Testing Pathways of Influence from Education to Fertility: Educational Enrollment and Attitudinal Change

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Abstract: An association between women's education and fertility is well-established: women with more education have fewer children and start childbearing later, on average, than their less educated peers. However, it has been difficult for researchers to disentangle the multiple co-occurring mechanisms by which women's education may affect their fertility. In this paper, we use changes in measures of young women's attitudes and beliefs over time to test competing theories of the mechanisms by which educational enrollment may affect fertility. Using data with unusually rich longitudinal measures of fertility-related attitudes and beliefs, we test whether mediating attitudes change in response to school enrollment in ways consistent with each hypothesized pathway.

An association between women's education and fertility has been observed across many contexts. In general, women with more education have fewer children and start childbearing later, on average, than do women with less education. This association has been observed not only during demographic transitions from high to low fertility, but also in the post-transition context of the United States. Completed fertility of women in the U.S. is lower for women with higher educational attainment (Dye 2008:4). In younger cohorts, fertility rates vary significantly by women's education even when the effects of postponement on period rates are statistically accounted for (Yang and Morgan 2003). Differences in the timing of fertility by education are important in their own right: women with more education have children later, on average, than do women with less education (Rindfuss et al. 1996). Recent work has also highlighted differences by education in the relationship context of fertility: women with more education are more likely to be married when they have children (McLanahan 2009). Many different explanations for the observed associations between education and fertility have found some level of support in empirical studies, but there is still a great deal of uncertainty about the relative importance of the mechanisms behind these associations (see Musick et al. 2009 and Basu 2002 for reviews).

One difficulty for attempts to understand how women's education affects fertility is the difficulty of disentangling multiple mechanisms: education simultaneously affects students' human capital, aspirations, and peer groups, among other things. In addition, the fertility outcomes of interest may be determined by factors that also lead to selection into education, rather than being determined by education per se. It is thus difficult to determine which of these processes produces the outcome of interest.

This study addresses the problem by looking at the association between exposure to education and change in mediating variables. We use measures of young women's attitudes and beliefs over time to observe whether educational enrollment is associated with the changes in attitudes and beliefs predicted by different theories of educational effects on fertility. For example, is time enrolled in education associated with *increased* aspirations for educational attainment and career achievement, more than time spent not enrolled? Or with *increased* perceptions of peer norms that value education and careers? For each mechanism, we may or may not observe within-individual change over time that is consistent with that mechanism.

The Effect of Education on Fertility: Pathways of Influence

The literature on education and fertility points to several mechanisms, or pathways, by which women's education may affect their fertility. Studies have demonstrated empirical support for the influence of each of these pathways, but it is not clear what their relative importance is, or how this might vary in different contexts. This section outlines the theories of how women's education affects their fertility that we will test in our analysis.

One hypothesis is that women with more education have *higher opportunity costs* to spending their time having and raising children, since their education brings them higher wages (Becker 1981). A variation on this theory argues that having appealing alternatives in other domains of life results in a desire to spend less time and energy on childrearing (Barber 2001); women with less education may have fewer of these compelling alternatives. Another related argument claims that women with less access to rewarding roles in education and career contexts may make greater emotional investments in childbearing, and place greater value on their role as mothers (Edin and Kefalas 2005). Enrollment in school may therefore lead women to prefer a higher age at marriage and childbearing and a smaller family size, for example.

A second hypothesis, which has received the most attention in lower-income countries but may also be applicable in wealthier countries, claims that education influences fertility by increasing women's autonomy and self-efficacy (Jejeebhoy 1995). The process of education may help women to view themselves as agents in control of their own life outcomes, enabling them to better bargain for or insist on their preferences related to sexual behavior or contraception. In the U.S., this could mean that enrollment in school may increase women's confidence in their ability to implement their choices for birth control use when negotiating with a partner.

A third possible pathway operates through the exposure to different peer or reference groups that occurs in educational contexts: education leads women to spend more time with peers who are also enrolled in education. As a result, the peers of enrolled women may be more likely to have high educational aspirations, less likely to become young parents, and less likely to approve of early parenthood (compared with the peers of nonenrolled women), although the extent of their difference can vary across social contexts. Perceiving different norms (either descriptive or prescriptive) among peers can affect women's own attitudes and behavior.

Analytic Approach

In existing studies of this topic, the most common approach to adjudicating among competing pathways by which women's education affects fertility is to predict fertility outcomes using control variables believed to be intervening mechanisms. The extent to which the association remains when various variables are added to the model is then used as a test of the extent to which these variables are the mechanisms causing the outcome. In one such study, a one-time measure of desired family size and a time-varying measure of wages are used to test the association between education and fertility (Musick et al. 2009). Another study used more extensive measures of attitudes to examine which of many measures mediate the relationship

between school enrollment and *unintended* pregnancy, using time lags to address the concern of reverse causality (Yarger 2012).

