
THE EVOLUTION OF FERTILITY EXPECTATIONS OVER THE LIFE COURSE*

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In low-fertility contexts, how many children people have is largely a product of how many children they want. However, the social, institutional, and individual factors that influence how many children people want are not well understood. In particular, there is scant evidence about how fertility expectations change over the life course. This article provides an empirical description of changes in women's expected fertility over the entire span of childbearing years. Using data from the National Longitudinal Survey of Youth, 1979 cohort, group-based trajectory analysis illuminates common patterns in the evolution of fertility intentions and identifies individual characteristics associated with these patterns. Factors related to family formation, such as marriage and whether a woman has a child at an early age, are found to be the most consistent correlates of patterns of change in expected family size.

In contexts where fertility is far below the biological maximum, understanding childbearing intentions is crucial to understanding childbearing. Virtually all theories of contemporary fertility agree that individual childbearing intentions are the primary determinant of fertility. In fact, Coale's (1973) formulation of the preconditions of fertility transition makes intentions—the entry of fertility into “the calculus of conscious choice”—a defining feature of modern childbearing patterns. Individual-level theories of low fertility are largely based on rational-actor models, in which individuals decide to have children for economic or social reasons (e.g., Friedman, Hechter, and Kanazawa 1994; Schoen et al. 1997). These theories take for granted the importance of intentions and seek to explain the desire for children. Intentions also play a dominant role in population-level models such as the Bongaarts (2001, 2002) model of proximate determinants of low fertility. In this low-fertility model, intentions take the place filled by biological limits in Bongaarts' original proximate determinants framework.

Of course, intentions to have children are not the only determinant of fertility, and births do not result only from conscious decisions. Imperfect control of fertility, whether due to technological failures or human lapses, results in high levels of mistimed and unwanted births in the United States (Chandra et al. 2005). As women postpone childbearing to older ages, infertility and subfecundity have become increasingly visible social concerns, and conflict between child-raising and other social institutions may make it difficult for women to have as many children as they would like (Bongaarts 2001; Menken 1985; Rindfuss and Brewster 1996; Rindfuss, Guzzo, and Morgan 2003). Thus, theories of contemporary fertility seek to explain the interactions between intentions and behavior as well as intentions or behavior alone.

Despite widespread interest in fertility intentions, the individual-level dynamics of fertility intentions and behavior are not well understood. Only a few studies have examined the correlation between early expected family size and completed family size, and the degree to which fertility intentions change over time is unknown. In part, this lacuna is due to the intensive data requirements for studying family size expectations over time. Fertility

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intentions and behavior develop jointly over childbearing years that can last three decades and interact with multiple other domains of life experience, including marriage and partnership, education, and employment, to name only a few.

In this article, I provide an initial empirical description of changes in women's family size expectations over the entire span of childbearing years, based on decades worth of data from the National Longitudinal Survey of Youth, 1979 cohort. I use group-based trajectory analysis to illuminate common patterns in the evolution of these intentions and analyze the socioeconomic correlates of observed patterns. I consider the results of these analyses in light of arguments about the growing divergence in American family formation patterns related to increasing socioeconomic inequality.

EMPIRICAL RESEARCH ON FERTILITY INTENTIONS

For as long as fertility intentions have been measured, there has been skepticism about the validity of these measures. The first difficulty lies in the inherent uncertainty among women themselves about future fertility plans (Zabin 1999). This difficulty is particularly salient when measuring fertility intentions among young women, who may not intend to begin childbearing for many years. Their fertility goals likely depend on future contingencies (marriage, education, employment), which are also uncertain, and so cannot be interpreted as immediate plans. Barber (2001) argued that fertility intentions should be understood as links between broader attitudes about family and other domains and more concrete planned behavior (cf. Ajzen and Fishbein 1980; Fishbein and Ajzen 1975). She demonstrated that fertility intentions have significant predictive power, even among teen women (Barber 2001). This article explores more fully how fertility expectations evolve over time.

A second question in researching fertility intentions is the degree to which intentions are accurately reported in survey interviews. As with any attitude or opinion measure, reported intentions may be biased if women are hesitant to report nonnormative fertility expectations. Certainly, there are strong social pressures against childlessness and against large families in the United States. The normative pull of the two-child family may lead women who want larger or smaller families, or who are uncertain about their intentions, to overreport expecting two children. The magnitude of this bias and the extent to which it reduces the validity of intention measures is an empirical question.

Empirical research has consistently found that fertility intentions are strong predictors of fertility behavior, independent of sociodemographic characteristics (Barber 2001; Bongaarts 1992; Rindfuss, Morgan, and Swicegood 1988; Schoen et al. 1999; Westoff and Ryder 1977). However, intentions are far from perfect predictors of behavior, and the strength of the relationship between intentions and behavior depends on both individual and contextual factors (Quesnel-Vallée and Morgan 2003; Westoff and Ryder 1977; Williams, Abma, and Piccinino 1999). The voluminous literature on the correspondence between fertility intentions and behavior is reviewed thoroughly in Morgan (2001); I provide here an overview of key findings from this literature.

The correspondence between intentions and behaviors varies depending on the components of intentions being measured—for example, women are more accurate at predicting their fertility behavior over a short period (two to three years) than over longer time spans, and intentions to have children or not match behavior better than intentions for specific numbers of children. As might be expected, women who report that their fertility expectations are more certain are more likely to carry out those expectations (Remez 2000; Schoen et al. 1999).

