NBER WORKING PAPER SERIES

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Working Paper 26242
http://www.nber.org/papers/w26242

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 2019, Revised July 2021

We are grateful to the referees and to Chinhui Juhn, Kjell Erik Lommerud, Wendy Manning, Eric Nielsen, Richard Reeves, David Ribar, Duncan Thomas, and Lawrence Wu for helpful comments. Earlier versions of this paper were presented at the Economic Demography Workshop (2016) where Mary Ann Bronson provided helpful comments and at the Population Association of America Conference (2017). We also thank seminar participants at Washington University in St. Louis, IZA, Duke University, the Melbourne Institute for Applied Economic Research, the University of Washington in Seattle, the University of Houston, and the University of California at Santa Barbara for useful suggestions. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 26242
September 2019, Revised July 2021
JEL No. I21,J12,J13

ABSTRACT

Fathers' multiple-partner fertility (MPF) is associated with substantially worse educational outcomes for children. We focus on children in fathers' "second families" when the second families are nuclear families – households consisting of a man, a woman, their joint children, and no other children. We analyze outcomes for almost 75,000 Norwegian children all of whom, at least until they were age 18, lived in nuclear families. Children with MPF fathers are more likely than other children from nuclear families to drop out of secondary school (24% vs 17%) and less likely to obtain bachelor's degrees (44% vs 51%). These gaps remain substantial after controlling for child and parental characteristics such as income and wealth, education and age: 4 percentage points (ppt) for dropping out of secondary school and 5 ppt for obtaining a bachelor's degree. Resource competition with the children in the father's first family does not explain the differences in educational outcomes. We find that the association between a father's previous childless marriage and his children's educational outcomes is similar to the association between a father's MPF and his children's educational outcomes. This similarity suggests that selection plays the primary role in explaining the association between fathers' MPF and children's educational outcomes.

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1. Introduction

Children who spend their entire childhoods in nuclear families—households consisting of a man, a woman, their joint children, and no other children—have better educational outcomes than children from other family structures.[1] However, not all nuclear families are alike: in some nuclear families one of the parents, usually the father, has children from a previous relationship living elsewhere.

We investigate the association between fathers' multiple partner fertility (MPF) and the educational outcomes of the children in fathers' "second families." In order to isolate the effect of MPF in absence of family structure transitions we restrict our attention to second families that are nuclear families. All of the children we consider spent their entire childhoods, at least until age 18, in nuclear families, the family structure that is associated with the best educational outcomes for children. We find that fathers' MPF is associated with substantially worse educational outcomes for the children in the fathers' second families.

Although MPF is receiving increasing attention from sociologists, demographers, and economists, attention has focused on mothers' rather than fathers' MPF. This reflects both the tradition of defining family structure as household structure and the paucity of US data on the family beyond the household. Outcomes for children in blended families – households consisting of a man, a woman, their joint children, and at least one nonjoint child – have been extensively studied (Ginther and Pollak 2004, Gennetian 2005, and Halpern-Meekin and Tach 2008). Since children usually remain with their mothers when unions dissolve, blended families typically include the mother's children from previous relationships but not the father's. Because most US data sets are

[1] A "joint child" is one who is the biological child of both the man and the woman. Although the US Census Bureau definition of a "traditional nuclear family" requires marriage, we do not.

household-based, they seldom report whether the father has children from other relationships unless those children live in the household under study.

We investigate short-term and long-term educational outcomes associated with fathers' MPF. Previous studies have examined the association between family structure and children's educational outcomes (e.g., Ginther and Pollak 2004, Gennetian 2005, Björklund et al. 2007, McLanahan and Sandefur 1994, Steele et al. 2009). A meta-analysis finds that fathers' involvement significantly improves children's educational outcomes (Jeynes 2015). Ours is the first study to examine whether fathers' MPF has a significant association with children's educational outcomes. Investigating this requires both data that link parents to all of their resident and nonresident children, and data that follow children far enough into adulthood to investigate both high school and college graduation. No US data set follows children into early adulthood in sufficient numbers to support this kind of analysis. For example, the PSID does not include enough MPF fathers to provide the data needed to investigate the association between fathers' MPF and college graduation or even high-school graduation of children in fathers' second families.[2]

We use Norwegian register data with information about all children born in Norway in 1986, 1987, and 1988 from birth until age 26. The large sample size provided by population registers allows us to explore several potential explanations for the association between fathers' MPF and children's educational outcomes.

Several researchers have used Norwegian register data to gain a better understanding of the association between birth order and various outcomes (Black et al. 2005, 2011, 2016, 2018; Lillehagen and Isungset 2020), the impact of proximity of divorced fathers to their children

[2] In the PSID we identified 1402 children in fathers' second families where the father had been married for twenty or more years. To investigate college graduation, we would need to observe these children to their mid-20s, but we find only 133 children. To investigate high school graduation, we could relax the age restriction to age 21, but this adds only 31 children.

(Kalil et al. 2011), and the effect of family disruptions on child outcomes (Steele et al. 2009). By restricting our analysis to children who spent their entire childhoods in nuclear families, we isolate the association between fathers' MPF and children's educational outcomes in a simple, transparent family environment without making untestable a priori assumptions. This restriction to nuclear families, together with the very large sample size found in the Norwegian registers, allows us to estimate the impact of MPF net of other types of family complexity. For example, it allows us to rule out family structure transitions as the cause of the worse educational outcomes experienced by the children in fathers' second families.

We call nuclear families in which fathers have children from another relationship "complex nuclear families" and families in which fathers do not have such children "simple nuclear families." We find that children from complex nuclear families experienced substantially worse educational outcomes. Our data allow us to investigate two mechanisms that may explain these worse outcomes: the "resource competition hypothesis" postulating that the children in fathers' first families compete with the children in their second families for resources, and the "later birth hypothesis" (i.e., viewing birth order from the father's perspective). We find very little support for these explanations.

Although Furstenberg (2014) argues that we should avoid rushing to judgment about the "causal effect" of family complexity on children's outcomes, for the type of family complexity we investigate our analysis points to the dominant role of selection (i.e., unobserved characteristics that affect both fathers' MPF and child outcomes). We find that the association between a father's previous childless marriage and his children's educational outcomes is similar to the association between a father's MPF and his children's educational outcomes. This is strong evidence that unobserved characteristics of the father rather than competition for resources or

later birth causes the children in the second families of the MPF fathers to experience worse educational outcomes.

2. The Literature on Fathers' Multiple Partner Fertility

It is easier to measure the prevalence of MPF than its effects. Using the National Survey of Family Growth, Guzzo (2014) finds that in the United States 13% of men and 19% of women aged 40-44 have had children with more than one partner.[3] But not all men are fathers and not all fathers have two or more children, so alternative measures of MPF also convey important information. For example, Guzzo reports that 17% of fathers and 22.5% of fathers with two or more children have had MPF.[4]

Using Norwegian using register data for the period 1971-2006, Lappegård and Rønsen (2013) analyze socioeconomic differences in fathers' MPF for men born between 1955 and 1984. On average, 8% of fathers in their sample have a multipartner second birth, and MPF is more likely for both low- and high-income men. Since a large fraction of the cohorts in their study were still relatively young, the numbers are not directly comparable to those calculated by Guzzo for the US. Using Norwegian register data and focusing on MPF by age 45 for men and women born in 1968-1970, we find that 11% of men and 14.5% of women have had children with more than one partner. Restricting our attention to parents, we find that MPF prevalence for fathers rises to 14%, and for mothers to 16.5%.

[3] For a collection of authoritative articles on MPF and other forms of family complexity, see *Annals of the American Academy of Political and Social Science* (2014) on "Family Complexity, Poverty, and Public Policy." Using the National Survey of Family Growth (NSFG), Guzzo and Furstenberg (2007) and Manlove et al. (2008) document the prevalence of fathers' MPF and find that in the US it is associated with economic disadvantage.

[4] Guzzo and Dorius (2016) provide a table summarizing studies of the prevalence of MPF in the United States. Joyner et al. (2012) and Amorim and Tach (2019) provide additional evidence.

