THREE ESSAYS EXAMINING SOCIAL DETERMINANTS OF FERTILITY ATTITUDES AND BEHAVIOR: EVIDENCE FROM LONGITUDINAL STUDIES

by

Jennifer Lyn Eckerman Yarger

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Doctoral Committee:

    Professor Jennifer S. Barber, Co-Chair
    Professor Mary E. Corcoran, Co-Chair
    Professor William G. Axinn
    Professor Pamela J. Smock

To my family.

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ABSTRACT

This dissertation examines social determinants of fertility attitudes and behavior in the United States. It consists of three separate studies, each relying on a different large-scale panel study that follows the same set of individuals over time. Two of the studies examine predictors of fertility attitudes and behavior, while the other examines predictors of change in fertility attitudes.

In the first chapter, I examine the relationship between school enrollment and unintended pregnancy during early adulthood. I find that the risk of unintended pregnancy is significantly lower among women enrolled in school than among those not enrolled. My results suggest that expectations for employment and pregnancy partially mediate this relationship, but the primary reason why women enrolled in school have a lower risk of unintended pregnancy is because they use contraception more effectively than non-enrollees.

The second chapter investigates the influence of women's working conditions on change in fertility expectations. Compared to working full-time, I find that working part-time is associated with greater declines in expected births. Self-employment also is associated with greater declines in expected fertility compared to employment in organizations, but this association washes out at higher parity levels. I find a marginally significant association between lack of paid vacation leave and a decline in fertility expectations after controlling for part-time hours and self-employment.

In the third chapter, I examine how involvement in sibling care during adolescence affects early childbearing and childbearing attitudes in young adulthood. The results indicate that greater involvement in sibling care increases the likelihood of having a child before age 20. Findings on the relationship between sibling care and childbearing attitudes are somewhat mixed. Among those who have not had a child, involvement in sibling care is positively associated with perceived parenting ability and the number of children expected. Only involvement in instrumental sibling care is associated with the higher perceived likelihood of having children, but only involvement in emotional sibling care is associated with a lower expected age at first birth.

CHAPTER 1

School Enrollment and Unintended Pregnancy in Early Adulthood:
Results from an Online Weekly Survey

Past research has established a negative relationship between level of educational

attainment and unintended pregnancy. In 2001, the unintended pregnancy rate for women

without a high school diploma was 76 per 1,000 women, compared to 26 per 1,000

women among college graduates (Finer & Henshaw, 2006). Although educational

attainment and enrollment are known to exert unique effects on family formation

behavior (e.g., Blossfeld & Huinick, 1991; Thornton, Axinn, & Teachman, 1995), we

lack research on the influence of enrollment on the risk of unintended pregnancy. Studies

have found that women enrolled in school tend to delay the initiation of childbearing

(Glick, Ruf, White, & Goldscheider, 2006; Manlove, 1998; Mare & Winship, 1991;

Moore, Manlove, Glei, & Morrison, 1998; Upchurch, Lillard, & Panis, 2002). This

enrollment differential is commonly attributed to differences in intended childbearing;

women enrolled in school intend to postpone childbearing longer than non-enrollees due

to the higher opportunity costs of raising children (Becker, 1981; Blossfeld & Huinick,

1991). However, women enrolled in school also may be more effective at preventing

unintended pregnancies than those not enrolled.

In this paper I examine the extent to which school enrollment influences women's risk of unintended pregnancy between ages 18 and 20, which is a period of considerable change in education and family formation (Rindfuss, 1991). In addition, I investigate the mechanisms that may link school enrollment and unintended pregnancy. Scholars have called for more research on the processes through which education affects unintended pregnancy (Finer & Henshaw, 2006; Musick, England, Edgington, & Kangas, 2009). The only study on this topic to date found that educational differences in unintended pregnancy cannot be explained by differences in family size preferences or wage rates (Musick et al., 2009). I examine several factors that may mediate the effect of school enrollment on the risk of unintended pregnancy, including perceived norms, expectations, attitudes toward contraception, relationship characteristics, sex, and contraception.

The analyses are made possible by longitudinal data from a weekly survey of young women, the Relationship Dynamics and Social Life (RDSL) study. These data are ideally suited to study the relationship between school enrollment and unintended pregnancy for two main reasons. First, the study collected data on prospective fertility intentions. The primary data sources for understanding unintended pregnancy in the United States, such as the National Survey of Family Growth, the National Longitudinal Survey of Youth, and the National Longitudinal Study of Adolescent Health, gather retrospective reports of pregnancy intentions. However, since attitudes tend to become consistent with reality (Festinger, 1957; Williams, Abma, & Piccinino, 1999), a woman is likely to feel more positively about a pregnancy over time. Second, the study collected detailed, weekly updates of attitudes and behaviors that may link school enrollment and unintended pregnancy. Frequent measurement of the potential mechanisms is essential,

given that attitudes and behaviors can be particularly unstable during the transition to adulthood (Alwin, 1994; Cunningham, Beutel, Barber, & Thornton, 2004).

Theory and Hypotheses

Many models of behavior share the assumption that behavior results from a reasoned process, where individuals consider their options, evaluate the consequences, and make decisions about how to act. For example, the most widely used social science framework to understand the relationships among attitudes, intentions, and behavior combines the reasoned action and planned behavior frameworks (Fishbein & Ajzen, 1975). In this framework, general attitudes, beliefs, and preferences related to a behavior predict intentions, and intentions predict behavior. Other social psychological theories share this assumption as well, including subjective expected utility theory (Ronis, 1992) and protection motivation theory (Rogers, 1983).

A large body of literature has outlined the reasons why women enrolled in school often intend to delay pregnancy. Studies commonly draw on role incompatibility theory, which stresses the difficulty of combining student and mother roles due to economic and time constraints (Moen, 1992). Economic independence can be difficult to achieve while enrolled in school, as classes and studying limit the amount of time available for employment and student jobs tend to be low-paying. Most students do not have enough financial resources to cover the expenses of childrearing until they have finished school and gained financial independence. In addition, caring for a child requires a substantial commitment of time and energy. Students would need to arrange childcare during their classes, and childcare would consume much of their time outside of class. Faced with limited time and financial resources, most women choose to delay childbearing until they

have finished school. Of course, women who become pregnant while enrolled in school can choose to drop out to care for the child, but this decision has significant opportunity costs. This decision tends to be costly because it interrupts the accumulation of knowledge and skills which are required to secure a well-paying job and, in turn, lowers the possible standard of living.

The notion that individuals are more likely to perform the behaviors that they feel positive toward and intend to perform has a great deal of intuitive appeal. However, individuals do not always choose, nor are they always able to act in ways that are consistent with their intentions (Bagozzi & Warshaw, 1990; Grube & Morgan, 1990; Liska, 1984; Wright, 1998). By definition, unintended pregnancies occur when behaviors fail to match intentions. Recent theoretical advances in the study of relationships among attitudes, intentions, and behavior explicitly recognize the social, psychological, and physical constraints that prevent individuals from carrying out their intentions (Ajzen, 1988, 1991; Ajzen & Madden, 1986). The clearest example of a constraint on women's fertility intentions is fecundity or the physiological ability to have children. Below I outline several mechanisms which may transmit the effect of school enrollment on unintended pregnancy by constraining or facilitating women's ability to prevent pregnancy.

Perceived norms. First, school enrollment and unintended pregnancy may be linked through differences in perceived peer group norms. Throughout early adulthood peer groups often form at school or work. Due to the difficulty of combining childbearing and school enrollment, women enrolled in school may have fewer friends who are parents, and their friends may hold less positive attitudes toward pregnancy than women

who are not enrolled. Previous studies have demonstrated the importance of peers for

childbearing behavior (Crockett, Raffaelli, & Shen, 2006; Kreager & Staff, 2009;

Lauritsen, 1994; Rogers & Rowe 1990). Through socialization, friends can affect an

individual's behavior by influencing how she *wants* to behave. Also, friends can influence

individuals *independent* of attitudes via social control techniques. Friends may use

punishments or rewards to attempt to influence each others' behavior in ways that they

find appropriate.

In addition to social norms regarding pregnancy, norms regarding behaviors that

compete with or support pregnancy may be important mechanisms (Barber, 2001).

Compared to women who are not enrolled in school, women enrolled may perceive more

positive norms regarding college attendance, an activity that competes with pregnancy in

early adulthood for the reasons described above. At the same time, women enrolled in

school may perceive less positive norms regarding full-time employment. For women

ages 18-20, full-time employment would be relatively supportive of pregnancy, as

employment provides greater financial resources to support a child. Full-time

employment also marks an entry into adulthood and, thus, a stage in life when parenthood

is considered appropriate (Elder, 1995). In addition, the opportunity cost of pregnancy

may be lower for women who have left school and entered the labor force, particularly

for women working in unskilled, low-paying positions (Brewster, Billy, & Grady, 1993;

Kraft & Coverdill, 1994; Rich & Kim, 2002).

Expectations. Second, women in school may be less likely to have an unintended

pregnancy because of differences in expectations. Although women may intend to avoid

pregnancy, they may nonetheless expect to become pregnant, because they feel that they

are unable to control their own sexual behaviors or the behaviors of their sexual partners (Ajzen, 1988, 1991; Ajzen & Madden, 1986). Expectations may be based on past experiences, second-hand information, the observed experiences of others, or by access to resources and opportunities that alter the perceived difficulty of avoiding pregnancy (Ajzen & Madden, 1986). Given that school enrollment often provides access to resources and fosters a stronger sense of control, women enrolled may be less likely to expect a pregnancy. As with social norms, expectations regarding behaviors that compete with pregnancy (e.g., college attendance) and support pregnancy (e.g., full-time employment) also may be important mechanisms linking school enrollment and unintended pregnancy.

Attitudes toward contraception. Third, school enrollment may deter unintended pregnancy by creating or reinforcing perceptions that contraception is affordable and easy to use. Research on the importance of the affordability of contraception has found mixed results. One survey of low income, sexually active women found that less than 10% of women who did not use contraception mentioned cost as a reason (Silverman, Torres, & Forrest, 1987). However, other studies have found that women fail to use contraception because they cannot afford or feel dissatisfied with the available contraceptive methods (Miller, 1986; Sable, Libbus, & Chiu, 2000). Women who are in school may have more access to affordable contraception and greater choice in methods through school-affiliated health clinics. In addition, women who are enrolled in school may have access to student health insurance programs that subsidize their contraception and provide access to a wider variety of methods.

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Relationship characteristics. Fourth, women in school may be less likely to have an unintended pregnancy because they are less likely to form serious romantic relationships. In a qualitative study of low-income women, Edin and Kefalas (2005) found that contraception is more likely to stop once a relationship "reaches the next level" (i.e., the couple has decided to become exclusive or committed). Other studies using nationally representative samples have found that contraceptive use is more common in serious, committed relationships (Ford, Sohn, & Lepkowski, 2001; Manlove, Ryan, & Franzetta, 2007; Manning, Longmore, & Giordano, 2000). Given the demands that school enrollment places on women's time and attention, women who are enrolled may have less time to invest in relationships and may choose to postpone serious relationships until they have completed school.

In addition, women in school may be less likely to have an unintended pregnancy because they are less likely to have an older partner. Previous studies have found that females with older partners are less likely to use contraception (Abma, Driscoll, & Moore, 1998; Ford et al., 2001; Glei, 1999; Manlove et al., 2003; Zavodny, 2001). School is a common setting where partners meet, and partners that meet in school tend to be closer in age than those that meet in other settings, such as places of employment or neighborhoods (Kalmijn & Flap, 2001).

Sex and contraception. Finally, the proximate determinants framework (Bongaarts 1978), suggests that social, economic, and cultural factors that influence fertility operate through the proximate determinants, including sex and contraception. While few studies have looked specifically at the effect of enrollment on sexual activity and contraceptive use, previous research suggests that women in school may be less sexually active than

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women not enrolled. Teens with higher levels of academic achievement are less likely to initiate sexual activity at a young age (Brewster, 1994a, 1994b; Halpern, Joyner, Udry, & Suchindran, 2000; Harris, Duncan, & Boisjoly, 2002; Luster & Small, 1994; Moore & Rosenthal, 1993; Voydanoff & Donnelly, 1990). In addition, research has found that higher-educated women have greater access to information about contraceptive methods and are more likely to use contraception than less educated women (Brewster et al. 1993; Frost, Singh, & Finer, 2007; Holmbeck, Crossman, Wandrei, & Gasiewski, 1994; Luster & Small, 1994; Manlove, 1998; Manning et al., 2000). Greater access to information about contraceptive methods and access to a wider range of methods through school-sponsored clinics also may lead women in school to choose more effective contraceptive methods than their non-enrolled counterparts.

Relationship among mechanisms. Although conceptually distinct, the mechanisms described above may be interrelated in complex ways. Each mechanism may shape and be shaped by the others. For example, plans to attend college in the next year may influence women's decisions to form serious relationships. Conversely, involvement in serious relationships may influence women's plans for pursuing a post-secondary degree. Therefore, it is likely that school enrollment will affect the risk of unintended pregnancy through multiple mechanisms.

The framework described above leads to several empirical hypotheses. The first hypothesis explains the overall relationship between school enrollment and unintended pregnancy:

Hypothesis 1: Women who are enrolled in school will have a lower risk of unintended pregnancy than those who are not enrolled.

Assuming that I find evidence supporting Hypothesis 1, I will examine hypotheses 2 through 6, which describe the mechanisms by which school enrollment may affect unintended pregnancy:

> *Hypothesis 2*: Enrollment differences in <u>perceived norms</u> will explain a portion of the enrollment difference in unintended pregnancy.
>
> *Hypothesis 3*: Enrollment differences in <u>expectations</u> will explain a portion of the enrollment difference in unintended pregnancy.
>
> *Hypothesis 4*: Enrollment differences in <u>attitudes toward contraception</u> will explain a portion of the enrollment difference in unintended pregnancy.
>
> *Hypothesis 5*: Enrollment differences in <u>relationship characteristics</u> will explain a portion of the enrollment difference in unintended pregnancy.
>
> *Hypothesis 6*: Enrollment differences in <u>sex and contraception</u> will explain a portion of the enrollment difference in unintended pregnancy.

Data

The Relationship Dynamics and Social Life (RDSL) study uses a representative population-based sample of 1,003 young women, ages 18-19, residing in a Michigan county. Although the study tracks respondents regardless of migration, the single county design has multiple advantages, such as minimizing variance that is not the main focus in this study (e.g., macro-level economic opportunities) and facilitating a high level of investigator involvement. It is important to note that Michigan falls around the national median of many key measures related to childbearing (e.g., cohabitation, marriage, age at first birth, completed family size, nonmarital childbearing, and teenage childbearing) (Lesthaeghe & Neidert, 2006). This, of course, is not to suggest that Michigan is

representative of the nation, rather that Michigan does not represent an outlier in terms of these behaviors. I evaluated the generalizability of the sample by comparing its characteristics to data for the same age group in the National Survey of Family Growth (NSFG), which collects a sample to represent all women in the United States. Overall, I find that the sample reflects the structure of the national population. The RDSL respondents are similar to the national averages for the percentage enrolled in school and employed full-time, although the percentage of high school graduates is higher in the RDSL sample. RDSL respondents also are similar to the national averages in terms of sociodemograhic characteristics and family background. For example, I find very similar distributions for childhood family structure, mother's age at first birth, and the percentage African American. One important difference is that the percentage of respondents who had sex at age 16 or younger is considerably lower among the RDSL respondents compared to the NSFG respondents.

A 60-minute face-to-face baseline survey interview was conducted with each participant between March 2008 and July 2009 to assess family background, demographic information, attitudes, current and past friendship and romantic relationships, education, and career trajectories. At the conclusion of this baseline interview, all respondents were invited to participate in a weekly journal-based study – a mixed mode (Internet and phone) survey for 2.5 years. Each week respondents choose to complete the journal either by logging into the study's secure website, or by calling a toll free number and completing the journal with a live interviewer. Each weekly journal collects updates about respondents' relationships, sexual activity, contraceptive use, and pregnancy status. Approximately every twelve weeks the journal collects updates about

respondents' involvement in school, employment, and attitudes. Figure 1.1 illustrates the design of the study and the strategy for measuring events in the respondent's life. The weekly journal portion of the study is still in the field, and will be completed in January 2012. The current study uses the 56,389 weekly journals collected through June 8, 2011. I tested the sensitivity of my results to samples based on the first 12, 18, and 24 months of journal data. The effect of school enrollment on unintended pregnancy was robust to the length of time used to define the sample.