Age and family formation status also affect the correspondence between fertility intentions and behavior. The predictive validity of intentions is higher among older women (O'Connell and Rogers 1983; Thomson 1997). Married women are more likely to meet fertility intentions than unmarried women; among unmarried women, the correspondence between intentions and behavior is strongly related to subsequent marriage (O'Connell and

Rogers 1983; Schoen et al. 1999). Evidence for variation by parity in the intentions-fertility correspondence is mixed. Remez (2000) found that parity is not related to the predictive validity of intentions, while others have found that the accuracy of intentions varies either by desired parity or by parity at the time intentions are recorded (Freedman, Freedman, and Thornton 1980; Monnier 1989; Quesnel-Vallée and Morgan 2003; Thomson 1997).

These results provide evidence for a sequential model of fertility intentions and behaviors—that is, a model that conceptualizes fertility decision-making as a dynamic process in which people revisit plans for childbearing in response to other changes in life experience (Namboodiri 1972; Udry 1983). Yet the persistent relationship between expectations and behaviors in a variety of contexts shows that fertility intentions are not totally fluid. Morgan (2001) called for a “moving target” model of fertility: to fully understand the relationships between intentions and behavior, we need to analyze changes in intentions as well as correspondence between intentions and behavior at particular points in time.

Compared with the extensive body of research on the impact of fertility intentions on fertility behavior, there is relatively little evidence on the determinants of fertility intentions and even less knowledge about changes in intentions. Research on the determinants of fertility intentions can be divided into two subsets. One body of research focuses on attitudes or values as key predictors of fertility intentions (Hayford and Morgan 2008; Kaufman 2000; Pearce 2002; Schoen et al. 1997). Religious beliefs, traditional gender values, and adherence to beliefs about the social ties provided by children are all associated with increased likelihood of intending children or intending larger families.

Another branch of the literature on fertility intentions examines the determinants of voluntary childlessness (Abma and Martinez 2006; Heaton, Jacobson, and Holland 1999; Jacobson and Heaton 1991; Park 2005; Rovi 1994). In general, more-educated women are more likely to intend childlessness, although some studies suggest that education is more strongly related to the postponement of childbearing than to planned childlessness (Jacobson and Heaton 1991; Rovi 1994). Similarly, white women are more likely than African American women to be childless, but this relationship may be driven by earlier childbearing among African American women (Heaton et al. 1999; Rovi 1994). Consistent with the above-cited research on values and fertility intentions, women with strong religious beliefs are less likely to be voluntarily childless (Abma and Martinez 2006; Jacobson and Heaton 1991). Finally, married women have higher fertility intentions and are less likely to be childless than unmarried women (Abma and Martinez 2006; Rovi 1994; Schoen et al. 1997).

Despite the empirical evidence (noted above) that intending to have no children may be linked to the timing of childbearing, little research has examined change over time in intended childlessness or expected family size more generally. Heaton and colleagues (1999) studied changes in the intention to have children over a six-year period spanning two waves of the National Survey of Families and Households. They found that intentions are unstable, with about one-quarter of their sample either changing intentions or having children despite intentions not to. As people get older, they are likely to modify their expected family size. Race, education, and family formation are also associated with either increases or decreases in fertility intentions. However, little is known about the long-term patterns of change or stability in fertility intentions.

HYPOTHESES

I hypothesize that most young women expect normative family sizes of two to three children, with few teenagers intending to have no children or only one child. Young women do not have definite knowledge about their future family formation, education, and career paths, and so are likely to form their fertility intentions based on general social norms rather than specific desires. In the absence of concrete plans, young women may also be likely to report what they perceive as socially desirable responses. To the extent that they have ideas about marriage, education, and work, teenagers may incorporate these ideas into

family size expectations. Again, however, these ideas are likely to be based more on widely shared constructs about marriage and childbearing or combining work and family than on specific individual experience.

Young women do have experience in their own families of origin, and this experience is an important source of information about family functioning. So, for example, sibship size should be correlated with intended family size for young women—women with more siblings should expect more children. The extent to which this correlation persists throughout the life course is an open question.

Expected family size may also vary by race and ethnicity. Because of differing historical experiences and continued discrimination and residential segregation, white and African American women have access to different levels of both material resources and social schemas. Attitudes related to marriage and childbearing are most relevant to the issue of fertility intentions. There is fairly consistent evidence that African American women are more accepting than non-Hispanic white women of early childbearing and childbearing outside of marriage (Browning and Burrington 2006; Forste and Tienda 1996; South and Baumer 2000; Trent and Crowder 1997). There is less evidence of racial differences in expected family size. African American women have higher birth rates than non-Hispanic white women at high parities, but it is unclear whether these differences are due to differences in intentions (Morgan 1996; Yang and Morgan 2003). I tentatively hypothesize that African American women are more likely than non-Hispanic white women to expect large families.

Hispanic women have higher fertility than non-Hispanic white women (Martin et al. 2003). These high birth rates are generally attributed to Catholicism or to familistic values, which would suggest that Hispanic women have high fertility intentions throughout the life course. However, there is substantial variation in the fertility of Hispanic women depending on national origin and nativity (Bean and Tienda 1987). I distinguish between Hispanic and non-Hispanic women in this analysis. I expect generally higher intentions among Hispanic women but do not attempt a full examination of variation in Hispanic women's fertility intentions.

Education is negatively associated with completed family size (Dye 2005). At the high end of the education scale, this negative association is hypothesized to act through women's labor force experience. Highly educated women may also find their work more personally fulfilling than women with less education, and so they may rely less on children as a way of providing identity (Friedman et al. 1994). At the low end of the education scale, women with little education and limited economic prospects may be more likely to see motherhood as their primary source of structure and identity (Edin and Kefalas 2005). Thus, women with low educational attainment may be more likely to intend to have children, though it is not clear whether they will also intend to have larger families. Finally, education may influence fertility intentions by shaping expectations about how children should be raised. Lareau (2003) argued that middle-class families devote more time and energy to children's activities than working-class and poor families, and best sellers portray upper middle-class women as beset by the heavy demands of parenting (e.g., Pearson 2002; Warner 2005; Weiner 2005). These intensive parenting schemas may reduce fertility intentions by increasing the resources perceived as necessary for bringing up children. I expect that women with low educational attainment are more likely to intend children than women with higher educational levels and that women reduce their intentions for children as they obtain more education.