2.1 Fathers' Multiple Partner Fertility and Outcomes for Children

Fomby and Osborne (2017) and Carlson and Furstenberg (2007) use US Fragile Families data to analyze children's behavior, but the Fragile Families children are not yet old enough to allow us to analyze outcomes such as college or even high school graduation. Fomby et al. (2016) uses the Early Childhood Longitudinal Study-Birth Cohort, but this study does not allow children to be observed past kindergarten. Other researchers have examined the effects of family disruption and complexity in Norway and Sweden. Steele et al. (2009) finds that family disruption is adversely associated with children's educational outcomes in Norway, and Björklund et al. (2007) finds that the association between family complexity and children's education and income outcomes is very similar in Sweden and the United States.

2.2 Mechanisms of Disadvantage

Economists, sociologists, and psychologists emphasize somewhat different mechanisms through which family structure might affect outcomes for children. As economists, we think of family structure as a mechanism that facilitates parental investment of time and money in children's human capital or as a proxy for such investments. For example, a father's child support obligations for the children in his first family might create resource competition between the children in his first family and those in his second family, thus reducing the resources available for investments in the human capital of the children in his second family.

Sociologists and psychologists have suggested that family structure could operate not only through resources but also through other mechanisms. For example, children from nuclear families might receive more consistent parenting, more supervision, more parental support, and more parental control than children from single-parent families (Cherlin and Furstenberg 1994;

Hofferth and Anderson 2003) or blended families (Cherlin 1978), perhaps resulting in better educational and socio-economic outcomes.

We investigate two mechanisms, "resource competition" and "later birth," that may underlie the substantial and statistically significant association between fathers' MPF and children's worse educational outcomes. The resource competition hypothesis posits that the children in the father's first family compete with the children in his second family for resources such as money, time, and attention. That is, the children in the first family drain away resources that would otherwise have gone to the children in the second family, adversely affecting the educational outcomes of the children in the father's second family. An underlying assumption is that, on average, fathers in simple and complex nuclear families have the same preferences, beliefs, information, personalities, and parenting styles. The resource competition hypothesis therefore attributes differences in children's educational outcomes to differences in the circumstances facing MPF fathers, specifically, to their obligations to the children in their first families.[5] Using the Fragile Families data, Carlson and Furstenberg (2007) found evidence of resource competition leading to disadvantage in fathers' second families.

Viewing birth order from the perspective of the father, the later birth hypothesis implies that estimates are likely to misattribute to fathers' MPF the effect of birth order because they compare the later-born children of some fathers with the first-born children of other fathers. In complex nuclear families, the oldest child in the father's second family is the first-born child of the mother but not the first-born child of the father. Researchers have investigated the causal effects of birth order on children's outcomes (Black et al. 2005, 2011, 2016, 2018; Hotz and

[5] Economists model the allocation of household resources as determined by parents' preferences, beliefs, and information. Economists seldom discus personality or parenting style. Exceptions include Lundberg (2012) which analyzed personality and Cobb-Clark et al. (2019) and Doepke and Zilbotti (2017, 2019) which analyze parenting style.

Pantano 2015; Bertoni and Brunello 2016). Using Norwegian data, the literature has established that first-born children have better educational outcomes than higher birth order children (Black et al. 2005). This older literature focuses on "parity" (i.e., birth order from the perspective of the mother). Using Norwegian data, Lillehagen and Isungset (2020) investigate birth order from the perspective of the father. They find that children born to MPF fathers have better educational outcomes compared to their older half-siblings. They conclude that maternal resources may contribute to negative birth order effects.

2.3 The Selection Hypothesis

Investigating the association between family instability and child outcomes, Fomby and Cherlin (2007) write, "The association between multiple transitions and negative child outcomes does not necessarily imply that the former causes the latter. In fact, multiple transitions and negative child outcomes may be associated with each other through common causal factors reflected in the parents' antecedent behaviors and attributes. We call this the *selection hypothesis*." (Italics in the original.) McLanahan et al. (2013, p. 422), concluding their analysis of the "causal effects of father absence," write: "Despite the robust evidence that father absence affects social-emotional outcomes throughout the life course, these studies also clearly show a role for selection in the relationship between family structure and child outcomes." Furstenberg (2014) also emphasizes the importance of selection in addressing family complexity: "Without effectively ruling out selection, it is very difficult to conclude that complexity per se undermines good parenting, couple collaboration, and successful child development. For the time being, it makes good sense not to rush to a judgment on the questions of whether or how family complexity

compromises child well-being." We agree with Furstenberg (2014) that we should avoid rushing to judgment about the "causal effect" of family complexity on children's outcomes.

In the context of fathers' MPF, the selection hypothesis posits that, on average, the fathers with and without MPF differ in both observed and unobserved characteristics, and that these account for the observed differences in children's educational outcomes. Net of controlling for observables, the selection hypothesis suggests that unobserved parental characteristics correlated with fathers' MPF may be associated with patterns of household expenditures or the allocation of goods and time within the household that favor parental consumption over investment in children's human capital. This focus on expenditure patterns and the allocation of goods and time within the household is standard in economists' models of the household (Behrman 1997, p. 128). The unobserved characteristics may include preferences, beliefs, information, personalities, or parenting styles. Perhaps the MPF fathers are less inclined to invest in their children or have different beliefs about what constitutes effective parenting. Or perhaps fathers' MPF is associated with less competent or less devoted parenting, less investment in personal relationships with mothers and children or with more marital conflict. According to the selection hypothesis, whether the father has a first family is an indicator of these or other unobserved characteristics – in the jargon of economics, it is an indicator of the father's "type."

3. The Norwegian Context, Family Types, and Covariates

All children in Norway attend compulsory school which they usually complete the year they reach age 16. After compulsory school, all children are entitled to attend secondary school. Secondary schooling in Norway involves more tracking than in the United States: students who attend secondary school choose between a three-year academic track and a three- or four-year

vocational track. University or college attendance usually requires completing the academic track with grades high enough to qualify for admission.

Graduation from secondary school has become increasingly important for successful participation in further education and work, and reducing the number of early school leavers is a policy objective in Norway and in most other OECD countries (Lamb and Markussen 2011). In Norway, between 97% and 98% of children graduating from compulsory school in 2002–2004 enrolled in secondary education, but only about 70% of each cohort had completed secondary education five years later (Falch et al. 2014). Although the returns to schooling are lower in Norway than in the US (Dolton et al. 2009), completed formal education is increasingly important for earnings prospects given the effect of international trade and technological change in lowering the demand for low-skilled workers.

The Norwegian registers do not provide information about custody arrangements, but they do report household composition, including the presence of half-siblings. Because we restrict our attention to nuclear families, no half-siblings are reported as residents in the households we consider.

Parents with children from a previous relationship either pay or receive child support for the children from the previous relationship depending on whether or not they have physical custody. Hence, MPF fathers were legally obligated to pay child support.[6] If a noncustodial parent refuses to pay child support it will be collected by the government via payroll deduction. Required child support payments to the custodial parent depended on the total number of

[6] Daily physical custody is granted to the parent with whom the child lives most of the time. During our sample time frame, research shows that mothers had daily physical custody in almost 90% of cases, (Jensen and Clausen 2000). Skevik (2006) presents survey statistics from 2001-2002 on father-child contact after parental break-up showing that among nonresident fathers about 60% have a written or oral agreement about contact with the child and 57% of the nonresident fathers report having met with the children within the last week. Tjøtta and Vaage (2008) provide a comprehensive description of the Norwegian child support system.

children of the noncustodial parent, the number of joint children living with the custodial parent, and the noncustodial parent's income. The formula specifies a percentage of the noncustodial parent's gross income as a function of his or her total number of children (11% for one child; 18% for two; 24% for three; and 28% for four or more children). For example, a father with two children, one child from his first family and one child in his second family, would pay his first wife 9% of his income in child support (1/2 x 18). A father with three children, two from his first family and one from his second family, would pay his first wife 16% of his income in child support (2/3 x 24). Noncustodial parents are legally obligated to provide financial support until their children turn 18 or until they complete secondary school, usually at age 19.[7] The child support formula implies that noncustodial parents make substantial financial transfers to the children in their first families.