The main innovation of our analysis is its use of within-individual change over time in mediating variables to test theories of the mechanisms by which education could affect fertility. Rather than directly examining whether an intervening variable statistically accounts for variation in education and fertility, our approach tests whether mediating attitudes change in response to school enrollment, in ways consistent with each hypothesized pathway. We use the extent of change among non-enrolled respondents as a baseline for comparison.

Data and Measures

Our study uses data from the Relationship Dynamics and Social Life study, a longitudinal survey of a population-based sample of women ages 18-19, who were followed for a period of two years. Respondents were sampled from a county in Michigan, and the sample is socioeconomically and racially diverse. The response rate for the baseline interview was 84% and the cooperation rate was 93%, yielding 1,003 baseline interviews. Of those who participated in the baseline interview, 99% agreed to participate in the longitudinal data collection (n=992). The survey includes an extensive array of attitudinal items related to the hypothesized pathways described above. Respondents completed weekly journals—short surveys completed online or by phone. Our study uses rotating modules of attitudinal measures and reports of educational enrollment that were included in the weekly journals, repeated quarterly.

We operationalize the pathways using attitudinal measures as follows:

1a. Higher direct opportunity costs to childbearing and child rearing: If education affects women's perceptions of the opportunity costs of childbearing by increasing their expected returns to time spent in labor force participation, then education should increase women's

expected income. It should also increase their beliefs that they will complete higher levels of education (which would also increase their expected income). We measure expected income with a question that asks respondents how likely they think it is that they will achieve a middle-class income by age 30. We measure expected level of educational completion with questions that ask how far respondents think they will go in school, and how likely they think it is that they will graduate from college. (These measures will be included in future analyses; results not included here.)

1b. Aspirations and desires that compete with childbearing: Education may lead women to aspire to greater achievements in areas besides family roles. We measure competing aspirations and desires using responses to questions about how far respondents want to go in school, and two agree/disagree items: a job is a way to make a living, and work is a major source of satisfaction.

1c. Value placed on having children and role of mother: If education gives women access to rewarding activities and roles besides that of mother, then education should decrease how important women say motherhood and having children is to them. We measure these factors using responses to an agree/disagree item that states that being a mother is the most fulfilling thing a woman can do, and an item that asks the ideal number of children for a family.

2. Autonomy and Self-Efficacy: Education may increase women's sense of control over their behavior and increase their belief that fertility can and should be under their control. We measure autonomy using a set of three items about respondents' ability to influence a partner's behavior related to sex and contraception. (These measures will be included in future analyses; results not included here.)

3. Peer Effects: Education may expose women to different peer groups and thus change their perceptions of descriptive norms (what people are doing) and prescriptive norms (what people

say is important) among their peers. We measure perceived *descriptive norms* using a series of questions on how many of respondents' friends have gotten pregnant, are going to college, are parents, work full time, and have dropped out of school, as well as how many women in their community are single parents. We measure perceived *prescriptive norms* using a series of questions on how much their friends would approve of their getting pregnant, having a baby, working full-time, and getting a college degree.

The mechanisms described above may lead women to want to have fewer children or to want to postpone fertility. To measure these possibilities, we use questions on respondents' own ideal age to get married and ideal age to have a baby.

Methods

Our first analysis is a simple test of the frequency with which changes occur in the direction consistent with each theory of education influence on fertility. Additional planned analyses will add hazard models of attitudinal changes in the predicted direction, in order to get a clearer picture of how the duration of educational enrollment relates to attitudinal changes. Another additional analysis will examine downward, as well as upward changes—attitudinal changes in the direction opposite of that predicted by theory. It may be that in some cases, education does not cause change but rather prevents changes in the other direction. Examining downward changes will show whether such a process can be observed in this population.

Results

Table 1 shows how the mediating variables change when respondents are (1) enrolled in school, and (2) not enrolled. The changes that are "counted" are those that we would predict would happen in response to exposure to education based on the theories outlined above. For example, we would expect that ideal marriage age would increase (rather than decrease or remain constant) with educational enrollment, and likewise, that the ideal age to have a baby

would increase (rather than decrease or remain constant), as women remained in school. These are referred to as "positive" changes; the table indicates what counts as a "positive" change for each variable. The table presents the number of such changes that occur for every 100 journal entries, by respondent's enrollment status.

