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Pathways of Children's Long-Term Living Arrangements: A Latent Class Analysis

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Abstract

This study employed latent class analysis to create children's family structure trajectories from birth through adolescence using merged mother and child data from the National Longitudinal Survey of Youth (N=1,870). Input variables distinguished between biological fathers and stepfathers as well as mother's marriages and cohabitations. The best-fitting model revealed 5 latent trajectories of children's long-term family structure: continuously married biological parents (55%), long-term single mothers (18%), married biological parents who divorce (12%), a highly unstable trajectory distinguished by gaining at least one stepfather (11%), and cohabiting biological parents who either marry or break up (4%). Multinomial logistic regression indicated that mother's education, race, teen birth status, and family of origin characteristics were important predictors of the long-term family trajectories in which their children grew up. These findings suggest that latent class analysis is a valuable statistical tool for understanding children's complete family structure experiences.

Keywords

Family structure; family instability; latent class analysis

1. Introduction

In the past few decades, the family structures in which children grow up have changed dramatically. Many children experience multiple family structures over the course of childhood. While research focusing on individual family transitions, such as divorce, continues to be a focal point for family scholars, there is growing recognition that a single change in family structure is often one of several transitions for children. Nearly twenty years ago, Hetherington (1993) noted that divorce and remarriage should not be considered single events, but rather part of a chain of marital transitions and family reorganizations. With each family transition, reworking of relationships and establishment of the new family system is necessary (Hetherington and Clingempeel, 1992). The emphasis on studying family structure transitions as chains of events has intensified as nonmarital childbearing and general instability have also increased (Amato, 2010; Cherlin, 2009). In response to these changes in children's family experiences, Manning and Bulanda (2007) have called for

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more research focused on complete family trajectories, and stated that “full family histories are ideal...as children increasingly experience new family forms and face greater instability, we must adjust our measurement and analytic strategies to keep pace” (Manning and Bulanda, 2007, p. 218).

While there is a great deal of research focused on the diverse family structures in which American children are growing up, most studies have employed a static measure of family structure that only captures children’s living arrangements at one point in time. A growing but comparatively small number of studies has included dynamic measures of children’s family structure over time, but there is no study to date that documents the complete living arrangement trajectories of a national sample of children from birth through adolescence.

Studying family structure trajectories rather than individual transitions is more in line with the life course perspective as developed by Elder (1994; 1998) and Clausen (1986), because trajectories describe the full sequence of changes over time rather than the effect of a single event or circumstance on another. Trajectories are made up of many individual transitions (Elder 1998; Zollinger and Elder 1998) and yield a more comprehensive understanding of life experiences and causal relationships. Family structure trajectories are particularly important for family research because they capture children’s *cumulative* family structure experiences. Because contemporary children’s living arrangements are so variable over time, capturing this cumulative experience is important. Constructing family structure trajectories provides an opportunity to combine these factors into one measure that is useful for descriptive and analytical purposes. Future studies that use this cumulative perspective will enable researchers to achieve a better understanding of how family structure affects children’s well-being.

There are two discrete research aims in this study. The first research aim is descriptive in nature. Using merged mother and child data from the National Longitudinal Survey of Youth (NLSY), the total number of distinct family structure trajectories that children experience from birth through adolescence is determined. Latent class analysis is then utilized to examine the most common family structure trajectories. The second research aim is explanatory in that this study examines the characteristics that predict children’s likelihood of experiencing different long-term family structure trajectories. Understanding the factors that increase children’s likelihood of experiencing various family structure trajectories may help uncover layers of cumulative disadvantage and inform policy decisions. Because clear differences between disadvantaged and advantaged women exist in terms of their children’s family contexts, including differences in married and single-parent households, which research suggests may lead to divergent outcomes for children (McLanahan and Percheski, 2008), understanding the characteristics that predict long-term living arrangements is crucial. While a large body of work shows that family structure experiences are highly predictive of offspring outcomes, the field lacks a comprehensive description of the full range of family structures and family structure transitions that contemporary U.S. children experience during childhood.

The broader impact of this research is to draw attention to a relatively neglected aspect of family research that may have important consequences for children’s well-being. This research is the first study to my knowledge to document the family structure experiences of American children across the entirety of childhood using latent class analysis and to investigate the factors that predict children’s long-term family structure trajectories. This work is also an attempt to encourage family scholars to answer Rindfuss, Swicegood, and Rosenfeld’s (1987) call to take a “more careful look at the life course *as it is actually lived*, not as we wish it to be for the sake of research” [emphasis theirs] (Rindfuss et al., 1987, p. 799).

2. Growing Complexity of American Children's Living Arrangements

It is well-known that the family structures in which American children grow up have diversified considerably in the last few decades, and there is a substantial demographic and sociological literature describing the percentage of children who live in various family structures at particular points in time and the percentage of children who experience certain family forms at some point during childhood. Divorce, remarriage, nonmarital childbearing, and cohabitation have become more common, and contemporary children experience a tremendous variety of family structures by the time they reach adulthood. For example, about 41% of all births are outside of marriage (Martin, Hamilton, Ventura, Osterman, Kirmeyer, and Mathews, et al., 2011), and the majority of those nonmarital births are in cohabiting unions (Mincieli, Manlove, McGarrett, Moore, and Ryan, 2007). In fact, by age 12, about two-fifths of all children have lived in a cohabiting family, a highly unstable family structure (Kennedy and Bumpass, 2008). According to the Census Bureau, over a quarter of American children live with a single parent and about 7.5 percent live in a stepparent family (Kreider and Ellis, 2011).

Although they provide useful descriptive information, statistics regarding how many children experience particular family structures overlook the fact that many of the same children may be experiencing multiple transitions over the course of their childhoods, while other children live in more traditional and/or stable households. Recent research is more likely to take this complexity into account, but changes in family structure have been studied as single events in most of the extant literature on changes in children's living arrangements. For example, a substantial literature examines how children's relationships with their parents are affected by individual family structure changes, especially divorce, or in a particular family structure, such as a nonresident father family (Amato, 2010; King, Mitchell, and Hawkins 2010; Martin, 2012; Mitchell, Booth, and King 2009). Such work is important for understanding family dynamics at certain points in time, but there is also a need to add to the enlarging body of scholarship focused on children's long-term experiences.