Parents who live with their children also receive a child benefit from the Norwegian social insurance system. For each child under 18, the child benefit has been fixed since 1993 at NoK 970 (about $110 US per month in 2015 dollars) and is exempt from taxes. If parents are married or cohabiting, the child benefit is usually transferred to the mother. If parents are not married or cohabiting, the custodial parent receives an extended child benefit, amounting to the child benefit for one child more than she or he lives with.

3.1 Data and Family Type Definitions

Our analysis is based on individual-level data from official Norwegian registers for the period 1986-2014. The registers, which cover the entire Norwegian population, are merged using

[7] Most Norwegian colleges and universities charge modest fees and do not charge tuition. Child support paid was deducted from the taxable income of the noncustodial parent and child support received was taxable income of the custodial parent. Until 2002 the noncustodial parent also had to pay travel costs related to visits of nonresident children.

unique person-specific identification codes. These registers provide information about demographic background characteristics (gender, birth year/month, links to biological parents, and country of birth), socio-economic data (education, annual income, and earnings), annually updated information about household composition, and continuously updated employment and social insurance status. The link to parents enables us to identify both mothers' and fathers' MPF and, combining this information with data on household composition, we can identify the family structures in which each child lived in each year from birth until age 18.

By an "eligible child" we mean a child who spent his or her entire childhood in a nuclear family. We include all eligible children in our analysis rather than selecting one "focal child" from each family.[8] For our empirical work, we define a *nuclear family* as a household in which the eligible child spent his or her entire childhood living with both biological parents and in which all the other children were also the joint children of these parents and, hence, full siblings.[9] The nuclear second family can be a married or cohabiting union. Data on marriage is available for all years, but data on cohabitation is only available starting in 1986.

The family structure literature often attributes the outcomes of children in complex families to family structure transitions; Wu and Martinson (1993) provided an early example. But family structure transitions cannot explain our results because we restrict our attention to nuclear families. This restriction allows us to rule out family structure transitions as an explanation for the worse educational outcomes associated with fathers' MPF. We use the following taxonomy to analyze the effects of fathers' MPF:

[8] We use "eligible child" as a shorthand, recognizing that about 8% of families in our sample have more than one eligible child.
[9] Our definition of a nuclear family excludes families with adopted children.

- Simple Nuclear Family (**NFo**): Neither the father nor the mother had children from another relationship.
- Complex Nuclear Family (**NF+**): The father, but not the mother, had at least one child from another relationship living elsewhere.
- Nonnuclear Family (**NNF**): the child spent at least one year in a household without both biological parents or in a household with at least one child who was not a joint child of her biological parents and, hence, not her full sibling. For example, in a single parent family, a blended family, or a nonparental family (e.g., with grandparents).[10]

Our starting point is the population of 146,923 children born in Norway between January 1, 1986 and December 31, 1988 with Norwegian-born parents registered as living in Norway. We begin with the 1986 birth cohort because it is the earliest cohort for which we have complete information about household composition. We end with the 1988 birth cohort because we want to follow all of the children into young adulthood to obtain information on completed higher education and 2015 is the latest year for which we have observations.

Table 1 shows the distribution of eligible children by family type. Among all children, 54% grew up with both biological parents until age 18 and 46% did not. Of the 54% who grew up with both biological parents, 95% grew up in nuclear families and 5% grew up in blended families. Among those who grew up with both biological parents, the vast majority (90.7%) grew up in simple nuclear families (NFo = 72,052, in 66,781 families) and somewhat more than 4%

[10] We have not included children from NNF because our identification strategy requires children who never experienced a family structure transition.

grew up in complex nuclear families (NF+=3,208, in 2,983 families).[11] Of the 2,983 fathers in complex nuclear families, 70% (2,082) have only one child from a previous relationship and of those 929 (45%) were previously married. There are 901 fathers with more than one child from a previous relationship and 810 (90%) of them were previously married. Only 176 of those with two or more children (6% of fathers with MPF) had them with more than two women.

3.2 Outcome Variables and Explanatory Variables

We analyze four measures of educational outcomes. Two of our measures are based on the grades received at completion of compulsory school, usually the year a child turns 16. The children receive grades ranging from 1 (lowest) to 6 (highest) in 11 subjects. Our first measure, *Grades*, is a normalized variable calculated by standardizing the sum of all grades to a distribution with mean 0 and variance 1. Our second measure, *Low Grades*, is based on the grades obtained in the three core subjects (Mathematics, Norwegian, and English); we use these grades to construct an indicator variable which is equal to one if the child received a grade below 4 in all three core subjects, indicating weak qualifications for attending secondary school. Our third measure, *Dropout*, is an indicator variable for not completing secondary school by age 22.[12] Our fourth measure, *Bachelor's*, is an indicator variable for whether the child completed a bachelor's degree or higher by age 26. Table 2 and Figure 1 shows the averages of each of our four educational outcomes by family type. For each educational outcome, the children from

[11] The remaining 5.3% (N=4,206) of the children who spent their entire childhoods with both biological parents grew up in what Ginther and Pollak (2004) call "stable blended families" – they spent their entire childhoods with both biological parents and some portion of it with half-siblings.

[12] Thus, "Dropout" includes both children who entered secondary school and failed to graduate by age 22 and the less than 3% who did not enter secondary school.

simple nuclear families do best, followed by those from complex nuclear families, followed by those from nonnuclear families.[13]

We use previous studies to guide our choice of covariates in the regressions (Ginther and Pollak 2004, Björklund et al. 2007). Our goal is to control for observable inputs associated with children's educational outcomes including parental educational attainment and earnings. Variables such as parents' marital status, age, and education are measured when the eligible child was born. For the years when the child is 0 to 18 years old, we also calculate the percentage of time that: i) the child lives in an urban location; ii) the mother is out of the labor force; iii) the father is out of the labor force; iv) the mother receives a disability pension; and v) the father receives a disability pension. For mothers' and fathers' annual income (sum of earnings, capital income and transfers) and for household net financial wealth, we averaged variables measured over the years when the child was 7 to 18 years old. For children we include information on gender, month and year of birth, parity (i.e., birth order from the perspective of the mother), number of full siblings, and an indicator of whether the child moved to a different municipality during schooling age.

We see systematic differences in the explanatory variables as we move from simple nuclear families (NFo) to complex nuclear families (NF+) to nonnuclear families (NNF) (Table 3). For example, the likelihood that parents were not married at the birth of the child increases and mothers are much less likely to be college or university graduates: 31% of mothers in simple nuclear families, 26% of those in complex nuclear families, and only 22% of those in nonnuclear

[13] Missing data on outcome variables is mainly due to exemption from being graded (Grades, Low Grades) and death or migration after the age of 18 (Dropout, Bachelor's). Although we have 75,260 children registered as living with their parents until they are 18, we have the complete set of grades for only 74,139.

families were college or university graduates. As the education figures suggest, income and wealth are higher in simple nuclear families than in complex nuclear families.

4. Descriptive Regressions

In this section we use "descriptive regressions" to summarize the patterns in the data; in the two following sections we discuss causal mechanisms. We start by comparing educational outcomes of children from simple (NFo) and complex (NF+) nuclear families, controlling for observable household, parent, and child characteristics. We use OLS and probit regressions to examine the association between fathers' MPF and our four measures of children's educational outcomes: Grades, Low Grades, Dropout, and Bachelor's. Our first specification includes controls for gender and birth year. Our second controls for gender, birth year, county of residence, percentage of time a child lives in an urban location, and parents' education and age. Our third specification, our "comprehensive specification," controls for gender, birth year, county of residence, parents' education and age, parity, labor force and disability status of the parents, household size, income, wealth, and mobility patterns. We rely primarily on the comprehensive specification in our discussion of the results.

Children in NF+ families experience worse educational outcomes than children in NFo families. Table 4 reports estimates of the association between of fathers' MPF on our four educational outcomes. As we add control variables, our estimates of the effects of fathers' MPF become smaller in magnitude, but even with our comprehensive specification fathers' MPF still accounts for a substantial part of the differences in all four of our measures of children's educational outcomes.[14]

[14] We also estimated propensity score matching models to determine whether our results were robust to this alternative estimation method for selection on observables. In unreported results, we found that NF+ coefficients have the same sign and significance using this method.

