The Effects of Stepfamily Formation for the Ninth Grade School Performance of Children – a Longitudinal Analysis Using Danish Register Data, 1986-2015

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---Very early draft---

Introduction

Across Northern Europe and North America, the traditional nuclear family has become gradually more challenged over the past fifty years, by an increasing prevalence of out-of-wedlock births, relationships that never make the transition to a formal marriage, as well as an increasing tolerance towards divorce. In the U.S., 84 percent of children lived with their married biological parents in 1970, a figure that decreased by more than 20 percentage points until 2010 (Anderson 2014). This decrease is due to a combination of all aforementioned factors, where the number of cohabiting rather than married couples over about that same time period increased from half a million to almost five million. Indeed, while the divorce rate has declined lately, this is primarily due to fewer couples at risk of divorce rather than an increasing relationship stability. Family transitions are considered challenging to everyone involved, particularly for the children, and a sizeable literature has examined the consequences of parental divorce for a range of outcomes, from the child's own probability of experiencing divorce or separation as an adult (Wolfinger 1999; Amato 1996), to well-being (Amato & Keith 1991) and various socio-economic outcomes (Tach & Eads, 2015; Bernardi & Radl, 2014) By and large, the findings support that experiencing parents divorcing during the upbringing is linked to negative psychosocial and educational outcomes for the child.

A considerable share of divorced or separated parents at some point enter into a new partnership, exposing the child to a step-parent, with or without formal marriage[1]. The literature on the consequences for the children who become exposed to stepfamily formation is considerably scarcer, but has also tended to suggest that the negative consequences outweigh the positive. This paper contributes to this literature, using Danish longitudinal register data containing the full population to examine the consequences of stepfamily formation for the school performance of children. Denmark represents a forerunner in several aspects regarding the second demographic transition, with less than 65% of children living in an intact nuclear family in 2017 (Statistics Denmark, 2017). Furthermore, aggregate statistics suggest that 13% of 17 year olds in 2017 had both a mother and a father that lived together with a new partner.

The contributions of this paper is manifold. Through unique longitudinal information on partner links, through both marriage and cohabitation, we are able to trace with unique precision the biological parents' marital and cohabitation status, as well as the socioeconomic and demographic characteristics of both the parents and their partners. This is of particular importance due to the prevalence of cohabitation as an alternative to marriage in contemporary contexts. Focusing on children whose biological parents were either married or cohabiting at the time of their birth, we investigate the importance of the timing of partnership dissolution and possible stepfamily formation as well as the influence of the socioeconomic resources provided to the household by its adult members, through biological parents or step-parents. In doing so, we

[1] For the sake of maintaining a more straightforward terminology, we will refer to partners of a child's mother and father as step-parents, even though they only technically become step-parents through marriage.

examine a range of theoretically relevant mechanisms of intergenerational transfers, extended to not only include biological parents but also step-parents. Lastly, through examining how outlined exposures affect the child's performance in standardized tests in math and the Danish language, administered by the schools to all children in ninth grade, we investigate whether stepfamily formation is particularly important in the formation of distinctly different types of academic skills.

Previous research and theoretical framework

The strength of the intergenerational transmission of socioeconomic attainment appears to be rather robust across context and time (see review in Björklund & Jäntti 2000), only influenced at the margin by ambitious attempts to achieve equality of opportunity, such as comprehensive education reform (Holmlund 2016). Thus, taking into account the resources provided by the previous generation is fundamental if one attempts to understand differences in educational or labor market outcomes. For the many children exposed to parental separation, divorce and – possibly – subsequent re-partnered parents, a model of intergenerational transfers only taking the resources of the biological parents into account is likely to be incomplete.

Research into the intergenerational consequences of parental separation and subsequent stepfamily formation has more or less exclusively focused on the consequences of exposure to parents' *marital transitions*, either through examining the consequences of experiencing divorce or remarriage. The bulk of the literature has examined the U.S. context, predominantly analyzing survey data sets. Looking at the effects of divorce, research has suggested exposure during childhood to be associated with future demographic behavior, including early childbearing (Ermish & Francesconi 2001) and marital disruption (Gahler et al 2009), but also with a range of socioeconomic outcomes, such as educational and occupational attainment in adulthood (Amato 2012, 2000, Amato et al 2016, Bernardi et al 2013). The literature examining the consequences of stepfamily formation is considerably more scarce, having – to our knowledge – only focused on the consequences of remarriage and not on the introduction of step-parents figure through cohabitation. This, we argue, represent a substantial gap in the literature, due to the prevalence of this phenomenon, both in general and – in particular – as an alternative to remarriage. Similar to the research on the consequences of divorce, this literature has primarily investigated educational and psychological outcomes. Compared to growing up in an intact two-biological-parent family, both school performance and psychological well-being among children exposed to divorce followed by remarriage was found to be about twenty percent of a standard deviation lower (Jeynes 2008).