Married women have both higher birth rates and higher fertility intentions than unmarried women (Rindfuss and Parnell 1989; Schoen et al. 1997). On average, married women have access to higher levels of both financial and social resources than unmarried women due to the presence of a (presumably) permanent partner. In addition, the institutions of marriage and parenthood are closely linked in American ideas about appropriate family behavior. Despite the rising prevalence and acceptance of nonmarital fertility, the majority of American women still report that they would rather have children while married

than unmarried (Thornton and Young-DeMarco 2001). Becoming pregnant or becoming “ready” to have children are understood as valid reasons to get married, and once married, couples feel pressure to have children to fully legitimate their marriage. Because most women desire children from a young age, I do not expect marriage to be linked to increases in fertility intentions. On the other hand, I expect nonmarriage to be associated with decreased expected fertility. That is, women who never marry should be more likely to reduce their fertility intentions over time.

I also consider the relationship between early childbearing and fertility intentions. Having a first birth at a young age is strongly correlated with lower educational and career attainment, although evidence for a causal relationship is mixed (Ellwood and Jencks 2004; Geronimus and Korenman 1992, 1993; Hoffman, Foster, and Furstenberg 1993a, 1993b; Martin 2004; McLanahan 2004). Women who have children at young ages, and especially women who have children before age 18, are less likely to graduate from high school and college and less likely to be in intensive professional careers. Young mothers may thus be less likely to be exposed to, or less able to take advantage of, pathways to nonmaternal achievement and may focus on children as a source of identity and achievement (Friedman et al. 1994; see also Edin and Kefalas 2005). Conversely, women who postpone childbearing have more time to become invested in work or other activities and are thus more likely to downgrade their intentions for having children. I therefore expect that women who have children at young ages are more likely to maintain or increase fertility intentions than women who postpone childbearing.

DATA AND METHODS

Data

I use data from women in the 1979 cohort of the National Longitudinal Survey of Youth (NLSY). Women in the NLSY were first interviewed in 1979, when they were between the ages of 14 and 22, and were reinterviewed annually until 1994 and biannually thereafter. I use data through the 2002 round of the survey. The NLSY works hard to retain respondents and has relatively good success rates. However, loss to follow-up is a concern, as with all longitudinal surveys. Excluding subsamples later dropped from the survey, 60.3% of the original respondents were interviewed in the 2002 survey. Attrition from the survey does not appear to be correlated with fertility expectations reported in the initial interviews, and membership in expectation trajectory groups is not associated with attrition. Some childbearing behaviors are associated with retention in the sample; for instance, women who gave birth before age 18 are more likely to be lost to follow-up than women who began childbearing later. Thus, this analysis may underrepresent some patterns of childbearing observed in the population to the extent that women following these patterns are underrepresented in longitudinal data.

Data on fertility expectations were collected in the first interview in 1979, yearly between 1982 and 1986, and biannually thereafter. Specifically, respondents were asked, “Altogether, how many (more) children do you expect to have?” Conceptually, fertility expectations differ from fertility intentions. However, empirical research has found little difference between the two measures (Ryder and Westoff 1971). I therefore use the words “expectations” and “intentions” interchangeably. Expected total fertility was calculated by adding reported expectations for future fertility to the number of children already born. I use the most recent information provided to calculate the number of children born at each interview date.

The measure of fertility expectations used here incorporates all previous births. Using this measure, women cannot expect fewer children than they have, and an unintended birth is treated as an increase in fertility expectations. The measure is best interpreted as a composite measure of fertility behavior and intentions. Combining past behavior and future

intentions into one measure faithfully represents the context in which fertility decisions are made: once children are born, women (for the most part) take on long-term responsibility for them and, taking existing children into account, form intentions about future childbearing.

Methods

In choosing an analytic approach, I was guided by several observations about the dynamics of fertility intentions. First, the meaning and determinants of a change in fertility expectations vary depending on the starting point. For example, a reduction in expected family size from four to three children suggests different causes than a reduction from one to zero children. Furthermore, there may be underlying differences between women who expect four children and women who expect one child, such that these women are exposed to different experiences shaping subsequent changes in expectations. Thus, any analytic model of fertility expectations over time should account jointly for both initial intentions and subsequent changes conditional on that starting point. Second, there is increasing evidence that multiple aspects of fertility behavior and socioeconomic status (age at first birth, marital status at first birth, race, education, income) cluster together rather than covarying continuously (Ellwood and Jencks 2004; Martin 2004; McLanahan 2004; Musick and Mare 2004; Sullivan 2005). Therefore, a modeling strategy should be able to represent discrete patterns of change over time.

I use group-based trajectory analysis (Jones, Nagin, and Roeder 2001; Land, Nagin, and McCall 2001; Nagin 1999, 2005), also known as latent class growth analysis (Muthén 2004), to uncover common pathways for change in intentions and then describe the characteristics of women whose intentions resemble these pathways. Like other methods of growth modeling, group-based trajectory analysis deals with outcomes measured at multiple time points and uses observed values to estimate intercepts and slopes (as well as higher-order quadratic and cubic terms) describing change over time. Group-based trajectory analysis is distinct from other growth modeling approaches because it adopts a mixture model approach. Rather than assuming some distribution for random variation around a population mean, the finite mixture model assumes that a sample is made up of individuals belonging to a finite number of distinct classes, each with its own pattern of growth. Under this model, variation in intercepts or growth—initial expected family size and subsequent increases or decreases in expectations—is described not by individual-level variation but by membership in an unobserved group. That is, variation is discrete rather than continuous. In the social sciences, mixture models of growth have been used to study a range of substantive issues, including criminal careers (D'Unger et al. 1998), substance use (Hamil-Luker, Land, and Blau 2004), women's employment around childbirth (Hynes and Clarkberg 2005), and movement in and out of poverty in childhood (Wagmiller et al. 2006). The model-generated groups and their associated trajectories can be interpreted as "ideal type" models of change in the population.