We focus on the two long-term outcomes, Dropout and Bachelor's.[15] The descriptive statistics in Table 2 show that Dropout for NF+ is 24%, while for NFo it is 17%. Bachelor's for NF+ is 44%, while for NFo it is 51%. These differences reflect both the effect of fathers' MPF and differences in covariates. The covariates exacerbate the adverse effects of fathers' MPF. Controlling for the full set of covariates in our comprehensive specification, fathers' MPF is associated with a 3.9 ppt ($p < .001$) increase in Dropout and a 5.2 ppt ($p < .001$) decrease in Bachelor's (Table 4).

We can use our estimates to calculate a counterfactual prediction of what Dropout and Bachelor's would have been for children from families with the same covariates as NF+ but in which the fathers did not have children from another relationship (see Appendix Table A1). These counterfactual predications show that although both fathers' MPF and differences in the covariates contribute to the worse educational outcomes of the children in NF+ families, the primary factor is fathers' MPF.

Falch et al. (2014) show that in Norway boys have worse educational outcomes than girls. To investigate the association between fathers' MPF and gender differences, our fourth specification interacts the child being male with fathers' MPF. We find that there is no significant gender effect associated with fathers' MPF.

5. Resource Competition

5.1 Number of Children

[15] Estimates from the comprehensive specification indicate that fathers' MPF is associated with 10% of a standard deviation lower grades ($p<.001$) where the rate for NFo is 0.022 and with a 3.2 ppt increase in the probability of having low grades ($p<.001$) where the rate for NFo is 0.258. Using Add Health data, Lei and Lundberg (2020) find that grades are not good predictors of long-term educational outcomes for boys.

Under the resource competition hypothesis, the connection between more children in the father's first family and educational outcomes for the children in his second family is straightforward: more children imply higher child support payments, and higher child support payments imply less resources available to the father's second family.[16]

To test this hypothesis, we add controls for one nonresident half-sibling or two or more nonresident half-siblings.[17] The average number of nonresident half-siblings in NF+ families is less than 2, with 70% of NF+ children having one nonresident half-sibling. We report the estimates from the simple and comprehensive specifications in Table 5. If resource competition explains our results, then the estimated adverse effect of half-siblings should increase with the number of half-siblings. The results show that for all educational outcomes, the coefficient on two or more nonresident half-siblings is statistically significant and slightly larger than that for one nonresident half-sibling. However, we found that having two or more nonresident half-siblings was not significantly different than having only one nonresident half-sibling in NF+ families: one half-sibling and two-half siblings reduced educational outcomes by similar amounts compared with NFo children.

5.2 Age Overlap between Children

The connection between the age overlap of the children from the father's first and second families provides another test of the resource competition hypothesis. If the children in the two families are close in age, then the father must pay child support for a greater fraction of the years when the children in his second family are growing up.

[16] We are grateful to Wendy Manning for suggesting that we investigate resource competition.
[17] If there is one joint child in the home, and the father has one child outside the home, he must pay 9% of his income in child support for his noncustodial child; if he has two children outside the home, he must pay 16% of his income in child support .

If there is one child in the father's first family and one child in his second family, we use the age difference (Δ) between them to construct an indicator of resource competition. Specifically, we use ($20 - \Delta$) to indicate the number of years the father is required to pay child support during which the child in the second family is 19 or younger.[18] This age-based indicator is associated with legally required child support payments but it may also be associated with unobserved voluntary transfers of money, time, and attention. If there are two or more children in the father's first family, we use the age differences (Δ_i) between each child in the father's first family and each eligible child in his second family; our indicator of resource competition with each eligible child is then the sum: $\Sigma\ (20 - \Delta_k)$.

To test the age-overlap hypothesis, we use the sum of age differences between half-siblings in the first family who were younger than 20 when the child in the second family was born, $\Sigma\ (20 - \Delta_k)$. We included dummy variables for the total number of years of overlap (0–5, 6–10, and 11+).[19] This provides a measure of the total amount of child support and the duration of that support during the childhood of the eligible child. If resource competition matters, we would expect the magnitude of the estimated effect of half-siblings to increase with more years of overlap. In Table 6 we report the results for our comprehensive specification. We tested whether the coefficients for 0–5, 6–10 and 11+ years differ significantly from one another. In nuclear families the probabilities of low grades, dropping out of secondary school, and having a bachelor's degree all increase in absolute size the more financial responsibility a father has for nonresident half-siblings. The association between having nonresident half-siblings who are younger than 20 years old for 11+ years is largest and statistically significant for all four

[18] We only consider children in the father's first family who were younger than 20 when the first child in his second family was born.
[19] The dummy for 0–5 is also 1 if the father has a child from a previous relationship who is 20 or more years older than the eligible child.

outcomes. However, the statistical tests fail to reject the null hypothesis that having half-siblings for 11+ years and 0–5 years is the same; the null hypothesis that 6–10 and 11+ years is the same; and the null hypothesis that having half-siblings for a total of 0–5 child years and 6–10 child years is the same.

5.3 Fathers' Income Quartile

Finally, we investigate whether the father's income quartile, interacted with his MPF, is associated with the educational outcomes of children in his second family.[20] If the resource competition hypothesis were correct, we would expect fathers' MPF to be more harmful for the children of fathers in the lowest income quartile.[21] These regressions estimate the association between income and children's educational outcomes. The highest income quartile is the omitted category. As income decreases relative to the highest levels, the lower income quartiles are associated with worse educational outcomes. Furthermore, the point estimates on fathers' MPF reported in Table 7 do not differ substantially from those reported in Table 4. None of the coefficients on fathers' income quartile interacted with fathers' MPF are statistically significant. Thus, fathers' income quartile provides no support for the resource competition hypothesis.

Taken together, the results in this section do not support the hypothesis that resource competition explains the association between fathers' MPF and children's educational outcomes.

[20] In estimates that are not reported, we found no effect of living in a different economic region than the nonresident half-siblings on educational outcomes for NF+ children.
[21] Løken et al. (2012) shows that income affects child outcomes near the bottom of the income distribution but not near the top.

6. Birth Order

Next we consider whether birth order explains our results. Black et al. (2005) have shown that first-born children in Norway have better educational outcomes than later-born children. Black et al. (2011) show that first-born children have higher IQs, an outcome that is positively correlated with educational attainment. Lillehagen and Isungset (2020) consider birth order from fathers' perspective. The oldest child in NF+ families is the first-born child of the mother but not the first-born child of the father. To see whether first-born effects are driving our MPF estimates, we divide the sample into the first-born children of the mother and the later-born children of both parents. The results are reported in Table 8. The first rows repeat our main results from Table 4 for ease of comparison. In the middle panel we limit the sample to first-born children. The coefficient estimates are remarkably similar in magnitude and statistical significance to the results for our full sample. In the bottom panel, we limit the sample to all later-born children. Comparing later-born children and our full sample estimates, we find that the coefficient estimates are quite similar for grades, low grades, and the probability of dropping out. That said, the coefficient estimate for obtaining a bachelor's degree is lower, perhaps reflecting the lower educational attainment of higher birth order children.

7. Selection

The selection hypothesis provides an alternative to the resource competition and birth order hypotheses as an explanation of the worse educational outcomes experienced by NF+ children. The simplest version of the selection hypothesis is that men who have children from previous relationships differ in unobserved characteristics from men who do not. A more complex version allows for the possibility that women who partner with men who have previous

children may differ in unobserved characteristics from women who do not. Because our data do not allow us to distinguish among these two versions of the selection hypothesis, we treat them as a single hypothesis.

To assess the plausibility of the selection hypothesis, we investigate the outcomes of children in simple nuclear families in which the fathers or mothers had previous childless marriages.[22] If the children in these families experience worse educational outcomes than the children in other simple nuclear families, the explanation cannot be resource competition or birth order because none of these men had previous children. Nor can the explanation be alimony and spousal support because these are sufficiently rare in Norway that these men are very unlikely to have financial obligations to their ex-wives.[23]

If selection is driving our MPF results, then fathers with previous childless marriages (FPCM) or the women who partner with them may have unobserved characteristics that adversely affect children's educational outcomes. That is, the characteristics associated with the failure of the father's first marriage are also associated with worse educational outcomes for the children in the nuclear family. As before, we restrict our attention to children who spent their entire childhoods in nuclear families. In our sample of 66,781 simple nuclear families we have 1,010 fathers with previous childless marriages.[24] For ease of comparison, in the top panel of Table 9 we repeat the estimates from our comprehensive specification (Table 4).