[Figure 1.1 about here.]

Respondents are paid $1 per weekly journal with $5 bonuses for on-time completion of five weekly journals in a row. Automated reminder email and/or text messages are sent to respondents weekly. If a respondent is late, study staff first attempt to contact her by phone and later by email and letter in an attempt to regain her participation. Respondents who become 60 or more days late are offered an increased incentive for completing the next journal. Small gifts (e.g., pen, chapstick, compact, pencil) are also given to respondents to reward continued participation.

The incentive scheme, coupled with the cooperative nature of this age group and their interest in the subject matter, has resulted in extremely high cooperation rates: an 83% response rate and a 94% cooperation rate for the baseline interviews. Over 99% of respondents who completed a baseline interview enrolled in the weekly journal portion of the study (N=992). Journal response rates are high, with more than 6 months of data on 84% of respondents, more than 12 months on 77%, and more than 18 months on 72%. Out of the 56,389 weekly journals collected as of June 8, 2011, 73% were completed 5 to

9 days after the previous journal. 21% of the journals were completed 10 to 19 days later, and 6% were completed 20 days or later.

Measures

Unintended pregnancy

I investigate unintended pregnancy, so measures of intentions are used to define my analytical sample. Specifically, all journals in which women report wanting to get pregnant in the prior week ($j - 1$) are excluded from the analyses, because they are not at risk of an unintended pregnancy. I measure pregnancy intentions in the journal with the following questions:

> *"You know, getting pregnant and having a baby is a big event, one that has a lot of consequences. Most people your age have some positive and some negative feelings about getting pregnant and having a child. For this reason we are going to ask you first how much you want to get pregnant, using a scale from 0 to 5. Then we are going to ask you how much you want to avoid getting pregnant, using a scale from 0 to 5.*
>
> *First, how much do you want to get pregnant during the next month? Please give me a number between 0 and 5, where 0 means you don't at all want to get pregnant and 5 means you really want to get pregnant.*
>
> *And next, how much do you want to avoid getting pregnant during the next month? Please give me a number between 0 and 5, where 0 means you don't at all want to avoid getting pregnant and 5 means you really want to avoid getting pregnant."*

Journals in which respondents reported both a weak desire to get pregnant (0, 1, or 2) and a strong desire to avoid pregnancy (3, 4, or 5) are included in my analytic sample.

Each week, in the journal, respondents are asked, "Do you think there might be a chance that you are pregnant right now?" Respondents who answer "yes" are asked, "Has a pregnancy test indicated that you are pregnant?" Respondents who answer "yes" to the question about the pregnancy test are coded "1" for unintended pregnancy during the

week they report it. Descriptive statistics for this and all other variables that I use in the analyses are presented in Table 1.1. About 15% of respondents reported an unintended pregnancy.[1]

[Table 1.1 about here.]

I tested the sensitivity of results to the measurement of unintended pregnancy in two different ways. First, I changed the timing of the measurement of pregnancy intentions, excluding from the analyses journals if the respondent wanted to become pregnant two weeks prior $(j - 2)$ and three weeks prior $(j - 3)$. Second, I re-ran the analyses using a definition of unintended pregnancy in which only the women who reported the weakest possible desire to get pregnant (0) and the strongest possible desire to avoid pregnancy (5) were at risk of an unintended pregnancy. In both sensitivity tests, the effect of enrollment on unintended pregnancy was robust to the measurement of unintended pregnancy.

Enrolled in school

In the baseline interview and quarterly in the journal, respondents are asked, "Which of the following describes your current enrollment in school?" The response options are not enrolled in school, attending school part-time, and attending school full-time. About 23% are not enrolled in school, 11% are enrolled in school part-time, and 66% are enrolled full-time. In additional analyses, I found no statistically significant differences in the risk of unintended pregnancy between women enrolled part-time and women not enrolled. Thus, the current analyses use a binary variable coded 1 if the

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[1] Of the 156 pregnancies in the study, 125 (80%) were unintended and 31 (20%) were intended. The small number of intended pregnancies precludes a meaningful analysis of the effect of school enrollment on *intended* pregnancy.

respondent was enrolled in school full-time and 0 otherwise. Throughout the paper I use the phrase "enrolled in school" to refer to women enrolled in school full-time and "not enrolled in school" to refer to women not enrolled and those enrolled part-time.

Among those enrolled in school full-time, 6% are enrolled in high school, 26% in 2-year college, 64% in 4-year college, and 4% in a vocational program. In analyses not shown, I found that the risk of pregnancy was not significantly different for women enrolled in different levels of education. In other words, the risk of unintended pregnancy is the same regardless of whether a woman is enrolled in a high school, vocational program, two-year college, or four-year college.

Perceived norms

In the baseline interview and quarterly in the journal, respondents are asked questions that capture their perceptions of peer group norms in two domains—prevalence and approval.

Prevalence. Respondents are asked a series of questions designed to measure perceptions of the prevalence of parenthood, college attendance, and full-time employment among their friends. These questions are coded from 1 to 5 (none, a few, some, many, or almost all of them).

How many of your friends…

1.   …are attending or planning to attend college?

2.   …are working full-time?

3.   …are parents?

Approval. Respondents are asked questions designed to measure individuals' perceptions of how their friends would react to attending college, getting a job, and

having a baby. These questions are coded from 0 to 5 where 1 is not at all positively and 5 is extremely positively.

How would your friends react if you…

1. …decided to get a college degree?

2. …decided to get a fulfilling job or career?

3. …had a baby?

Expectations

Expectations for the next year about attending college, full-time employment, and pregnancy are measured in the baseline interview and quarterly in the journal. These questions ask respondents to give a number from 0 to 100, where 0 means absolutely no chance of the behavior and 100 means the behavior is absolutely sure to happen.

What are the chances that you will…

1. …be attending college during the next year?

2. …be working full-time during the next year?

3. …get pregnant during the next year?

Attitudes toward contraception

In the baseline interview and quarterly in the journal, respondents are given statements about the usability and affordability of contraception and asked if they strongly agree, agree, disagree, or strongly disagree. Although the category was not offered by the interviewer, respondents could also provide a response of neither agree nor disagree at the baseline interview. (This option is not provided when the questions are measured again in the journal.) These measures are coded 1 to 5, where 1 means strongly disagree and 5 means strongly agree.

1. Using birth control is likely to make a woman feel sick.

2. Using birth control interferes with sexual enjoyment.

3. It takes too much planning ahead of time to have birth control on hand when you're going to have sex.

4. In general, birth control is too much of a hassle to use.

5. In general, birth control is too expensive to buy.

I created an averaged index for the set of measures above to capture the respondent's general attitude toward contraception. A high score on the index represents greater dissatisfaction with contraception.

Relationship characteristics

Each week, in the journal, respondents are asked questions about the relationship they are in at that time. If they are in more than one relationship, they are asked to choose the one that is the most serious or the one they have been in most recently. All information reported at that journal is based on the time between the current journal and the last journal. For instance, at the sixth journal, respondents would be talking about events that occurred between the fifth and the sixth journals.

My first measure captures whether the respondent is in an exclusive relationship. Respondents are considered in a relationship if they are married, engaged, cohabiting, had a "special romantic relationship," or "had physical or emotional contact, such as kissing, dating, spending time together, sex, or other activities with a partner." If a respondent is not married, engaged, or cohabiting with her partner, she is asked whether she and her partner have agreed to only have a special romantic relationship with each other and no one else. Respondents who answered affirmatively to this question are

coded as in an exclusive relationship at that journal and 0 otherwise. Respondents who are married, engaged, or cohabiting are recoded to 1 (i.e., considered exclusive), and respondents not in relationships are coded 0.

I also capture relationship seriousness with a measure of whether the respondent lives with a partner. Respondents who are not married are asked, "Do you have a place you live that is separate from where [Partner Name] lives?" Respondents who answered negatively to this question are coded as cohabiting and 0 otherwise. Respondents who are married are recoded to 1, and respondents not in relationships are coded 0.

Respondents are asked to report their own age and their partner's age. I create a separate variable to indicate if a respondent has an older partner, which is equal to 1 if the partner was older by three or more years and 0 otherwise. Again, respondents not in relationships are coded 0.

Sex and contraception

Each week, in the journal, respondents are asked if they had sexual intercourse with their partner. Respondents are coded 1 if they have had sex with their partner in the "current" journal period and 0 otherwise.

Using data from the weekly journals, I also create a categorical variable that captures sex and any contraceptive use in the "current" journal period. Respondents are coded into three categories: 1) did not have sex, 2) had sex and used any birth control method (although not necessarily every time), 3) had sex and used no birth control method. The comparison group is did not have sex.

In addition, I use data from the weekly journals to create a six-category measure of sex and the most effective birth control method used: long-lasting methods (birth

control patch, NuvaRing, Depo-Provera shot or any other type of contraceptive shot,

Norplant or another contraceptive implant, IUD), birth control pills, male condoms, other

method (rhythm method, diaphragm, spermicide, female condom, morning after pill,

withdrawal), no method used, and no sex. If a respondent used two or more methods, she

is coded as the most effective method reported. The comparison group is did not have

sex.

Controls

Several sociodemographic characteristics measured at the baseline interview are

included as controls in the analysis. *Age* is continuous and ranges from 18.12 to 20.34

years. *Race* is included as a dichotomous indicator for African American versus non-

African American. A respondent is coded as *received public assistance* if she reported

currently receiving at least one of the following: 1) WIC, 2) FIP, 3) cash welfare, or 4)

food stamps. The *importance of religion* to the respondent is based on the question, "How

important if at all is your religious faith to you – would you say not important, somewhat

important, very important, or more important than anything else?", and is coded as not

important (1) to more important than anything else (4). A dichotomous measure indicates

whether the *respondent's biological mother was less than 20 years old at her first birth*.

Family structure is based on the questions, "While you were growing up, which of the

following people did you live with?/Which of these people did you live with for the

majority of the time when you were growing up?" It includes the following three

categories: 1) two biological parents, 2) one biological parent only, and 3) other. Two-

parent family is the reference category. A dichotomous measure indicates whether the

respondent's *mother's education is less than high school*. I create a five-category

measure of *parents' income*: $14,999 or less, $15,000 to $44,999, $45,000 to $74,999, $75,000 or greater, or don't know/refused. The reference group is $14,999 or less.

Prior pregnancy-related experiences before age 18 are also included as controls. *Age at first sex* is coded as 16 years or less. *Number of sexual partners* is coded as 2 or more partners before age 18. A dichotomous measure indicates whether a respondent *ever had sex without birth control* before age 18. *Number of prior pregnancies* is coded as: 1) none, 2) one, and 3) two or more. No prior pregnancy is the comparison group.

In addition, characteristics of school-related experiences and expectations for educational achievement are included as controls. A dichotomous measure, updated quarterly in the journal, indicates whether the respondent is a *high school graduate* or has completed a GED. I include a baseline measure of *high school grade point average* (GPA), which is coded as the proportion of grade points earned out of possible grade points, with values ranging from 0 to 1. Whether the respondent *expects to graduate from college* is based on a question asked at the baseline interview, "How far do you expect to go in school? Do you expect to graduate from high school, graduate from a two year community college, earn a specialized certificate from a vocational or trade school, attend a 4-year college, graduate from a 4-year college, get more than 4 years of college, or do something else?" A respondent is coded 1 if she said that she expects to graduate from a 4-year college or get more than 4 years of college and 0 otherwise.

I also control for full-time employment status. Each quarter in the journal respondents are asked, "Which of the following describes your current work for pay situation – Not working for pay, working 1-9 hours per week, working 10-19 hours per week, working 20-29 hours per week, or working 30 or more hours per week?"

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Respondents are considered *employed full-time* if they are working 30 or more hours per week and 0 otherwise.

Finally, I include a set of controls related to the respondent's participation in the weekly journal. *Time in the study*, which is measured in months, ranges from 0.49 to 31.36 and the mean is 12.93. *Time in study squared* is the measure squared. The *number of journals completed* ranges from 4 to 162, and its mean is 91.38. I also include a time-varying control for *time between journals*, which is the average number of days since the prior journal. This measure is intended to capture the respondent's timeliness in completing the journal. Its values range from 5 to 304.33 with a mean of 9.54 days.

Analytic Strategy

I use event history methods to model the risk of unintended pregnancy. Because the data are precise to the week, I use discrete-time methods to estimate these models. Person-weeks of exposure are the unit of analysis.

I consider the respondents to be at risk of an unintended pregnancy during all weeks they report that they are not currently pregnant. Although using person-weeks of exposure to risk as the unit of analysis substantially increases the sample size, Petersen (1986, 1991) and Allison (1982, 1984) have shown that using discrete-time methods does not deflate the standard errors and thus provides appropriate tests of statistical significance. Furthermore, because the probability of becoming pregnant is so small within each week, the estimates obtained using discrete-time methods are similar to those that would be obtained using continuous methods.

The time-varying measure of school enrollment is measured three weeks prior to the current week of pregnancy status. The measures of intervening variables, including

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measures of whether the respondent had sex or used contraception, are measured two weeks prior to the current week of pregnancy status. Although research in this area has found conflicting results, young women may be more likely to drop out of school after learning that they are pregnant (Anderson, 1993; Fergusson & Woodward, 2000; Forste & Tienda, 1992; Hofferth, Reid, & Mott, 2001; Upchurch & McCarthy, 1990). The use of lagged measures of enrollment and intervening variables and weekly reports of pregnancy status helps guard against the possibility of reciprocal causation. Figure 1.2 demonstrates the temporal ordering of all measures in the study.

[Figure 1.2 about here.]

My analysis of enrollment differences in unintended pregnancy and potential mediators proceeds in several steps. I begin by comparing reports of unintended pregnancy and the intervening variables by enrollment status. Second, I estimate the effects of school enrollment and each potential mechanism on the hazard of pregnancy, controlling for only the study-specific measures (time in the study, number of journals completed, and time between journals). Third, I estimate a baseline model that includes school enrollment and all control variables. In addition to the study-specific measures, I control for high school graduation status and full-time employment status measured three weeks prior (the same time as enrollment status is measured). Time-fixed control variables (measured in the baseline interview) for sociodemographic characteristics, family background, prior sexual, contraceptive, and pregnancy experience, high school GPA, and expected college graduation are included in each model.

Next, I run a series of more complicated models that add each measure or group of measures of potential mechanisms to the baseline model. In order to establish

mediation, the mediating variable must be significantly related to the risk of unintended pregnancy. The extent to which the coefficient for enrollment changes in the more complicated models compared to the baseline model represents the extent to which the total effect of enrollment operates via the intervening mechanisms added to the base model. Finally, I run a model that includes all of the potential mechanisms that predict unintended pregnancy when tested on their own.

Results

Table 1.2 presents the mean values of the dependent and intervening variables used in the analyses, separately by school enrollment status. I used repeated measures analysis of variance (ANOVA) to test the equality of means, which accounts for the correlation between repeated measures for the same individuals. Reports of unintended pregnancy are significantly lower among respondents enrolled in school than among those not enrolled. Of the 125 unintended pregnancies reported in the study, 34% were to respondents enrolled in school, and 66% were to non-enrollees (not shown in table).

[Table 1.2 about here.]

I find significant enrollment differences for all of the potential attitudinal mechanisms. Respondents enrolled in school report having more friends in college or planning to attend college and fewer friends who are working full-time or have children. Compared to respondents not enrolled, enrollees believe that their friends would react more positively if they decided to get a college degree or pursue a fulfilling job or career. Conversely, enrolled respondents believe that their friends would react less positively if they had a baby. Enrolled respondents perceive higher chances of attending college and lower chances of working full-time or becoming pregnant in the next year than non-

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enrollees. In general, respondents enrolled in school report more positive attitudes toward contraception than non-enrollees; they agree less with statements that contraception makes a woman sick, requires too much planning to have on hand, is a hassle to use, and is too expensive.

In addition to the attitudinal mechanisms, I find significant enrollment differences for all of the potential behavioral mechanisms. Respondents enrolled in school are less likely to be in an exclusive relationship and less likely to live with a partner than non-enrollees. They are also less likely to have an older partner than non-enrollees, although the difference is only marginally significant (p<.10). Compared to women who are not enrolled, enrollees are less likely to have had sex, and they are less likely to have had sex without using birth control. When examined by method effectiveness, women enrolled in school are more likely to have used the pill and less likely to have used male condoms or some other type of method (e.g., rhythm or withdrawal).

