried, or died during the past two years in either the 1990 or 1992 survey.

Parental socioeconomic status is measured with a composite measure based on data from the 1988 Parent Survey and the 1988 Student Survey. The National Center for Education Statistics (NCES) created this composite measure (BYSES) by averaging

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[3] The legal relationship between the adults in the household does not factor into the measure of family structure; cohabiting and married couples are treated the same in the analysis.

[4] Although some research finds differential experiences for children raised in cohabiting households (for a review, see Seltzer, 2000), the small number of females living with cohabiting adults prohibits separating out these families. The total number of students living in a cohabiting household is only 83, similar to the number of students living in an "other" family (n=87) but smaller than the number of students who are missing data on their family structure type (n=99).

standardized measures of parent's education, partner's education, parent's occupation, partner's occupation, and family income[5]. Whenever possible, NCES used the parent's report of these characteristics. As a more parsimonious measure of family socioeconomic status, this composite captures multiple dimensions of status and better reflects permanent income. To examine whether the effects of parents socioeconomic status are conditional on family structure, I also test for interactions between 8th grade family structure and the composite of family socioeconomic status[6]. Therefore, the results will assess if increasing family socioeconomic status has differential associations for the students' education transitions and early fertility for those females in nonintact families relative to those living with both biological parents.

Parental expectations for the child's educational attainment provide an interesting test for the linkages of these two intergenerational processes if messages about how far the daughter should go in school contain explicit or implicit messages about the timing of her fertility. Previous research, conducted within the framework of the Wisconsin model of status attainment, documents that parental expectations for the child's education mediates effects of parents' education on a child's educational attainment. It is an empirical question whether these expectations influence fertility. Parental expectations are measured as the number of years associated with the educational credential the parent expects the child to attain.

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[5] The occupation measures were transformed into Duncan SEI scores before being standardized.

[6] I also estimated models that interacted the indicator for family structure change with family socioeconomic status, but the bivariate probit results consistently found that these interactions were nonsignificant for all outcomes. Thus, they have been dropped from the analysis and discussion.

Finally, several control variables have been included in the analyses. The student's number of siblings derives from both the student and parent 1988 surveys, counting all biological, step-, half-, and adopted siblings. The student's region of residence is categorized into three dummy variables, with the South excluded. Similarly, the urbanicity of the student's residence is categorized into dummy variables for central city and rural residence, with suburban residence omitted.

Three variables have been included in the models to account for past academic performance and experience. First, I include the student's standardized score from the 8th grade mathematics achievement test. Second, the student's year of birth is included in the models to account for whether the student has been held back or accelerated in school. Finally, I include the student's placement in the school's tracking system. Two of the student's 8th grade teachers were asked the following question: "Which of the following best describes the achievement level of the 8th graders in this class compared with the average 8th grade student in this school? This class consists primarily of students with: higher levels, average levels, lower levels, or widely differing" (BYT2_2 & BYT5_2). I recoded the response category of "higher levels" to a value of 3, "average levels" and "widely differing" to 2, and "lower levels" to 1. Then, I averaged the two teacher responses.

To arrive at better estimates of the effects of family background, I include two additional variables. These two variables were originally conceptualized as possible instrumental variables for the nonrecursive models, but now they are included as additional controls. The first variable, whether the student has a disability is derived from the 10th grade teacher's survey. The student is coded as having a disability if at least one of the teachers surveyed in 1990 answered "yes" to either of the following questions:

1. "Do you feel this student has a learning disability that affects his or her school work?" (F1T1_9 and F1T5_9)
2. "Do you feel that this student has a physical or emotional handicap that affects his or her school work?" (F1T1_10 and F1T5_10)

The second variable is a standardized scale about the student's relationships with boys. In the 1990 survey, students were asked to indicate the degree to which the following statements were true:

1. "I get a lot of attention from members of the opposite sex" (F1S63H or F1D47H)
2. "I'm not very popular with members of the opposite sex" (F1S63T of F1D47T)
3. "I make friends easily with boys" (F1S63L or F1D63L)
4. "I do not get along very well with boys." (F1S63P or F1D47P)

Individuals could respond on the following scale: "true," "mostly true," "more true than false," "more false than true," "mostly false," and "false." I have transformed these responses into a six-point scale, where higher values reflect greater attention from or popularity with boys. The responses to these four statements have been summed and then the scale has been standardized. Although I refer to this scale as the student's "relations with boys," this scale might not only reflect the female's interpersonal communication style, but also her physical attractiveness.

In the models, the student's disability status is assumed to only influence the student's educational transitions, while her relationship to boys is assumed to only influence her fertility. These exclusions restrictions are bolstered by the multivariate results presented in Table 1, but theoretical arguments also provide support for these exclusions. With regard to the student's disability status, one might question whether having a disability influences

sexual activity and fertility. In fact, this might be true in the case of mental retardation because Cheng and Udry (2003) find that adolescents with severe mental disabilities know very little about sex and birth control. But students with severe mental disabilities are not included in the present analysis because NELS:88 excluded persons with disabilities (or language barriers) that prohibited successful completion of the survey (Thurgood, et al, 2003; Wells, Sandefur & Hogan, 2003). In light of this concern, however, it is important to recognize that the measure of disability not only includes mild to moderate mental retardation, but also hearing impairment, vision impairment, learning disability, speech impairment, or emotional disturbances. Similarly, one might wonder whether a girl's "relationship to boys" or beauty influences her educational transition. Beauty does provide social rewards and benefits over the life course (for review, Piliavin & LePore, 1995), but it is unlikely to influence the educational outcomes under investigation here. For high school completion, social norms and legal prohibitions regarding sexual relationships between teachers and students leave teachers wary of even the appearance of sexual misconduct with their students. Furthermore, high school graduation is the result of a sequence of multiple grades and relationships with many teachers, leaving little room for beauty to play a significant role. For college attendance, applications do not usually include photographs or personal interviews. Whether this is a measure of beauty or not, it is both theoretically and empirically related to sexual activity and early conception.