While many studies suffer from analyzing very small sample sizes that also may be of a cross-sectional nature, research on Scandinavian countries have been able to benefit from population-wide longitudinal register data. For Sweden, Jonsson and Gähler (1997) have showed an association between exposure to family dissolution or subsequent remarriage during childhood and lower educational attainment in adolescence, primarily attributing this to a decline in economic well-being. Also for Sweden, Skog (and Larsson) uses register data covering the 1973 birth cohort to examine the adulthood labor market consequences of children of divorce (2016a) and remarriage (2016b). Explicitly analyzing their influence on attained labor income, both studies fail to find any economically significant effect from either experiencing divorce or parental remarriage during childhood. The lack of a significant effect between divorce and adulthood earnings resembles those of Björklund et al (2007). Other studies from Sweden have focused on the consequences of children's being brought up in joint or shared custody, suggesting an increasing prevalence of psychosomatic (Hagquist 2016) or psychological (Fransson et al 2016) problems among children in non-intact or sole custody parent arrangements.

The paper proposes an extended model of intergenerational transmission, taking into account the influence of not only the characteristics of the individual's biological parents but also of possible step-parents, introduced through remarriage or cohabitation. We focus on two pathways of influence (see Zheng & Xie 2014), both belonging to the realm of environmental (rather than biological) factors of intergenerational

transmission; the socio-emotional and economic pathways. Economic resources not only benefit the subsequent generation through the direct transfer of resources such as wealth or property, but also through providing access to human capital or networks. Such characteristics influences the child generation for as long as the parent lives and beyond, from the neighborhood characteristics and the school environment in which the child grows up as well as through access to (or the lack of) resources facilitating a successful labor market entry and career. In some cases, networks and reputation could even remain important in cases when the father is dead, through – for example – surnames associated with certain prestige. The socio-emotional pathway is inspired by socialization theory which suggests that (early) experiences with parents directly shape the values and beliefs of children. Arguably, it represents the only pathway which is conditional on direct intergenerational interaction, where parents affect their children's values through modeling (through the observation of parents' behavior and expressed attitudes) and formal training (e.g. through religious and cultural instruction).

Due to the nature of the intergenerational transmission of resources along economic and socio-emotional pathways, such a model can straightforwardly be extended to families with step-parents, having no biological link to the child. For example, (one of) the divorced parent(s) may re-partner with a socioeconomically more endowed partner whose resources could benefit the child through similar mechanisms as if the relationship was between father/mother and child, arguably especially if the new partner has no previous children of his or her own. Thus, through the increased (or decreased) socioeconomic resources provided to the household by the new partner, they may have a nontrivial influence on choices of residential and school location and beyond. Similarly, the presence of a new parental figure may influence the child's behavior, attitudes and aspirations, through a socio-emotional pathway.

There is, however, reason to expect that the relationship between the partners and children of divorced or separated parents is considerably more complex than fitting an extrapolated model of intergenerational transmission. Indeed, the prevailing model in the family literature is that living with a stepparent is disadvantageous for the child, with the majority of the theories suggesting neutral to negative consequences of re-partnering parents (Pryor 2014). Challenges have been identified for all members of the household, from the new adult experiencing constant feelings of being an outsider to the child struggling with loyalties and how to navigate new authorities. A core model in explaining children's experiences in stepfamilies originates from stress theory, suggesting that the many changes following divorce and re-partnering, including relocating and getting familiar with new routines and family members leads to problems focusing on, for example, school work. Consequently, this would result in immediate effects on school performance, however, possibly with long-term consequences through venturing down a certain path. This is facilitated by the idea that parental competencies may be compromised in the early phases of stepfamily formation, with the parent having less ability to participate in and monitor the child's school (and other) activities. In the absence of repeated re-partnering events, the consequences of stepfamily formation according to stress theory are, however, predominantly of a short-term nature. Models suggesting more long term effects overlap with aforementioned economic and socio-emotional pathways of intergenerational influence. Brown (2004) identifies fundamental differences between nuclear and stepfamilies' economic and parental resources/involvement. The parental resources hypothesis suggests lower parenting effectiveness in stepfamilies, due to ambiguities regarding parental roles leading to a lack of trust and authority. Step-parents furthermore are believed to invest less socioemotional capital in their stepchildren as well as displaying less affection and supervision than they do in their own biological children. Turning to the economic resources hypothesis, not only do cohabiting families typically face greater economic hardship than married two-biological-parent families, but they also share resources to a lesser extent. Adding another dimension to aforementioned theories, stepfamily formation through cohabitation rather than marriage is believed to exacerbate the negative effects for the child, not only through a lower degree of commitment to the family union from the cohabiting partner but also through a lower level of relationship stability.