Group-based trajectory analysis posits that the probability of observing the longitudinal series of dependent variables Y_i for any individual i can be expressed as

$$\sum_j \pi_j P_j(Y_i).$$

Here, π_j is the proportion of the population in group j and $P_j(Y_i)$ is the probability of observing the given series of outcome variables conditional on membership in group j . That is, the probability of observing a given outcome is the sum across all groups of the probability of membership in each group multiplied by the probability of observing the outcome conditional on membership in the group.

The number of groups and group membership are neither observed nor predetermined by the investigator. Instead, maximum likelihood methods are used to estimate group size and membership along with the shapes of growth curves based on the observed data. The

standard approach to determining the most appropriate number of groups is to estimate a series of models with different numbers of groups and then decide among these models using both fit statistics and substantive knowledge of the phenomenon under study. Following Nagin (1999, 2005), I use the Bayesian information criterion (BIC) to judge model fit; other measures of model fit (log likelihood, Akaike information criterion) produce the same conclusions. After determining the appropriate number of groups, I test further models to establish the functional form of the growth curves, starting with a cubic function of time and testing quadratic and linear trajectories.

Models can be further refined by incorporating individual characteristics hypothesized to be related to fertility expectations. In the unconditional model described above, individuals are assigned group membership based solely on the posterior probabilities of observing the given fertility intentions over time assuming membership in a given group. Multinomial logit models can then be used to relate group membership to individual characteristics. However, more efficient estimation of both growth parameters and the relationship between individual characteristics can be achieved by jointly estimating group trajectories and individual risk factors for group membership (Muthén 2004; Nagin 2005). In this article, I estimate conditional models that include individual characteristics as well as observed fertility expectations.

The main outcomes of interest in a group-based analysis are the number of groups needed to adequately model the observed data, parameters describing the shape of the growth curves, and individual probabilities of group membership. All models are estimated using a methodology developed by Nagin and colleagues (Jones et al. 2001; Nagin 1999, 2005) and implemented via a SAS add-on developed by Jones et al. (2001; available for downloading at <http://www.andrew.cmu.edu/user/bjones/index.htm>). A Poisson distribution is specified for fertility intentions.

Analytic Sample

I analyze expectations from ages 18 to 40, and I include in this analysis only respondents for whom intentions were measured at least five times and at least once after age 25. Respondents ranged from 14 to 22 years old at the first interview. Because of this variation in age, because of movement in and out of the sample, and because fertility expectations were not collected in every wave of the survey, the set of ages at which fertility expectations were recorded varies across respondents; that is, respondents have different amounts of missing data. The estimation method accounts for missing data under the assumption that missing values are missing completely at random. This assumption would be violated if fertility expectations or behavior were associated with the likelihood of sample attrition. As noted above, neither early fertility expectations nor predicted group membership is correlated with retention in the sample. I tested the sensitivity of results to missing values by rerunning the analysis starting at age 16 and at age 20 and by varying the selection criteria with regard to the number of observations per woman. The results were robust to sample specification. Missing values for individual risk factors cannot be incorporated in model estimation; respondents with missing values on these variables are excluded. The analytic sample size for the group-based trajectory analysis is 5,557 women, or 88% of the 6,283 women initially interviewed in 1979.¹ Six hundred fifty-nine women were excluded because they reported an insufficient number of observations; most of these women (441) were in a supplementary sample of military personnel that was included in the initial survey waves but dropped from the sample after the 1984 interview. The 218 women who were excluded because they were lost to follow-up before reporting five waves of fertility expectations

1. Retention through the 2002 wave of data collection was not required for inclusion in the analytic sample; respondents lost to follow-up were included in the analysis as long as they remained in the survey long enough to meet the baseline criteria.

reported an average expected family size of 2.3 children in 1979, compared with an average of 2.4 children reported by women in the analytic sample. Sixty-seven women were excluded because of missing values for individual risk factors.

The NLSY oversampled African Americans, Hispanics, and poor whites. Sample weights from the initial 1979 sample are used in order to more closely represent the national population in 1979. These weights do not account for sample attrition. Results are highly similar across weighted and unweighted analyses and are robust to the exclusion of oversampled respondents.

Independent Variables

The group-based trajectory analysis reported here incorporates variables shown in previous research on fertility to be associated with either fertility intentions or fertility behavior. These variables measure characteristics at or before the initial observation of fertility expectation at age 18. These early characteristics are expected to influence both initial expected family size at age 18 and the later dynamics of fertility intentions, either because they imply persistent attitudes and values or because of their influence on subsequent life events (education, family formation) not captured in this analysis. Background characteristics used are race, Hispanic origin, and the number of siblings in the family of origin; these characteristics were measured at the initial interview in 1979 and are taken directly from survey questions. I also control for whether a respondent graduated from high school on time (by age 18) and whether the respondent had a first birth before age 18; these variables are constructed based on fertility and education histories collected at each interview.