3. Advancing the Measurement of Children's Long-Term Family Structure Experiences

Though there is growing recognition that family structure is a dynamic process rather than a static characteristic and must be treated as such in family research, family instability has thus far been examined in fairly limited ways. An increasingly common strategy is to operationalize family instability by counting the number of family structure transitions children have experienced. Indeed, a major goal of current research on family instability is to achieve an accurate estimate of how many family structure transitions children experience on average. Several recent studies have documented and analyzed the number and type of family transitions children have experienced (Albrecht and Teachman, 2003; Brown, 2006; Cavanagh and Fomby, 2012; Cavanagh and Huston, 2006; 2008; Cavanagh, Schiller, and Riegle-Crumb, 2007; Fomby and Cherlin, 2007; Heard, 2007; Osborne and McLanahan, 2007; Teachman, 2008). The bulk of this research suggests that the number, type, and timing of family transitions that children experience are significant predictors of many different measures of well-being. Yet the relatively small literature on family transitions sometimes focuses exclusively on marital transitions and often does not include transitions into and out of cohabitation (e.g. Aquilino, 1996; Wu and Thomson, 2001). Brown (2006) conducted one of the first studies to include transitions into and out of cohabitation using panel data from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative, longitudinal study of a sample of adolescents. Since Brown's study, transitions into and out of cohabitation have been included in more studies (e.g. Fomby and

Cherlin, 2007; Manning and Bulanda, 2007). Raley and Wildsmith (2004) also improved on counting transitions by demonstrating the importance of including nonmarital relationships and creating trajectories, but they presented abbreviated trajectories only to age 12.

As research focused on children's long-term experiences accumulates, the incidence and implications of family instability are becoming clearer. Using Add Health data, Brown (2006) reported that 7% of the total sample and 15% of the adolescents not residing in a two-biological-parent family experienced a living arrangement transition during a one-year interval. Using data from the Fragile Families and Child Well-Being Study, which follows a national sample of children with a purposefully large proportion of children born outside of marriage, Beck, Cooper, McLanahan, and Brooks-Gunn (2010) reported that by age 5, 23.6% of children born to married mothers experienced at least one partnership change, and 13.1% experienced three or more changes. Eighty-three percent of children born to unmarried mothers experienced at least one partnership change, and about 50% experienced three or more transitions. Cavanagh and Huston (2006) determined that about one quarter of children experienced at least one family structure transition between birth and the start of elementary school using data from the NICHD Study of Early Child Care and Youth Development.

Fewer studies estimate family instability over a long proportion of the child's life, though some new research in this area does exist. Manning and Bulanda used National Survey of Family Growth (NSFG) data to examine family structure transitions and find that over one third of all children experience at least one family structure transition by age 14. Specifically, 16.4% of their sample experienced one transition and 19.0% experienced multiple transitions, compared to the 64.6% of the sample that experienced no transitions (Manning and Bulanda, 2007).

Cavanagh, Schiller, and Riegle-Crumb (2006) used Add Health data to estimate family structure transitions for adolescents between birth and Wave II of Add Health, when the average age of the sample was in their mid-teens. Thirty-eight percent of their sample experienced at least one family structure transition. About 18% experienced one transition, 14% experienced two transitions, 5% experienced three transitions, and 2% experienced four or more transitions. Fomby and Cherlin (2007) studied children aged 5-14 using NLSY data and found that although, on average, children experienced .7 of a transition over the course of their lives, there was much variation in the number of transitions experienced. Fourteen percent of their sample had experienced a transition within the previous two years. Blau and van der Klaauw (2008) analyzed family structure experiences through age 18 using NLSY data and found relatively high levels of family structure instability. For example, they estimated that, on average, White and Hispanic children spend about 73% and 64% of childhood living with both biological parents, and children of Black mothers spend about one-third of childhood living with both biological parents.

Manning and Bulanda (2007) have called for more studies that include complete family trajectories, especially because of the increasing incidence of cohabitation, which is often missed. They pointed out that because cohabitation is often unstable (Manning, Smock, and Majumdar, 2004; Raley and Wildsmith, 2004), it is likely to be underrepresented in studies looking at family structure at one point in time. Furthermore, even research that includes cohabitation trajectories often does not specifically test for differences between biological and nonbiological cohabiting parents (e.g. Dunifon and Kowaleski-Jones, 2002, though they did not find differences in preliminary analyses; Hao and Xie, 2002). This lack of specificity in measurement may be problematic because children who live with married stepfathers often exhibit more problems than children who live with married biological fathers, so

reactions to living with cohabiting biological fathers and cohabiting stepfathers are likely to differ in similar ways.

Taken together, the extant body of research on children's family structure suggests that family structure both at birth and during childhood, family structure transitions, and the timing of family structure transitions are all associated with children's well-being. Yet it is difficult to capture children's complete family structures. Rather, current knowledge is somewhat episodic in that we have data about children's living arrangements at several points in time. We understand the effects of specific circumstances but not entire lived experiences. Family structure factors with effects on children's outcomes are not limited to family structure at birth (e.g. cohabiting couple) or living through a stressful family transition (such as divorce) or co-residing in a certain family structure (such as a stepparent family) at a particular time (e.g. early childhood). These family structures and transitions all matter, so capturing the entirety of family structure experiences is crucial. Thus, the next major research challenge in family structure research is to find a measure of the cumulative effects of all of these experiences.

Such a measure of children's complete trajectories would be a key addition to the literature because it would include all of the aforementioned family structure experiences in one parsimonious and useful measure. Creating a classification of the major trajectories children are experiencing would take into account family structure at birth as well as number, type, and timing of transitions and family structures children experience. Yet because there are undoubtedly such a large number of possible trajectories that they cannot be used to predict children's outcomes without some sort of categorization, the need for a measure of the cumulative effects of all of these experiences has so far been unmet. One potential method for reducing many trajectories into a few useful categories is latent class analysis.