In the lower panel we include additional controls for fathers' previous childless marriages. The estimated effects of FPCM are adverse and roughly similar to the estimated

[22] We are grateful to David Ribar and Richard Reeves for suggesting these strategies.
[23] According to Thomson Reuters Practical Law, "In Norway it is unusual for a spouse to be granted spousal maintenance after a divorce." https://uk.practicallaw.thomsonreuters.com/w-012-2153?transitionType=Default&contextData=(sc.Default)
[24] We excluded from our analysis the 84 simple nuclear families with 91 children in which both parents had previous childless marriages. In results not reported, we found that the added effect of having a second parent with a previous childless marriage was not statistically significant.

effects of fathers' MPF. We tested whether the coefficients for FPCM and fathers' MPF were significantly different from one another and rejected this hypothesis only for grades ($p<.04$). Thus, for the other three outcomes (Low Grades, Dropout, and Bachelor's) the estimated effect of FPCM is similar in magnitude to that of fathers' MPF, indicating that the children of FPCM have worse educational outcomes than other children from simple nuclear families. The average educational outcomes of children in FPCM families, however, are much better than those in NF+ families because covariates, such as income and wealth, education and age, offset or more than offset these adverse effects. For the children in FPCM families, some educational outcomes are a bit worse than those of children in other NFo families, while others are substantially better.

We focus on the two long-term outcomes, Dropout and Bachelor's.[25] For Dropout, the mean outcomes are similar: 18% for the FPCM children and 17% for the other NFo children, while for the NF+ children Dropout is 24% (see Table A2). We use our estimates to calculate a counterfactual prediction of Dropout for children from families with the same covariates as the families of FPCM but in which the fathers did not have previous childless marriages (see Appendix Table A2). The covariates for families with fathers' previous childless marriages are more favorable than those for the other NFo families (see Appendix Table A3). We found that predicted Dropout for children in FPCM is worse than experienced by children in other NFo families. We also tested whether the coefficients for FPCM and the coefficients for MPF fathers were equal and could only reject the null hypothesis for grades ($p<.104$). This constitutes powerful evidence in favor of the selection hypothesis.

Although it is not directly relevant to explaining the adverse effects of fathers' MPF, the association between mothers' previous childless marriages (MPCM) and children's educational

[25] Children of FPCM are 4.9 ppt more likely to have low grades ($p < .01$). The estimated effect on grades is 3.8% of a standard deviation lower, one-third the size of the effect of fathers' MPF, and it is not statistically significant.

outcomes provides additional evidence of the importance of selection. We investigated outcomes for children in the 832 simple nuclear families with MPCM. In our comprehensive specification, the effect of MPCM is to reduce significantly both grades and the likelihood of obtaining a bachelor's degree. These estimates of the effect of MPCM are adverse and roughly similar to the estimates of the effect of fathers' MPF (see Appendix Table A2). The counterfactual predictions illustrate the importance of covariates as determinants of children's educational outcomes (Appendix 1). For both FPCM and MPCM, the covariates offset the adverse effects of previous childless marriages; in contrast, for NF+ families the covariates amplify the adverse effects of fathers' MPF.

8. Discussion and Conclusion

Until very recently, the family structure and family complexity literatures have emphasized household structure and household complexity. Because of data limitations and because children generally remain in households with their mothers when their parents separate, research has emphasized mothers' MPF while virtually ignoring fathers'. Ours is the first study to investigate the relationship between fathers' MPF and children's adult educational outcomes. Using Norwegian register data, we investigated the association between fathers' MPF and the educational outcomes of the children in fathers' second families when the second families are nuclear families – households consisting of a man, a woman, their joint children, and no other children. Controlling for a rich set of covariates, we found that fathers' MPF is associated with substantially and significantly worse educational outcomes for children: children of MPF fathers are 4 percentage points more likely to drop out of secondary school and 5 percentage points less likely to obtain a bachelor's degree.

Why do children in complex nuclear families have worse educational outcomes than children in simple nuclear families? Competition for resources between the children in fathers' first and second families is a possible explanation and birth order is another. Estimates provide little support for either. Family structure transitions and resultant stress are often invoked to explain adverse outcomes for children in complex families. For the children we studied, this explanation is a nonstarter because we restricted our analysis to children who never experienced a family structure transition.

Discussing outcomes for children in complex families, Furstenberg (2014) reminds us of the need to consider selection. According to the selection hypothesis, fathers who have children from another relationship may differ in unobserved characteristics (e.g., preferences, beliefs, information) from fathers who do not, and the women who partner with these men may differ from the women who do not. To evaluate the selection hypothesis, we estimated whether children in simple nuclear families whose fathers had previous childless marriages experienced worse educational outcomes than children in simple nuclear families whose fathers did not have previous childless marriages. Controlling for covariates such as income and wealth, education and age, we found that the association between having a father with a previous childless marriage and children's educational outcomes was similar to the association between having a MPF father and children's educational outcomes. This finding, together with our finding that the data do not support the resource competition hypothesis or the birth order hypothesis, suggests that selection is the primary explanation for the association between fathers' MPF and the worse educational outcomes of children in fathers' second families.

We think that the "MPF father effects" we observe in Norway probably reflect household expenditure patterns and the allocation of goods and time within the household. Norwegian

register data, comprehensive as they are, do not enable us to identify the mechanisms behind the association between fathers' MPF and children's educational outcomes. Data on household expenditure patterns or, better yet, on the allocation of goods and time within households, might allow us to understand better why children in complex nuclear families experience worse educational outcomes than those in simple nuclear families.

Previous studies have found striking similarities between the estimated effects of family complexity on children's outcomes in Nordic countries and the United States. Björklund et al. (2007) found that the effect of family complexity on children's educational outcomes was very similar in the US and Sweden. Heckman and Landersø (2021) and Landersø and Heckman (2017) draw the same conclusion for the US and Denmark. Breivik and Olweus (2006) found that the negative effect of parental divorce on children's educational outcomes was very similar in US and Norway, despite the much more generous social safety net in Norway. Reisel (2011) found "more similarities than differences in the relationship between family background and college degree attainment" in the US and Norway. Grätz et al. (2019) argue that family background characteristics have a universal effect on educational outcomes in Nordic countries, Germany, the United Kingdom, and the United States.

We think selection is likely to play a substantial role in all types of complex families. Assessing the importance of selection in most types of complex families is difficult because doing so requires sorting out the roles of selection, family structure transitions, and differences in covariates such as parental income and education that represent parental resources. In blended families and most single parent families, children experience at least one family structure transition and these transitions are widely believed to adversely affect children's outcomes (McLanahan et al. 2013). By restricting our attention to a type of complex family in which children do not experience

family structure transitions, we have been able to demonstrate the importance of selection. We decline to speculate about the relative importance of selection compared with family structure transitions in blended families and single parent families. We do suggest, however, that researchers who study outcomes for children in complex families should take selection more seriously.