Table 1.3 presents the results from bivariate logistic regression models that evaluate the impact of school enrollment and the potential intervening variables on the risk of having an unintended pregnancy. Each row represents a separate regression model, and only the study-specific control variables are included in the models.

At the bivariate level, school enrollment has the hypothesized effect on unintended pregnancy. Respondents who are enrolled in school are significantly less likely to have an unintended pregnancy than those not enrolled. The risk for enrollees is almost three times lower ($2.92 = e^{1.07}$) than the corresponding risk for those not enrolled.

[Table 1.3 about here.]

Of the variables that potentially mediate the effects of school enrollment, most are significantly related at the bivariate level to risk of unintended pregnancy.[2] Having more friends in college decreases the risk of unintended pregnancy, whereas having more friends who are parents increases the risk of unintended pregnancy. As expected, respondents who believe that their friends would react more positively if they had a baby are significantly more likely to have an unintended pregnancy. At the bivariate level, the prevalence of friends working full-time and friends' approval of attending college or getting a fulfilling job are not significantly associated with unintended pregnancy.

Two of the three indicators of expectations are significantly associated with the risk of unintended pregnancy in the anticipated direction. The risk of an unintended pregnancy is higher among those who expect to work full-time and those who expect to become pregnant in the next year (despite their current intentions to avoid pregnancy). Expectations for attending college are not significantly associated with the risk of unintended pregnancy in the bivariate model.

At the bivariate level, I find a significant relationship between attitudes toward contraception and unintended pregnancy in the expected direction. The risk of unintended pregnancy is higher for those who hold negative attitudes toward contraception (i.e., those who agree more that birth control makes you sick, takes too much planning to have on hand, is a hassle to use, and is too expensive).

The measures of relationship characteristics, sexual activity, and use of contraception are all significantly associated with the risk of unintended pregnancy.

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[2] I tested the bivariate correlations among all of the measures of intervening variables. All of these correlations are in the expected direction, but only one is correlated above .55. The correlation between friends' approval of attending college and friends' approval of getting a fulfilling job is .82. However, these variables are never included in the same regression model.

Being in an exclusive relationship, living with a partner, having an older partner, and having had sex increase the risk of unintended pregnancy. As expected, compared to those who did not have sex, the risk of unintended pregnancy was more than two times higher among those who had sex and used birth control ($2.18 = e^{.78}$) and more than twelve times higher among those who had sex and did not use birth control ($12.68 = e^{2.54}$). Lastly, I examined the measure of sex and contraceptive use according to the effectiveness of the method used. Compared to those who did not have sex, the risk of unintended pregnancy was not significantly different for those who used long-acting methods, but the risk of unintended pregnancy was significantly higher for those who used male condoms and those who used some other method.

Table 1.4 shows the unstandardized regression coefficients from multivariate logistic regression models. In addition to the study-specific measures, all models include controls for sociodemographic characteristics, prior pregnancy-related experiences, school experiences and expectations, and work experiences. Results are presented for the measures of school enrollment and potential mediators. (The results from models that include the controls are provided in the Appendix Table 1.5; the results did not differ substantially upon including the measures of enrollment or potential mediators.)

Model 1 is a baseline model that includes school enrollment and the controls. The results shows that the risk of unintended pregnancy is more than two times lower for respondents enrolled in school ($2.27 = e^{.82}$). Note that, compared to the bivariate model, the enrollment difference in the risk of unintended pregnancy is reduced by almost one quarter in the model with controls ($.23 = (1.07 - .82)/1.07$). This reduction is mostly due to the correlation between school enrollment and the number of prior pregnancies (not

shown in tables). In other words, past pregnancies reduce the chances of women attending school and, at the same time, increase the risk of additional pregnancies. However, the effect of enrollment remains statistically significant when controls are included, indicating that net of the characteristics that influence enrollment status, young women enrolled in school have a lower risk of unintended pregnancy.

[Table 1.4 about here.]

Models 2 through 9 address the extent to which enrollment differences in unintended pregnancy can be explained by the hypothesized mechanisms. I include only the intervening variables that vary significantly by school enrollment and predict unintended pregnancy in the bivariate models. Model 2 adds the three measures of perceived peer group norms related to college attendance and pregnancy. As in the bivariate model, the coefficient for more friends attending college is negative and significant, which indicates that having more friends who are on a college track reduces a young woman's risk of unintended pregnancy, independent of her own enrollment status. After including the control variables, having more friends who are parents is no longer significantly associated with the risk of unintended pregnancy, largely because it is correlated with respondents' prior pregnancies. The coefficient for friends' approval of having a baby remains positive and significant, which indicates that the risk of an unintended pregnancy is greater among women who believe that their friends would react more positively if they became parents. Overall, controlling for perceived peer group norms accounts for 7% of the observed enrollment difference in unintended pregnancy (.07 = (.82 − .76) / .82).

Model 3 adds the second set of potential attitudinal mechanisms, which are expectations for full-time employment and pregnancy in the next year. As predicted, the risk of an unintended pregnancy is higher among respondents who expect to work full-time next year and among those who expect to become pregnant in the next year. Overall, enrollment differences in expectations account for 9% of the observed impact of enrollment on unintended pregnancy ($.09 = (.82 − .75) / .82$).

In Model 4, I investigate whether attitudes toward birth control explain the impact of enrollment on unintended pregnancy. I find that respondents who hold less positive attitudes toward contraception are more likely to have an unintended pregnancy. However, the coefficient on enrollment decreases by only 2% after adding the measure of attitudes toward contraception ($0.02 = (.82 − .80) / .82$).

Model 5 adds the measures of the respondent's relationship characteristics. Being in an exclusive relationship increases the risk of unintended pregnancy. Living with a partner and having an older partner are no longer statistically significant in the multivariate model, primarily due to the correlation with relationship exclusivity. Adding relationship characteristics to the base model reduces the coefficient on school enrollment by only 2% ($0.02 = (.82 − .80) / .82$).

Models 6, 7, and 8 add the proximate determinants of pregnancy – sex and contraception. In Model 6 I add a binary variable for whether the respondent has had sexual intercourse (since the last journal), regardless of her contraceptive use. As expected, having had sex increases the risk of unintended pregnancy. However, controlling for whether the respondent has had sex reduces the coefficient on school enrollment by only 2% ($0.02 = (.82 − .80) / .82$).

We see a more nuanced picture in Model 7, which includes a categorical variable with sexually active respondents divided into two groups according to contraceptive use. Compared to respondents who did not have sex, the risk of an unintended pregnancy was almost twice as high among those who had sex and used contraception ($1.86 = e^{.62}$) and more than eight times higher among those who did not use contraception ($8.25 = e^{2.11}$). Adding sex and contraceptive use to the base model reduces the coefficient on enrollment by 9% ($0.09 = (.82 - .75) / .82$).

Model 8 examines the measure of sex and birth control use that distinguishes between the effectiveness of the methods used. The results are similar to the bivariate model with a higher risk of pregnancy among respondents who had sex and used condoms, other methods, and no method. Overall, enrollment differences in the effectiveness of methods used explain the largest proportion of the observed impact of enrollment on unintended pregnancy – 13% ($0.13 = (.82 - .71) / .82$).

In order to evaluate the joint contribution of all potential mechanisms to the risk of unintended pregnancy, the final model of Table 1.4 (Model 9) adds all the potentially intervening variables that are significantly associated with the risk of unintended pregnancy in Models 2 – 8. In the full model, having more friends in college and friends' approval of having a baby are no longer significantly associated with the risk of unintended pregnancy. The effects of perceived norms are largely explained by sex and the most effective birth control method used; this finding suggests that women with more friends in college and those whose friends reinforce their intention to prevent pregnancy are also more effective contraceptive users, which reduces their risk of unintended pregnancy. Respondents who expect to work full-time and those who expect to become

pregnant in the near year have a higher risk of pregnancy in the full model. In addition, more negative attitudes toward contraception, being in an exclusive relationship, and having sex with condoms or no method independently increase the risk of unintended pregnancy. In the full model, the coefficient on enrollment is reduced by about one fifth (.21 = (.82 − .61)/.82). Thus, a substantial proportion – though far from all – of the effect of school enrollment on women's risk of unintended pregnancy is explained in the full model.

Discussion and Conclusion

Past research on education and unintended pregnancy has established a negative relationship between level of educational attainment and unintended pregnancy, but we know little about the influence of school enrollment on unintended pregnancy. The current paper addressed this gap in the literature by investigating the extent to which school enrollment reduces women's risk of unintended pregnancy in early adulthood. I found that, in fact, the risk of unintended pregnancy is significantly lower among women enrolled in school than among those not enrolled, regardless of whether they are enrolled in high school, 2-year college, 4-year college, or a vocational program. This finding sheds new light on past research which has attributed the childbearing differential between school enrollees and non-enrollees to differences in intentional childbearing (Glick et al., 2006; Manlove, 1998; Upchurch et al., 2002; Mare & Winship, 1991; Moore et al., 1998). By focusing on young women who do not want to become pregnant, my findings indicated that women enrolled in school also are more effective at preventing unintended pregnancies than those who are not enrolled.

This paper also addressed the reasons for the negative effect of women's school enrollment on their risk of unintended pregnancy, which is an area lacking empirical research (Finer & Henshaw, 2006; Musick et al., 2009). The paper investigated several potential mechanisms which may facilitate or constrain women's abilities to prevent pregnancy, including perceived norms, expectations, attitudes toward contraception, relationship characteristics, sex, and contraception. All of the potential mechanisms varied by enrollment status in the expected direction, and most were significantly related at the bivariate level to risk of unintended pregnancy. The prevalence of friends working full-time, friends' support of college and career pursuits, and expectations for attending college were not significantly related to the risk of unintended pregnancy, so they can be ruled out as intervening mechanisms. In other words, the reason women in school have a lower risk of unintended pregnancy is not because they have fewer friends working full-time or because their friends are more supportive of college and career pursuits. Nor is the enrollment differential due to differences in plans for attending college.

My final step in the analyses, which involved comparing models with only enrollment to models controlling for each group of potential mediators, helped to narrow further the list of possible mechanisms. Compared to a baseline model with only enrollment, controlling for attitudes toward the usability and affordability of contraception, relationship characteristics, or sex reduced the size of the coefficient of enrollment on unintended pregnancy by only 2%. The effect-size mediated tends to be relatively modest in mediation studies (MacKinnon, Fairchild, & Fritz, 2007). However, such small changes in the effect of enrollment indicate that enrollment differences in unintended pregnancy are not due to attitudes toward contraception, relationship

characteristics, or sexual involvement. Controlling for perceived norms accounted for 7% of the effect of enrollment, but these factors were largely explained by contraceptive use in the full model.

I found stronger evidence that expectations partially mediate the effects of school enrollment on unintended pregnancy. Controlling for expectations for employment and pregnancy in the next year reduced the effect of school enrollment on pregnancy by 9%, and expectations remained significant predictors of unintended pregnancy in the full model. This finding suggests that women in school have a lower risk of pregnancy because they do not expect to work full-time in the next year, which would provide the financial resources to support a child and signal entry into adulthood. Another reason why women in school have a lower risk of pregnancy is because they expect to be able to delay pregnancy for more than a year.

Overall, I found the strongest evidence of mediation for the combined measure of sex and the effectiveness of birth control methods used, which explained 13% of the effect of enrollment on unintended pregnancy. Women in school are less likely to engage in risky sexual behavior, including unprotected sex or sex with a less effective method, and, in turn, their risk of unintended pregnancy is lower. An important question stemming from this analysis is *why* women enrolled in school use contraception more effectively than non-enrollees. I found that women enrolled in school have more positive attitudes toward the usability and affordability of contraception in general, but enrollment affects the risk of unintended pregnancy independent of these attitudes. More research is needed to explore enrollment differences in attitudes toward birth control pills and long-term

methods, access to these more effective methods, and reasons for selecting less effective methods or using no method.

Finally, this research has two main implications for policymakers and practitioners who are engaged in efforts to help young women prevent an unintended pregnancy and reduce social disparities in unintended pregnancy. First, their policies and programs should target women who are not enrolled in school or enrolled part-time, as these women represent an 'at-risk' population for unintended pregnancy even after controlling for socioeconomic status and other important characteristics. Family planning providers should continue to reach out to women with limited or no school attachment through other social institutions, including the community-based clinics that are funded through the Title X Family Planning program. Second, the results indicate that programs and policies should prioritize the goal of motivating and enabling women to choose more effective birth control methods and to avoid unprotected sex. Eliminating barriers to contraceptive use beyond affordability and accessibility and developing ways to encourage and facilitate more consistent use of effective methods is essential for helping women achieve their fertility goals and reducing the enrollment disparity in unintended pregnancy.

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Table 1.1. Descriptive Statistics of Measures Used in the Analyses (N=837 individuals, 44,643 observations)

	Mean	*SD*	Minimum	Maximum
Dependent Variable				
Unintended pregnancy (N=837 individuals)	.15		0	1
Independent Variable				
Enrolled in school	.66		0	1
Intervening Variables				
Perceived Norms				
How many of your friends…				
…attend or plan to attend college	4.15	1.03	1	5
…work full-time	2.48	1.00	1	5
…are parents	2.19	.99	1	5
How would your friends react if you…				
…decided to get a college degree	4.73	.70	0	5
…decided to get a fulfilling job or career	4.71	.71	0	5
…had a baby	2.42	1.55	0	5
Expectations				
What are the chances that you will…				
…attend college during the next year	89.45	23.81	0	100
…work full-time during the next year	56.32	34.10	0	100
…get pregnant during the next year	12.21	19.99	0	100
Attitudes toward Contraception				
Index of attitudes toward contraception	1.87	.61	1	4.8
Relationship Characteristics				
In an exclusive relationship	.51		0	1
Lives with partner	.14		0	1
Has an older partner	.13		0	1
Sex and Contraception				
Had sex	.31		0	1
Sex and birth control use				
No sex	.69		0	1
Any method	.28		0	1
No method	.03		0	1
Sex and most effective birth control method used				
No sex	.69		0	1
Long-term method	.03		0	1
Pill	.13		0	1
Condom	.07		0	1
Other method	.05		0	1
No method	.03		0	1

(continued)

	Mean	SD	Minimum	Maximum
Control Variables				
Sociodemographic Characteristics				
Age	19.18	.58	18.12	20.34
African American	.25		0	1
Receiving public assistance	.15		0	1
Religious importance	2.68	.97	1	4
Biological mother <20 years old at 1st birth	.26		0	1
Childhood family structure				
Two parents	.59		0	1
One biological parent only	.32		0	1
Other	.05		0	1
Mother's education <high school graduate	.05		0	1
Parent's income				
$14,999 or less	.09		0	1
$15,000-$44,999	.28		0	1
$45,000-$74,999	.21		0	1
$75,000 or higher	.25		0	1
Don't know/refused	.18		0	1
Prior Pregnancy-Related Experiences				
Age at first sex 16 years or less	.37		0	1
Total number of sexual partners 2 or more at age 18	.46		0	1
Ever had sex without birth control before age 18	.31		0	1
Number of pregnancies before age 18				
None	.89		0	1
1 pregnancy	.08		0	1
2 or more pregnancies	.03		0	1
School Experiences and Expectations				
High school graduate	.92		0	1
High school grade point average	.83		0	1
Expects to graduate from college	.75		0	1
Work Experiences				
Working full-time	.17		0	1
Study-Specific Measures				
Time in study	12.93	8.16	.49	31.36
Time in study squared	233.82	239.19	.24	983.72
Number of journals completed	91.38	31.19	4	162
Average number of days between journals	9.54	7.01	5	304.33

Table 1.2. Means for Dependent and Intervening Variables by School Enrollment Status (N=837 individuals, 44,643 observations)

	Enrolled (N=29,301)	Not enrolled (N=15,342)	
Unintended pregnancy	.001	.005	*
Perceived Norms			
How many of your friends…			
…attend or plan to attend college	4.39	3.69	***
…work full-time	2.39	2.66	***
…are parents	2.02	2.52	***
How would your friends react if you…			
…decided to get a college degree	4.81	4.58	***
…decided to get a fulfilling job or career	4.77	4.60	***
…had a baby	2.23	2.78	**
Expectations			
What are the chances that you will…			
…attend college during the next year	96.70	75.60	***
…work full-time during the next year	50.40	67.64	***
…get pregnant during the next year	10.24	15.98	***
Attitudes toward Contraception			
Index of attitudes toward contraception	1.82	1.98	***
Relationship Characteristics			
In an exclusive relationship	.49	.54	***
Lives with partner	.10	.22	***
Has an older partner	.11	.18	†
Sex and Contraception			
Had sex	.28	.36	***
Sex and birth control use			
No sex	.72	.63	
Sex and any method	.26	.30	***
Sex and no method	.02	.06	
Sex and most effective birth control method used			
No sex	.72	.63	
Sex and long-term method	.03	.03	
Sex and pill	.14	.11	
Sex and condom	.06	.10	***
Sex and other method	.04	.07	
Sex and no method	.02	.06	

Note: Repeated measures analysis of variance (ANOVA) used to test the equality of means.