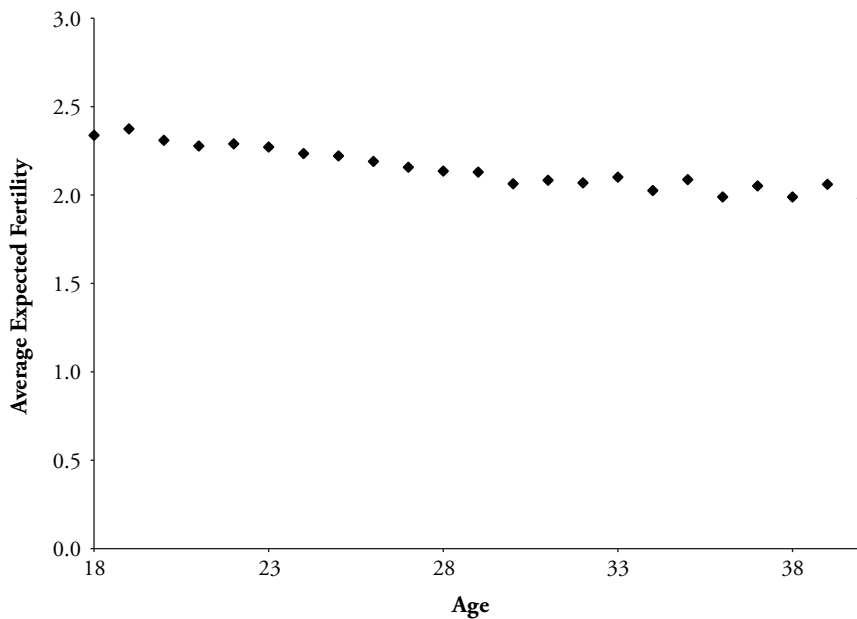
I also present simple bivariate statistics describing the relationship between group membership and the respondent's later educational attainment and family formation. Fertility, marital, and education histories were collected at each interview. I use information from the most recent interview available to establish the respondent's total completed fertility, whether the respondent ever married, and whether the respondent ever obtained a four-year college degree.

RESULTS AND DISCUSSION

Figure 1 shows the average expected fertility reported by female respondents to the NLSY between the ages of 18 and 40. Women in early adulthood expect to have an average of 2.3 children in their lifetime, but the average expected family size declines gradually with age, and women finish their childbearing years expecting about 0.3 fewer children than they initially expected. This slight decrease in expectations may be an age effect, as women gain more knowledge about children, work, and other experiences, or may be a period effect related to changing social norms about child-raising and family size.

Patterns of Change in Expected Family Size

Of course, individual women's expectations vary from this aggregate curve. Group-based analysis postulates that individual variation can be effectively described by estimating trajectories for a finite number of distinct subgroups. I tested a range of models including up to seven groups. Within this range, adding more groups always improved fit statistics (BIC) but was not always substantively useful. In models with more than four groups, the proportion of women in some groups was very small (less than 1% of the sample), and the remaining groups closely resembled groups in the four-group model. I concluded that a model with four groups best represented fertility expectations over the life course. Further tests showed that one of the groups could be represented as a straight line without loss of fit, and other groups could be represented as quadratic (rather than cubic) functions. Predicted fertility expectations generated by this model are shown in Figure 2. Both the preferred number of groups and the predicted growth curves were extremely robust to model and sample specification. I tested models with and without individual characteristics

Figure 1. Mean Expected Family Size, by Age

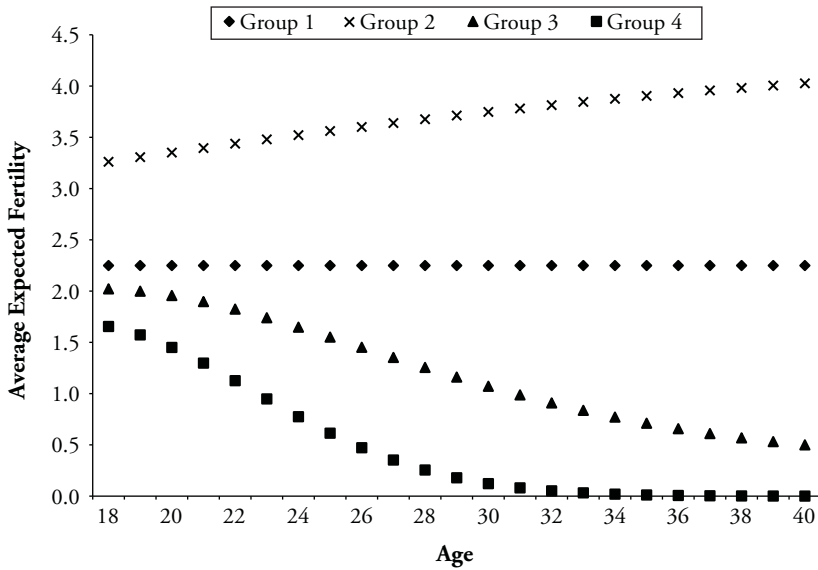
Notes: $N = 5,557$ women. See the text for details of the analytic sample.

Source: National Longitudinal Survey of Youth, 1979 cohort.

(unconditional and conditional models), models starting at different ages, and models using various criteria for the level of missing data. In all cases, the four-group model was preferred, and the shapes and levels of the growth curves did not vary substantively. Figure 2 shows results from a conditional model using the analytic sample described in the methods section. Individual characteristics included in the model are race and Hispanic origin, number of siblings, whether the respondent received a high school diploma on time, and whether the respondent had a birth before age 18; individuals are assigned to groups based on the posterior probability of their observed fertility expectations conditional on individual characteristics. Observed trajectories for the women assigned to these groups match predicted trajectories well.

Demographic research on fertility tends to focus on perceived problems—either too many children to the wrong women or not enough children to eager mothers. Yet the largest group of women in this model, making up 67% of the sample, follow a normative trajectory of fertility intentions, expecting around two children throughout their lives and largely meeting those expectations. The dominance of this group suggests that the overall decline in fertility expectations shown in Figure 1 is neither a pure aging effect nor a pure period effect. Rather, some groups of women experience declining fertility expectations as they get older, while the majority maintain stable expected family size.