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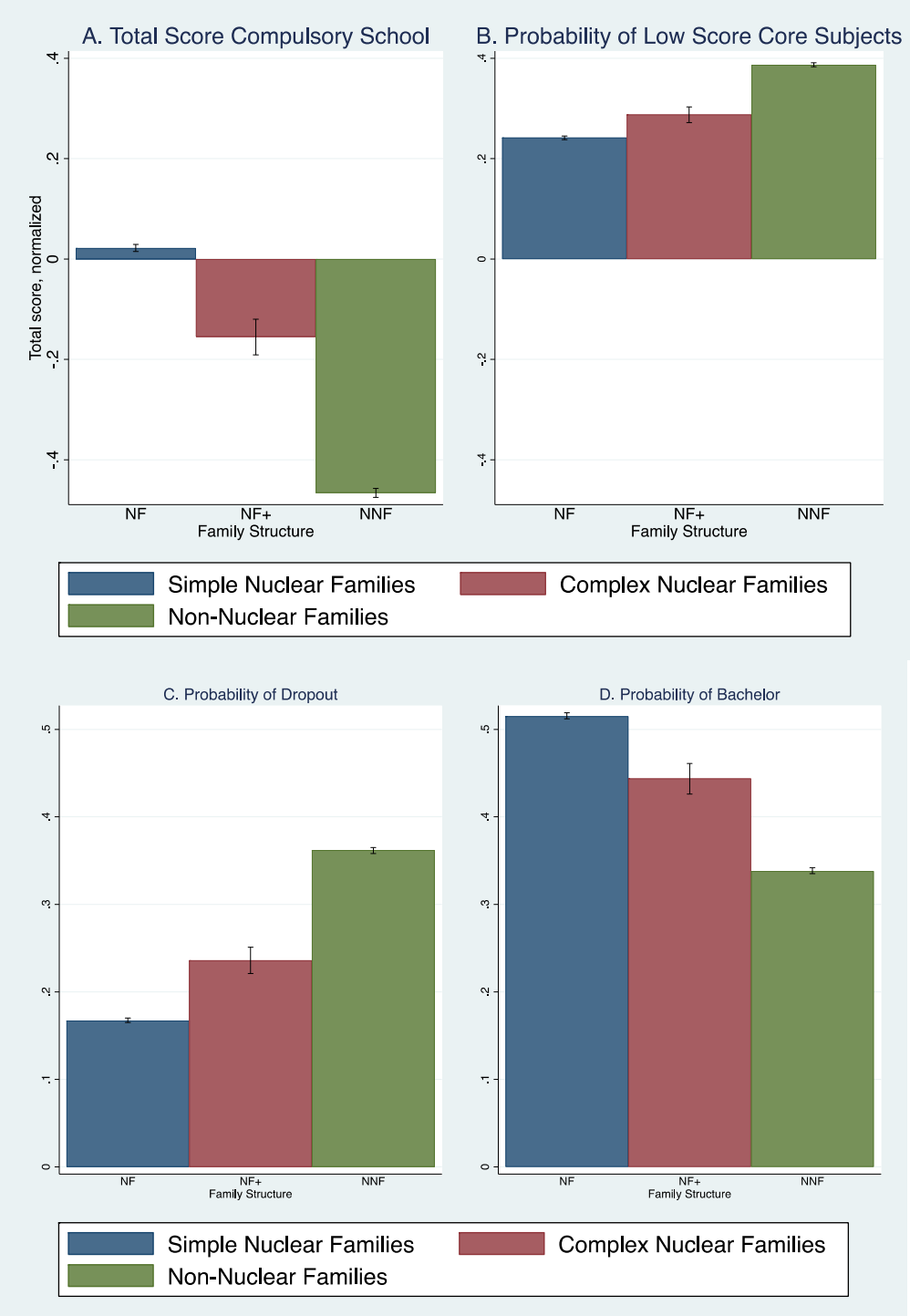

Fig. 1a
Normalized total exam scores by family structure.
Fig. 1b
Probability of low exam scores by family structure.
Fig. 1c
Probability of dropping out of secondary school by family structure.
Fig. 1d
Probability of obtaining a bachelor's degree by family structure.

Table 1: Family Type: Children, Full Siblings, and Half-Siblings

# Children born in 1986–1988 by Norwegian born parents	146,923
# Children living with both biological parents until age 18	79,466
# Children in Simple Nuclear Families (NFo)	72,052
% no full siblings	2.7
% one full sibling	38.8
% two or more full siblings	58.5
# Children in Complex Nuclear Families (NF+)	3,208
% no full siblings	10.6
% one full sibling	46.6
% two or more full siblings	42.8
% one nonresident half-siblings	70.0
% two or more nonresident half-siblings	30.0
% of children non-resident half siblings ages 0-5	17.0
% of children non-resident half siblings ages 6-10	37.4
% of children non-resident half siblings ages 11+	56.3
% of children non-resident half siblings 0-5 years of overlap	18.5
% of children non-resident half siblings 6-10 years of overlap	30.1
% of children non-resident half siblings 11+ years of overlap	51.4
# Children in Nonnuclear families (NNF)	63,258
% no siblings	4.4
% no full siblings	26.0
% one full sibling	42.3
% two or more full siblings	31.7
% no half-sibling	51.7
% one half-sibling	18.4
% two or more half-siblings	29.9
% half-siblings both parents	17.0

Note: Complex defined as having at least one nonresident half-sibling.
4,199 children are dropped from this classification due to lack of identity of the father, missing place of living (living abroad mostly), or death before age 18. Among those who grew up with both biological parents are also 4,206 children who grew up with both parents in different kinds of blended families. Number of siblings and half-siblings is counted at age 18. Among our 75,260 eligible children in NFo and NF+ families 7.75% have full siblings who were born in 1986-1988 and, hence, are also included in our analysis.

Table 2: Children's Educational Outcomes by Family Type

Family type:	Outcome:	N	Mean	Std.Dev
Simple Nuclear	**Grades**	70,992	0.222	0.992
NFo	**Low Grades**	72,052	0.252	
	Dropout	71,910	0.172	
	Bachelor's	71,930	0.513	
Complex Nuclear	**Grades**	3,147	-0.155	1.013
NF+	**Low Grades**	3,208	0.300	
	Dropout	3,201	0.240	
	Bachelor's	3,202	0.442	
Nonnuclear	**Grades**	61,526	-0.466	1.120
NNF	**Low Grades**	63,258	0.403	
	Dropout	63,036	0.368	
	Bachelor's	63,065	0.336	

Grades: Sum of grades at completion of compulsory school, normalized.
Low Grades: Indicator for no grade or grade below 4 in three core subjects (Math, Norwegian, English).
Dropout: Indicator for not completed secondary school by age 22.
Bachelor: Indicator for having completed a bachelor's degree by age 26.

Table 3: Descriptive Statistics for Covariates by Family Type

	Nfo		NF+		NNF	
Variable	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**
Parents cohabit at birth	0.134		0.296		0.451	
# Full Siblings	1.8	1.1	1.5	1.0	1.1	1.0
Age father	30.9	4.9	35.4	6.1	29.1	5.9
Age mother	28.4	4.5	29.2	4.6	26.1	5.04
Father's education:						
Primary school	0.178		0.255		0.312	
Some secondary	0.182		0.249		0.162	
Secondary school	0.329		0.270		0.315	
University/college	0.310		0.219		0.206	
Educ missing	0.002		0.006		0.006	
Mother's education:						
Primary school	0.264		0.296		0.372	
Some secondary	0.213		0.250		0.179	
Secondary school	0.215		0.190		0.216	
University/college	0.307		0.262		0.222	
Educ missing	0.001		0.003		0.004	
Income father	451.7	239.8	412.0	226.5	538.6	704.1
Income mother	210.1	119.9	226.5	127.6	363.1	344.0
Wealth household	1307.5	4945.9	1258.6	7060.6	1362.9	7437.6
Percent of Childhood 0-18:						
Urban area	75.1	42.4	74.9	42.2	78.5	38.6
Father no earnings	2.8	12.7	9.0	23.3	23.1	35,1
Mother no earnings	8.1	21.8	9.9	24.0	31.5	37.6
Mother on disability pension	2.6	12.8	8.1	22.2	2.3	10.5
Father on disability pension	3.8	15.6	5.5	18.6	2.0	11.0
Household size	4.7	1.0	4.4	0.9	na	
Family moved when child age 7-17	0.548		0.563		0.353	
Observations	72052		3208		63258	

Parents' marital status, age and education are measured when eligible child is born.
Parents' income includes annual earnings, capital income and transfers, averaged over the years when the child is 7-18 years old, measured in 1000 NoK 2015..
Wealth household is sum of parents' net financial wealth, averaged over the years when the child is 7-18 years old, 1000 NoK 2015. For NNF children this variable does not reflect actual

wealth of the household as parents do not live together throughout the child's entire childhood.
Additional covariates in regressions are gender, birth year and month, parity (from the perspective of the mother), number of full siblings and county of residence at age 10.
The NNF measures of income and wealth are not directly comparable to NF and NF+ families because they are the sum of income and wealth of two parents who do not live together.