† p < .10; * p < .05; ** p < .01; *** p < .001

Table 1.3. Bivariate Logistic Regression Estimates of Effects of School Enrollment and Intervening Variables on Hazard of Unintended Pregnancy (N=837 individuals, 44,643 observations)

	Unintended pregnancy
Enrolled in school	-1.07***
	(.19)
Perceived Norms	
How many of your friends…	
...attend or plan to attend college	-.28***
	(.08)
...are working full-time	-.02
	(.09)
...are parents	.25***
	(.08)
How would your friends react if you…	
...decided to get a college degree	-.12
	(.10)
...decided to get a fulfilling job or career	-.12
	(.10)
...had a baby	.25***
	(.06)
Expectations	
What are the chances that you will…	
...attend college during next year	-.002
	(.003)
...work full-time during next year	.01***
	(.003)
...get pregnant during next year	.02***
	(.003)
Attitudes toward Contraception	
Index of attitudes toward contraception	.43***
	(.13)
Relationship Characteristics	
In an exclusive relationship	.96***
	(.21)
Lives with partner	.79***
	(.20)
Has an older partner	.61**
	(.21)

(continued)

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(Table 1.3, continued)

	Unintended pregnancy
Sex and Contraception	
Had sex	1.14***
	(.19)
Sex and birth control use	
No sex	(ref.)
Sex and any method	.78***
	(.21)
Sex and no method	2.54***
	(.24)
Sex and most effective birth control method used	
No sex	(ref)
Sex and long-acting method	.14
	(.60)
Sex and pill	.40†
	(.31)
Sex and male condom	1.09***
	(.28)
Sex and other method	1.10***
	(.30)
Sex and no method	2.54***
	(.24)

Notes: Each cell represents a logistic regression model. Coefficients are effects on log-odds. Standard errors in parentheses. All model X^2 values are statistically significant at the .001 level. All models include controls for time in study, number of journals, and time between journals.

† p < .10; * p < .05; ** p < .01; *** p < .001 (one-tailed tests)

Table 1.4. Multivariate Logistic Regression Estimates of Effects of School Enrollment and Intervening Variables on Hazard of Unintended Pregnancy (N=837 individuals, 44,643 observations)

	1	2	3	4	5	6	7	8	9
Enrolled in school	-.82***	-.76***	-.75***	-.80***	-.80***	-.80***	-.75***	-.71***	-.61**
	(.21)	(.22)	(.21)	(.21)	(.22)	(.21)	(.22)	(.22)	(.22)
Perceived Norms									
How many of your friends…									
…attend or plan to attend college		-.15*							-.04
		(.08)							(.09)
…are parents		-.13							
		(.09)							
How would your friends react if you had a baby		.14*							.06
		(.06)							(.06)
Expectations									
What are the chances that you will…									
...work full-time during next year			.004†						.01*
			(.003)						(.003)
...get pregnant during next year			.02***						.01*
			(.003)						(.004)
Attitudes toward Contraception									
Index of attitudes toward contraception				.34**					.24†
				(.14)					(.15)
Relationship Characteristics									
In an exclusive relationship					.84***				.43*
					(.24)				(.25)
Lives with partner					.04				
					(.23)				
Has an older partner					.04				
					(.22)				
Sex and Contraception									
Had sex						.93***			
						(.20)			
Sex and birth control use									
No sex							(ref.)		
Sex and any method							.62**		
							(.22)		
Sex and no method							2.11***		
							(.26)		
Sex and most effective birth control method used									
No sex								(ref.)	(ref.)
Sex and long-acting method								-.30	-.52
								(.61)	(.62)
Sex and pill								.45†	.25
								(.32)	(.34)
Sex and male condom								.90***	.65*
								(.28)	(.31)
Sex and other method								.77**	.36
								(.31)	(.34)
Sex and no method								2.12***	1.68***
								(.27)	(.30)

Notes: Coefficients are effects on log-odds. Standard errors in parentheses. All model X^2 values are statistically significant at the .001 level. All models include controls for sociodemographic characteristics; family background; prior sexual, contraceptive, and pregnancy experiences; prior school experiences and expectations; work experiences; and time in study, number of journals, and time between journals. All measures of intervening variables are time-varying and measured two weeks prior to the current week of pregnancy status.

† p < .10; * p < .05; ** p < .01; *** p < .001 (one-tailed tests)

Table 1.5. Appendix: Multivariate Logistic Regression Estimates of Effects of Control Variables on Hazard of Unintended Pregnancy (N=837 individuals, 44,643 observations)

	Unintended pregnancy
Sociodemographic Characteristics	
Age	.03
	(.17)
African American	.04
	(.24)
Receiving public assistance	.25
	(.25)
Religious importance	.05
	(.11)
Biological mother <20 years old at 1st birth	.23
	(.20)
Childhood family structure	
Two parents	(ref.)
One biological parent	.12
	(.21)
Other	.12
	(.33)
Mother's education <high school graduate	.32
	(.30)
Parents' income	
$14,999 or less	(ref.)
$15,000-$44,999	-.36
	(.29)
$45,000-$74,999	-.24
	(.33)
$75,000 or higher	-.36
	(.38)
Don't know/refused	-.17
	(.30)
Prior Pregnancy-Related Experiences	
Age at first sex 16 years or less	.41†
	(.26)
Total number of sexual partners 2 or more at age 18	.64*
	(.29)
Ever had sex without birth control before age 18	.31†
	(.23)
Number of prior pregnancies	
None	(ref.)
1 pregnancy	.65**
	(.27)
2 or more pregnancies	.83**
	(.33)

(continued)

	Unintended pregnancy
School Experiences and Expectations	
High school graduate	.53*
	(.31)
High school grade point average	-.57
	(.66)
Working full-time	.08
	(.24)
Expects to graduate from college	-.03
	(.21)
Study-Specific Measures	
Time in study	.12**
	(.04)
Time in study squared	-.004*
	(.001)
Number of journals completed	-.02***
	(.003)
Time between journals	.01***
	(.004)
Intercept	-7.11*
	(3.33)

Notes: Coefficients are effects on log-odds. Standard errors in parentheses. Model X^2 value is statistically significant at the .001 level.

† p < .10; * p < .05; ** p < .01; *** p < .001 (one-tailed tests)

Figure 1.1. Design and Measurement Strategy of the Relationship Dynamics and Social Life (RDSL) Project

Timeline

Birth

Baseline
Interview
(age 18/19)

Weekly journal
(2.5 years)

End of observation

Childhood & Adolescence (Time-invariant)
- Sociodemographic characteristics
- Pregnancy-related experiences
    - Sex
    - Contraception

Early Adulthood (Time-varying)
- School and work experiences
- Attitudes
- Relationship characteristics
- Sex
- Contraception
- Pregnancy desires
- Pregnancy

Figure 1.2. Temporal Ordering of Measures in Hazard Model of Pregnancy

Journal period: j = 1 to 162

median period
between journals:
8 days

median period
between journal j
and journal j-2:
16 days

......//......

Start of Hazard

journal j-3

journal j-2

journal j-1

journal j

Time-invariant measures

Independent
variable:
school
enrollment

Intervening
variables

Dependent
variable:
unintended
pregnancy
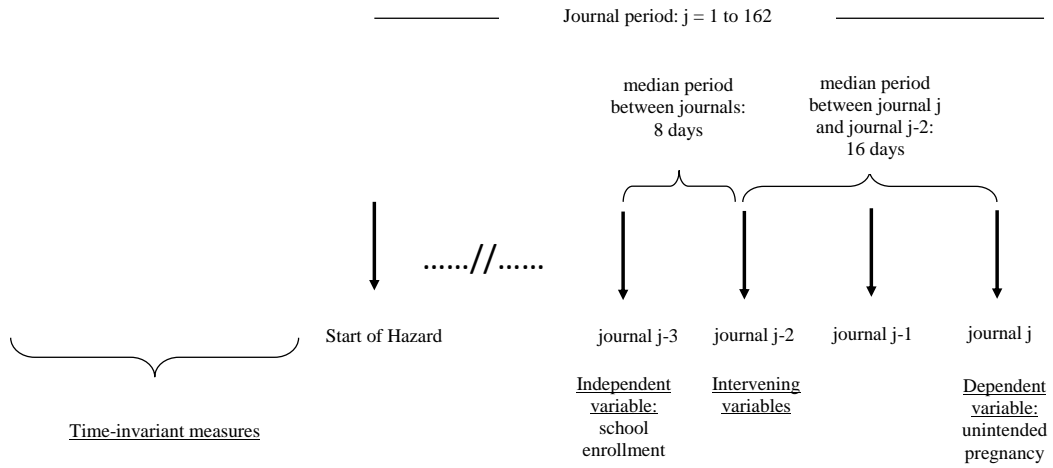
CHAPTER 2

Women's Working Conditions and Change in Fertility Expectations

Women's labor force participation increased dramatically between the 1970s and 1990s before declining slightly in the first half of the 2000s (Juhn & Potter, 2006). The growth in women's employment has been followed by increased research on the challenges of combining work and family. From this research, we know that work-family conflict is relatively common among women in the labor force, but its level varies by working conditions, such as total work hours and access to leave benefits (Bakker & Guerts, 2004; DeSai & Waite, 1991; Duxbury & Higgins, 2001; Galinsky & Stein, 1990; Schieman, Milkie, & Glavin, 2009; Schieman, Whitestone, & Van Gundy, 2006). Furthermore, the extent to which women's jobs are "family-friendly" can influence their decisions to leave the labor force, scale back work hours, or change jobs (Becker & Moen, 1999; Glass & Riley, 1998). However, the literature has not sufficiently recognized another possible response to work-family conflict, which is scaling back or delaying childbearing (Gerson, 1986).

In this study I investigate the influence of women's working conditions on plans for future childbearing. The study focuses on characteristics related to time spent working, including part-time work hours, nonstandard work schedules, self-employment, and access to paid vacation benefits. Using longitudinal data covering over twenty years,

the analyses take into account the effects of selection into certain types of working

conditions. Specifically, I use lagged dependent variable methods, which control for prior

fertility expectations, to analyze *change* in fertility expectations. If working conditions

are causally related to women's fertility intentions, then we can expect to find differences

in change in fertility expectations by working conditions. In addition, this paper specifies

how working conditions might interact with parity to influence fertility expectations.

THEORETICAL AND EMPIRICAL BACKGROUND

Employment Context and Fertility Intentions

A large body of sociological research has shown that individual fertility intentions

are the primary determinant of fertility. The importance of fertility intentions is implicit

in most theories of fertility, which are largely based on rational-actor models in which

individuals decide to have children for economic or social reasons (e.g., Friedman,

Hechter, & Kanazawa, 1994; Schoen, Kim, Nathanson, Fields, & Astone). Numerous

studies have found that fertility intentions are strong predictors of fertility behavior

(Barber, 2001; Bongaarts, 1992; Freedman, Freedman, & Thornton, 1980; Hendershot &

Placek, 1981; Schoen, Astone, Kim, Nathanson, & Fields, 1999; Westoff & Ryder,

1977). Of course, individuals are not always capable of carrying out their fertility

intentions. Almost half of pregnancies in the United States are mistimed or unwanted

(Chandra, Martinez, Mosher, Abma, & Jones, 2005), and many women struggle to have

as many children as they would like (Menken, 1985; Rindfuss & Brewster, 1996;

Rindfuss, Guzzo, & Morgan, 2003).

In the sociological framework, individuals form their fertility intentions within

particular contexts, and their intentions reflect normative as well as structural constraints

embedded in these contexts. Put simply, some contexts facilitate plans for larger family

sizes, while others constrain them. Furthermore, the sequential model of fertility

intentions conceptualizes fertility decision-making as a dynamic process in which people

reassess their earlier decisions in response to changing experiences and social contexts

(Namboodiri, 1972; Udry, 1983). A recent study by Hayford (2009) supports the

sequential model; while most women exhibited stable and normative fertility

expectations, intending to have about two children, many women increased or decreased

their expected fertility size between ages 18 and 40.

Previous research has shown that employment is an important context for fertility.

Early studies of the relationship between women's employment and fertility decisions and

behavior were largely theoretical and focused on negative correlations between labor

force participation or plans to participate and fertility or fertility expectations (e.g.,

Cramer, 1980; Jones, 1981; Reed & Udry, 1973; Ryder & Westoff, 1971). Building on

the evidence suggesting that employment and fertility are interrelated, the next wave of

research focused on testing for simultaneous effects. For example, Waite and Stolzenburg

(1976; Stolzenberg & Waite, 1977) found reciprocal effects between plans for labor force

participation and fertility expectations. In contrast, studies by Smith-Lovin and

Tickamyer (1978) and Hout (1978) found that fertility affected employment, but that

employment did not significantly affect fertility. Despite the increase in women's labor

force participation and the growing diversity in women's work contexts, research in this

area continues to focus on the effects of employment status on fertility. In one of the most

recent studies in this area, Budig (2003) analyzed data from the National Longitudinal

Survey of Youth and found that labor force participation−whether part-time or full-

time−reduces fertility. More research is needed on the relationship between the specific characteristics of women's employment and decisions around childbearing.

In the sociological literature, the negative relationship between female labor force participation and fertility is commonly attributed to incompatibility between the social institutions of work and family. Following industrialization, childcare and economically productive work became increasingly incompatible (Weller, 1977). Work sites moved to locations further from home, work hours grew longer, and schedules lost the flexibility that children require. Thus, most women who participate in the labor force must find an alternate child care arrangement or limit their fertility. However, no study to date has examined whether the working conditions that create incompatibility with family care can be linked to women's decisions to limit fertility.

Working Conditions and Work-Family Incompatibility

In the next section I review the empirical research on how working conditions facilitate or constrain a worker's ability to meet family responsibilities. I focus on working conditions that are directly related to the organization of time spent working, because family life and the workplace are both considered to be "greedy institutions" that place significant demands on individuals' time and energy (Coser, 1974; Glass & Camarigg, 1992; Hochschild, 1997). Recent research suggests that too many work hours or inflexibility in work hours remains a major problem for families, leaving insufficient time for family life (Daly, 2001; Jacobs & Gerson, 2004; Milkie, Mattingly, Nomaguchi, Bianchi, & Robinson, 2004; Nomaguchi, Milkie, & Bianchi, 2005).

Part-time hours. Whether a woman works a part-time schedule, which is generally defined as less than 35 hours per week in the United States, may be associated

with a greater increase in fertility expectations. Much of the work-family research conceptualizes an individual's time and energy as fixed quantities with work and childcare competing for both (Voydanoff, 2005). Working a part-time schedule is one strategy workers adopt for balancing work and family; scaling back their work commitment frees up more time and energy for family demands. Previous research has shown that, compared to their full-time counterparts, part-time workers had lower levels of work-family conflict and greater family satisfaction (Higgins, Duxbury, & Johnson, 2000; Hill, Martinson, & Ferris, 2004; Hosking & Western, 2008; Lewis, 1998; Raabe, 1998).

However, working part-time has been associated with challenges that may offset or outweigh the benefits of increased time for family. Compared to full-time jobs, most part-time jobs in the U.S. are considered "bad" jobs that offer lower compensation and fewer fringe benefits, such as health insurance and maternity leave (Ferber & Waldfogel, 1998; Kalleberg, Reskin, & Hudson, 2000; Tilly, 1996). Studies of professional workers show that part-time schedules are associated with more limited career advancement opportunities and less job security (Catalyst 1993, 1997; Kalleberg & Reskin, 1995; Kropf, 2001; Moen & Roehling, 2005). In addition, many women are involuntarily employed part-time and would prefer full-time family care or full-time employment. Negrey (1993) found that a quarter of part-time workers in the United States worked part-time because their hours had been reduced due to slack work or because they were unable to find full-time employment. For these reasons, working a part-time schedule may be associated with reduced fertility expectations.