Latent class analysis (LCA) has been used to examine data patterns in order to create typologies of other complex pathways in social science research. For example, one study used LCA to identify pathways to adulthood (Osgood, Ruth, Eccles, Jacobs, and Barber, 2005): fast starters, parents without careers, educated partners, educated single, working singles, and slow starters. In another study, LCA revealed young women's family formation pathways: college with family formation, high school with no family formation, cohabitation without children, married mothers, single mothers, cohabiting mothers, and inactive (Amato, Landale, Havasevich-Brooks, Booth, Eggebeen, Schoen, and McHale, 2008). Ross, Schoon, Martin, and Sacker (2009) utilized LCA to examine life course patterns in two British cohorts. Sandefur, Eggerling-Boeck, and Park (2005) modeled five categories of patterns of education and single motherhood using LCA.

Four patterns of nonresident father contact over time emerged in a latent class analysis by Cheadle, Amato, and King (2010). In the same year, Silverstein, Gans, Lowenstein, Giarrusso, and Bengtson (2010) used LCA to identify patterns of affection and conflict in parent-child relationships. Macmillan and Copher (2005, p. 864) specifically and strongly advocated using latent class analysis as a way to "identify the underlying structure of social roles" within a life course perspective. In a recent review of demographic trends, Cherlin (2010) suggested related probabilistic methods to better measure family life. I considered other methods, including cluster analysis, for this analysis. LCA was the most appropriate to the data because, in contrast to standard clustering techniques, it is a model-based clustering approach wherein a statistical model is created for the sample in the analysis (McLachlan and Peel, 2000). Rather than estimating parameters, as many other clustering methods do (Kaufman and Rousseeuw, 1990), LCA calculates each individual's class membership probabilities from the estimated model parameters and actual observed scores (Vermunt and Magidson, 2002; see Hagenaars and McCutcheon, 2002, for more information). Though

LCA has been used to investigate other questions in family research, to my knowledge, latent class analysis has not yet been applied to study children's family structure trajectories, and it is methodologically and theoretically well-suited for the task.

The present study extends and improves upon prior research by using national data to create parsimonious family structure *trajectories* that cover nearly the entirety of childhood for children from a specific cohort that is currently experiencing the transition to adulthood. The trajectories differentiate biological fathers from stepfathers and mother's marriages from cohabitations because these family structure differences predict parental investment and offspring outcomes (Brown 2004; Hofferth and Anderson 2003; Thomson and McLanahan 2012). This study also examines the characteristics that predict cumulative family structure arrangements in an effort to understand which children are more likely to experience which trajectories.

4. Characteristics Predicting Long-Term Family Structure Trajectories

Extant research points to mother and child characteristics that increase the likelihood of experiencing certain family experiences. In this study, these characteristics are examined as predictors of long-term trajectories of family structure in order to determine whether they operate in the same way when predicting long-term family structure.

Some research suggests that offspring gender may predict parental relationship decisions (Morgan, Lye, and Condran 1988). More often, though, mother characteristics are predictive of children's family structure. It is clear that minority children, with the exception of Asians, are generally more likely to be born to unmarried mothers than White children (Bianchi and Casper, 2000; Blau and van der Klaauw, 2008), which in turn is associated with higher levels of family instability for Black children (Raley and Wildsmith, 2004).

Previous literature and family theory also suggests that aspects of family structure are likely to be transmitted across generations (Axinn and Thornton, 1996; McLanahan and Percheski, 2008; Thornton, 1991; Teachman, 2004). The most commonly cited example is divorce: experiencing parental divorce increases offspring risk of divorce for a variety of reasons (Amato 1996). Likewise, economic circumstances are likely to persist across generations, and the socioeconomic circumstances of one's family of origin often predict family formation choices as well (Musick and Mare, 2006).

Religiosity has also been found to be associated with family formation choices (Amato, et al., 2007; Lehrer, 2004), especially nonmarital fertility (Wildeman and Percheski, 2009), and likelihood of cohabitation versus marriage (Eggebeen and Dew, 2009). Attitudes toward marriage have also been found to be predictive of family structure choices (Clarkberg, Stolzenberg, and Waite, 1995). In addition, mother's self-esteem in young adulthood may be associated with the type and stability of her future romantic relationships as well as her children's well-being. Specifically, having lower self-esteem lowers the chances that women will marry (Kim and McKenry, 2002).

Having a teen birth has been associated with long-term disadvantage in terms of future economic circumstances and lower chances of marriage, resulting from both causal effects and family background (Hoffman and Maynard, 2008). In addition, children with less educated mothers are more likely to spend some time with a single mother (McLanahan, 2004; McLanahan and Percheski, 2008). It is likely that these factors predict long-term family trajectories in addition to individual structures or transitions, but the association has thus far not been empirically tested. If these characteristics predict long-term family trajectories as well as shorter-term family experiences, then they may be even more salient predictors of divergent family structure trends than previously thought.

5. Method

The goals of this study were to 1) demonstrate the utility of latent class analysis for empirically describing children's long-term family structure trajectories and 2) analyze the characteristics that predict children's likelihood of experiencing various trajectories.

5.1 Analytic Strategy

The first step was to determine the number of unique family structure trajectories among this sample of children in the NLSY. The next step was to apply latent class analysis in *Mplus* in order to reveal the major pathways of such trajectories in the sample. Latent class analysis is used to capture underlying patterns due to an unidentified latent variable, in this case of children's living arrangements over the course of childhood. LCA is particularly appropriate to describe the family structure experiences of American children over time, yet has not been applied for this purpose in extant research. McCutcheon (1987) states that latent class analysis is appropriate when people belong to different groups but how people fall into those groups is not known *a priori* and should be decided according to the data.