As in any analysis attempting to assess the effects of family background characteristics on children's well-being, it is difficult to know if the significant associations are due to unmeasured heterogeneity within and between families. Because so few twins exist in the NELS:88 data, it is practically impossible to conduct a sibling analysis, but some

survey questions about the student's siblings can help speak to unmeasured family characteristics. First, I include an indicator for whether the student reports that a sibling has dropped out of school during the last two years in either the 1990 or 1992 survey. Second, I include an indicator for whether the student reports that an unmarried sister became pregnant during the last two years in either the 1990 or 1992 survey[7]. Despite the fact that not all students have siblings at risk for these negative outcomes, these two indicators, when present, will pick up attributes of the family that are not otherwise measured.

Finally, the sample is restricted to cases with valid data for all independent and dependent variables. By using the most conservative approach to handling missing data, I hope to ensure that the estimated coefficients and standard errors of this highly technical analysis are not biased due to imputation procedures (Allison , 2001). This requirement does reduce the final sample size especially because I require the students to have valid responses to the 10th grade teacher survey questions about student disability. Therefore, the sample is restricted to students who did not drop out between the 8th and 10th grades. The final sample contains 3,615 females, 453 of whom are non-Hispanic Black and 3,162 of whom are non-Hispanic White.

Models

I conduct two sets of bivariate probit models. The first set of models estimates the joint determination of completing high school and having an early birth. Completing high school is defined as having received a high school diploma or a GED certificate by 1994. A

[7] Hogan and Kitagawa (1985) find that Black teenagers are more likely to initiate sexual activity and become pregnant if they have a sister who is a teenage mother.

student is coded as having an early birth if her first birth occurs before her 20th birthday[8]. Students who have a birth before or during the 8th grade (n = 6) or who are missing data on the timing of their fertility (n = 5) are eliminated from the analysis.

Akin to education transition models (Mare, 1980), I estimate a second set of models predicting the joint determination of post-secondary attendance and having an early birth for those women who have completed high school. Post-secondary attendance is defined with two indicators to test the robustness of the results to different specifications. The two measures of post-secondary attendance are defined as whether the female attends: (a) any post-secondary institution, and (b) any four-year college or university. Because I do not vary the measurement of the female's fertility by the timing of her education transitions, I am, therefore, assuming that her fertility and education decisions are made jointly regardless of whether a birth follows or precedes an education transition. In addition to the justifications outlined previously, this assumption rests primarily on the fact that the life course period under consideration is relatively short[9].

Before estimating the bivariate probit models for each set of equations, I first estimate probit models separately for having an early birth and the particular educational transition (Model 1). Then, I estimate bivariate probit models with correlated disturbances (Model 2). Finally, to further correct for bias in the coefficients for family background variables, I then

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[8] For those students who have had a birth and have valid information on the timing of that birth, but are missing data on their own birth date, I code those births as early if they occur before or during 1992 (n = 3) given that NELS:88 is a cohort survey of students expected to graduate high school in 1992. The students who are missing data on their own birth date and have a birth during 1993 or later are coding as not having an early birth (n = 7).

[9] Given the short period in the life course under consideration here, one might also question whether the education transition decisions are made sequentially, as I have modeled them, or simultaneously, as Cameron and Heckman argue (1998).

estimate bivariate probit models with correlated disturbances and include the two variables with exclusion restrictions – the student's disability status and their relationship with boys (Model 3).

Since NELS oversampled some types of schools to enable analyses of small subpopulations and given sample attrition across survey years, I include sample weights to calculate proper population estimates for both descriptive statistics and multivariate analyses. In addition, the multivariate analyses conducted in STATA account for the multi-stage cluster design of NELS:88 by using information on the sampling strata and primary sampling units (schools) to generate weighted point estimates and appropriate standard errors. Since the clustering of observations within schools violates the maximum likelihood theory, model χ^2 statistics are not provided.

RESULTS

The weighted, descriptive statistics for the sample are provided in Table 2. Ninety-four percent of the sample completes high school, seventy-six percent attend a post-secondary institution, and forty-three percent attend a four-year college by 1994. Only twelve percent of the females in the sample have an early, first birth. Given the dominance of Whites in the sample, the total sample statistics better reflect their experiences. Black females are less likely to finish high school and attend college, but are more likely to have an early first birth. In fact, 20 percent of Black females in this sample have an early birth. As expected, the subsample of high school graduates has more prestigious family background characteristics relative to the full sample. And among high school graduates, 45 percent attend a four-year college and 80 percent attend any post-secondary institution. In the

NELS:88 data, girls who have an early birth are 91% less likely to complete high school. Among girls who complete high school, those who have an early birth are 85% less likely to attend any post-secondary schooling and 91% less likely to attend a four-year college.

Simultaneous Predictions of Having an Early Birth and Completing High School

Table 3 provides the results from models predicting high school completion and having an early birth. In Model 1, the two outcomes are estimated independently. While the particular interactions for each outcome are significant, these interactions are not jointly statistically significant for either outcome, as shown in Table 4. The pattern of results for high school demonstrate that daughters in single parent families receive a lower return for their high school completion with increases in their parents' socioeconomic status relative to daughters living with both biological parents. For having an early birth, the significant interaction is for daughters living in step-parent families. Among step-parent families, increases in socioeconomic status actually provides a greater protection against their daughter's early fertility than does it does for daughters living with both biological parents. The difference between daughters in single parent families and those in intact families is additive – at every level of socioeconomic status, daughters in single parent families are more likely to have an early birth. To better understand the differences by family structure, Figure 1 displays the predicted probabilities for having an early birth for daughters in each family structure type. At lower levels of socioeconomic status, daughters in step-parent families are much more likely to have an early birth relative to daughters in intact families. As socioeconomic status increases, however, the difference between step-parent families and intact families declines and at the highest levels of socioeconomic status daughters in step-parent families are actually less likely to have an early birth. This is an interesting and

unanticipated result that is not predicted by any of the literature. One might suppose that the estimated differences to the right of the cross-over point is an artifact of the data or a result of selection effects. This finding deserves further investigation in the future.