Nonstandard shift. A second working condition that may influence fertility expectations positively or negatively is whether a woman works a nonstandard schedule, which includes evening and night shifts, schedules that change periodically, and irregular hours. Nonstandard shifts have become increasingly common in response to the needs of a global 24-7 economy (Presser, 2003). According to the U.S. Census, about 15% of the workforce work evenings, nights, rotating shifts, or irregular schedules or hours (US Bureau of Labor Statistics, 2005). Furthermore, the percentage of employees working nonstandard shifts is likely to increase, because the occupations in which shift work is more common (e.g., cashier, truck driver, personal services) are expected to grow disproportionately (Presser, 2003).

Studies on the effects of nonstandard shifts on work-family conflict have found mixed results. Some parents view nonstandard shift work as a strategy for avoiding the high cost of child care and enabling family members to share child care responsibilities. In particular, spouses arrange their work schedules so that one is at work while the other provides child care (Garey, 1999). Research shows that nonstandard shifts are more common among dual-earner spouses with children, and there is a strong association between non-day shifts and high rates of parental child care (Presser 1988; 1989; 2003).

On the other hand, working nonstandard hours has been associated with negative consequences at the individual, couple and family-level. People working nonstandard hours tend to experience more health problems, including physical fatigue and sleeping problems (see Wedderbrun 2000 for a review). Furthermore, working evening or night shifts is linked to higher levels of depressive symptoms (Perry-Jenkins, Goldberg, Pierce, & Sayer, 2007) as well as lower levels of social satisfaction and higher levels of family

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conflict and marital instability (Bohle & Tilley, 1998; Booth, Johnson, & White, 1984; Grosswald, 2004; Hertz & Charlton, 1989; Presser, 2000; Totterdell et al. 1995; Wedderburn, 2000; White & Keith, 1990). Given the potentially mixed effects of nonstandard work schedules on parents' ability to manage work and family, working a nonstandard work schedule may be associated with positive or negative change in fertility intentions.

Self-employment

Whether women are self-employed or employed in a business or other organization also may influence their fertility plans positively or negatively. The number of self-employed women has increased steadily over the past three decades, and women with young children are more likely to choose self-employment than those without young children (Connelly, 1992; Fairlie, 2004). Self-employment is considered an option that is more conducive for balancing work and family responsibilities (Cromie, 1987; Loscocco, 1997; Manheim & Schiffrin, 1984). Compared to those who are organizationally employed, self-employed people tend to report greater freedom, autonomy, and ability to structure their workday according to their preferences (Eden, 1975; Loscocco, 1997; Mannheim & Schiffrin, 1984; Naughton, 1987). Opportunities to combine child care and paid work also tend to be more common among self-employed individuals, such as home child care providers. In turn, this autonomy and flexibility should facilitate better balancing of work and family responsibilities (Greenhaus, Parasuraman, Granrose, Rabinowitz, & Beutell, 1989).

However, self-employed workers also tend to be more psychologically involved in work and more likely to work long hours than organizationally employed persons

(Hornaday & Aboud, 1987), which could exacerbate work-family conflict. Research has found that self-employed persons report higher levels of work-family conflict (Parasuraman & Simmers, 2001; Schieman, Whitestone, & Van Gundy, 2006). Also, difficulty balancing the demands of work and family roles is a factor that negatively affects the satisfaction and well-being of business owners (Bowen & Hisrich, 1986; Kalleberg & Leicht, 1991; Stoner, Hartman, & Arora, 1990).

Paid vacation leave. Research on leave benefits suggest that access to paid vacation leave may be associated with an increase in birth expectations. Policies that allow workers to leave work when family needs arise without sacrificing income are important for reducing work-family conflict. Little research has been done on the link between vacation leave and work-family conflict, but we know that vacation leave is often used following a child's birth or in place of paid sick leave.[3] Of course, vacation leave tends to be less helpful than paid sick leave when children become sick or child care interruptions occur, as many workplaces require advance requests for vacation leave (Clemans-Cope, Perry, Kenney, Pelletier, & Pantell, 2008; Heymann, 2000; Heymann, Toomey, & Furstenberg, 1999). However, I would expect access to vacation leave to be positively associated with change in fertility expectations.

Importance of parity

There are reasons to believe that the influence of working conditions on plans for future childbearing may decline as a woman's family size increases. As the number of children born increases, the number of future births expected is likely to decline towards zero, because women approach their desired family size and the normative family size of

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[3] This study focuses on vacation leave only, because measures of maternity leave and sick leave were available only in later waves of the NLSY.

two or three children. At this point, women make smaller adjustments to their future birth expectations, regardless of contextual factors such as working conditions.

Summary of Hypotheses

In the present study, I build on the previous research by focusing specifically on working conditions as factors that may influence fertility intentions among employed women, controlling for prior fertility intentions, family characteristics, and human capital. I examine the individual and combined effects of four characteristics that vary among jobs: 1) part-time hours, 2) nonstandard schedule, 3) self-employment, and 4) access to paid vacation leave. Given that previous research shows mixed results regarding the effects of part-time schedules, nonstandard shifts, and self-employment on work-family conflict, I leave open the possibility that these working conditions will be associated with larger increases or decreases in expected births. I expect that those who lack access to paid vacation leave will report larger decreases in expected births than those who have access to the benefit. In addition, I hypothesize that these main effects will vary depending on the number of children already born. Specifically, I expect that working conditions will exert a weaker effect on change in fertility expectations at higher parity levels.

METHODS

Data and Sample

This study uses data from the 1979 cohort of the National Longitudinal Survey of Youth (NLSY), a national probability sample of individuals who were ages 14-21 and living in the United States in 1979. Interviews were conducted every year from 1979 to 1994 and on a biennial basis thereafter (the survey is ongoing). Retention rates for the

NLSY have been relatively high; retentions rates exceeded 90 percent through the early 1990s, and they were 77.5 percent in 2002, when sample members were ages 37-45.

The NLSY is ideal for this study in three main ways. First, the NLSY collected data on childbearing expectations at 13 different waves between 1979 and 2000. The survey collected employment histories and repeated, detailed measures of working conditions at each wave. Whereas many studies of work and fertility have relied on cross-sectional data, my study uses repeated measures of working conditions, fertility behavior, and fertility expectations to help identify the causal relationships over time. Second, each wave of the NLSY has included detailed questions about a wide variety of working conditions related to work hours and scheduling. Third, the length of the observation period allows me to examine the relationship between working conditions and childbearing expectations across the childbearing years.

I analyze expectations among women ages 18 to 40, which are primary years for both labor force participation and childbearing. My analytic sample includes 4,139 women who were out of school and employed in at least one wave. This represents 87.5% of the 4,728 women initially interviewed in 1979.[4] My analysis includes all person-years in which respondents were out of school and employed. Two hundred twenty-five women were excluded because they were never out of school and employed during the course of the study. About 25% of these women had children in 1979, compared to 14% of the women who worked during the study. They also expected fewer

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[4] This number (4,728) excludes the military and poor white oversamples. The full military sample was dropped from the NLSY in 1985, and the poor white oversample was dropped in 1991. I exclude men, because they are known to misreport fertility (Rendall, Clarke, Peters, Ranjit, & Verropoulou, 1999), and women continue to hold primary responsibility for childcare (Bianchi, 2000; Sandberg & Hofferth, 2001, 2005; Sayer, Bianchi, & Robinson, 2004).

future births in 1979 than their counterparts who worked (1.89 vs. 2.27). Another 346 women were excluded due to missing values on measures included in the analyses.

Analytic Strategy

I examine the association between working conditions and fertility expectations using multilevel models. The data are organized as a pooled-time series. Each wave of observations for each individual in the sample is a separate record, which violates the assumption of independent observations (Johnson, 1995). However, the random effects estimator is an appropriate estimator for data organized in this manner. Compared to fixed-effects models, the random-effects model allows me to include in the model variables that do not vary over time for individuals, such as race and family background characteristics (Allison, 1994).

I test models that use a lagged dependent variable, so the score of the fertility expectation is regressed on the prior fertility expectation, plus the working conditions and control variables. These models allow me to assess *change* in fertility expectations among women in various working conditions, while accounting for characteristics that may have sorted women into different types of jobs in the first place. By controlling for prior fertility expectations when predicting current expectations, the specification is similar to a change score model but preferable in two important ways. First, there are substantive reasons for assuming that prior fertility expectations exert a causal effect on current fertility expectations; the expectation at time t is a function of the expectation at time t-1, modified by new information. Second, these models allow me to include time-invariant factors as controls.

For example, the random-effects model for a data set with i individuals and t time periods, which investigates the hypothesis that working part-time hours influences fertility expectations, takes the following form:

$$F_{it} = u + b_1 F_{it-1} + b_2 P_{it-1} + b_k X_{ki} + b_j Z_{jit-1} + e_{it}$$

where u is the constant term, e_{it} an error term, and the bs are regression coefficients. The variables are as follows: F_{it} fertility expectations; F_{it-1} fertility expectations in the prior wave; P_{it-1} a measure of whether the respondent worked a part-time schedule in the prior wave; X_{ki} k time-invariant control variables; and Z_{jit-1} j time-varying control variables. I hypothesize that working a part-time schedule will have a significant effect on change in fertility expectations, net of other factors. I test similar models for working a nonstandard schedule, self-employment, and access to vacation leave. In addition, I test a full model that includes all the working conditions that significantly affect change in fertility expectations. Random effects estimates for all models were computed with the xtreg procedure in STATA.

The estimation proceeds in two main steps. First, I regress fertility expectations on working conditions, controlling for prior fertility expectations. Second, I test an interaction between each working condition and the number of children born.

Measures

Fertility Expectations

I derived my dependent variable of fertility expectations from two questions. Women who had no children were asked, "Altogether, how many children do you expect to have?" Women who already had children were asked, "Altogether, how many *more* children do you expect to have?" From these questions, I constructed a continuous

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dependent variable: *number of births expected*. An identical measure captures the *number of births expected in the prior wave*. The average number of births expected was 0.85 in the current wave and slightly higher−1.01 births−in the prior wave. Descriptive statistics for the number of births expected and all variables in the analyses appear in Table 2.1.

[Table 2.1 about here.]

Working Conditions

The key measures of interest in my analyses are within-individual factors—that is, working conditions that vary over time for a given woman. The measures refer to the respondents' current job. If the respondent held more than one job at the time of the interview, the measures refer to the job at which she worked the most hours.

Part-time hours. Part-time hours is measured as a dichotomous variable equal to 1 if the respondent worked less than 35 hours per week (21%). This commonly used definition of part-time hours is based on the U.S. Bureau of Labor Statistics definition.

Nonstandard schedule. The type of shift the respondent usually worked is based on the question, "What hours do you usually work? Is it the regular day shift, the regular evening shift, the regular night shift, a split shift, or do your hours vary?" I created a dichotomous variable equal to 1 if the respondent worked evenings, nights, a split shift, or varied hours (26%), and 0 if they worked a regular day shift (74%).

Self-employed. Respondents were asked, "Were you an employee of a private company, business, or individual for wages, salary, or commission; or a government employee; or employed in your own business, professional practice, or farm; or working without pay in a family business or farm?" The dichotomous variable is coded 1 if the

respondent was employed in her "own business, professional practice, or farm" or "working without pay in a family business or farm" (5%) and 0 otherwise (95%).

Paid vacation leave. Respondents were asked a series of questions about whether their employer makes fringe benefits available to them. The question about paid vacation leave is worded, "Does [employer] make available to you paid vacation?" The variable is coded 1 if the respondent did *not* have access to paid vacation leave (25%) and 0 if she had paid vacation leave (75%).[5] Note that this measure refers to access to paid vacation leave, as compared to actual use of the benefit.

Controls

I also include a number of control variables which may be associated with working conditions and fertility expectations. Unless otherwise noted, the control measures are obtained in the prior wave (the same wave as the lagged measure of fertility expectations). Several variables control for characteristics of the respondent's current family life. *Parity*, which is the number of children already born, and *change in parity (t-1 to t)* are included as continuous variables. Women may be more likely to scale back their expected births at higher parity levels, and the number of expected future births is likely to decline following an actual birth between waves. Respondents who are *married* are coded 1. I also control for *spouse's income* using a continuous measure of the spouse's total wages and salary from the previous year in $10,000s. If respondents are not married, the measure is coded 0.

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[5] From 1980 to 1992 questions about benefits were asked to those respondents who worked 20 hours or more per week at their main job and who were not self-employed in an unincorporated business. Respondents who worked less than 20 hours per week and those who were self-employed are coded 0 for vacation leave benefits.

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I also control for the level of human capital. The respondent's *education* is coded as her highest grade of school completed, which ranges from 0 to 20. The *log of hourly wage* in dollars is included as a continuous variable. *Tenure* is a continuous measure of the number of years the respondent has worked at her current employer. I use the three-digit Census occupation codes and widely used groupings to create a dichotomous indicator of whether the respondent works in a *managerial or professional occupation*. Glass and Fujimoto (1995) found that employment in a managerial or professional occupation is positively associated with the provision of family-responsive benefits and policies.

Age is a time-varying continuous variable, which ranges from 18 to 40 years. *Race/ethnicity* is a categorical variable coded as white, non-Hispanic white (reference category), Hispanic, or African American. *Parents' education* is coded as the average number of years of education the respondent's mother and father completed. I include a dichotomous measure coded 1 if the respondent was raised *Catholic* and 0 otherwise. Next is a count of *number of siblings* based on the number of births to the respondent's mother.

Measures of early aspirations for work and family may play an important part in later choices in both domains. A continuous measure of *desired family size* is based on the question asked in 1979, "How many children do you want to have?"[6] I also include a dichotomous indicator of whether the respondents *plans to work outside the home* (instead of raising a family) at age 35. An early measure of *egalitarian gender role attitudes* is derived from six statements about the employment of wives, to which

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[6] The question about desired family size was asked in 1979 and 1982. I used the 1979 measure unless it was missing, in which case I used the 1982 measure.

respondents reported their level of agreement/disagreement.[7] Important phrases from the

six items are as follows:

1. A working wife feels more useful than one who doesn't hold a job.

2. The employment of wives leads to more juvenile delinquency.

3. Employment of both parents is necessary to keep up with the high cost of

living.

4. It is much better for everyone if the man is the achiever outside the home and

the woman takes care of the home and family.

5. Men should share the work around the house with women.

6. Women are much happier if they stay at home and take care of their children.

I reversed the coding on some items, so all were coded as pro-egalitarianism. I added the

value of their responses and took the mean across the six items to indicate their level of

egalitarianism.

Finally, all models include a set of dummy variables for the year in which the

interview took place. The models also include a continuous measure of the number of

years since the prior wave.

RESULTS

I begin the analysis by exploring how working conditions influence change in

women's fertility expectations. Table 2.2 presents random-effects regression estimates of

the effect of working conditions on the number of future births expected, controlling for

prior fertility expectations as well as time-varying family characteristics, human capital,

other attitudes, and sociodemographic characteristics. In Model 1, I examine the effect of

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[7] The gender role attitudes questions were asked in both 1982 and 1987. I used the 1982 measure unless it was missing, in which case I used the 1987 measure.

working a part-time schedule on change in fertility expectations compared to working a full-time schedule. I find that working a part-time schedule is associated with significantly greater declines in birth expectations than working a full-time schedule. This finding suggests that the negative characteristics that tend to accompany part-time work, such as limited autonomy and career growth opportunities, outweigh the benefits of having more time available for childcare when it comes to planning future births. Model 2 examines the effect of schedule type on change in birth expectations. I find that working a nonstandard schedule, which includes evening and night shifts, split shifts, and schedules with varying hours, has no significant effect on change in fertility plans compared to working a regular day shift. Model 3 shows that self-employment also has no significant effect on change in expected future births compared to employment in an organization. Although the total number of hours worked is important for fertility plans, it appears that *when* those hours are worked (e.g., day or night) and working for one's self do not influence fertility plans. In Model 4, the focus is on whether women can take leave from work without losing pay. I find that respondents who lack paid vacation leave decrease their expected births more than those who have access to the benefit. In other words, women who are unable to take time off work for child care or other reasons without lost wages are more likely to scale back their childbearing plans.