The preliminary tabulations presented in Table 1 indicate that variables regarding aspirations for marriage and childbearing timing do seem to function in the expected direction. In particular, women's reported ideal age of marriage and reported ideal age of childbearing increase more often when they are enrolled in school, compared to when they are not enrolled. Similarly, women who are enrolled in school are more likely to decrease their agreement with the idea that motherhood is the most fulfilling role for a woman. Interestingly, peer responses to factors related to early childbearing (for example, anticipating a negative reaction from friends if the respondent got pregnant) are often not in the predicted direction, which may indicate that these are not key mechanisms linking education to fertility outcomes.

It is also possible, however, that lower rates of change among enrolled women may reflect higher initial levels on these measures for enrolled than non-enrolled women, leaving them less room for upward movement. Planned analyses will incorporate information on the level at which respondents start, as well as the number of increases. As noted before, we will also examine downward changes, as well as upward, and use hazard models of attitudinal changes to examine the relationship between enrollment duration, as well as enrollment status.

Table 1: Number of positive changes in attitudinal measures, by enrollment status.
Changes in the predicted direction are shaded.

Variable	"Positive change" means this variable…	# of "positive changes" per 100 journal entries while: Enrolled	Not enrolled
Fertility Timing			
Ideal age to get married	increases	1.59	1.50
Ideal age to have a baby	increases	1.77	1.56
Education and career aspirations			
Want to go to college next year	increases	0.41	0.70
Likelihood of attending college next year	increases	0.52	1.32
Want to get a job next year	decreases	1.12	1.01
Value of children and mother's role			
Motherhood most fulfilling experience woman can have	less agreement	1.17	1.04
Ideal number of children for average family	decreases	0.94	0.78
Peer effects (*descriptive* norms)			
How many of your friends are attending/planning to attend college	increases	1.80	2.53
How many of your friends have had sex	decreases	1.67	1.42
How many of your friends have had sex without birth control	decreases	2.50	2.90
How many of your friends have gotten pregnant	decreases	1.48	1.95
How many of your friends are parents	decreases	1.52	1.74
How many women in community single parents	decreases	2.21	2.22
Peer effects (*prescriptive* norms)			
How would your friends react if you had sex without birth control	less approving	2.08	2.42
How would your friends react if you got pregnant	less approving	1.90	2.27
How would your friends react if you had a baby	less approving	1.90	2.42
Women your age who have sex without birth control are careless	more agreement	1.57	1.63
Women your age who get pregnant are careless	more agreement	1.95	1.63
Women your age who go to college are intelligent	more agreement	0.64	0.67
Women your age who go to college are cool	more agreement	1.30	1.25
Women your age who have sex without birth control are intelligent	less agreement	0.86	0.86
Women your age who have sex without birth control are cool	less agreement	0.52	0.66
Women your age who get pregnant are intelligent	less agreement	1.53	1.56
Women your age who get pregnant are cool	less agreement	0.74	0.72
Number of journals		**34,802**	**23,792**
Number of respondents contributing journals		**699**	**701**

References

Barber, Jennifer. 2001. "Ideational Influences on the Transition to Parenthood: Attitudes toward Childbearing and Competing Alternatives." *Social Psychology Quarterly* 64(2):101-127.

Basu, A. M. 2002. "Why does Education Lead to Lower Fertility? A Critical Review of Some of the Possibilities" *World Development* 30(10):1779-90.

Becker, G. S. 1981. *A Treatise on the Family*. Cambridge: Harvard University Press.

Dye, J. L. Current Population Reports. Washington, DC: U.S. Census Bureau; 2010. "Fertility of American Women: 2008."

Edin, K. J. and M. J. Kefalas. 2005. *Promises I can keep: Why poor women put motherhood before marriage.* Berkeley: University of California Press.

Jejeebhoy, S. J. 1995. *Women's education, autonomy and reproductive behavior: experience from developing countries*. Oxford: Clarendon Press.

McLanahan, S. 2009. "Fragile Families and the Reproduction of Poverty" *Annals of the Amerian Academy of Political and Social Science*. 621(1):111-31.

Musick, K., P. England, S. Edgington, and N. Kangas. 2009. "Education Differences in Intended and Unintended Fertility." *Social Forces* December 88(2):543-72.

Rindfuss R. R., Morgan S. P., Offutt K. 1996. "Education and changing age pattern of American fertility: 1963-1989." *Demography* 33:277-290.

Yang Y., Morgan S. P. 2003 "How Big Are Educational and Racial Fertility Differentials in the U.S.?" *Social Biology* 50(3-4):167-87.

Yarger, J. L. E. 2012. "School Enrollment and Unintended Pregnancy in Early Adulthood: Results from an Online Weekly Survey." Pp. 1-50 in *Three Essays Examining Social Determinants of Fertility Attitudes and Behavior: Evidence from Longitudinal Studies*. PhD Dissertation, University of Michigan.