The consequences of stepfamily formation on children's outcomes according to aforementioned theoretical models are hypothesized to be modified by certain key characteristics (Pryor 2014). Firstly, the timing of

re-partnering is important, where young children are more likely to forge a positive relationship with the new parental figure, for example through a higher likelihood of participation in childcare activities promoting closeness at early ages. This is reinforced by older children, especially teenagers, whose quest for autonomy and rebellion against parental authority counteracts the formation of positive relationships. Secondly, the gender of both the child and the stepparent is believed to be important, where boys are viewed to be more amenable to the introduction of a biological parent's new partner. Lastly, a stepparent without their own children is likely to invest more into a relationship with a stepchild, as there will be no competition for resources.

Data and method

We use Danish administrative register data for the time period 1986-2016, containing a 95% random sample of the Danish population. The data allows us to follow all individuals throughout the time period observed as well as linking them to their parents and siblings, with information on a full set of socioeconomic and demographic characteristics. Furthermore, and a truly unique feature of the Danish data, is that it identifies cohabiting couples, through which we are able to more accurately capture relationships where cohabitation may or may not precede transitioning into marriage. This is a particularly important feature in contemporary western societies where partnerships that never make this transition are common.

The study examines the intergenerational effects of parents' separation, divorce and re-partnership, where the outcome variable is represented by results from standardized national tests, administered in ninth grade in all Danish schools (at age 15). The exams are identical for all schools in Denmark and thus considered highly comparable (Nielsen & Rangvid, 2011). They are furthermore marked both by the class teacher and an external examiner who has the dominant opinion of the final grade. For ease of interpretation and comparability over time, grades are standardized to have a mean of zero and a standard deviation of one within each school year. In both subjects, several exams are taken (such as spelling and reading comprehension in Danish), and the outcome variable therefore represents the grade average of several exams.

Our study sample consists of individuals whose biological parents are either married (58.7%) or cohabiting (41.3%) at the time of their birth, occurring between 1987 and 2001. The key dependent variables are constructed through using longitudinal information on the biological parents' relationships during the individual's upbringing. While we also examine the association between experiencing parents separating or divorcing prior to the individual turning 16[2], the main contribution is represented by the investigation of the influence that the introduction of new parental figures has on the outcome in question. We not only examine whether the mother or father re-partners during the child's upbringing, but we also examine the influence of a range of different aspects of this transition that may be important. Firstly, the timing of the separation/divorce as well as the re-partnering will be examined. As outlined previously, theory suggests the existence of different developmental phases as well as periods when the introduction of a new partner may be particularly problematic. Secondly, the intergenerational transmission of educational attainment (as well as other socioeconomic outcomes) is one of the more extensively studied mechanisms in within the social sciences, with a genetic as well as a behavioral component. In this paper, the socioeconomic resources of parents as well as step-parents are viewed as a type of resources for the successive generation to enjoy. We measure this both through the parental figures' educational attainment as well as through their lifetime earnings[3], and we investigate whether there are heterogeneities in the effects of re-partnering parents (either through cohabitation or marriage) depending on the amount and type of resources the new parental figure is able to provide the household with. Lastly, the influence of aforementioned resources is examined by taking into account the competition for resources within the household. For example, while a step-parent, through cohabitation or marriage, may be able to contribute with important resources to a household with

[2] Individuals whose parents' marriage/cohabitation end due to the death of one of the parents are excluded from the analysis.

[3] Here, we follow the approach in Helgertz and Dribe (2017)

existing children from a previous union, this impact may be smaller if the step-parent has their own children from a previous relationship, or if the step-parent and the individual's biological parent has a joint child.