The analysis of the characteristics that predict children's experiences of different trajectories was conducted using multinomial logistic regressions. Characteristics that prior research has found may affect family choices include mother's race, family structure and poverty background, religion, expectations of marriage, self-esteem, experience of having a teen birth, and education. These variables were included in the present analysis in order to determine whether they predict the long-term latent class pathways in similar ways. Expectation maximization algorithms were used to deal with missing data in regression-based analyses. Five percent or fewer of the cases were missing on the imputed variables with the exception of time spent in poverty (8% of cases were missing).

5.2 Sample

The data used in the study come from the National Longitudinal Survey of Youth 1979 (NLSY79) and the linked NLSY79 Children and Young Adults (CNLSY). The sample selected for this analysis consists of children who were 14-19 years old in 2006. The CNLSY surveys the biological children of women in the NLSY79. Information on the CNLSY sample has been collected every two years since 1986. When appropriate sample weights are used, the CNLSY is representative of children born to the women of the NLSY79, which in turn is representative of Americans who were 14 to 21 years of age on December 31, 1978.

The NLSY data are sponsored by the U.S. Department of Labor and the data have been compiled through the Ohio State University Center for Human Resource Research. The original NLSY79 data included a nationally representative sample of 12,686 men and women. As of the 2006 wave, the NLSY79 women were between the ages of 41 and 49. The CNLSY sample is estimated to represent over 90 percent of all the children ever to be born to this cohort of women. By 2004, there were 8,267 children identified in the NLSY data as having been born to the original NLSY79 female respondents, including a small number who were born prior to the original 1979 survey.

The sample selected for the study is children from a cohort who were 14-19 years old in 2006. Selecting adolescents in this narrow age range ensures that all of the respondents are from the same cohort. Adolescents in the sample were born between late 1986 and 1992. Limiting the sample to this age group allows more complete cohabitation information to be used, as information on cohabitation was not collected in the early years of the NLSY study. It must be noted that because there is a range of ages in the sample, some adolescents had several additional years of risk for experiencing more family transitions, and transitions did

occur in less than 4% of the sample at each additional age above age 14 (15-19). Those selected for the sample must have lived with their biological mothers continuously throughout childhood because the family structure information in the NLSY comes from mothers' interviews. These children represent children born in their mothers' late twenties. The mothers in the sample must have missed no more than two surveys during their child's lifetime in order to ensure that complete family structure histories were obtained. After applying those restrictions, the sample size was 1,927 children. In 57 cases, as family structure histories were being created, there were conflicting data reported by the mother about what transitions had occurred and when they had occurred, and it was not possible to reconcile the various reports, so the cases were dropped. The final sample size was 1,870 adolescents.

5.3 Measures

Family Structure Variables—All of the family structure transitions that the child experienced from birth until the survey in 2006, at which time the children were 14-19 years old, were recorded. Yearly measures of children's living arrangements were created using multiple sources of mother's relationship information available in the NLSY79. All family structure variables are measured in reference to the mother's marital and cohabiting status. The family structure variables were coded using data from the constructed variables in the Fertility and Relationship History File, the household roster for each wave, and mothers' reports of their marital status at each wave of data collection. Women reported retrospective start and end dates of current relationship status and up to 3 relationship transitions since the last survey wave. Cohabitation information was used as it was made available (mother's reports from 1990 forward, with more information in recent years from the NLSY-created Fertility and Relationship History File), and every effort was made to include cohabitation transitions that began and ended between waves using mother's report of the entrance and exit dates of a nonmarital romantic partner. Partner IDs corresponding to the household roster were used to establish whether a mother's residential partner was a child's biological father and whether the mother resided with that partner at the time of the child's birth. Same-sex partners were not included in this analysis. In 57 cases, as family structure histories were being created, there were conflicting data reported by the mother about what transitions had occurred and when they had occurred, and it was not possible to reconcile the various reports, so the cases were dropped.

Children were coded into one of six possible family structures at birth: mother married to biological father, mother cohabiting with biological father, mother married and separated from biological father, mother married to a non-biological stepfather, mother cohabiting with non-biological partner (hereafter referred to as a cohabiting stepfather), or single (currently does not report any spouses or partners in the household). Then the date and type of each relationship transition after the child's birth through 2006 were coded. Both the type of transition and the type of partner (biological or non-biological father) were recorded in the transition codes. There were 16 possible transitions: marriage to biological father, separation from biological father, reunite with biological father after a married separation, divorce from biological father, marriage to biological father ended due to father's death, marriage to stepfather, separation from stepfather, reunite with stepfather after a married separation, divorce from stepfather, marriage to stepfather ended due to father's death, begin cohabiting with biological father, end cohabitation with biological father, cohabitation with biological father ended due to father's death, begin cohabiting with stepfather, end cohabitation with stepfather, and cohabitation with stepfather ended due to stepfather's death. The total number of family structure transitions variable is the sum of all of the transitions that the child experienced.

For the latent class analysis, children were coded into one of five possible family structures for each year between birth and the child's age in 2006: mother married to biological father, mother cohabiting with biological father, mother cohabiting with stepfather, mother married to stepfather, and single mother (no partner reported in the household). A dichotomous variable (1,0) indicating whether the child experienced each family structure in each year of life was created. In years in which one or more transitions occurred, the child was coded 1 for each status experienced that year. Including the year of birth, there are 99 separate variables for each respondent (no one in the sample was born to a mother who was married to a stepfather at the time of birth, so this variable was omitted from the analysis).

Independent Variables—Child sex is measured as 1 = *male*, 0 = *female*. Mother's race is coded as a set of dichotomous variables: Black, Hispanic, and non-Black non-Hispanic. Mother's family structure at age 14 is coded according to whether she was living in an intact family with both of her parents when she was 14 years old (0 = *mother and father in household*, 1 = *other family structure*). Family poverty status is calculated for 1979, the first year of the survey (1 = *in poverty*, 0 = *not in poverty*).