[Table 2.2 about here.]

Model 5 includes both part-time hours and paid vacation status in order to estimate their combined effects on change in fertility expectations. In the full model, respondents who worked part-time expect a greater decline in expected births than those who worked a full-time schedule. Lack of paid vacation leave remains negatively

associated with change in birth expectations, but the coefficient is no longer statistically significant. This finding suggests that the effect of paid vacation leave on change in fertility expectations can be explained by the association between part-time hours and paid leave benefits.

Note that most of the family characteristics included as control variables are strong predictors of change in childbearing expectations. Women who have more children and those who gave birth since the prior wave tend to reduce their birth expectations more than women with fewer children and no recent births. Married women also tend to scale back their birth expectations more than non-married women, which is surprising given that two-parent households remain the normative family structure for childbearing and single women may need to scale back their childbearing plans due to lack of a partner. At the same time, married women may be more likely to revisit their childbearing plans than single women and adjust them according to their partner's childbearing preferences, marital dynamics, and the division of labor within the household.

I also find that human capital affects change in fertility expectations, independent of working conditions. Higher education levels are associated with greater increases in birth expectations, which runs counter to opportunity cost theories which suggest that the cost of childbearing rises with education, leading to a negative education-fertility relationship. Higher wages also are associated with greater increases in birth expectations, which suggests that higher incomes support childbearing among working women by enabling them to purchase childcare and household services. At the same time,

a longer tenure with an employer is associated with greater decreases in fertility expectations.

Women's attitudes also are important predictors of change in childbearing plans in the expected directions. Birth expectations in the prior wave exert a strong effect on birth expectations in the current wave. Preferences for larger families are associated with greater increases in fertility expectations, and more egalitarian gender norms are associated with greater decreases in fertility expectations.

Lastly, many of the sociodemographic characteristics are associated with change in birth expectations in the expected direction. Older women are more likely to scale back their birth expectations, and African American women are more likely to scale back their fertility expectations than non-Hispanic white women. On the other hand, coming from a larger family, having more highly-educated parents and Catholicism are associated with greater increases in expected births.

Is it possible that the effects of women's working conditions on childbearing plans vary by the number of children already born. The models in Table 2.3 introduce interaction effects into the previous models to test for differential effects of working conditions by parity. Model 1 shows that working part-time hours is associated with greater decreases in fertility expectations compared to working full-time hours. The effect size for part-time hours is twice as large as the effect without the interaction term in the model (-.060 vs. -.032). The interaction effect of part-time hours and parity was positive and significant, which suggests that the effect of working part-time on change in fertility expectations is weaker among those who have more children. In Model 2, working a nonstandard schedule is significantly associated with a decline in fertility expectations,

and the interaction with parity is positive and marginally significant. Models 3 and 4

show that self-employment and lack of paid vacation leave are associated with larger

declines in fertility expectations, and in both cases the effects are reduced at higher parity

levels. Note that the magnitude of the coefficient for self-employment is larger than the

coefficients for other important influences on fertility expectations, including all of the

family, human capital, and sociodemographic characteristics. Finally, Model 5 includes

all of the working conditions and interactions between working conditions and parity. In

this model part-time employment and lack of paid vacation leave are associated with

greater declines in fertility plans, but the effects no longer vary by parity. Self-

employment is also associated with a decline in fertility plans, and the effect is

minimized at higher parity levels. The effect of working a non-standard shift on fertility

expectations is no longer statistically significant, largely due to the correlation with part-

time hours.

[Table 2.3 about here.]

DISCUSSION

This paper investigated the relationship between women's working conditions and

plans for future childbearing. Results were based on a large national cohort and

longitudinal data covering over twenty years. I use lagged dependent variable models,

which control for prior fertility expectations, to analyze *change* in fertility expectations.

Furthermore, a host of family, human capital, attitudinal, and sociodemographic

characteristics that might be linked to working conditions or fertility plans are controlled

in the analyses. In general, my results suggest that women adjust their fertility

expectations in response to working conditions. This finding is consistent with earlier

studies demonstrating that fertility decision-making is a dynamic process in which people reassess their earlier decisions in response to changes in their social context (Hayford, 2009; Namboori, 1972; Udry, 1983).

One key finding is that working a part-time schedule is associated with greater declines in expected births than working a full-time schedule. This pattern may emerge because part-time workers have fewer fringe benefits, such as health insurance and maternity leave (Ferber & Waldfogel, 1998; Kalleberg et al., 2000; Tilly, 1996). The decline in expected births also may be related to the association between part-time schedules and limited career advancement opportunities and job insecurity (Kalleberg & Reskin, 1995; Kropf, 2001; Moen & Roehling, 2005). The extent to which it is lack of fringe benefits, limited career advancement opportunities, or job insecurity is an empirical question for further research.

On the other hand, my results indicate that work schedules and the ability to take paid time off work are not important for fertility plans. I find no evidence that working a nonstandard shift is associated with change in fertility expectations. It is possible that the costs of working a nonstandard shift in terms of physical and mental health, social satisfaction, and marital well-being offset the benefits of being able to share childcare responsibilities among family members. I find only weak evidence that lack of paid vacation leave is associated with a decline in fertility expectations after controlling for part-time hours and self-employment. I would expect to find similar but stronger results for access to paid sick leave, which is a benefit that generally requires less advance notice than paid vacation leave and, therefore, is used more often to meet childcare needs (Clemens et al., 2008; Heymann, 2000; Heymann et al., 1999).

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I also find that self-employment is associated with larger declines in expected fertility, but this relationship washes out at higher parity levels. This finding is consistent with research showing that self-employed persons report higher levels of work-family conflict (Parasuraman & Simmers, 2001; Schieman et al., 2006). Although self-employed people tend to have greater autonomy and control over the structure of their workday (Eden, 1975; Loscocco, 1997; Mannheim & Schiffrin, 1984; Naughton, 1987), they also tend to be more psychologically involved in their work and work longer hours than organizationally employed persons (Hornaday & Aboud, 1987).

When interpreting these findings, it is important to consider how other factors co-occurring with working conditions that were not controlled in the current analyses may have contributed to the associations found. For example, supportive working conditions tend to co-occur with workplace cultures that support the integration of work and family lives, which can manifest in managerial support for work-family balance and social norms that encourage workers to utilize benefits (Thompson, Beuauvais, & Lyness, 1999). Regardless of whether the workplace culture leads to or results from working conditions, it likely affects fertility plans and may have extraneously contributed to the effects found in the current study.

These caveats aside, the study results underscore the important role working conditions play in constraining fertility plans. Previous studies have shown that working conditions affect women's decisions to exit the labor force, scale back their work hours, or change jobs (Becker & Moen, 1999; Glass & Riley, 1998). However, this study shows that individuals also respond to working conditions by scaling back in their family life. Collectively, the findings also suggest that working conditions exert a broader influence

on family well-being than previous research has demonstrated. Previous studies have shown that working conditions influence parenting behaviors and the time that parents spend with children (Estes, 2005; Parcel & Menaghan, 1994), but this study is the first to show that working conditions also influence the initial process of becoming parents. Similarly, studies have shown that working conditions can influence the risk of marital dissolution (Hughest, Galinksky, & Morris, 1993; Wanamaker & Bird, 1990), but research also should explore how working conditions influence the processes leading up to marriage as well as decisions to forgo marriage.

Important next steps would be to explore the influence of a broader set of work-family benefits on fertility behavior and the effects of benefit use as compared to availability. In addition to the working conditions examined in this study, research is needed to examine the influence of several other work-family benefits on women's childbearing plans. For example, are women who lack access to maternity leave and paid sick leave more likely to scale back their fertility plans? What effect do flexible work options, such as telecommuting and flexible scheduling, have on fertility plans? Another important step would be comparing the relationship between benefit use and availability on fertility plans. Access to a benefit, such as paid vacation leave, may have different effects on childbearing plans than actual use of the benefit. Although I have exploited the rich longitudinal data in the NLSY79, the limited number of years in which some working conditions were measured and the survey's focus on availability of benefits prevent me from exploring these questions. However, these questions represent compelling lines for further research, particularly for researchers interested in the consequences of employment on families.

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Table 2.1. Descriptive Statistics of Measures Used in the Analyses (N=4,139 subjects, 24,421 observations)

	Mean	*SD*	Minimum	Maximum
Fertility Expectations				
Number of births expected	0.85	1.09	0	12
Working Conditions				
Part-time schedule	0.21		0	1
Nonstandard shift	0.26		0	1
Self-employed	0.05		0	1
No paid vacation leave	0.25		0	1
Family Characteristics				
Parity	1.07	1.19	0	10
Change in parity (t–1 to t)	0.13	0.35	0	3
Married	0.47		0	1
Spouse's income (in $10,000s)	1.23	2.11	0	22.34
Human Capital				
Years of education	13.09	2.08	0	20
Hourly wage	10.29	147.63	0	21000.00
Tenure	3.50	3.85	0.02	28.40
Managerial or professional occupation	0.28		0	1
Attitudes				
Number of births expected (t-1)	1.01	1.17	0	12
Desired family size	2.48	1.46	0	15
Plans to work outside the home	0.88		0	1
Egalitarian gender role attitudes	2.91	0.42	1.17	4
Sociodemographic Characteristics				
Age	28.77	5.94	18	40
Race/ethnicity				
Non-Hispanic white	0.54		0	1
African American	0.28		0	1
Hispanic	0.18		0	1
Number of siblings	3.62	2.49	0	19
Parents' education	10.94	3.09	0	20
Catholic	0.36		0	1

Table 2.2. Random-Effects Regression Estimates of the Effect of Working Conditions on C*hange* in Future Births Expected (N=4,139 subjects, 24,421 observations)

	1	2	3	4	5
Working Conditions					
Part-time schedule[a]	-.032**				-.024*
	(.010)				(.012)
Nonstandard shift[b]		-.014			
		(.009)			
Self-employed[c]			-.024		
			(.020)		
No paid vacation leave[d]				-.028**	-.018
				(.010)	(.011)
Family Characteristics					
Parity	-.099***	-.100***	-.100***	-.099***	-.099***
	(.005)	(.005)	(.005)	(.005)	(.005)
Change in parity (t–1 to t)	-.558***	-.559***	-.559***	-.558***	-.558***
	(.012)	(.012)	(.012)	(.012)	(.012)
Married	-.070***	-.071***	-.070***	-.071***	-.070***
	(.011)	(.011)	(.011)	(.011)	(.011)
Spouse's income (in $10,000s)	.003	.002	.002	.003	.003
	(.003)	(.003)	(.003)	(.003)	(.003)
Human Capital					
Years of education	.022***	.021***	.022***	.022***	.022***
	(.003)	(.003)	(.003)	(.003)	(.003)
Log of hourly wage	.023**	.024**	.023**	.020*	.020*
	(.008)	(.008)	(.008)	(.008)	(.008)
Tenure	-.005***	-.004***	-.004***	-.005***	-.005***
	(.001)	(.001)	(.001)	(.001)	(.001)
Managerial or professional occupation	-.015	-.013	-.013	-.014	-.015
	(.010)	(.010)	(.010)	(.010)	(.010)
Attitudes					
Number of births expected (t-1)	.562***	.562***	.563***	.562***	.562***
	(.005)	(.005)	(.005)	(.005)	(.005)
Desired family size	.028***	.028***	.028***	.028***	.028***
	(.003)	(.003)	(.003)	(.003)	(.003)
Plans to work outside the home	.016	.016	.015	.015	.016
	(.013)	(.013)	(.013)	(.013)	(.013)
Egalitarian gender role attitudes	-.041***	-.040***	-.040***	-.041***	-.041***
	(.010)	(.010)	(.010)	(.010)	(.010)

(continued)

(Table 2.2, continued)

	1	2	3	4	5
Sociodemographic Characteristics					
Age	-.027***	-.027***	-.027***	-.027***	-.027***
	(.002)	(.002)	(.002)	(.002)	(.002)
Age squared	.001***	.001***	.001***	.001***	.001***
	(.000)	(.000)	(.000)	(.000)	(.000)
Race/Ethnicity[e]					
Hispanic	-.010	-.010	-.009	-.009	-.010
	(.014)	(.014)	(.014)	(.014)	(.014)
African American	-.041***	-.039***	-.040***	-.041***	-.042***
	(.011)	(.011)	(.011)	(.011)	(.011)
Number of siblings	.004*	.004*	.004*	.004*	.004*
	(.002)	(.002)	(.002)	(.002)	(.002)
Parents' education	.004*	.004*	.004*	.004*	.004*
	(.002)	(.002)	(.002)	(.002)	(.002)
Catholic	.051***	.050***	.050***	.051***	.051***
	(.011)	(.011)	(.011)	(.011)	(.011)
Constant	.018	.021	.016	.036	.031
	(.124)	(.124)	(.124)	(.124)	(.124)

Note: Standard errors in parentheses. Models also controlled for survey year. [a]Reference group is full-time schedule. [b]Reference group is standard shift. [c]Reference group is employed by organization. [d]Reference group is paid vacation leave. [e]Reference group is non-Hispanic white.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2.3. Random-Effects Regression Estimates of the Effect of Working Conditions on *Change* in Future Births Expected, including Interactions with Parity (N=4,139 subjects, 24,421 observations)

	1	2	3	4	5
Working Conditions and Interactions with Parity					
Part-time schedule[a]	-.060***				-.037*
	(.015)				(.017)
Part-time × parity	.022**				.011
	(.008)				(.009)
Nonstandard shift[b]		-.029*			-.016
		(.013)			(.013)
Non-standard shift × parity		.014†			.008
		(.008)			(.008)
Self-employed[c]			-.127***		-.093**
			(.030)		(.032)
Self-employed × parity			.066***		.052**
			(.015)		(.016)
No paid vacation leave[d]				-.061***	-.029†
				(.014)	(.016)
No paid vacation leave × Parity				.028***	.012
				(.008)	(.009)
Family Characteristics					
Parity	-.104***	-.104***	-.105***	-.108***	-.111***
	(.005)	(.005)	(.005)	(.005)	(.006)
Change in parity (t–1 to t)	-.557***	-.559***	-.559***	-.557***	-.556***
	(.012)	(.012)	(.012)	(.012)	(.012)
Married	-.069***	-.071***	-.069***	-.070***	-.069***
	(.011)	(.011)	(.011)	(.011)	(.011)
Spouse's income (in $10,000s)	.003	.002	.002	.002	.003
	(.003)	(.003)	(.003)	(.003)	(.003)
Human Capital					
Years of education	.022***	.022***	.021***	.022***	.021***
	(.003)	(.003)	(.003)	(.003)	(.003)
Log of hourly wage	.022**	.024**	.024**	.019*	.021*
	(.008)	(.008)	(.008)	(.008)	(.008)
Tenure	-.004***	-.004***	-.004***	-.005***	-.005***
	(.001)	(.001)	(.001)	(.001)	(.001)
Managerial or professional occupation	-.015	-.013	-.013	-.014	-.015
	(.010)	(.010)	(.010)	(.010)	(.010)

(continued)

	1	2	3	4	5
Attitudes					
Number of future births expected (t-1)	.561***	.562***	.562***	.561***	.561***
	(.005)	(.005)	(.005)	(.005)	(.005)
Desired family size	.028***	.028***	.028***	.028***	.028***
	(.003)	(.003)	(.003)	(.003)	(.003)
Plans to work outside the home	.017	.016	.016	.016	.017
	(.013)	(.013)	(.013)	(.013)	(.013)
Egalitarian gender role attitudes	-.040***	-.040***	-.040***	-.040***	-.041***
	(.010)	(.010)	(.010)	(.010)	(.010)
Sociodemographic Characteristics					
Age	-.028***	-.027***	-.027***	-.027***	-.027***
	(.002)	(.002)	(.002)	(.002)	(.002)
Age squared	.001***	.001***	.001***	.001***	.001***
	(.000)	(.000)	(.000)	(.000)	(.000)
Race/Ethnicity[e]					
Hispanic	-.010	-.009	-.009	-.009	-.010
	(.014)	(.014)	(.014)	(.014)	(.014)
African American	-.040***	-.039***	-.039***	-.039***	-.039***
	(.011)	(.011)	(.011)	(.011)	(.011)
Number of siblings	.004*	.004*	.004*	.004*	.004*
	(.002)	(.002)	(.002)	(.002)	(.002)
Parents' education	.004*	.004*	.004*	.004*	.004*
	(.002)	(.002)	(.002)	(.002)	(.002)
Catholic	.051***	.051***	.050***	.051***	.051***
	(.011)	(.011)	(.011)	(.011)	(.011)
Constant	.031	.026	.023	.044	.052
	(.124)	(.124)	(.124)	(.124)	(.124)

Note : Standard errors in parentheses. Models also controlled for survey year. [a]Reference group is full-time schedule. [b]Reference group is standard shift. [c]Reference group is employed by organization. [d]Reference group is paid vacation leave. [e]Reference group is non-Hispanic white.