Other groups in the model come closer to the “problem” trajectories that inspire most fertility research. Group 2, comprising 12% of the sample, represents women who have higher than average fertility expectations in young adulthood and whose expectations continue to increase over their early predictions. About 16% of women are classed in Group 3.

Figure 2. Mean Expected Family Size, by Age: Predicted Values From a Four-Group Model

Notes: The figure presents the results of a group-based trajectory analysis with a four-group conditional model. Individuals were assigned to groups based on the posterior probability of their observed fertility expectations conditional on individual characteristics. $N = 5,557$. See the text for details of the models and sample.

Source: National Longitudinal Survey of Youth, 1979 cohort.

They expect an average of 2.0 children in early adulthood, but their expectations decline over time, to an average of only 0.5 children by age 40. The smallest group, Group 4, makes up only 4% of the population. Women in this group begin their childbearing years with lower than average expected fertility; their expectations decline with age, and by their early 30s, these women expect to have no children.

The modeled trajectories depict a process of growing differences across groups. As hypothesized, there are relatively small differences in fertility intentions among young women. These initial differences in early fertility expectations cumulate over the life course into larger differences in later expectations. Group 2, the high and increasing group, is distinguished by higher than average expectations even by age 18, but the difference between this group and Group 1, the average and stable group, nearly doubles between the ages of 18 and 40. Groups 1, 3, and 4, the low and average fertility groups, are separated by less than one child at age 18 but by more than two children, on average, by age 40. Thus, although fertility expectations in the teenage years are associated with expectations at older ages, the largest differences in expected family size do not emerge until the late 20s.

Expecting childlessness, in particular, is an example of this process of cumulative difference. No underlying group distinguishes women who initially expect to have no children from other women. I tested models containing up to seven groups; in none of these models did women with stable expectations for childlessness emerge as a distinct trajectory. This pattern points to the difficulty of defining voluntary childlessness, even setting aside variation in the biological capacity to have children. When women reduce their fertility expectations as they age, there is no *a priori* reason to take either expectations at young ages or

Table 1. Individual Risk Factors for Group Membership

Variable	High and Increasing Versus Average and Stable		Average and Declining Versus Average and Stable		Low and Declining Versus Average and Stable	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	-2.28***	0.22	-0.87***	0.18	-1.73***	0.36
Race/Ethnicity (omitted = white, non-Hispanic)						
African American	0.40*	0.16	-0.28	0.17	-0.53	0.31
Hispanic	0.10	0.16	0.42**	0.14	-0.45	0.26
Childhood Family Context						
Number of siblings in family of origin	0.14***	0.02	-0.10***	0.03	-0.14**	0.05
Experiences in Early Adulthood						
Received high school diploma on time	-0.35*	0.15	-0.07	0.16	-0.21	0.26
Birth before age 18	1.28***	0.17	-1.11**	0.37	-14.40***	0.31

Notes: The results are from a group-based trajectory analysis based on a four-group conditional model. The sample is women with data on fertility expectations collected in at least five waves and at least once after age 25; women with missing values on individual characteristics are excluded. $N = 5,557$. See the text for details of the models and sample.

Source: National Longitudinal Survey of Youth, 1979 cohort.

* $p < .05$; ** $p < .01$; *** $p < .001$

expectations at older ages as “true” desires and no clear baseline expectation from which to judge whether fertility goals were met.

All modeled trajectories are monotonic. Although one could imagine women whose expected family size changed nonmonotonically—for example, women might reduce intentions as they became more invested in a career, then increase intentions after a positive experience with a first child—these women do not form an empirically significant group. The consistency in the direction of change in intentions suggests that forces pushing intentions up or down are steady or perhaps self-reinforcing. These patterns might be described as a “mommy” track for women who want more than two children and “nonmommy” tracks for women with smaller than average expected family sizes; women who get on one of these tracks in their 20s (roughly a third of women in these cohorts) are unlikely to change course.

Characteristics Associated With Group Membership

The group sizes reported above reflect group assignments based on posterior probabilities determined by both reported expectations and individual characteristics. The probability that an individual woman falls into any one of the four groups depends on these individual characteristics. The model-generated odds of group membership associated with specified characteristics are presented in Table 1. The columns in Table 1 show log-odds comparing the likelihood of being in the high and rising group (Group 2), the average and declining group (Group 3), and the low and declining group (Group 4) relative to membership in the average and stable group (Group 1). I first briefly describe these relationships for comparisons between groups and then discuss these results collectively.

Both background factors and experiences in early adulthood are significantly related to group membership, and these relationships are for the most part consistent with the hypotheses proposed earlier. The first column shows how individual characteristics are associated with the odds of being in the high and increasing group. Compared with non-Hispanic white women, African American women are more likely to be in the higher intentions group. The number of siblings a woman has is positively correlated with membership in

Group 2: the larger the family of origin, the more likely the woman is to have higher than average intentions at a young age and to increase her fertility intentions as she gets older. As predicted, women who have an early first birth are significantly more likely than those who have a child after age 18 to be in the increasing fertility intentions group, and women with a high school diploma are significantly less likely to be in this group.

Results for comparisons between Group 3 (average and declining) and Group 1 (average and stable) are shown in the second set of columns in Table 1. Recall that women in these two groups had similar fertility intentions at age 18, but women in Group 3 had much lower intentions at age 40 than women in Group 2. Thus, comparing these two groups is equivalent to examining the likelihood of later declines in fertility intentions among women whose early family size expectations were largely similar (around two children per woman). There are no significant differences between white and African American women. Somewhat surprisingly, Hispanic women are more likely than non-Hispanic white women to report declining fertility expectations as they get older. Women with more siblings are less likely to reduce their expected family size as they get older. Early educational attainment is not significantly correlated with fertility trajectories over the life course among these two groups of women. In contrast, early family formation experience is strongly related to group membership. Women with early first births are much less likely to be in the declining intentions group. This finding is consistent with the argument that early childbearing reinforces the salience of family-related schemas, thus maintaining expectations for childbearing.