Since the outcome is measured at one point in time, the characteristics outlined above are operationalized to capture the child's experience during their first fifteen years of life, as a cross-sectional variable. For example, in gauging exposure to a step-parent (either through cohabitation or marriage), we model this both as a dummy variable indicating whether the child experienced this event before age 16, as well as the age at which the step-parent was introduced, simultaneously capturing the timing of exposure as well as the amount of exposure before turning 16. Multivariate models are estimated by means of OLS regression, where it should be acknowledged that observed relationships from the main analysis reflect associations rather than causal relationships. This is linked to the nontrivial caveat that none of the transitions of interest occurring in the parental generation, i.e. divorce/separation, re-partnering and partner choice, are exogenously assigned. More specifically, individuals whose parents' divorce or separate are likely to differ on unobserved characteristics from those who do not, which may lead to nontrivial bias in the estimated associations. In attempting to overcome this, we also estimate sibling fixed effect models, where effects are identified on differences between siblings in the independent variables of interest (for example, age of the child at parents' divorce or separation), cancelling out the influence of everything shared between siblings, for example their biological parents' underlying propensity to make partner choices and abandon existing relationships.

Preliminary results

Our analytical sample consists of 531,000 unique children whose parents were either cohabiting or married at their time of birth. As indicated by Table 1, below, 14% of the sample experiences their parents either separating or divorcing prior to their 16th birthday, a figure comparable with aggregate statistics for Denmark as a whole. More importantly for the purpose of this paper, about half of the children who experience this transition will become exposed to a stepmother or a stepfather through at least one of their parents entering into a new relationship, though cohabitation or marriage. The statistics also confirm that only looking at partnerships through marriage substantially underestimates the share who become exposed to a new parental figure, as while 6.7 percent of the entire sample obtain a stepmother through marriage, an additional 5.9 percentage points do so but only through their biological father being in a cohabiting relationship.

- Table 1 here

Turning to the association between aforementioned parental relationship transitions and children's school performance, through their test scores in ninth grade, Table 2 provides some indications suggesting that children in intact families perform better, regardless of their biological parents' level of educational attainment. As already mentioned, through standardization the outcome variable(s) have been constructed to have a mean of zero and a standard deviation of one. While both outcomes are important for the Danish school curriculum, they arguably represent two different types of skills, where math to a larger extent consist of separate knowledge elements that build upon each other, whereas those required for language skills are more parallel. As a result, playing catch-up becomes more difficult in math, why exposure to disruptions or adversity could be more expected to have long-term repercussions. Among children whose parents stay together until they turn 16, the average test performance of children of parents whose highest level of education is a primary school degree is -0.26, to be compared with -0.04 and 0.61 for children of secondary and university educated parents, respectively. Holding the parents' educational attainment constant, the performance is consistently worse. Furthermore, the magnitude of the differences is not trivial: Among children of parents with university education, if the parents separate/divorce and re-partner, the mean standardized grade is about .4 of a standard deviation lower.

- Table 2 here

Lastly, we turn to some (very) preliminary results from OLS regression models where the dependent variable is represented by the individual's score from national standardized tests in Danish and math, respectively. The results are presented in Table 3, where we begin with Model 1a, examining the influence of parental separation/divorce on test scores in Danish. Apart from the additional influence of the adult role models' educational attainment, the models only control for the individual's sex. Model 1a displays a clear negative influence from exposure to parental divorce or separation, which is furthermore strongest the earlier it occurs. More specifically, if the parents' divorce during the year the child turns 16, it is associated with 11 percent of a standard deviation lower test score, whereas the influence of separation during the first year of life amounts to 27 percent of a standard deviation. Moreover, the point estimates suggests a disadvantage that is the largest until around age 5, only to thereafter plateau, with all point estimates being statistically significant. Turning to Model 1b, on math scores, point estimates are substantially larger but similar in terms of how it develops over the child's age. During the first year of life, exposure to parental separation or divorce is associated with 67 percent of a standard deviation lower test score, quite a substantial penalty. This is to be compared with 25 percent of a standard deviation lower test score if the separation or divorce occurs during the child's teenage years. Lastly, in both models 1a and 1b the influence of the parents' education display the expected signs, with – for both subjects – larger effects from the father's than the mother's educational attainment.

- Table 3 here

Models 2a and 2b are extended to not only take into account the age of the child at the parents' possible separation or divorce but also the age at which they become exposed to a step-parent. Here, this exposure is modeled to come through either cohabitation or marriage, where we do not distinguish between the two. In both models, the effects of divorce are substantially attenuated, both in terms of effect size and statistical significance. Indeed, for both outcomes, the teenage years emerge as the most problematic for exposure to divorce or separation, net of whether a step-parent enters the picture. Again, effects are larger for math, where parents who separate or divorce when the child is between 13-16 is associated with around a 20 percent of a standard deviation lower test score in math.