† p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001

CHAPTER 3

Sibling Care, Early Childbearing, and Childbearing Attitudes

Past research has demonstrated the important influence of the parental family on childbearing attitudes and behavior (Axinn & Thornton, 1992, 1996; Barber, 2000; East, 1998; Starrels & Holm, 2000; Trent, 1994). Individuals may develop attitudes about childbearing by observing and imitating their parents' behavior (Bandura, 1977; Campbell, 1969; Chodorow, 1978). Parents also may actively encourage their children to adopt their beliefs through rewards and sanctions (Baumrind, 1978; Gecas & Seff, 1990; Peterson & Rollins, 1987; Smith, 1988).

Another way in which the parental family context may influence childbearing attitudes and behavior is through interactions among siblings and, in particular, early experiences caring for siblings. A large body of literature shows that an individual's experiences affect his or her attitudes (Ajzen, 1988; Schuman & Johnson, 1976). Adolescents are commonly asked to supervise younger siblings, although the tendency of scholars to combine sibling care with other household tasks makes it difficult to quantify involvement in sibling care alone (Benin & Edwards, 1990; Gager, Cooney, & Call, 1999; Romich, 2007; Weisner & Gallimore, 1977). Some adolescents have significant responsibility for sibling care to the extent that they adopt a parental role in their families. Discussions of "parentified" children can be found in the literature on children in single-

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parent families and in families in which marital conflict, alcoholism, or other problems

cause parents to be physically or emotionally absent (Chase, 1999; Jurkovic, 1997). Just

as adolescents learn about parenting from observing interactions between their parents

and siblings, they may develop beliefs and attitudes about childbearing based on their

own experiences caring for siblings.

This study investigates the influence of involvement in sibling care during

adolescence on early childbearing and childbearing attitudes in young adulthood. The

empirical analyses are made possible by longitudinal data from the Child Development

Supplement (CDS) to the Panel Study of Income Dynamics. The study interviewed

respondents when they were adolescents and again as young adults. The interview during

adolescence collected information on two types of sibling care: instrumental care, which

includes activities such as helping with homework, and emotional care, such as providing

advice or comfort. The interview in young adulthood collected information on early

childbearing experiences, which are important to study due to the higher likelihood of

negative outcomes for young parents and their children (Bennett, Bloom, & Miller, 1995;

Geronimus & Korenman, 1992, 1993; Hoffman, 2008; Hoffman, Foster, & Furstenberg,

1993). Multiple domains of childbearing attitudes also were assessed. Most of the studies

on childbearing attitudes during the transition to adulthood have focused on attitudes

toward early and nonmarital childbearing (e.g., Abrahamse et al., 1988; East, 1998; Smith

& Zabin, 1993; Trent & Crowder, 1997). However, more general attitudes about whether

to have children at all also warrant attention. The past three decades have seen growing

acceptance of childlessness in the United States (Thornton, 1989; Thornton & Young-

DeMarco, 2001), and many young people decide to remain childless during their youth

(Barnett & McDonald, 1976; Kenkel, 1985; Veevers, 1980). Also, examining attitudes about ideal family size may help explain changes in parity preferences in the United States in recent decades. Although a preference for two children has remained the most common, the popularity of four or more children has decreased (Hagewen & Morgan, 2005).

The Role of Sibling Care in Shaping Childbearing Attitudes and Behavior

The research community knows very little about how experiences caring for siblings in adolescence may alter childbearing attitudes. Explicit consideration of the mechanisms linking sibling care to childbearing attitudes suggests that these links can be divided along three broad themes. The first theme focuses on the learning process, which refers to the ways in which individuals' attitudes change in response to new experiences. The second theme focuses on cognitive consistency or the process whereby individuals develop more positive beliefs toward their past experiences. The third theme focuses on adolescents' self-assessed ability to parent. Certainly, these mechanisms are neither mutually exclusive nor exhaustive.

Learning processes

One way that experiences caring for siblings may lead towards more positive childbearing attitudes is through the learning process. A longstanding theoretical perspective in the social sciences holds that individuals' attitudes and beliefs change in response to new experiences (Festinger, 1957; Fishbein & Ajzen, 1975; Schuman & Johnson, 1976). This idea provides a foundation for the life course perspective, which states that experiences early in life continue to influence preferences, expectations, and choices throughout adulthood (Brofenbrener, 1979; Elder, 1977, 1978). A large body of

research demonstrates how individuals' experiences can shape their family formation attitudes. For example, growing up in a large family has been linked to subsequent desires for many children (Axinn, Clarkberg, & Thornton, 1994; Duncan, Freedman, Coble, & Slesinger, 1965).

Adolescents may learn about parenthood through their involvement in caring for siblings and, in turn, form more positive attitudes toward having children of their own. I expect individuals to interpret their experiences caring for siblings positively, as research indicates that adults and youth benefit personally from experiences caring for others. For example, several studies have found that adopting a caregiver role can lead to higher levels of emotional health, including heightened self-esteem and sense of identity (Marks, 1977; Moen, Robison & Dempster-McClain, 1995; Sieber, 1974). In addition, caregivers may enjoy the degree of power and control involved in accepting responsibility for others (Barnett & Parker, 1998).

Cognitive consistency

Another way that sibling care experiences may lead to more positive childbearing attitudes is through cognitive consistency. The theory of cognitive consistency proposes that individuals are motivated to interpret their past experiences in a favorable way. In other words, they strive to convince themselves and others that their experiences have been positive. Due to cognitive dissonance, individuals whose past behaviors are inconsistent with their attitudes are likely to adjust their attitudes (Festinger, 1957). Even individuals who find an experience objectionable may develop favorable attitudes toward the experience in order to rationalize their past behavior. For example, individuals who are unsupportive of divorce tend to develop more positive attitudes toward divorce after

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they, themselves, experience a divorce (Thornton, 1985). Thus, I expect that individuals want to interpret their sibling care experiences positively and want others to do the same. Even adolescents who initially hold neutral or negative attitudes towards sibling care will modify their attitudes and look back on sibling care as a positive experience. In turn, positive assessments of experiences caring for siblings will contribute to more positive attitudes about future involvement caring for one's own children.

Invariably, some individuals may not enjoy the experience of sibling care and, in turn, may form negative beliefs about parenthood. For example, some adolescents may feel burdened by the responsibility for younger siblings and identify parenthood with restriction and loss of personal freedom. I expect this reaction to be the exception rather than the general pattern, given the dramatic consistency found in the research between individuals' attitudes and their experiences in the family of origin (Thornton, 1985; Axinn & Thornton, 1993).

Self-assessed competency

A third mechanism linking sibling care and childbearing attitudes and behavior is adolescents' self-assessment of their parenting abilities. Those who have been more involved in caring for siblings may feel more confident in their parenting abilities. They may feel more familiar with parental responsibilities and more capable of meeting them than individuals who have had less experience caring for siblings, who may view parental responsibilities as more stressful and overwhelming. Edin and Kefalas (2005) provide support for this notion in their ethnographic study of marriage and motherhood among low-income women. They suggest that caring for younger siblings, cousins, nieces and nephews, and other children creates among low-income youth "the illusion of a near Dr.

Spock-like competence in childrearing" (p. 33). More frequent experience caring for siblings may contribute to an early mastery of the mechanics of parental responsibilities and, in turn, a stronger desire to have children of one's own and a readiness to transition to parenthood at an earlier age.

Consequences for early childbearing

In addition to childbearing attitudes, experiences caring for siblings may influence fertility behavior, including early entry into parenthood. The most widely used social science framework to understand the relationships among attitudes, intentions, and behavior combines the reasoned action and planned behavior frameworks (Fishbein & Ajzen, 1975). In this framework, general attitudes, beliefs, and preferences related to a behavior predict intentions, and intentions predict behavior. In the case of childbearing behavior, positive attitudes toward childbearing, in addition to social pressure, increase the likelihood of childbearing (Fishbein & Ajzen, 1975; Vinokur-Kaplan, 1978). Empirical research has shown that positive attitudes toward childbearing lead to earlier childbearing among men and women (Barber, 2001). Therefore, to the extent that greater involvement in sibling care leads to more positive attitudes toward childbearing, I would expect to find a positive association between sibling care and early childbearing.

Hypotheses

This framework leads to a concrete set of empirical expectations regarding the impact of involvement in sibling care on childbearing attitudes and behavior. The first hypothesis addresses the link between sibling care in adolescence and early childbearing:

Hypothesis 1: Those who were more involved in sibling care in adolescence will be more likely to have a child before age 20.

The remaining hypotheses address the relationship between involvement in sibling care in adolescence and childbearing attitudes among those who remain childless in early adulthood:

> *Hypothesis 2*: Those who were more involved in sibling care in adolescence will feel more confident in their parenting ability.

> *Hypothesis 3*: Those who were more involved in sibling care will express a greater likelihood of having children than those less involved.

> *Hypothesis 4*: Those who were more involved in sibling care will expect to have more children than those less involved.

> *Hypothesis 5*: Those who were more involved in sibling care will expect to begin childbearing at an earlier age than those less involved.

Method

Data and Sample

Data used for this study are from the Child Development Supplement (CDS) to the Panel Study of Income Dynamics (PSID). Begun in 1968, the PSID is a longitudinal survey of a representative sample of U.S. individuals and the families in which they live. In 1997, the PSID initiated the CDS to collect additional information on children, ages 0 to 12, and their parents. The CDS-I collected data on 3,563 children in 2,394 PSID families. In 2002 – 2003, CDS-II re-interviewed 2,017 families (91%), which resulted in data on 2,908 children and adolescents ages 5 – 18 years. In 2007, the PSID initiated the CDS Youth's Transition into Adulthood (TA) study, which involved re-contacting participants who met the following criteria: participated in the CDS-I or CDS-II, at least 18 years old, no longer attending high school, and family participated in the PSID 2007

interview. They successfully interviewed 1,118 respondents who met these criteria, and the response rate was 90%.

My analytic sample includes 796 respondents who participated in both the CDS-II in 2002 – 2003 and the TA study in 2007. Of the 1,118 respondents in the TA study, 236 (21%) respondents were excluded because they did not complete an interview in 2002 and, thus, were missing on the key independent variables. I excluded another 13 respondents who already had children in 2002, because their childbearing attitudes and behaviors were likely to be dramatically different from their peers as a result of very different social learning experiences. An additional 69 respondents were excluded due to missing data on variables included in the analyses.

Measures

Birth before age 20. In the 2007 interview, respondents were asked, "How many biological, adopted, or step-children do you have?" Those who reported having at least one child were asked, "How old were you when you (had your first child/first took on a parenting role)?" Respondents who had their first child before age 20 years are coded "1"; those who had their first birth at age 20 or older and those without children are coded "0". Table 3.1 shows descriptive statistics for this and all variables in the analyses. Twelve percent of respondents had a child before age 20.[8]

[Table 3.1 about here.]

Childbearing attitudes. I examine four separate measures of childbearing attitudes, which are based on questions asked of childless respondents in the 2007 interview. First, a measure of the respondent's perceived parenting ability is based on the

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[8] Note that 255 respondents (32%) are ages 18 –19 in 2007 and, thus, remain at risk of having a child before age 20.

question, "Using any number from 1 to 7, where 1 means "Not a Very Good Parent" and 7 means "An Excellent Parent", in general, how good of a parent do you think you would be?" The responses were positively skewed, so I recode the variable into three categories where 1 to 5 equals *low* (23%), 6 equals *medium* (41%), and 7 equals *high* (36%).

Second, a measure of the perceived likelihood of having children is based on the question, "What do you think are the chances that you will have children?" The response options were: 1) no chance, 2) some chance, 3) about 50 - 50, 4) pretty likely, and 5) it will happen. The responses were positively skewed, so I recoded the variable into three categories where 1 to 3 equals *low* (23%), 4 equals *medium* (38%), and 5 equals *high* (39%).

A measure of the expected number of children is based on the question, "How many children do you think you will have?" Those who reported no chance of having children were coded as expecting zero children. The responses ranged from 0 to 12 children, and the average number of children expected in the sample was 2.33.

The final measure captures the expected age at first birth. Respondents who reported some chance of having children (a value of 2 or higher) were asked, "At what age do you think you will have your first child?" The responses ranged from 19 to 50 years, with a mean expected age of 27.52.

Sibling care. I examine two measures of sibling care, which are based on questions asked in the 2002 interview when respondents were ages 13 – 18. A measure of instrumental care, which refers to more tangible forms of assistance, is based on the question, "In the last six months, how often have you helped your brothers or sisters with things they had to get done, such as homework or chores?" A measure of emotional

sibling care is based on the question, "In the last 6 months, how often have you provided

emotional support to your brothers or sisters, such as giving them advice on a problem or

making them feel better when they were sad?" The response options included the

following categories: 1) almost never, 2) less than once a month, 3) 1 – 3 times a month,

4) about once a week, 5) a few times a week, 6) almost every day, and 7) every day. The

respondents without siblings were not asked the questions about sibling care; I recode

them as 0 on the scale of sibling care.[9] The measures of sibling care were treated as

continuous in statistical analyses.[10] The mean values were 3.28 for instrumental care and

3.13 for emotional care.

Controls. My models also include numerous control variables at the

household/family and individual level that may be linked with involvement in sibling

care as well as childbearing attitudes and behavior. All control variables are measured in

2002 except where otherwise noted.

Age is a continuous variable that ranges from 13 to 18 years. Research has shown

important racial variation in family formation attitudes in adolescence and early

adulthood (East, 1998; Starrels & Holm, 2000; Trent, 1994), so I include a dichotomous

indicator for *African American* (42%) versus non-African American. *Gender* is a

dichotomous indicator for female (55%) versus male.

Measures of family background include a dichotomous indicator of whether the

respondent *lived with both biological* parents (58%). Studies have identified a correlation

between young people's religiosity and their attitudes and behavior (Studer & Thornton,

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[9] I re-ran the models excluding the respondents who have no siblings, and there were no changes in the substantive findings.

[10] Ordinal variables with many categories, such as 7-point Likert-type scales of agreement, are often treated as continuous. I re-ran the models in my analyses treating the independent variables as categorical and reached similar substantive conclusions.

1987; Thornton & Camburn, 1987, 1989), so I include a measure of r*eligious importance*, based on the question, "How important is religion to you?" The response options included the following categories: 1) not at all important, 2) not very important, 3) somewhat important, and 4) very important. The mean is 2.94. *Number of siblings* is a continuous measure based on the total number of children born to the respondent's mother.[11] The number ranges from 0 to 8 with a mean of 1.75.

I include controls for socioeconomic status at the family and individual levels. The *education level of the household head* includes the following categories: 1) less than high school (17%), 2) high school (31%), 3) some college (24%), and 4) college (22%). The reference category is high school. I include the *log of family income*, which includes all income that members of the family unit earned in 2002. The *education level of the respondent*, which is measured in 2007 when respondents were ages 18 to 23, is coded less than high school (17%), high school (31%), some college (24%), or college (22%). The reference category is high school.

Finally, I include measures of sexual experiences based on questions asked in the 2002 interview. A dichotomous measure indicates whether the respondent had *ever had sex* (40%), based on the question, "Have you ever had sexual intercourse (that is, "had sex", "made it," etc.)?" A dichotomous measure indicates whether the respondent had *ever been pregnant* (3%), based on separate questions asked of male and female respondents. Girls were asked, "Some teenage girls have been pregnant. Have you ever been pregnant?" Male respondents were asked, "Some teenage boys have partners or girlfriends who get pregnant. Have you ever gotten a girl pregnant?"