Mother's religion in young adulthood is coded from a question in 1979 asking the respondent what their present religion is (a separate question asks in what religion was the respondent raised and is not used in this study). A dichotomous variable was created from this question (1 = *respondent named a religion*, 0 = *none, no religion*). Mother's expectation of marriage is coded from a question asked in 1979 regarding the age at which the respondent expects to marry (1 = *already married or answers with an age range*, 0 = *never*).

Mother's self-esteem is measured using the Rosenberg Self-Esteem Scale, which was administered in 1980 to tap mother's self-esteem in young adulthood. In the Rosenberg scale, respondents indicate the degree (1-4) to which they agree with statements such as, "I am a person of worth," "I am inclined to think I am a failure," and, "Sometimes I think I am 'no good' at all." Mother's self-esteem is the mean of the 10 questions in the Rosenberg scale, some of which are reverse-coded, so that a higher score always indicates higher self-esteem on a scale of 1 to 4 (ten items, reliability $\alpha = .83$). Mother's age at first birth is coded as a dummy variable according to whether the mother was less than 20 years old at the time of her first birth. Mother's education in 1985 was coded into a set of three dichotomous variables: *less than high school*, *completed high school*, and *education beyond high school*. This year was chosen because all mothers were over 20 years old in 1985, yet the first child in the sample was not born until the following year, in 1986.

6. Results

Descriptive statistics of the sample are described in Table 1. The sample was composed of adolescents with a mean age of about 16 and a half years old. Just over half of the sample was male. The mothers in the sample were about 30% Black, 20% Hispanic, and 50% non-Black non-Hispanic. Just under one-third of the mothers were living in a nonintact family at age 14, and about a quarter were living in poverty during the first wave of the NLSY. The mothers in the sample overwhelmingly reported having a religion and expecting to ever be married in 1979. Their mean self-esteem in 1979 was 3.21 on a scale of 1 to 4. About 20% of the mothers in the sample were teenagers at the time of their first birth. Over 80% of the mothers had completed high school before the birth of the focal child, and nearly 40% had some education beyond high school.

As shown in Table 2, there were 187 unique family structure trajectories in the sample of 1,870 adolescents. Although examining the 22 most common family structure trajectories provides useful information, the family structure experiences of 17% of the sample are

completely missed. There are 165 other trajectories among the remaining 322 children in the sample. These trajectories are not suited to statistical analysis, but they provide a picture of the complexity with which family researchers must deal (in this case, by using LCA to identify the overarching patterns of trajectories).

6.1 Identification of Latent Class Membership

Latent class analysis in *Mplus* (version 5) was utilized to determine the basic patterns of children's family structure experiences and obtain a parsimonious number of trajectories for further analysis. As a precaution against depending on a local maxima that might lead to a false solution instead of a global maxima, many different parameter start values were used for many iterations in multiple runs of the analysis in order to verify that the same, optimal solution was reached (Hagenaars and McCutcheon, 2002; McCutcheon 1987). Results were consistent across models. The results presented here are based on a model using 500 iterations for each of 20 random starting values.

Following Amato et al. (2008), latent class analysis was run on models specifying 1 to 12 latent classes so that all possible solutions to the data were tested, and three statistical methods were used to determine the best solution. First, the Bayesian Information Criterion (BIC) declined as the number of classes was increased from 1 to 12. Lower values suggest better solutions, but statistical research indicates that the BIC may overestimate the optimum number of classes (Nylund, Asparoutiov, and Muthen, 2007). In this case, the BIC clearly leveled off to a low point at the 5-class solution, which was eventually determined to be the best solution.

Second, entropy was used to determine the best number of classes, as it is a way to determine unambiguous classification into a particular number of separated groups (Wedel and Kamakura, 1998). The entropy values measure certainty in classification. Entropy reached a maximum of .997 in the 5-class solution, indicating that the 5-class solution was among the best. Third, the Lo-Mendell-Rubin (L-M-R) likelihood ratio test of model fit (Lo, Mendell, and Rubin, 2001) compares the fit of each model to the data with the solution with one fewer class. The L-M-R suggested a perfectly significant improvement ($p=.0000$) from the 4-class solution to the 5-class solution, and much larger p -values thereafter, indicating insignificant improvement in model fit with additional classes. Taking all three tests and a substantive interpretation of model usefulness into account, the 5-class solution emerged as the definitive best solution.

6.2 Typology of Children's Family Structure Trajectories

The children in the sample were categorized into one of the five latent classes based on their probability of being a member of each class (using the highest probability to assign classes resulted in class membership that was nearly identical to class sizes resulting from the latent class probabilities identified by *Mplus*). In other words, children were assigned to a class of trajectories based on whether they had a high or low probability of experiencing each family structure in each year. The 5 trajectories as identified by the 5-class solution are shown in Figure 1, where year 1 is the first year of the child's life (from birth to age 1) and year 20 is the year of being age 19.

In Figure 1, Trajectory 1 ($n=225$, 12%) includes children whose probability of living with married biological parents at birth was nearly 1. Sometime in middle childhood, these children experienced the divorce or separation of their parents, and the probability of living in a two married biological parent family plunged to about zero. At the same time, the probability of living with a single mother rose to between 70 and 80% in the early teen years. Those who did not live with a single mother lived with a married or cohabiting

stepfather during the late teen years. This class is referred to as born to married, biological parents, experience their divorce or separation.

Trajectory 2 ($n=329$, 18%) was made up of children who lived with long-term single mothers. Children in this trajectory spent the overwhelming majority of their childhood living with a single mother. At the very earliest ages, a minority lived with married or cohabiting biological parents, but the probability of not living with one parent was over 90% for the bulk of childhood. This class is referred to as *long-term single mothers*.

Trajectory 3 ($n=1031$, 55%) was the most common family structure pathway. Children who experienced this trajectory were born to married biological parents and remained in that family structure their entire lives. This class is referred to as biological parents continuously married to each other.