Table 4: Estimates of Effect of Fathers' MPF on Children's Educational Outcomes

VARIABLES	Grades (1)	Grades (2)	Grades (3)	Grades (4)	Low Grades (1)	Low Grades (2)	Low Grades (3)	Low Grades (4)
Nuclear Family+	-0.182***	-0.141***	-0.099***	-0.115***	0.051***	0.045***	0.032***	0.045***
	[0.018]	[0.017]	[0.017]	[0.023]	[0.008]	[0.009]	[0.009]	[0.013]
Nuclear Family+ * Male				0.031				-0.021
				[0.032]				[0.015]
Constant	0.323***	-1.645***	-2.233***	-2.232***				
	[0.014]	[0.106]	[0.120]	[0.120]				
Observations	74,139	74,139	74,139	74,139	75,260	75,260	75,260	75,260
R-squared	0.079	0.257	0.278	0.278				

VARIABLES	Dropout (1)	Dropout (2)	Dropout (3)	Dropout (4)	Bachelor's (1)	Bachelor's (2)	Bachelor's (3)	Bachelor's (4)
Nuclear Family+	0.069***	0.062***	0.039***	0.035**	-0.077***	-0.071***	-0.052***	-0.064***
	[0.008]	[0.008]	[0.007]	[0.011]	[0.009]	[0.010]	[0.010]	[0.014]
Nuclear Family+ * Male				0.007				0.024
				[0.013]				[0.020]
Observations	75,111	75,111	75,111	75,111	75,132	75,132	75,132	75,132

Robust Standard errors in brackets. OLS estimates of Grades; Probit Estimates of Low Grades, Dropout and Bachelor's.
Probit coefficients are marginal effects. *** p<0.001, ** p<0.01, * p<0.05
(1): Additional covariates include dummies for male, birth year and birth month.
(2): Covariates include (1) plus parents age, birth order from the perspective of the mother and dummies for parents education.
(3): Comprehensive specification with full set of covariates. include (2) plus dummies for fathers' income quartile, log of mothers' income, household wealth and size, percent of childhood characteristics and county of residence at age 10 and dummies for family having moved during schooling age and parents' cohabiting at birth (not legally married).
(4): Comprehensive specification plus interaction between male and dummy for Complex Nuclear Family (NF+).

Table 5: Estimates of Effect of Fathers' MPF on Children's Educational Outcomes, Controlling for Number of Half-Siblings

VARIABLES	Grades (1)	Grades (3)	Low Grades (1)	Low Grades (3)	Dropout (1)	Dropout (3)	Bachelor's (1)	Bachelor's (3)
Nuclear Family	-0.183***	-0.095***	0.054***	0.032**	0.069***	0.039***	-0.077***	-0.046***
1 Half-sib	[0.021]	[0.019]	[0.010]	[0.010]	[0.009]	[0.009]	[0.011]	[0.012]
Nuclear Family	-0.179***	-0.112***	0.044**	0.032*	0.069***	0.041**	-0.075***	-0.068***
2+ Half-sibs	[0.033]	[0.031]	[0.015]	[0.015]	[0.014]	[0.014]	[0.016]	[0.018]
Constant	0.323***	-2.234***						
	[0.014]	[0.120]						
1 Half = 2+ Half Sibs[a]		0.23		0.01		0.33		1.16
		(0.632)		(0.974)		(0.865)		(0.305)
Observations	74,139	74,139	75,260	75,260	75,111	75,111	75,132	75,132
R-squared	0.079	0.278						

Probit Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects. OLS estimates of grades.

Robust Standard errors in brackets. *** p<0.001, ** p<0.01, * p<0.05

[a] Hypothesis test of difference in estimated coefficients with p-values in parentheses.

(1): Additional covariates include dummies for male, birth year and birth month.

(3): Comprehensive specification with full set of covariates.

Table 6: Estimates of Effect of Fathers' MPF on Children's Educational Outcomes, Controlling for Number and Years of Overlap with Half-Siblings

VARIABLES	Grades (1)	Grades (3)	Low Grades (1)	Low Grades (3)	Dropout (1)	Dropout (3)	Bachelor's (1)	Bachelor's (3)
0–5 Years Overlap	-0.144***	-0.082*	0.025	0.013	0.051**	0.028	-0.044*	-0.039
With Half-sibs	[0.041]	[0.039]	[0.019]	[0.019]	[0.017]	[0.017]	[0.021]	[0.024]
6–10 Years Overlap	-0.151***	-0.081**	0.036*	0.023	0.050***	0.028*	-0.053**	-0.035*
With Half-sibs	[0.031]	[0.028]	[0.015]	[0.015]	[0.014]	[0.013]	[0.016]	[0.018]
11+ Years Overlap	-0.214***	-0.116***	0.069***	0.043***	0.087***	0.050***	-0.102***	-0.067***
With Half-sibs	[0.025]	[0.023]	[0.012]	[0.012]	[0.011]	[0.010]	[0.012]	[0.014]
Constant	0.323***	-2.231***						
	[0.014]	[0.120]						
0–5 Years = 6–10		0.00		0.18		0.00		0.02
Years Overlap [a]		(0.995)		(0.675)		(0.992)		(0.891)
6–10 Years = 11+		0.93		1.12		1.91		2.03
Years Overlap [a]		(0.335)		(0.290)		(0.167)		(0.154)
11+ years = 0–5		0.60		1.79		1.28		1.04
Years overlap [a]		(0.440)		(0.181)		(0.258)		(0.308)
Observations	74,139	74,139	75,260	75,260	75,111	75,111	75,132	75,132
R-squared	0.080	0.278						

Probit Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects. OLS estimates of Grades. Robust Standard errors in brackets. *** p<0.001, ** p<0.01, * p<0.05.

[a] Hypothesis test of difference in estimated coefficients with p-values in parentheses.

(1): Additional covariates include dummies for male, birth year and birth month.

(3): Comprehensive specification with full set of covariates.

Table 7: Estimates of Effect of Fathers' MPF on Children's Educational Outcomes Interacted with Income Quartile

VARIABLES	Grades (1)	Grades (3)	Low Grades (1)	Low Grades (3)	Dropout (1)	Dropout (3)	Bachelor's (1)	Bachelor's (3)
Nuclear Family +	-0.123***	-0.085*	0.056**	0.047*	0.049**	0.039*	-0.060**	-0.056**
	[0.036]	[0.033]	[0.019]	[0.019]	[0.017]	[0.017]	[0.020]	[0.021]
Income Quartile 3	-0.211***	-0.002	0.078***	0.011*	0.044***	-0.007	-0.125***	-0.028***
	[0.010]	[0.009]	[0.005]	[0.005]	[0.005]	[0.004]	[0.005]	[0.006]
Income Quartile 2	-0.358***	-0.048***	0.124***	0.023***	0.085***	0.005	-0.196***	-0.054***
	[0.010]	[0.010]	[0.005]	[0.005]	[0.005]	[0.004]	[0.005]	[0.006]
Income Quartile 1	-0.513***	-0.103***	0.178***	0.044***	0.146***	0.029***	-0.278***	-0.097***
	[0.010]	[0.011]	[0.005]	[0.006]	[0.005]	[0.005]	[0.005]	[0.007]
Income Quartile 3	-0.031	-0.027	-0.012	-0.014	0.035	0.026	-0.006	0.001
*** Nuclear +**	[0.051]	[0.046]	[0.023]	[0.023]	[0.023]	[0.022]	[0.028]	[0.029]
Income Quartile 2	-0.071	-0.080	-0.022	-0.012	0.012	0.011	-0.004	-0.007
*** Nuclear +**	[0.050]	[0.046]	[0.022]	[0.022]	[0.020]	[0.020]	[0.027]	[0.029]
Income Quartile 1	-0.003	0.037	-0.020	-0.027	-0.003	-0.021	0.002	0.016
*** Nuclear +**	[0.047]	[0.043]	[0.021]	[0.020]	[0.018]	[0.016]	[0.026]	[0.027]
Constant	0.596***	-2.239***						
	[0.015]	[0.124]						
Observations	74,139	74,139	75,261	75,261	75,112	75,112	75,133	75,133

Robust Standard errors in brackets. OLS estimates of Grades. NS: Difference in estimated coefficients not statistically significant. Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects.

*** p<0.001, ** p<0.01, * p<0.05

(1): Additional covariates include dummies for male, birth year and birth month.

(3): Comprehensive specification with full set of covariates.