The final set of columns in Table 1 shows coefficients and standard errors for the comparison between Groups 4 (low and declining) and 1 (average and stable). There are small differences between teenagers in these two groups, which widen as group members enter their 20s and 30s; the low and declining group represents women who evolve into expecting childlessness. Race and ethnicity are not significantly related to membership in these two groups. The coefficients describing racial and ethnic differences are relatively large, however, and in the predicted direction; there may not be enough statistical power in this sample to detect differences by race and ethnicity. Results for family background and experiences in early adulthood mirror those for the differences between Group 3 (the average and declining group) and Group 1: women with more siblings and women with an early first birth are less likely to be in the lowest expectations group, and education is not associated with group membership.

The similarity of the associations between individual characteristics and membership in the two declining trajectories (Groups 3 and 4) raises the question of whether any individual characteristics differentiate these two groups. Table 2 shows the associations between individual characteristics and the log-odds of membership in Group 4 (low expectations declining to zero) and Group 3 (average expectations declining to less than one child, on average).

Although the associations between race and ethnicity and the relative odds of belonging to the two declining expectations groups versus the stable group are weak, Hispanic origin does distinguish those women who expect to have no children in adulthood from those with low expected fertility. Hispanic women are less likely than non-Hispanic white women to be in Group 4, the expected childlessness group, relative to the average and declining expectations group. The number of siblings a woman has is positively associated with family size expectations but does not distinguish between the two declining intentions groups. The relative lack of explanatory power of background characteristics in determining membership in one of the two declining trajectories groups suggests that later life events are more central in determining which women reduce intentions to expect no children.

To provide a basic picture of the correlations between fertility trajectories and later life experiences, Table 3 presents descriptive statistics showing differences across expectations

Table 2. Individual Risk Factors for Membership in the Low and Declining Group Versus the Average and Declining Group

Variable	Low and Declining Versus Average and Declining	
	Coefficient	SE
Intercept	-0.86**	0.37
Race/Ethnicity (omitted = white, non-Hispanic)		
African American	-0.25	0.36
Hispanic	-0.87***	0.25
Childhood Family Context		
Number of siblings in family of origin	-0.04	0.05
Experiences in Early Adulthood		
Received high school diploma on time	-0.15	0.30
Birth before age 18	-13.50***	0.53

Notes: The results are from a group-based trajectory analysis based on a four-group conditional model. The sample is women with data on fertility expectations collected in at least five waves and at least once after age 25; women with missing values on individual characteristics are excluded. *N* = 5,557. See the text for details of the models and sample.

Source: National Longitudinal Survey of Youth, 1979 cohort.

p* < .01; *p* < .001

trajectories in completed fertility, marriage, and completed education. Marriage, education, and fertility expectations are likely to be mutually determined; the same attitudes and aptitudes drive outcomes in each of these domains, and each domain affects the others. Table 3 simply describes associations between expectations trajectories and other outcomes and does not attempt to determine causality.

The modeled trajectory groups represent fertility expectations, not fertility behavior. By age 40, however, few women expect to have more children, so fertility expectations match completed fertility for the majority of women. Women in Group 1 have an average of 2.0 children, compared with 4.0 children for women in Group 3, 0.6 in Group 3, and no children in Group 4.

Women with stable and increasing fertility expectations (Groups 1 and 2) are much more likely to have ever married than women in the declining groups (Groups 3 and 4). Close to 90% of women in the first two groups married at some point, whereas more than

Table 3. Fertility Expectations Trajectories and Later Life Experiences

Variable	<i>N</i>	Total	Group 1: Average and Stable	Group 2: High and Increasing	Group 3: Average and Declining	Group 4: Low and Declining
Number in Group		5,557	3,750	687	873	247
Mean Number of Children Ever Born	5,557	1.9	2.0	4.0	0.6	0.0
Proportion With a College Degree	5,417	25.7	26.2	16.3	27.7	31.7
Proportion Never Married	5,557	13.9	10.5	10.1	21.7	37.9

Notes: The results are from a group-based trajectory analysis based on a four-group conditional model. *N* = 5,557 for the group-based trajectory analysis; *N* is as noted in the table for each outcome. See the text for details of the models and sample.

Source: National Longitudinal Survey of Youth, 1979 cohort.

one-third of women in the lowest expectations trajectory group never married. Chi-square tests indicate that differences in the proportions marrying between the declining expectations groups and the stable and increasing groups are statistically significant ($p < .001$), as are differences between Groups 3 and 4 ($p < .001$). The difference between Groups 1 and 2 in the proportion marrying is not statistically significant ($p > .10$). These associations are consistent with the hypothesis that nonmarriage is associated with declining intentions for childbearing but marriage is not necessarily associated with increasing intentions.

In terms of educational attainment, the largest distinction appears to be between the group with high and increasing expectations and the other three groups. Only 16% of women in Group 2 earned a college degree, compared with about a quarter of women in the other groups. The educational differences between the three low-to-average groups are small and not statistically significant ($p > .10$).

The limited association between education and expectations trajectories is the most surprising conclusion from the examination of characteristics associated with group membership. Low educational attainment—not receiving a high school diploma on time and not receiving a bachelor's degree—is associated with high and increasing expected family size. Among women with low to average expected family size at age 18 (Groups 1, 3, and 4), however, educational achievement is not associated with subsequent fertility intentions. Women who do not obtain a high school diploma are no more or less likely than women who do to reduce their expected family size, providing they do not expect large families to begin with. Furthermore, women with low and declining fertility expectations are no more or less likely to obtain a college degree than women in the average and stable trajectory group.