Trajectory 4 ($n=72$, 4%) was composed of children born to cohabiting biological parents. This trajectory included the fewest children; only 4% of the sample were in this class. The children in this trajectory had a very high probability of being born to two cohabiting biological parents. By the late teen years, children in this class still had about a 30-40% chance of living with two cohabiting biological parents. They were most likely to have experienced their parents' transition to marriage, with the probability of living with married biological parents rising to over .5 during ages 10-17. They had about a .2 probability of living with a single mother at the end of childhood. It is notable that children whose cohabiting parents married and those whose parents broke up are in the same trajectory distinguished by parental cohabitation rather than fitting with the continuously married class. This class is referred to as cohabiting biological parents who marry or break up.

Trajectory 5 ($n=214$, 11%), the fifth and final trajectory, was distinguished by gaining a stepfather, usually a married stepfather, at some point during childhood. Children in trajectory 5 were born into diverse family structures. About half of them were born to married biological parents who subsequently divorced (nearly all did so by age 7), so they share that experience with trajectory 1. Yet the probability of living with a married stepfather increased sharply in middle childhood, then leveled off and declined a bit at the end of the teenage years as some of those marriages ended. The probability of living with a cohabiting stepfather peaked around age 9 at nearly 30%, then declined as some of those cohabitations with stepfathers became marriages and others broke up. The probability of living with a married stepfather peaked around age 14 at nearly 80%, as mothers married some of the cohabiting stepfathers or began marriages not preceded by cohabitation. The probability of living with a single mother varied across the childhood years but remained high as mothers were single parents between co-residential relationships. Children in this trajectory clearly experienced substantial family instability over the course of childhood. This class is referred to as *gain a stepfather*.

In order to gain a better sense of the individual trajectories, it is useful to compare the number of family structure transitions children in each family structure trajectory experienced on average. As shown in Table 3, there was great variation in the number of family structure transitions between the different classes. Trajectory 3, *continuously married biological parents*, experienced the least number of transitions, on average, because the parents in that group were stably married. That group of children, over half the sample, experienced virtually no transitions. All of the other trajectories of living arrangements experienced at least one transition, on average. This finding is consistent with overall estimates of family instability in other studies using comparable NLSY data (e.g. Fomby and Cherlin 2007).

The trajectory with the most family structure transitions was Trajectory 5, *gain a stepfather*. These children experienced three and a half transitions, on average. As stepfathers are moving into and out of the household, children are experiencing substantial family instability. The group with the second highest number of transitions is Trajectory 1, born to married, biological parents, experience their divorce or separation. Children who experienced this trajectory experienced about two and a half transitions, on average.

The other two trajectories, living long-term with a single mother and being born to cohabiting parents, both experienced about a transition and a half, on average. The modal number of transitions among single mothers was zero, and the modal number of transitions among cohabiting biological parents who marry or break up was 1. From Figure 1, we know that some children in Trajectory 2, *long-term single mothers*, experienced a transition very early on, while children in Trajectory 4, cohabiting biological parents who marry or break up, were likely to experience their transition in later childhood.

6.3 Predictors of Long-Term Family Structure Pathways

Multinomial logistic regression models were employed in order to better understand the characteristics that predict latent class membership. The results are presented in Table 4. The reference group is trajectory 3: married continuously.

Child gender is generally not predictive of what family structure trajectory children experience, with the exception of male children being more likely to live with long-term single mothers than to be born into a married family that subsequently breaks up. Mother's race is a statistically significant predictor of latent class membership. Children with Black mothers have 10 times higher odds of living with a long-term single mother, 4 times higher odds of living with cohabiting parents who marry or break up, and nearly 3 times higher odds of living in the gain a stepfather trajectory than to experience the continuously married trajectory compared to children with non-Black non-Hispanic mothers, and there are differences between almost all other trajectories as well. Children with Black mothers are also significantly more likely to be in trajectory 2 (single mothers), 4 (cohabiting parents who marry or break up), and 5 (gain a stepfather) than trajectory 1 (born married, divorce) and more likely to be in trajectory 2 than trajectories 4 or 5 compared to children of non-Black Non-Hispanic mothers. Children with Hispanic mothers are more likely to live with a long-term single mother or to live in the gain a stepfather trajectory than the continuously married trajectory. They are also more likely to live with a long-term single mother than parents who are married and subsequently break up compared to children with non-Black non-Hispanic mothers.

In three out of four models predicting latent class membership into a trajectory other than the continuously married group, mother's family structure at age 14 was a statistically significant predictor of child's family structure trajectory. Having a mother who lived in a non-intact family at age 14 was associated with being more likely to be in the long-term single mother group, the born married and then divorce or separate group, and the gain a stepfather group compared to the continuously married group. Mother's family structure at 14 was not predictive of experiencing one trajectory versus another among the remaining trajectories. Having a mother who lived in poverty during her youth was also associated with higher odds of living with a long-term single mother group and gaining a stepfather compared to living with continuously married parents, but was not predictive of experiencing one trajectory versus another among the remaining trajectories.

For the most part, the variables capturing mother's religious identification, marital expectations, and self-esteem were not significant predictors of the family structure in which children were raised, with the exception of reporting having a religion (as opposed to not

having a religion) being associated with lower odds of children experiencing trajectory 5, gain a stepfather, compared to living with continuously married biological parents and cohabiting parents who subsequently marry or break up. Trajectory 5 was the trajectory with the most instability, so it is possible that being religious is associated with a lower likelihood of having several consecutive live-in relationships.

Children whose mothers were teenagers at the time of their first birth had higher odds of being in trajectory 1, born to married, biological parents who subsequently divorce or separate, and trajectory 5, gain a stepfather, compared to the continuously married trajectory. Children born to mothers who gave birth as teenagers also had increased odds of experiencing trajectory 1, born married and divorce, compared to trajectory 2, long-term single mothers, and trajectory 4, cohabiting parents who marry or break up. Children born to mothers who gave birth as teenagers also had increased odds of experiencing trajectory 5, gain a stepfather, compared to trajectory 2, long-term single mothers.