Table 8: Estimates of Effect of Fathers' MPF on Children's Educational Outcomes, Sample Stratified by Birth Order

VARIABLES	Grades (1)	Grades (3)	Low Grades (1)	Low Grades (3)	Dropout (1)	Dropout (3)	Bachelor's (1)	Bachelor's (3)
Full Sample								
Nuclear Family+	-0.182***	-0.099***	0.051***	0.032***	0.069***	0.039***	-0.077***	-0.052***
	[0.018]	[0.017]	[0.008]	[0.009]	[0.008]	[0.009]	[0.009]	[0.010]
Constant	0.323***	-2.233***						
	[0.014]	[0.120]						
R-squared	0.079	0.278						
Observations	74,139	74,139	75,260	75,260	75,111	75,111	75,132	75,132
First-borns								
Nuclear Family+	-0.183***	-0.102***	0.050***	0.036**	0.065***	0.041***	-0.089***	-0.074***
	[0.025]	[0.024]	[0.012]	[0.012]	[0.011]	[0.011]	[0.013]	[0.016]
Constant	0.440***	-2.698***						
	[0.021]	[0.190]						
R-squared	27,627	27,627	28,040	28,040	27,984	27,979	27,993	27,993
Observations	0.082	0.275						
Later-borns								
Nuclear Family+	-0.214***	-0.099***	0.062***	0.028*	0.078***	0.037***	-0.076***	-0.031*
	[0.025]	[0.023]	[0.012]	[0.012]	[0.011]	[0.010]	[0.012]	[0.014]
Constant	0.251***	-2.174***						
	[0.018]	[0.195]						
R-squared	0.080	0.275						
Observations	46,512	46,512	47,220	47,220	47,127	47,127	47,139	47,139

Probit Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects.
OLS estimates of grades. Propensity Score Matching using Probit first-stage.
Robust Standard errors in brackets. *** p<0.001, ** p<0.01, * p<0.05
(1): Additional covariates include dummies for male, birth year and birth month.
(3): Comprehensive specification with full set of covariates.

Table 9: Estimates of Effect of Fathers' MPF on Children's Educational Outcomes, Nuclear Families Compared with Results for Previously Divorced Fathers & Mothers

VARIABLES	Grades (1)	Grades (3)	Low Grades (1)	Low Grades (3)	Dropout (1)	Dropout (3)	Bachelor's (1)	Bachelor's (3)
Full Sample								
Nuclear Family+	-0.182***	-0.099***	0.051***	0.032***	0.069***	0.039***	-0.077***	-0.052***
	[0.018]	[0.017]	[0.008]	[0.009]	[0.008]	[0.009]	[0.009]	[0.010]
Constant	0.323***	-2.233***						
	[0.014]	[0.120]						
R-squared	0.079	0.278						
Observations	74,139	74,139	75,260	75,260	75,111	75,111	75,132	75,132
Previously Divorced Parents								
Nuclear Family+	-0.180***	-0.102***	0.051***	0.034***	0.069***	0.041***	-0.075***	-0.054***
	[0.018]	[0.017]	[0.008]	[0.009]	[0.008]	[0.008]	[0.009]	[0.010]
Previously Divorced Fathers (FPCM)	0.056	-0.038	0.011	0.049**	0.013	0.034**	0.036*	-0.035*
	[0.032]	[0.029]	[0.014]	[0.016]	[0.013]	[0.013]	[0.016]	[0.018]
Previously Divorced Mothers (MPCM)	0.081*	-0.075*	-0.024	0.031	-0.013	0.022	0.056**	-0.040*
	[0.034]	[0.031]	[0.015]	[0.018]	[0.013]	[0.015]	[0.018]	[0.020]
Constant	0.322***	-2.264***						
	[0.014]	[0.120]						
R-squared	0.080	0.278						
Observations	74,051	74,051	75,169	75,169	75,020	75,020	75,041	75,041

Probit Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects. OLS estimates of grades.

Robust Standard errors in brackets. *** p<0.001, ** p<0.01, * p<0.05. Regressions drop 84 families (91 children) where both parents have been previously divorced.

(1): Additional covariates include dummies for male, birth year and birth month.

(3): Comprehensive specification with full set of covariates.

Appendix Tables

Table A1: Predicted Outcome Evaluated at Mean of Covariates for NF+

		Predicted mean
Grades	Nfo	-0.056
		[0.006]
	NF+	-0.155
		[0.0157]
Low Grades	Nfo	0.271
		[0.003]
	NF+	0.300
		[0.008]
Dropout	Nfo	0.199
		[0.003]
	NF+	0.240
		[0.007]
Bachelors	Nfo	0.485
		[0.003]
	NF+	0.442
		[0.008]

Notes: All predictions use Specification 3 and the covariates from NF+ families (see Table 3). Standard Errors in brackets. Grades: Total score at completion of compulsory school (age 16). Low Grades: Score 3 or below in all three core subjects (Math, Norwegian, English) at completion of compulsory school. Dropout: Not having completed secondary school (High school) by age 22. Bachelor: Having completed a bachelor's degree or higher by age 26. NFo: Traditional nuclear, NF+:Father had child(ren) from previous relationship.

Table A2: Predicted Outcome Calculated at Mean of Previously Childless Marriages

Outcome	Family type	Mean Outcome	Predicted Mean FPCM Covariates	Predicted Mean MPCM Covariates
Dropout	NFo	0.172	0.128	0.138
			[0.002]	[0.002]
	NF+	0.240	0.165	0.181
			[0.007]	[0.008]
	FPCM	0.183	0.159	0.170
			[0.012]	[0.012]
	MPCM	0.157	0.148	0.157
			[0.013]	[0.013]
Bachelors	NFo	0.512	0.594	.0602
			[0.003]	[0.003]
	NF+	0.442	0.540	0.557
			[0.010]	[0.008]
	FPCM	0.552	0.559	0.574
			[0.017]	[0.014]
	MPCM	0.569	0.554	0.569
			[0.020]	[0.017]

Notes: Means are the averages of the outcomes by family type. All predictions use Specification 3 and the covariates from FPCM/MPCM families. . Standard errors of predictions in brackets.
Grades: Total score at completion of compulsory school (age 16). Low Grades: Score 3 or below in all three core subjects (Math, Norwegian, English) at completion of compulsory school. Dropout: Not having completed secondary school (High school) by age 22. Bachelor: Having completed a bachelor's degree or higher by age 26. NFo: Traditional nuclear, NF+:Father har child(ren) from previous relationship, FPMC/MPCM: father/mother with previous childless marriage.

Table A3: Background Characteristics of Traditional Nuclear Families in which the Father or Mother has a Previous Childless Marriage (PCM)

Variable	Father PCM Mean	Std.dev.	Mother PCM Mean	Std.dev.
Parents not married at birth [a)]	0.215		0.242	
# full siblings [b)]	1.530	0.870	1.42	0.830
Fathers age	35.2	4.6	32.9	5.1
Mothers age	30.0	4.3	31.7	3.9
Fathers' education				
Compulsory	0.156		0.119	
Compulsory and some secondary	0.198		0.17	
Completed secondary	0.237		0.273	
Higher education	0.406		0.437	
Education missing	0.003		0.001	
Mothers' education				
Compulsory	0.203		0.205	
Compulsory and some secondary	0.208		0.221	
Completed secondary	0.178		0.176	
Higher education	0.410		0.392	
Education missing	0.002		0.005	
Fathers' mean earnings [c)]	470	216	511	319
Mothers' mean earnings	239	135	245	145
Household mean wealth	1408	2497	1643	4591
% of childhood when				
father has no earnings	4.4	14.5	3.0	11.4
mother has no earnings	16.9	25.8	18.7	27.1
living in urban area	86.3	33.1	85.7	33.8
mother is disabled	1.3	7.9	1.2	7.6
father is disabled	1.0	7.5	0.4	3.7
% moving during age 7 - 17 [d)]	10.9		9.5	
# children	963		765	

a) Proportion. Either cohabiting or not registered as living in the same household.
b) Number of full siblings from the perspective of the child.
c) Income (all sources) and wealth is in NOK 1000, 2015, based on annual measures and averaged over the years when child is aged 7-19.
d) % of children moving to a different municipality during age 7 to 17.