The limited relationship between obtaining a college degree and fertility *intentions* is surprising given the strong negative relationship between college education and fertility *behavior*. It is possible that women with a college education are less likely to achieve their expected family size, although given the generally close relationship between expected and achieved fertility at age 40 in this sample, it seems unlikely that an intentions-behavior gap fully explains the discrepancy between my results and other research on education and fertility. These results suggest that the negative relationship between fertility and education may be concentrated at high parities. My findings also reinforce recent work arguing that educational differences in fertility are primarily differences in the timing, not the number, of births (Yang and Morgan 2003).

In contrast to the weak relationship between education and expected family size, there is a strong association between nonmarriage and low and declining fertility intentions. This relationship is not surprising: it is consistent with virtually all research ever conducted on fertility in the United States. However, it is worth underlining this finding given the recent interest in voluntary and “semivoluntary” childlessness (for academic work, see Abma and Martinez 2006; or Park 2005; for works in the popular press, see Fey and Fallon 2002; Grigoriadis 2002; or Hewlett 2002). Women who do not have children or who have only one child are often assumed to be choosing career over motherhood. These results remind us that childlessness may also be the result of relationship constraints—that is, the lack of a family context supportive of childbearing reduces expectations for childbearing. (Nonmarriage may be the result as well as the cause of low fertility expectations, if women who expect few children desire marriage less or are less attractive marriage partners. This explanation is most plausible for women in the lowest expectations group, who reduce their fertility intentions to below one child per women by their early 20s, well below the average age at first marriage in the United States.)

CONCLUSIONS

This article provides the first description of women's fertility intentions over the entire childbearing period. Using group-based trajectory analysis, I uncovered four “ideal type”

trajectories of fertility intentions for one cohort of American women. The majority of women exhibited stable and normative expected fertility, intending in their teenage years to have about two children, maintaining those intentions throughout adulthood, and largely meeting them. Smaller groups of women increased or decreased their expected family size as they grew older. Differences in fertility intentions cumulated as women aged, so that relatively small differences in expected family size across groups at age 18 produced much larger differences in expected (and completed) fertility at age 40. Both experiences in the family of origin and young adult educational and family formation experiences are correlated with the level and changes of adult fertility intentions.

Recent U.S.-based research has emphasized the growing association between and among social disadvantage, fertility timing, and fertility context (Ellwood and Jencks 2004; Martin 2004; McLanahan 2004; Morgan and Rindfuss 1999; Musick and Mare 2004; Rindfuss, Morgan, and Offutt 1996). Women from disadvantaged backgrounds are more likely to begin childbearing at young ages and while unmarried, which in turn limits opportunities for achievement for both them and their children. The strong relationship between early childbearing and membership in the high and increasing fertility intentions group suggests that relatively high lifetime fertility may also be part of the cluster of fertility behaviors associated with social disadvantage.

Research in low-fertility countries in Europe and Asia, as well as the United States, focuses on the determinants of below-replacement fertility levels (Caldwell and Schindlmayr 2003; Kohler, Billari, and Ortega 2002; McDonald 2000; Morgan and Taylor 2006; Rindfuss et al. 2003). In this analysis, about one in five women were classified in one of the two declining intentions trajectories, and these women averaged only 0.5 children born by age 40. Much of the literature on low fertility concentrates on work-family conflict—or, more generally, conflict between childbearing and other, more fulfilling activities—as the force behind low fertility. This analysis found little role for educational attainment in explaining differences among women with average or lower expectations. Instead, it points toward the need for further exploration of nonmarriage as a major determinant of declining fertility intentions. Future fertility levels may depend on social and political support for nonmarital childbearing as well as attitudes and policies surrounding work-family balance.

The extent to which these findings are generalizable to other low-fertility countries is unknown. The distribution of completed family sizes varies substantially across Europe and North America. In the United States, the proportion of both large families and childless women is large relative to that in Northern and Eastern European countries (Shkolnikov et al. 2007). Countries with a less concentrated distribution of fertility may show less variation in trajectories of fertility intentions as well. Different trajectory groups may also emerge in different countries. For example, women who expect to have no children consistently from a young age may form a distinct group in Germany and Austria, where recent research has found an increasing proportion of women with below-replacement fertility intentions (Goldstein, Lutz, and Testa 2003).

The shape and distribution of expectations trajectories may also vary across cohorts. These data reflect the experience of women of childbearing age from the mid-1970s to the 1990s and will not necessarily apply to current or future generations. Given the relative stability of both fertility intentions and fertility behaviors over the past few decades (Hagewen and Morgan 2005), it is not unreasonable to suppose that the patterns observed for women in the NLSY 1979 cohort have relevance for neighboring cohorts as well. Changes in marriage and fertility timing may affect the longitudinal dynamics of family size expectations, however. Given the paucity of longitudinal data on fertility expectations, it is difficult to explore either cross-national or cross-cohort variation empirically.

The data used here do allow for further study of the dynamics of fertility intentions. The relationship between employment and fertility intentions is not addressed here, and

education is studied only summarily. Future research should reach for a more dynamic analysis of expectations and life course events beyond young adulthood. Possible avenues for exploration include the relationship between fertility intentions and the timing of educational attainment, or the area of study for college graduates. Marriage timing as well as divorce and remarriage might also be incorporated into subsequent analyses. In addition, I do not measure unintended fertility here. It is likely that unplanned births play a role in increasing or maintaining fertility intentions, especially among women with large expected family sizes. More detailed and nuanced analyses are needed to understand the full complexity of relationships between fertility expectations and events in other domains.

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