Mother's education before the birth of the focal child is confirmed to be an important predictor of the long-term family structures in which children grow up. In general, children whose mothers have more education are less likely to experience trajectories not associated with marriage compared to children with mothers with a high school education or less. Specifically, children with mothers who have less than a high school diploma are significantly more likely to grow up with a long-term single mother than continuously married parents or married parents who later divorce compared to those with a high school diploma. They are more likely to grow up with cohabiting parents who either marry or break up than married parents who divorce. In contrast, children whose mothers have attended at least some college are significantly less likely to grow up with long-term single mothers (trajectory 2), cohabiting parents (trajectory 4), or highly unstable families with at least one stepfather (trajectory 5) than continuously married biological parents. They are more likely to live with married parents who divorce than long-term single mothers or cohabiting parents, and they are slightly more likely to live in trajectory 5 (gain a stepfather) than trajectory 4 (marked by parental cohabitation).

7. Discussion

This study presented the first application of latent class analysis to capturing the tremendous heterogeneity in family structure trajectories among contemporary American children. It is the first to classify the major family structure trajectories children experience into useful, parsimonious *pathways* of common long-term experience. The living arrangements that children experience vary widely, with most children still growing up in stable households of different types, mostly with married biological parents or a single mother, and a substantial and growing proportion of children experiencing multiple family structure transitions. The contribution of this study is to describe a method that researchers can utilize for analyzing the correlates and consequences of growing up in these trajectories.

In this sample of 1,870 adolescents, there were 187 different trajectories. Latent class analysis was utilized to understand the underlying pathways of children's long-term family structure experiences. The latent class analysis revealed five major classes of children's family structure experiences: married parents who divorce or separate; long-term single mothers; continuously married biological parents; cohabiting biological parents who marry or break up; and a highly unstable trajectory distinguished by gaining at least one stepfather.

Although American families are rapidly changing, over half of this sample of children grew up with continuously married biological parents. An additional 18% of the sample grew up with long-term single mothers. Therefore, about three-quarters of this sample of children

grew up in stable families of one kind or another. The remaining quarter grew up in unstable families marked by periods of marriage, cohabitation, and single mothers. As the nonmarital fertility rate continues to rise, current cohorts of children are increasingly likely to experience these less stable family structures in greater numbers. This instability will not be experienced by all children at the same rates, however.

Mother's education, mother's race, mother having a first birth as a teenager, mother's experiencing a nonintact family, and mother experiencing poverty in youth were important predictors of children's family structure trajectories. These findings speak to the intergenerational transmission of both family structure and inequality. Previous studies have demonstrated the importance of mother's socioeconomic status and family background in predicting children's family structure (e.g. Carlson and Furstenberg, 2006; Edin and Kefalas, 2005; McLanahan, 2004), and this study both confirms and extends those findings by demonstrating that these characteristics also predict long-term *trajectories* of family structure experience. Many of the family structures that children of less advantaged women are more likely to experience according to the present study are associated with negative child outcomes (McLanahan and Percheski, 2008).

The next step in this line of research will be to determine whether these long-term trajectories of family structure are associated with offspring well-being. Preliminary analyses (available upon request) confirm that experiencing certain family structure trajectories is associated with worse outcomes compared to other family structure trajectories. Not only are these trajectories associated with offspring outcomes, they are significant predictors of several key measures of well-being independently of currently used measures such as number of transitions and current family structure. Trajectories of children's long-term family structure experiences are likely to matter because they tap the type, order, and timing of transitions and the cumulative experience of family structure. As children experience increasingly complex family structures over the entire course of childhood, it will become even more important to assess the long-term impact of the cumulative *trajectories* of experience.

There were several limitations in this study. A major limitation is the fact that the sample included only children who lived continuously with their biological mothers because family structure information was derived from the mother's survey. Family instability is likely underestimated, because children who did not live with their mothers throughout childhood and spent time in other family structures (with biological fathers and their partners, other family members, or in non-family arrangements) likely experienced greater and more intense instability than the children in this sample. Changing households from mother's home to father's home, for example, is probably a more intense and stressful family structure transition than having a mother's partner move in or out. In addition, some children may move out of the mother's household as a result of the addition of a stepfather whom the child does not like.

Despite the fact that the sample only includes children who lived continuously with their biological mothers, it captures the experiences of a very large proportion of American children's family structure experiences. According to U.S. Census Bureau statistics (2011), the vast majority of children live with their biological mothers. About 3% of children live in father-only families, and one-half of a percent of children lived in father-stepmother families. About 4% of children lived with neither biological parent. Adding these numbers together, about 7.5% of children live in households that do not include their biological mother, but close to four percent live with their fathers and not their mothers; the rest lived with neither parent. Although this sample does not include children who left their mother's

household, it does capture the experiences of the overwhelming majority of American children, who mostly do live with their biological mothers (Kreider and Ellis 2011).

Another limitation is the fact that the data are not perfectly nationally representative. Rather, the CNLSY is representative of the children of the women in the NLSY, which is in turn nationally representative of young Americans in 1979, and this study utilizes a subsample of CNLSY children born within a particular range. Immigrant children are particularly underrepresented. Still, the data used in this study are an improvement in terms of representativeness upon other commonly used data sets used to study family instability because it follows children over their entire life course and provides insight into the family lives of American children today.

This study demonstrates that long-term trajectories determined by latent class analysis are empirically useful ways of understanding children's cumulative family structure experiences. In addition, this study reveals how much complexity in long-term experience can be missed when static measures of family structure are employed.

It is important to fully understand the family contexts in which children are growing up. This study employed a life course approach to answer Rindfuss, Swicegood, and Rosenfeld's (1987) call to study "the life course *as it is actually lived*, not as we wish it to be for the sake of research" [emphasis theirs] (Rindfuss et al., 1987, p. 799). Studying long-term family structure will continue to become more difficult as families become more complex. If we want to understand children's experiences as we shape policy and practice, however, future research must continue to improve upon current family structure measures in order to build understanding about the family contexts of the next generation.