As for other variables in the models, Whites are less likely to complete high school relative to Blacks after controlling for socioeconomic status, school track placement, test scores, and grade retention. Also, students who have a sibling who's dropped out of school and those who experience a change in family composition are less likely to complete high school. With regard to early fertility, the chances of having an early birth increase as the number of siblings increases. For both outcomes, mathematics achievement test scores are significant and the coefficients are in the expected directions. Interestingly, increases in parental expectations for the daughter's educational attainment reduces the probability of having an early birth, but they are not significant for completing high school. Thus, it would appear that parents' educational expectations and aspirations for their children exert an independent effect of the timing of their daughter's fertility.

Model 2 accounts for the effects of unobserved heterogeneity to arrive at better estimates of the effects of family background. With the simultaneous equations, we find very strong evidence that there is a large and negative correlation between the errors of the outcomes (-0.52). This negative correlation in the disturbances reinforces the need to model these two processes simultaneously. After accounting for unobserved heterogeneity, the interactions of family structure and socioeconomic status become statistically significant, as shown in Table 4. Most of the significant coefficients in the early birth equation change very little with the adjustment for unobserved heterogeneity, but the slope for socioeconomic status among step-parent families becomes flatter. For predicting high school completion,

the slopes for socioeconomic status among intact families and single parent families retain their relative position because both become steeper. Also, the interaction of "other" family and socioeconomic status becomes significant for high school completion, indicating that daughters in "other" families also receive a lower return from increasing socioeconomic status relative to daughters in intact families. Finally, the coefficient for being Black increases in the equation for high school completion, while the coefficient for sibling dropout decreases.

Next, in Model 3, the variables with exclusionary restrictions – student's disability and relationship with boys – are added to the bivariate probit models. With their inclusion, the coefficients for some family background characteristics change in magnitude. For high school completion, the estimated disadvantages associated with living in an "other" family, experiencing family change, and being White decline. Furthermore, the estimated difference in the returns to parental socioeconomic status between intact families and single parent families declines between Models 2 and 3. For early fertility, the inclusion of the variables with exclusionary restrictions reduces the negative effect of living in a single parent family. In addition, the slope for socioeconomic status among intact families becomes steeper, as does the slope for step-parent families. Thus, the difference in slopes in socioeconomic status is approximately the same as that observed in Model 1, but both family types have steeper slopes in Model 3 than in Model 1. The other variables remain relatively unchanged.

In summary, parental socioeconomic status affects both high school completion and having an early birth, but children in step-parent families receive less of a protective effect against having an early birth and children in single parent families receive less of a benefit for high school completion. If these models had not been estimated simultaneously, then we

would have concluded that the interactions were not significant and arrived at slightly different estimates for the interactions. In addition, if we had not controlled for student disability and relationship to boys, we would have underestimated the effects of parental socioeconomic status among intact families for having early births. After adjusting for both correlated disturbances and the variables with exclusion restrictions, the difference in slope between single parent families and intact families for high school completion grows, while the coefficients for being Black and having a sibling who dropped out increase.

Simultaneous Predictions of Having an Early Birth and Post-Secondary Attendance

For those students who complete high school, I estimate their probability of post-secondary attendance and having an early birth. Post-secondary attendance is measured in two ways to ascertain the robustness of the results across different specifications. Table 5 displays the results from the models for any post-secondary education and Table 6 displays the results for attending a four-year college.

Turning first to the results for any post-secondary education, in Model 1, we find the same pattern of significant interactions as we did in the models estimating high school graduation and having an early birth. Relative to daughters in intact families, daughters in single parent families receive a lower benefit from increasing socioeconomic status for post-secondary attendance, but daughters in step-parent families are more protected by increasing socioeconomic status for having an early birth. Figure 2 presents the predicted probabilities for having an early birth among the sample of high school graduates, but the predicted probabilities are very similar to those presented for the full sample in Figure 1. As a group, however, the interactions are jointly not significant for either outcome, as shown in Table 4. In contrast to the results for high school completion, the results for post-secondary attendance

show an additive effect of living in a step-parent family. At every level of socioeconomic status, children of step-parent families are less likely to attend any post-secondary institution. Increases in parental educational expectations, sibship size, and mathematics achievement significantly impact both outcomes in the anticipated, opposite directions. African Americans and students in higher tracks in the 8th grade are more likely to attend any post-secondary schooling, but they are not significantly different for having an early birth. Females in "other" families are more likely to have an early birth than those in intact families, but they are not significantly different for post-secondary attendance.

Model 2 estimates these two outcomes simultaneously and there is strong evidence that post-secondary attendance and early fertility are negatively associated with each other. The estimated correlated disturbance is -0.42, but this is smaller than the estimated error correlation for high school completion and having an early birth. The smaller correlated disturbance results, in part, from the fact that the sample members included in these models have all completed high school and, thus, those who have an early birth are less likely to be in this sample and those mothers who are in the sample are likely to be a select group of students possessing characteristics enabling them to complete high school despite their early fertility.

With the adjustment for unobserved heterogeneity, the interactions of family structure and socioeconomic status become statistically significant. Furthermore, the slopes for socioeconomic status for having an early birth increase for those in intact families and step-parent families. The slopes for the interactions in the equation predicting any post-secondary attendance do not change between Models 1 and 2. Finally, the adjustment for unobserved

heterogeneity leads to a lower estimate for the effect of increasing the number of siblings for having an early birth.