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[11] Thirty-two respondents were missing information on the mother's birth history; for these respondents, the measure of number of siblings is based on the number of siblings who lived in the same household in 2001.

Analytic Strategy

My analysis consists of two main parts. First, I use multivariate logistic regression to determine whether involvement in sibling care has a significant effect on the probability of having a child before age 20. Second, I analyze the relationship between involvement in sibling care and attitudes toward childbearing in 2007. The models predicting childbearing attitudes are limited to respondents who remain childless in 2007, because the respondents with children were not asked the questions about childbearing attitudes. Specifically, I use multivariate ordered logistic regression to analyze the effect of sibling care on perceived parenting ability and likelihood of having children. I use multivariate OLS regression to assess the relationship between sibling care and expected family size and expected age at first birth.

Results

Having a child before age 20. Table 3.2 presents the effects of involvement in sibling care during adolescence on having a child before the age of 20. Model 1 shows the effect of instrumental care, and Model 2 shows the effect of emotional sibling care.

The results in Model 1 demonstrate that greater involvement in instrumental sibling care increases the odds of having a teenage birth, controlling for sociodemographic characteristics, family background, socioeconomic status, and early sexual experiences. For a one-unit increase in the frequency of instrumental care, we can expect a 13% increase in the odds of having a teenage birth ($1.13 = e^{.126}$). Model 2 shows that greater involvement in emotional sibling care also increases the odds of having a teenage birth, although the coefficient is only marginally significant ($p < .10$). For a one-unit increase in the involvement in emotional sibling care, we can expect a 9% increase in

the odds of having a teenage birth ($1.09 = e^{.084}$). Consistent with previous research, the odds of a teenage birth are higher among African Americans, females, and respondents with prior sex and pregnancy experiences, and they are lower among those who grew up with two biological parents or a college-educated household head.

[Table 3.2 about here.]

Perceived parenting ability. Table 3.3 examines the effects of involvement in sibling care during adolescence on two measures of childbearing attitudes – perceptions of parenting ability and expected chance of having children. Again, I analyze the effects of instrumental and emotional sibling care separately. These analyses are limited to respondents who remained childless in 2007.

As hypothesized, Model 1 in Table 3.3 shows that more frequent involvement in instrumental sibling care in adolescence is associated with greater confidence in parenting abilities in early adulthood. For a one unit increase in the frequency of instrumental sibling care, the odds of high perceived parenting ability versus the combined middle and low categories are 1.09 times greater, given the other variables are held constant in the model ($1.09 = e^{.090}$). Likewise, for a one unit increase in instrumental sibling care, the odds of the combined high and middle perceived parenting ability versus low ability are 1.09 times greater, given the other variables are held constant. Model 2 shows that greater involvement in emotional sibling care is also linked to greater confidence in parenting abilities, although the coefficient is significant at the lowest level. Of the results in Models 1 and 2, it is also interesting to note that African Americans and those with more siblings report greater confidence in their parenting ability.

[Table 3.3 about here.]

Chance of having children. Models 3 and 4 in Table 3.3 show the relationship

between involvement in sibling care during adolescence and perceptions of the chance of

having children in early adulthood. Model 3 indicates that more frequent involvement in

instrumental care is associated with greater perceived chances of having children. For a

one unit increase in the frequency of instrumental sibling care, the odds of reporting a

high chance of having children versus the combined middle and low categories are 1.07

times greater, controlling for other variables in the model ($1.07 = e^{.063}$). Likewise, for a

one unit increase in instrumental sibling care, the odds of the combined high and middle

chance of having children versus low chance are 1.07 times greater. As for emotional

sibling care, which is shown in Model 4, the coefficient for emotional sibling care is not

significant but operates in the expected direction. Other notable findings in Models 3 and

4 include the positive relationships between living with two biological parents, religious

importance, and sex by 2002 on the perceived chance of having children. On the other

hand, older respondents, women, those with less than a high school education, and those

who had been pregnant in 2002 report lower chances of having children.

   Expected number of children. In Table 3.4, Models 1 and 2 show models of the

relationship between involvement in sibling care and the number of children respondents

expect to have. As hypothesized, the results suggest that more frequent involvement in

instrumental and emotional sibling care are significantly associated with more expected

births. For each unit increase in the frequency of instrumental sibling care, the number of

children expected increases by .035. For each unit increase in the frequency of emotional

sibling care, the expected number of births increases by .04. I also find that more

religious respondents and those with more siblings expect to have more children, which is consistent with previous studies in this area (Axinn et al., 1994; Duncan et al., 1965).

[Table 3.4 about here.]

Expected age at first birth. Models 3 and 4 show the effect of sibling care in adolescence on the age when respondents expect to have their first birth. Recall that these analyses exclude the respondents who perceive no chance of having children and those who already have children. In Model 3, the coefficient for instrumental sibling care is not statistically significant but operates in the expected direction. In Model 4, more frequent involvement in emotional care is negatively related to the expected age at first birth, but the coefficient is significant at the lowest level ($p < .10$). For each one-unit increase in frequency of providing emotional support, the expected age at first birth declines by .110. Several of the control variables are associated with expected age at first birth in ways that are consistent with previous research findings. Most notably, women expect to have their first birth earlier than men, and African Americans anticipate an earlier first birth than non-African Americans. Growing up in a household with a college-educated head and having a college education are associated with an older expected age at first birth.

Discussion

Past research has demonstrated the critical role of family context in influencing attitudes about childbearing. However, most prior studies have focused on the role of parents in socializing their children, while overlooking the potential importance of interactions among siblings. This study is the first to focus on involvement in sibling care during adolescence and how these experiences may influence childbearing attitudes and behavior later in the life course. Using data from the Child Development Supplement to

the Panel Study of Income Dynamics, I evaluated the relationship between involvement in sibling care in adolescence and having a birth before age 20 as well as childbearing attitudes in early adulthood.

The results suggest that more frequent involvement in sibling care in adolescence is associated with a higher risk of teenage childbearing even after controlling for sociodemographic characteristics, family background, socioeconomic status, and early sexual experiences. Both instrumental and emotional sibling care were positively associated with early childbearing, although the coefficient on emotional sibling care was only marginally significant. This is an important finding given that early childbearing has been associated with negative outcomes for mothers and their children, such as lower educational attainment and earnings (Hoffman, 2008; Miller, 2006).

My results were mixed with regard to the effect of sibling care on childbearing attitudes. I found a positive association between involvement in sibling care – instrumental or emotional – and perceived parenting ability. In other words, those who more frequently played a caregiving role for their siblings in adolescence believe that they will be better parents when asked in young adulthood. This result is consistent with Kathy Edin's ethnographic research among low-income women, which found that caring for younger siblings, cousins, nieces and nephews, and other children creates a premature mastery of parenting tasks and responsibilities among low-income youth (Edin & Kefalas, 2005). My sample includes men and women from a range of socioeconomic backgrounds, which suggests that this relationship extends beyond low-income women. I also found a positive association between involvement in instrumental and emotional sibling care and the number of children expected. However, I find only weak evidence

that involvement in sibling care is associated with the likelihood of having children or the expected age of entry into parenthood. Additional qualitative research would be helpful for exploring why the association between sibling care and childbearing attitudes is not uniform across the attitudinal domains.

These findings should be considered in light of the limitations of the study. First, my analyses are not able to determine whether involvement in sibling care has a *causal* effect on early childbearing and childbearing attitudes. Although the study benefits from measures of sibling care that precede measures of childbearing attitudes, it is possible that these childbearing preferences developed prior to the involvement in sibling care. Future studies should collect measures of childbearing attitudes that precede measures of involvement in sibling care in order to rule out the possibility that adolescents who exhibit a stronger preference for childbearing select into sibling care in the first place. Another important step would be controlling for a wider range of circumstances that lead to parental absence, such as illness or demanding work schedules, and, thus, draw adolescents into a caregiving role. Second, the study would benefit from a broader set of measures of sibling care. For example, it would be helpful to know how often adolescents are asked to supervise their siblings, which the current measures may not capture.

Given the limited time, financial resources, and social support available to many parents, I expect families to continue to rely on adolescents for sibling care. The present analysis is not intended to stake a claim about the extent to which adolescents should be involved in sibling care. Rather, my purpose has been to explore the broader consequences of adolescents' involvement in sibling care for their childbearing attitudes and behavior. The results indicate that adolescents' experiences caring for siblings play

an important role in their socialization. To fully understand the relationship between

family context and childbearing attitudes and behavior, research should explore further

the importance of sibling interactions.

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Table 3.1. Descriptive Statistics of Measures Used in the Analyses

	N	Mean	SD	Min	Max
Dependent variables					
Had child before age 20	796	.12		0	1
Childbearing attitudes					
Perceived parenting ability[a]					
Low	650	.23		0	1
Medium	650	.41		0	1
High	650	.36		0	1
Perceived chance of having children[a]					
Low	650	.24		0	1
Medium	650	.38		0	1
High	650	.39		0	1
Expected number of children[a]	650	2.33	.99	0	12
Expected age at first birth[b]	640	27.53	3.43	19	50
Independent variables					
Sibling care					
Frequency of instrumental sibling care	796	3.28	1.99	0	7
Frequency of emotional sibling care	796	3.13	1.91	0	7
Control variables [c]					
Sociodemographic characteristics					
Age	796	15.66	1.55	13	18
African American	796	.42		0	1
Female	796	.55		0	1
Family background					
Lives with both biological parents	796	.58		0	1
Religious importance	796	2.94	1.17	1	4
Number of siblings	796	1.75	1.17	0	8
Socioeconomic status					
Education level of household head					
Less than high school	796	.17		0	1
High school	796	.31		0	1
Some college	796	.24		0	1
College	796	.22		0	1
Log of family income	796	10.79	1.09	0	14.53
Education level of respondent					
Less than high school	796	.09		0	1
High school	796	.19		0	1
Some college	796	.65		0	1
College	796	.06		0	1
Early sexual experiences					
Ever had sex	796	.40		0	1
Ever pregnant	796	.03		0	1

[a]Question is asked only of childless respondents.

[b]Question is asked only of childless respondents and those who expect some chance of having children.

[c]Control variables are measured in 2002, except for respondent's education, which is measured in 2007.

Table 3.2. Logistic Regression Estimates of Sibling Care on Having a Child Before Age 20

	1	2
Sibling care		
Frequency of instrumental sibling care	.126*	
	(.062)	
Frequency of emotional sibling care		.084†
		(.065)
Sociodemographic characteristics		
Age	-.180*	-.181*
	(.088)	(.088)
African American	.947***	.962***
	(.286)	(.285)
Female	1.024***	.975***
	(.282)	(.284)
Family background		
Lives with both biological parents	-.530*	-.550*
	(.284)	(.283)
Religious importance	-.087	-.094
	(.111)	(.111)
Number of siblings	.033	.052
	(.104)	(.102)
Socioeconomic status		
Education level of household head		
Less than high school	.499†	.482†
	(.308)	(.307)
High school (ref.)		
Some college	-.090	-.103
	(.334)	(.333)
College	-1.119*	-1.147*
	(.639)	(.638)
Log of family income	.093	.095
	(.130)	(.128)
Education level of respondent		
Less than high school	.550†	.506†
	(.352)	(.351)
High school (ref.)		
Some college	-1.031***	-1.017***
	(.305)	(.304)
College	-1.878*	-1.870*
	(1.071)	(1.070)
Early sexual experiences		
Ever had sex	.612*	.606*
	(.280)	(.279)
Ever pregnant	1.245**	1.254**
	(.499)	(.498)
N	796	796
Model chi-square	136.444	134.022
df	16	16

Note: Standard error is in parentheses. Ref. = reference or omitted category for the variable.

† p < .10. * p < .05. ** p < .01. *** p < .001 (one-tailed test)

Table 3.3. Ordered Logistic Regression Estimates of Sibling Care on Perceived Parenting Ability and Perceived Chance of Having Children

	Perceived parenting ability		Perceived chance of having children	
	1	2	3	4
Sibling care				
Frequency of instrumental sibling care	.090*		.063†	
	(.041)		(.040)	
Frequency of emotional sibling care		.067†		.010
		(.043)		(.042)
Sociodemographic characteristics				
Age	-.037	-.043	-.092*	-.099*
	(.054)	(.054)	(.053)	(.053)
African American	1.167***	1.162***	-.017	-.011
	(.186)	(.186)	(.177)	(.176)
Female	-.070	-.090	-.297*	-.279*
	(.156)	(.159)	(.153)	(.155)
Family background				
Lives with both biological parents	-.062	-.058	.607***	.606***
	(.175)	(.175)	(.170)	(.170)
Religious importance	.059	.059	.137*	.138*
	(.070)	(.070)	(.068)	(.068)
Number of siblings	.111†	.124*	-.080	-.058
	(.074)	(.074)	(.071)	(.071)
Socioeconomic status				
Education level of household head				
Less than high school	-.021	-.009	-.120	-.102
	(.243)	(.243)	(.236)	(.235)
High school (ref.)				
Some college	.047	.057	.074	.080
	(.208)	(.208)	(.204)	(.204)
College	-.302†	-.309†	-.347*	-.341†
	(.212)	(.212)	(.210)	(.211)
Log of family income	-.050	-.050	.020	.016
	(.080)	(.080)	(.075)	(.074)
Education level of respondent				
Less than high school	.478†	.445	-.589*	-.598*
	(.371)	(.371)	(.334)	(.334)
High school (ref.)				
Some college	.009	.027	.133	.135
	(.219)	(.220)	(.213)	(.214)
College	-.170	-.155	.418	.415
	(.370)	(.371)	(.358)	(.359)
Early sexual experiences				
Ever had sex	.174	.197	.418**	.449**
	(.182)	(.181)	(.179)	(.179)
Ever pregnant	-1.099†	-1.027	-1.500*	-1.419*
	(.858)	(.858)	(.786)	(.784)
N	650	650	650	650
Model chi-square	103.428	101.006	47.914	45.517
df	16	16	16	16

Note: Standard error is in parentheses. Ref. = reference or omitted category for the variable.

† p < .10. * p < .05. ** p < .01. *** p < .001 (one-tailed test)

Table 3.4. OLS Regression Estimates of Sibling Care on Expected Number of Children and Expected Age at First Birth

	Expected number of children		Expected age at first birth	
	1	2	3	4
Sibling care				
Frequency of instrumental sibling care	.035*		-.054	
	(.020)		(.068)	
Frequency of emotional sibling care		.040*		-.110†
		(.022)		(.071)
Sociodemographic characteristics				
Age	-.033	-.035	.264**	.265**
	(.028)	(.028)	(.091)	(.091)
African American	-.062	-.063	-1.468***	-1.456***
	(.090)	(.090)	(.297)	(.297)
Female	-.053	-.072	-.513*	-.449*
	(.080)	(.081)	(.262)	(.266)
Family background				
Lives with both biological parents	.110	.112	-.267	-.267
	(.087)	(.087)	(.288)	(.287)
Religious importance	.112***	.109**	-.202*	-.192*
	(.035)	(.036)	(.116)	(.116)
Number of siblings	.075*	.075*	-.242*	-.224*
	(.037)	(.037)	(.121)	(.120)
Socioeconomic status				
Education level of household head				
Less than high school	-.132	-.130	-.126	-.115
	(.121)	(.121)	(.399)	(.399)
High school (ref.)				
Some college	-.133	-.133	.471†	.480†
	(.105)	(.105)	(.345)	(.344)
College	.022	.017	.877**	.898**
	(.109)	(.109)	(.359)	(.359)
Log of family income	.054†	.055†	.010	.006
	(.040)	(.040)	(.131)	(.131)
Education level of respondent				
Less than high school	.038	.032	.389	.384
	(.176)	(.176)	(.585)	(.584)
High school (ref.)				
Some college	.003	.016	1.278***	1.237***
	(.111)	(.111)	(.363)	(.363)
College	.194	.210	1.640**	1.584**
	(.190)	(.190)	(.621)	(.621)
Early sexual experiences				
Ever had sex	.012	.016	-.851**	-.841**
	(.091)	(.091)	(.298)	(.297)
Ever pregnant	-.872*	-.840*	3.404**	3.341*
	(.404)	(.404)	(1.440)	(1.436)
N	650	650	640	640
Adjusted R-squared	.035	.036	.157	.159

Note: Standard error is in parentheses. Ref. = reference or omitted category for the variable.
† p < .10. * p < .05. ** p < .01. *** p < .001 (one-tailed test)