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Highlights

- Latent class analysis is used to measure children's long-term family structure.
- Latent class analysis reveals parsimonious, useful family structure classifications.
- American children generally grow up in one of five family structure trajectories.
- Two trajectories are stable but three and involve multiple family transitions.
- Mother characteristics are highly predictive of children's family trajectories.

Figure 1.
Five-Class Solution of Latent Pathways (N = 1,870)

Table 1

Descriptive Characteristics of Sample (N = 1,870)

	<i>% or M (SE)</i>
<i>Child characteristics</i>	
Age	16.41 (1.62)
Male	52.2%
<i>Mother Characteristics</i>	
Race	
Black	28.2%
Hispanic	19.9%
Non-Black, non-Hispanic	51.8%
Non-intact family at age 14	30.6%
Poverty in 1979	24.7%
Claim a religion 1979	92.1%
Expect to marry 1979	98.6%
Self-esteem in 1979	3.21 (.41)
Teen 1 st birth	20.9%
Education	
Less than high school	17.4%
High school	42.9%
More than high school	39.7%

Note: Imputed cases excluded.

Table 2

Number and percentage of adolescents in sample who experienced most common family structure trajectories
(N = 1,870)

Family structure at birth	Trajectory after birth	n	%
Married biological parents	no transitions	971	52%
Married biological parents	→ separate → divorce	138	8%
Married biological parents	→ separate	27	1%
Married biological parents	→ separate → divorce → remarry stepfather	26	1%
Married biological parents	→ divorce → remarry stepfather	18	1%
Married biological parents	→ separate → divorce → cohabit with stepfather → → remarry stepfather	26	1%
Married biological parents	→ divorce → cohabit with stepfather → remarry stepfather	16	1%
Married biological parents	→ separate → divorce → cohabit with stepfather → → breakup	14	1%
Married biological parents	→ separate → cohabit with stepfather → divorce → → remarry stepfather	11	1%
Married biological parents	→ separate → divorce → cohabit with stepfather	9	1%
Married biological parents	→ divorce → remarry stepfather → divorce	10	1%
Married biological parents	→ father dies	15	1%
Married biological parents	→ separate → reunite	13	1%
Cohabiting biological parents	→ biological parents marry	39	2%
Cohabiting biological parents	→ breakup	24	1%
Cohabiting biological parents	no transitions	14	1%
Single mother	no transitions	117	6%
Single mother	→ cohabit with stepfather → marry stepfather	20	1%
Single mother	→ cohabit with stepfather → breakup	17	1%
Single mother	→ marry stepfather	13	1%
Single mother	→ cohabit with biological father → biological parents marry	10	1%
TOTAL	22	1,548	83%
Other trajectories	165	322	17%
Total number of unique trajectories	187	1,870	100%

Table 3

Number of family structure transitions by latent class membership (N = 1,870)

Latent Class	Mean (S.D.)	Mode	Range
Trajectory 1: Born to married, biological parents, experience their divorce or separation.	2.48 (1.47)	2	1-9
Trajectory: Long-term single mothers.	1.69 (1.75)	0	0-7
Trajectory 3: Biological parents continuously married to each other.	.09 (.40)	0	0-4
Trajectory 4: Cohabiting biological parents who marry or break up.	1.53 (1.33)	1	0-6
Trajectory 5: Gain a stepfather.	3.55 (1.69)	3	1-9

Table 4
Summary of multinomial logistic regression analysis for mother and child characteristics predicting latent class membership

	Class 1: Born married, divorce or separation			Class 2: Long-term single mothers			Class 4: Cohabiting parents marry or break up			Class 5: Gain a stepfather		
	<i>B</i>	<i>SE</i>	<i>e^B</i>	<i>B</i>	<i>SE</i>	<i>e^B</i>	<i>B</i>	<i>SE</i>	<i>e^B</i>	<i>B</i>	<i>SE</i>	<i>e^B</i>
<i>Child characteristics</i>												1
Male ^a	-.21	.15	.81	.18	.15	1.19	-.32	.25	.73	-.15	.15	.86
<i>Mother Characteristics</i>												
Race												
Black ^{abcde}	-.05	.22	.95	2.32	.19	10.19	1.45	.33	4.24	1.02	.20	2.76
Hispanic ^a	.06	.20	1.06	.61	.22	1.83	.46	.35	1.58	.48*	.21	1.62
Non-Black, non-Hispanic	---	---	---	---	---	---	---	---	---	---	---	---
Non-intact family	.56	.17	1.75	.74	.16	2.10	.26	.28	1.30	.39	.18	1.47
Poverty in 1979	.33	.21	1.39	.51	.18	1.67	.40	.31	1.49	.40	.20	1.48
Claim a religion 1979 ^f	-.01	.29	.99	-.22	.27	.81	.65	.62	1.92	-.65*	.26	.52
Expect to marry 1979	-.85	.75	.43	-.89	.64	.41	1.51	.82	.22	-.75	.73	.47
Self-esteem in 1979	-.03	.20	.97	-.31	.20	.74	.01	.34	1.01	-.11	.21	.90
Teen 1 st birth ^{abcde}	.87	.20	2.40	.15	.19	1.16	.21	.30	1.23	.61	.20	1.83
<i>Education</i>												
Less than HS ^{ab}	-.38	.26	.68	.48	.21	1.61	.64	.32	1.90	.10	.23	1.11
High school	---	---	---	---	---	---	---	---	---	---	---	---
More than HS ^{abf}	-.17	.17	.84	-.79	.18	.45	1.51	.38	.22	-.61	.19	.55
Constant	-.74			-.46			2.10			-.29		

	Class 1: Born married, divorce or separation				Class 2: Long-term single mothers				Class 4: Cohabiting parents marry or break up				Class 5: Gain a stepfather			
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>e^B</i>	<i>SE</i> <i>B</i>	<i>B</i>	<i>e^B</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>e^B</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>e^B</i>	
<i>n</i>	224				329			72				214				
Model Fit	χ^2				<i>df</i>				Pseudo R-Squares							
	572.664***				44				.264				.287			
									Cox and Snell				McFadden			
									Nagelkerke							