Model 3 includes the student's disability and relationship to boys. The most of the estimates for various characteristics do not change substantially for predicting an early birth, but the slope for socioeconomic status among step-parent families becomes much steeper, while the slope for socioeconomic status among intact families becomes only slightly steeper. This suggests an even greater difference in slope between daughters in intact families and those in step-parent families for the probability of having an early birth. For post-secondary attendance, the estimated coefficient for socioeconomic status among intact families increases slightly, increasing to the difference in slope between intact families and single parent families. In addition, the effects of being Black and one's track placement in the 8th grade decline in Model 3 for post-secondary attendance.

The results are quite similar when post-secondary attendance is narrowed to only include four-year colleges. These results are presented in Table 6. Before discussing the differences across the two specifications of post-secondary attendance, however, it is worth reviewing their commonalities. First, similar to Table 5, we find that sibship size and mathematics test scores affect both outcomes, but in opposite directions. Likewise, parental expectations influence post-secondary attendance and early fertility. Thus, parental educational expectations appear to discourage teen pregnancy. Females living in "other" families are more likely to have a birth, while Whites are less likely to attend a four-year college. Again we find that family structure moderates the impact of socioeconomic status, but these interactions are only jointly significant when these outcomes are modeled simultaneously. On the one hand, increases in socioeconomic status among daughters in step-

parent families have a greater protective effect against early fertility than among intact families. On the other hand, increases in socioeconomic status among daughters in single parent families have lower benefit for college attendance relative to intact families. Finally, the correlated disturbances for having an early birth and attending a four-year college is again very large (-0.46) and similar to the estimated correlated disturbance in Table 5.

There are three important differences between the results that define post-secondary attendance as attending a four-year college versus those modeling any post-secondary attendance. First, the effect of parents' socioeconomic status is greater for attendance at a four-year college than for attendance at any post-secondary institution. In light of the higher financial costs for attending a four-year college, this finding is not surprising.

Second, the consequences associated with growing up in a step-parent family for post-secondary education appear to operate differently based on the definition of higher education. In models predicting any post-secondary education, daughters of step-parent families are less likely to attend a post-secondary institution relative to daughters of intact families. When the definition is narrowed to attendance at four-year institutions, daughters in step-parent families are not significantly different than daughters in intact families.

Third, the sibling variables acting as indicators of unobserved family characteristics operate differently across the two definitions of post-secondary education. In the models for any post-secondary attendance, the sibling variables were never statistically significant. When post-secondary schooling is defined as four-year college attendance, having an unmarried sister who became pregnant or a sibling who dropped out of high school reduces the likelihood of attending college in the bivariate probit models.

In summary, for those females who complete high school, parental socioeconomic status more strongly affects post-secondary attendance than having an early birth, especially for daughters in single parent and intact families. If these models had not controlled for unobserved heterogeneity, disability, and the student's relationship with boys, we would have slightly underestimated the effects of socioeconomic status on post-secondary attendance and early fertility among intact families, but overestimated the effects of being Black and school track for post-secondary attendance. Family structure differences moderate the impact of parental socioeconomic status for both outcomes, but different family structure types are involved in the interaction for having an early birth versus post-secondary attendance. In addition, parental educational expectations are important for both early fertility and early education transitions, suggesting that fertility and education are not only linked within the children's generation but also in the minds and actions of their parents.

DISCUSSION

The results demonstrate that parental socioeconomic status affects both having an early birth and education transitions, but parental socioeconomic status has greater effects on the daughter's education transitions. If these models had not controlled for the effects of unobserved heterogeneity, then we would have concluded that the interactions of family structure and socioeconomic status were not significant. By controlling for the student's disability and relationship to boys, we arrive at improved estimates for the effects of family background. Without controlling for these two variables, we would have underestimated the effects of parental socioeconomic status for the educational transitions, as well as the

differences in slopes for socioeconomic status between single parent and intact families for successfully making these educational transitions.

In the simultaneous equations, family structure differences play both an additive and moderating role in the transition to adulthood. In the final models, females raised in "other" families are consistently more likely to have a birth. Daughters in single parent families are also more likely to have a birth when the bivariate probit models are predicting early fertility and high school completion. Among high school graduates, however, daughters in single parent families do not have a greater risk for having an early birth. High school graduates in step-parent families are less likely to attend any post-secondary institution relative to their counterparts in intact families, but they are not significantly different for attendance at a four-year institution.

Family structure also moderates the association of socioeconomic status for both the fertility and education outcomes. For education transitions, the benefits of increasing socioeconomic status are greater for daughters in intact families than they are for daughters in single parent families. For fertility, the interaction results are more surprising. The results consistently demonstrate that daughters in step-parent families receive a higher return for increases in parental socioeconomic status relative to daughters in intact families. The results even suggest that at higher levels of socioeconomic status, daughters in step-parent families are actually less likely to have an early birth. While the results to the right of the cross-over point require further investigation to ensure that these differences are real, the results to the left of the cross-over point are reminiscent of a Murphy Brown hypothesis. In other words, as socioeconomic status increases, parents in step-parent families are better able to transmit

their resources to their children, allowing their children to catch up to those in intact families. This provocative finding would greatly benefit from further investigation.

As noted earlier, parental expectations for their child's eventual educational attainment provides an interesting test of the association between the intergenerational process of status attainment and the intergenerational process of family formation. Parental educational expectations not only influence a student's education transitions, but also her likelihood of having an early birth. This suggests that parental messages about education continuation decisions carry along with them explicit or implicit messages about delaying fertility.

The large and significant correlations in disturbances strongly suggest that the process of early fertility is linked to the processes for high school completion and post-secondary attendance. Thus, future research should continue to model these processes together. In addition, we need to develop better theoretical propositions for understanding the mechanisms by which these two early adult transitions are linked.

It is important to note that we can only draw conclusions about the cohort of non-Hispanic females in the 8th grade in 1988 with this data. This cohort is coming of age in a different career and family environment than did previous cohorts of females because of secular changes toward greater high school completion and college attendance for women, greater female labor force participation, delays in fertility, and increases in out-of-wedlock childbearing. The associations between early education transitions and early fertility were probably different when fewer young women went on to college and more women had births at younger ages. While these transitions might have been linked over centuries, modern changes in the organization of work could strengthen their negative association. Educational

and career opportunities are increasing for women, but the gendered norms of childcare remain relatively unchanged (Hochschild, 1989). Therefore, early births could be very detrimental for a young woman's career. As such, parents' who have high career expectations for their daughters, and these parents are likely to be high status themselves, probably openly discuss the risks of teen pregnancy for their daughter's future career. It would be helpful if we had direct measures of parents' expectations for the child's family formation behavior just as we have parents' expectations for the child's educational attainment, but theory might have to make up for missing data. Future research should continue investigating these linkages so that we have a better understanding of both family formation patterns and status attainment for women. And with more theorizing about these processes, we can develop better models of the intra- and intergenerational processes involved.

The results are specific to the non-Hispanic White and Black population. This restriction not only is a restriction by ethnicity but also a restriction by immigration status. Although some members of the sample could be immigrants themselves or the children of immigrants, the probability is lower among this sample than it would be for Hispanics and Asians. In considering how these intra- and intergenerational processes might work for Hispanics or Asians, it is important to consider and conceptualize how the intergenerational processes of immigrant adaptation impinges upon the relationships and patterns documented in the present sample.

To conclude, there is strong evidence that the intergenerational processes of status attainment and family formation are linked. An individual's early education and fertility decisions are clearly linked within one generation, but family formation characteristics and

socioeconomic characteristics are linked across two generations. The present research has better information to model the intergenerational association of socioeconomic status relative to the information for the intergenerational association of family formation. The NELS:88 data does not have any information on the marital history of these families before 1988. We do not know how the single parent families were formed – through divorce or non-marital childbearing. In addition, it would be useful to have information on the mother's fertility timing, especially since I am modeling the timing of the daughter's fertility. Therefore, the parental measures of family formation (family structure) are not parallel to the daughter's measure of family formation (early fertility). Despite this incongruence, family formation behavior and socioeconomic status appear linked in the intragenerational processes for the transition to adulthood and in the intergenerational processes of parental investment.

In the future, I will continue to seek out instrumental variables that identify a nonrecursive model for the educational transitions and early fertility. This is a substantial task. To estimate reciprocal effects, each instrumental variable must have a significant association with the second endogenous variable in the reduced form equation, but this significant association must be fully mediated by the first endogenous variable. Once such instrumental variables are found, the nonrecursive model will enable me to better understand the direct and indirect pathways through which the family background characteristics influence early fertility and educational transitions. Finally, the nonrecursive models will allow me to estimate whether early fertility has stronger effects on educational transitions or if educational transitions more strongly affect early fertility and, thus, contribute to the on-going debate in this literature.

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Table 1. Results from Multivariate Probit Analyses Testing Exclusion Restrictions

	High School Completion	Any Post-Secondary	Four-year College	Early Birth
Disability affects schoolwork, 10th grade teacher	-0.405 **	-0.313 **	-0.346 **	0.093
	(0.118)	(0.084)	(0.093)	(0.090)
Relations with boys, 10th grade	0.026	0.052	0.008	0.095 **
	(0.050)	(0.030)	(0.030)	(0.035)

Robust standard errors, adjusted for clustering, in parentheses
* significant at 5%; ** significant at 1%

Note: Models also include measures for family structure, socioeconomic status composite, number of siblings, parental expectations of child's education, region, urbanicity 8th grade mathematics achievement score, 8th grade track, year of birth, sibling dropout, and unmarried sister pregnant.

Table 2. Statistics for Final Sample of NELS:88 Non-Hispanic Black and White Females

	Full Sample			High School Graduates		
	Unweighted		Weighted & Clustered	Unweighted		Weighted & Clustered
	Mean or %	S.D.	Mean or %	Mean or %	S.D.	Mean or %
Dependent Variables						
High school certification	95.2%	-	94.1%	100.0%	-	100.0%
Attend any post-secondary	75.5%	-	75.5%	78.8%	-	79.6%
Attend four-year college	41.7%	-	42.7%	43.8%	-	45.3%
Early first birth	12.0%	-	12.2%	10.1%	-	9.7%
Family Structure						
Bio. two-parent[a]	69.7%	-	69.5%	70.5%	-	70.5%
Single parent	16.4%	-	16.1%	15.9%	-	15.4%
Step-parent	12.6%	-	13.1%	12.5%	-	13.0%
Other family	1.3%	-	1.3%	1.2%	-	1.1%
Change between 8^{th} & 12^{th}	18.3%	-	18.2%	17.4%	-	17.1%
Family Human & Financial Capital						
SES Composite	-0.03	0.73	0.01	0.00	0.73	0.05
Ln(Family Income)	10.31	0.95	10.32	10.34	0.93	10.36
Avg. Years of Education	13.41	2.04	13.47	13.48	2.04	13.56
Avg. Occupation SEI	0.46	1.13	0.52	0.49	1.13	0.56
Controls						
Parental Expectations	15.72	2.40	15.73	15.80	2.38	15.83
No. siblings	2.15	1.51	2.16	2.13	1.50	2.13

(Continued)

Table 2. Statistics for Final Sample of NELS:88 Non-Hispanic Black and White Females (cont.)

	Full Sample			High School Graduates		
	Unweighted		Weighted & Clustered	Unweighted		Weighted & Clustered
	Mean or %	S.D.	Mean or %	Mean or %	S.D.	Mean or %
Controls (continued)						
Region						
Northeast	18.2%	-	19.9%	18.3%	-	20.2%
North Central	32.3%	-	29.9%	32.4%	-	30.1%
South[a]	36.8%	-	35.8%	36.4%	-	35.2%
West	12.7%	-	14.5%	12.8%	-	14.5%
Urbanicity						
Central city	20.3%	-	20.7%	20.5%	-	21.1%
Suburban[a]	41.8%	-	44.4%	42.1%	-	44.2%
Rural	37.9%	-	34.9%	37.4%	-	34.6%
Mathematics Achievement	52.13	9.84	52.20	52.60		52.78
School track (range: 1-3)	2.18	0.54	2.20	2.20	0.54	2.22
Year of birth	1973.7	0.50	1973.7	1973.7	0.48	1973.7
Sibing dropout	5.5%	-	5.6%	4.9%	-	4.8%
Unmarried sister pregnant	8.0%	-	7.9%	7.5%	-	7.4%
Disability for schoolwork	14.2%	-	13.8%	12.8%	-	12.2%
Relations with boys	0.01	0.99	0.01	0.02	0.98	0.02
N	3,615			3,433		

[a] Indicates omitted variable in multivariate analyses.

Table 3. Bivariate Probit Analysis of Having an Early Birth and High School Completion

	Early Birth			High School Completion		
	(1)	(2)	(3)	(1)	(2)	(3)
Single parent	0.195 *	0.198 *	0.213 *	-0.301	-0.299	-0.287
	(0.098)	(0.099)	(0.098)	(0.162)	(0.166)	(0.166)
Step-parent	0.106	0.103	0.093	0.040	0.048	0.038
	(0.113)	(0.112)	(0.113)	(0.203)	(0.194)	(0.197)
Other family	0.938 **	0.934 **	0.935 **	-0.952 *	-0.958 *	-0.927 *
	(0.302)	(0.276)	(0.280)	(0.393)	(0.389)	(0.374)
Family change	0.105	0.106	0.102	-0.291 *	-0.303 **	-0.270 *
	(0.079)	(0.078)	(0.078)	(0.114)	(0.112)	(0.109)
No. Siblings	0.075 **	0.077 **	0.077 **	-0.020	-0.022	-0.026
	(0.022)	(0.022)	(0.021)	(0.033)	(0.032)	(0.032)
Composite SES	-0.211 **	-0.217 **	-0.227 **	0.534 **	0.554 **	0.551 **
	(0.073)	(0.073)	(0.073)	(0.122)	(0.119)	(0.119)
Single*SES	-0.084	-0.072	-0.060	-0.336 *	-0.340 *	-0.332 *
	(0.125)	(0.125)	(0.123)	(0.158)	(0.162)	(0.163)
Step*SES	-0.360 *	-0.349 *	-0.374 *	-0.111	-0.114	-0.106
	(0.151)	(0.150)	(0.152)	(0.186)	(0.191)	(0.193)
Other*SES	0.254	0.259	0.286	-0.625	-0.655 *	-0.594
	(0.286)	(0.268)	(0.271)	(0.330)	(0.325)	(0.313)
Black	0.139	0.135	0.133	0.326 *	0.345 *	0.330 *
	(0.101)	(0.102)	(0.101)	(0.161)	(0.158)	(0.156)
Northeast	-0.225 *	-0.226 *	-0.217 *	0.081	0.050	0.055
	(0.109)	(0.110)	(0.109)	(0.153)	(0.148)	(0.145)
North Central	0.012	0.012	0.015	0.067	0.058	0.051
	(0.084)	(0.084)	(0.085)	(0.131)	(0.130)	(0.128)

(Continued)

Table 3. Bivariate Probit Analysis of Having an Early Birth and High School Completion (cont.)

	Early Birth			High School Completion		
	(1)	(2)	(3)	(1)	(2)	(3)
West	-0.044	-0.039	-0.022	-0.098	-0.132	-0.115
	(0.115)	(0.112)	(0.113)	(0.190)	(0.183)	(0.188)
Central city	-0.069	-0.058	-0.062	0.301 *	0.262	0.227
	(0.110)	(0.109)	(0.110)	(0.140)	(0.134)	(0.136)
Rural	-0.023	-0.016	-0.009	0.224	0.190	0.197
	(0.077)	(0.076)	(0.076)	(0.121)	(0.117)	(0.117)
Par. Expectations	-0.045 **	-0.045 **	-0.046 **	0.046	0.047	0.040
	(0.017)	(0.017)	(0.017)	(0.030)	(0.029)	(0.029)
Mathematics Score	-0.030 **	-0.030 **	-0.030 **	0.058 **	0.060 **	0.057 **
	(0.005)	(0.005)	(0.005)	(0.009)	(0.009)	(0.009)
Year of birth	0.036	0.033	0.022	0.157	0.166	0.137
	(0.062)	(0.061)	(0.062)	(0.086)	(0.087)	(0.089)
School track	-0.043	-0.043	-0.055	-0.049	-0.046	-0.096
	(0.078)	(0.076)	(0.077)	(0.118)	(0.108)	(0.109)
Sibling dropout	-0.071	-0.052	-0.057	-0.592 **	-0.583 **	-0.601 **
	(0.133)	(0.129)	(0.130)	(0.168)	(0.171)	(0.168)
Sister nonmar. pregnant	0.145	0.138	0.134	0.074	0.057	0.076
	(0.105)	(0.105)	(0.105)	(0.158)	(0.155)	(0.153)
Relations with boys	-	-	0.097 **	-	-	-
			(0.033)			
Disability	-	-	-	-	-	-0.391 **
						(0.111)
N	3,615	3,615	3,615	3,615	3,615	3,615
Error Covariance	-	-0.52 **	-0.53 **	-	-0.52 **	-0.53 **

Robust standard errors in parentheses * significant at 5%; ** significant at 1%

Table 4. Tests for a Signficant Interaction Between Family Structure and Socioeconmic Status

		High School & Early Birth		Any Post-secondary & Early Birth		Four-year College & Early Birth	
		Interx of All Types	Only Single & Step	Interx of All Types	Only Single & Step	Interx of All Types	Only Single & Step
		p value	p value	p value	p value	p value	p value
M1	Early Birth	0.092	0.060	0.070	0.058	0.070	0.058
	Education Transition	0.066	0.105	0.148	0.070	0.078	0.093
M2	Correlated Disturbances	0.038	0.044	0.011	0.006	0.032	0.020
M3	M2 + Variables with Exclusion Restrictions	0.039	0.039	0.006	0.004	0.021	0.013

Table 5. Bivariate Probit Analysis of Having an Early Birth and Attending a Post-secondary Institution

	Early Birth			Any Post-secondary		
	(1)	(2)	(3)	(1)	(2)	(3)
Single parent	0.140	0.113	0.130	-0.155	-0.157	-0.142
	(0.108)	(0.110)	(0.110)	(0.097)	(0.098)	(0.097)
Step-parent	0.095	0.068	0.051	-0.179 *	-0.175 *	-0.177 *
	(0.105)	(0.105)	(0.106)	(0.088)	(0.089)	(0.089)
Other family	0.965 **	0.967 **	0.993 **	0.206	0.211	0.236
	(0.307)	(0.310)	(0.314)	(0.341)	(0.343)	(0.355)
Family change	0.094	0.094	0.089	-0.127	-0.127	-0.121
	(0.086)	(0.085)	(0.086)	(0.078)	(0.078)	(0.078)
No. Siblings	0.084 **	0.078 **	0.079 **	-0.055 **	-0.051 *	-0.053 **
	(0.024)	(0.023)	(0.023)	(0.020)	(0.020)	(0.020)
Composite SES	-0.185 *	-0.191 *	-0.198 *	0.547 **	0.547 **	0.552 **
	(0.081)	(0.080)	(0.080)	(0.072)	(0.073)	(0.073)
Single*SES	-0.078	-0.096	-0.093	-0.293 *	-0.293 *	-0.291 *
	(0.129)	(0.130)	(0.130)	(0.127)	(0.126)	(0.126)
Step*SES	-0.400 *	-0.447 **	-0.485 **	-0.085	-0.076	-0.089
	(0.167)	(0.165)	(0.167)	(0.136)	(0.136)	(0.136)
Other*SES	0.363	0.379	0.418	-0.127	-0.118	-0.100
	(0.302)	(0.303)	(0.304)	(0.318)	(0.317)	(0.331)
Black	0.186	0.202	0.197	0.415 **	0.406 **	0.387 **
	(0.112)	(0.110)	(0.110)	(0.106)	(0.105)	(0.105)
Northeast	-0.168	-0.157	-0.148	0.076	0.072	0.066
	(0.116)	(0.115)	(0.114)	(0.091)	(0.091)	(0.092)
North Central	0.057	0.056	0.058	0.015	0.008	0.011
	(0.088)	(0.087)	(0.088)	(0.075)	(0.075)	(0.075)

(Continued)

Table 5. Bivariate Probit Analysis of Having an Early Birth and Attending a Post-secondary Institution (cont.)

	Early Birth			Any Post-secondary		
	(1)	(2)	(3)	(1)	(2)	(3)
West	0.031	0.046	0.069	-0.020	-0.032	-0.032
	(0.110)	(0.110)	(0.110)	(0.100)	(0.100)	(0.101)
Central city	0.054	0.059	0.057	0.017	0.018	0.008
	(0.111)	(0.110)	(0.110)	(0.095)	(0.095)	(0.095)
Rural	0.100	0.096	0.107	-0.042	-0.042	-0.043
	(0.078)	(0.077)	(0.077)	(0.064)	(0.064)	(0.064)
Par. Expectations	-0.044 **	-0.042 **	-0.044 **	0.095 **	0.095 **	0.092 **
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Mathematics Score	-0.026 **	-0.026 **	-0.025 **	0.038 **	0.038 **	0.036 **
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
Year of birth	0.025	0.023	0.015	0.044	0.040	0.016
	(0.066)	(0.066)	(0.067)	(0.065)	(0.066)	(0.066)
School track	-0.039	-0.038	-0.052	0.193 **	0.196 **	0.178 **
	(0.070)	(0.070)	(0.070)	(0.067)	(0.067)	(0.068)
Sibling dropout	-0.236	-0.244	-0.257	-0.105	-0.095	-0.098
	(0.168)	(0.168)	(0.170)	(0.145)	(0.146)	(0.145)
Sister nonmar. pregnant	0.134	0.155	0.146	-0.191	-0.186	-0.183
	(0.119)	(0.115)	(0.116)	(0.113)	(0.113)	(0.114)
Relations with boys	-	-	0.122 **	-	-	-
			(0.036)			
Disability	-	-	-	-	-	-0.292 **
						(0.080)
N	3,433	3,433	3,433	3,433	3,433	3,433
Error Covariance	-	-0.43 **	-0.43 **	-	-0.43 **	-0.43 **

Robust standard errors in parentheses * significant at 5%; ** significant at 1%

Table 6. Bivariate Probit Analysis of Having an Early Birth and Attending a Four-year College

	Early Birth			Four-year College Attendance		
	(1)	(2)	(3)	(1)	(2)	(3)
Single parent	0.140	0.129	0.148	0.064	0.063	0.075
	(0.108)	(0.109)	(0.109)	(0.082)	(0.082)	(0.082)
Step-parent	0.095	0.086	0.071	-0.127	-0.133	-0.127
	(0.105)	(0.103)	(0.104)	(0.093)	(0.093)	(0.093)
Other family	0.965 **	0.936 **	0.956 **	-0.081	-0.132	-0.125
	(0.307)	(0.318)	(0.321)	(0.436)	(0.457)	(0.456)
Family change	0.094	0.091	0.088	-0.062	-0.060	-0.056
	(0.086)	(0.085)	(0.086)	(0.080)	(0.080)	(0.081)
No. Siblings	0.084 **	0.086 **	0.086 **	-0.047	-0.049	-0.050
	(0.024)	(0.023)	(0.023)	(0.026)	(0.026)	(0.026)
Composite SES	-0.185 *	-0.196 *	-0.202 *	0.679 **	0.673 **	0.681 **
	(0.081)	(0.081)	(0.081)	(0.058)	(0.058)	(0.058)
Single*SES	-0.078	-0.073	-0.064	-0.242 *	-0.245 *	-0.241 *
	(0.129)	(0.131)	(0.130)	(0.112)	(0.112)	(0.111)
Step*SES	-0.400 *	-0.392 *	-0.431 *	-0.114	-0.102	-0.116
	(0.167)	(0.165)	(0.167)	(0.152)	(0.153)	(0.155)
Other*SES	0.363	0.363	0.397	-0.583	-0.639	-0.635
	(0.302)	(0.306)	(0.306)	(0.353)	(0.374)	(0.371)
Black	0.186	0.191	0.192	0.611 **	0.609 **	0.596 **
	(0.112)	(0.110)	(0.109)	(0.106)	(0.105)	(0.105)
Northeast	-0.168	-0.181	-0.174	0.190 *	0.189 *	0.185 *
	(0.116)	(0.115)	(0.114)	(0.087)	(0.086)	(0.086)
North Central	0.057	0.049	0.054	0.034	0.038	0.040
	(0.088)	(0.088)	(0.088)	(0.074)	(0.073)	(0.073)

(Continued)

Table 6. Bivariate Probit Analysis of Having an Early Birth and Attending a Four-year College (cont.)

	Early Birth			Four-year College Attendance		
	(1)	(2)	(3)	(1)	(2)	(3)
West	0.031	0.036	0.057	-0.421 **	-0.417 **	-0.424 **
	(0.110)	(0.110)	(0.110)	(0.095)	(0.094)	(0.094)
Central city	0.054	0.041	0.037	0.070	0.073	0.066
	(0.111)	(0.110)	(0.110)	(0.083)	(0.083)	(0.083)
Rural	0.100	0.095	0.103	0.095	0.090	0.088
	(0.078)	(0.077)	(0.077)	(0.066)	(0.065)	(0.065)
Par. Expectations	-0.044 **	-0.038 *	-0.040 **	0.078 **	0.077 **	0.075 **
	(0.016)	(0.015)	(0.015)	(0.013)	(0.013)	(0.013)
Mathematics Score	-0.026 **	-0.025 **	-0.025 **	0.041 **	0.041 **	0.040 **
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
Year of birth	0.025	0.015	0.006	0.110	0.110	0.097
	(0.066)	(0.065)	(0.066)	(0.064)	(0.064)	(0.065)
School track	-0.039	-0.054	-0.068	0.240 **	0.240 **	0.225 **
	(0.070)	(0.069)	(0.070)	(0.058)	(0.058)	(0.059)
Sibling dropout	-0.236	-0.226	-0.236	-0.302	-0.308 *	-0.311 *
	(0.168)	(0.166)	(0.168)	(0.157)	(0.156)	(0.155)
Sister nonmar. pregnant	0.134	0.135	0.128	-0.368 **	-0.359 **	-0.351 **
	(0.119)	(0.118)	(0.118)	(0.113)	(0.113)	(0.114)
Relations with boys	-	-	0.114 **	-	-	-
			(0.037)			
Disability	-	-	-	-	-	-0.318 **
						(0.091)
N	3,433	3,433	3,433	3,433	3,433	3,433
Error Covariance	-	-0.46 **	-0.46 **	-	-0.46 **	-0.46 **

Robust standard errors in parentheses * significant at 5%; ** significant at 1%

Figure 1. Predicted Probability of Having an Early Birth for the Full Sample (Table 3, M1)

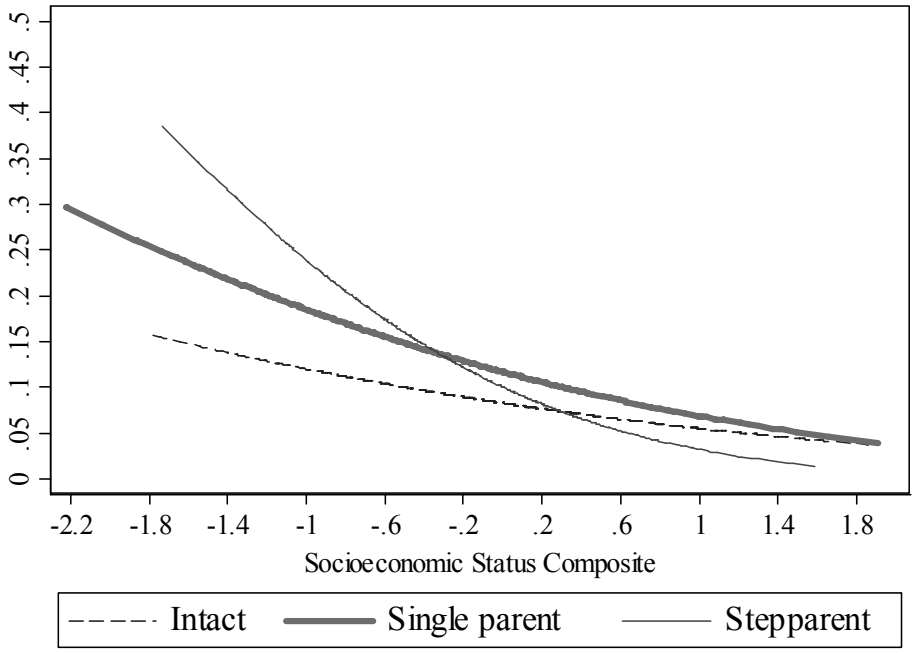

Figure 2. Predicted Probability of Having an Early Birth for Sample of High School Graduates (Table 5, M1)