Both models indicate rather sizeable and negative effects from the mother introducing a stepfather into the household, with effects that are largest if this occurs early during the child's life. This is especially evident in terms of the child's performance in Danish, whereas the influence remains much more consistent over the child's life-course when it comes to math. An interesting finding, that will be investigated further, is that whereas the introduction of a stepmother is rather unimportant for the child's performance in Danish, it exercises a large negative effect on their performance in math.

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Tables

Table 1: Share of sample experiencing various parental relationship transitions.

	%
Divorce or separation	14,04
Stepmother (remarriage)	6,74
Stepfather (remarriage)	6,27
Stepmother (cohabitation)*	5,91
Stepfather (cohabitation)*	5,49
Both parents remarried	3,12
Both parents re-cohabiting*	4,04

*Excluding marriage

Table 2: Mean standardized grade in math, by parental relationship transition

	Mean standardized grades in Math							
	No divorce/separation	Divorce/separation	Father remarried	Father recohabiting	Mother remarried	Mother recohabiting	Both re-married	Both re-cohabiting
Highest educational level of parents								
Primary	-0.258	-0.569	-0.583	-0.562	-0.543	-0.581	-0.646	-0.636
Secondary	-0.040	-0.368	-0.374	-0.385	-0.377	-0.403	-0.475	-0.473
Tertiary	0.607	0.268	0.268	0.243	0.261	0.212	0.200	0.150

Table 3: OLS regression estimates

	Model 1a		Model 1b		Model 2a			Model 2b		
	z-score, danish		z-score, math		z-score, danish			z-score, math		
Child's age at	parents' separation				parents' separation	stepfather introduction	stepmother introduction	parents' separation	stepfather introduction	stepmother introduction
1	-0.274 ***		-0.673 ***		-0.073	-0.418 ***	-0.168 **	-0.436 ***	-0.357 ***	-0.368 ***
2	-0.209 ***		-0.505 ***		-0.132	-0.331 ***	-0.166 **	-0.241 **	-0.233 ***	-0.309 ***
3	-0.172 ***		-0.415 ***		0.065	-0.309 ***	-0.132 **	-0.131	-0.239 ***	-0.268 ***
4	-0.147 ***		-0.395 ***		-0.007	-0.308 ***	-0.078	-0.025	-0.262 ***	-0.309 ***
5	-0.132 ***		-0.367 ***		-0.035	-0.313 ***	-0.107 *	-0.124 **	-0.240 ***	-0.287 ***
6	-0.118 ***		-0.326 ***		-0.175 **	-0.224 ***	-0.024	-0.191 *	-0.245 ***	-0.255 ***
7	-0.138 ***		-0.318 ***		0.019	-0.233 ***	-0.052	-0.056	-0.288 ***	-0.168 ***
8	-0.097 ***		-0.331 ***		-0.029	-0.141 **	0.013	-0.175 *	-0.166 ***	-0.17 ***
9	-0.116 ***		-0.266 ***		0.023	-0.205 ***	-0.025	-0.031	-0.197 ***	-0.081
10	-0.117 ***		-0.288 ***		-0.027	-0.190 ***	-0.201 ***	-0.079	-0.295 ***	-0.268 ***
11	-0.115 ***		-0.227 ***		-0.106	-0.115 *	-0.114 *	-0.101 *	-0.153 **	-0.121 **
12	-0.120 ***		-0.252 ***		-0.008	-0.184 **	-0.068	-0.075	-0.235 ***	-0.183 ***
13	-0.141 ***		-0.263 ***		-0.182 ***	-0.049	0.014	-0.186 ***	-0.131 **	-0.099 *
14	-0.115 ***		-0.255 ***		-0.085	-0.081	-0.065	-0.213 ***	-0.182 ***	-0.205 ***
15	-0.107 ***		-0.243 ***		-0.188 ***	-0.184 **	-0.007	-0.238 ***	-0.206 ***	-0.043
16	-0.111 ***		-0.251 ***		-0.145 **	-0.142 **	0.032	-0.277 ***	-0.190 **	-0.14 **
Biological father's highest level of education										
Primary	ref		ref			ref			ref	
Secondary	0.384 ***		0.363 ***			0.400 ***			0.347 ***	
University	0.873 ***		0.712 ***			0.619 ***			0.562 ***	
Biological mother's highest level of education										
Primary	ref		ref			ref			ref	
Secondary	0.258 ***		0.161 ***			0.330 ***			0.204 ***	
University	0.764 ***		0.574 ***			0.714 ***			0.526 ***	
Stepfather's highest level of education										
Primary						ref			ref	
Secondary						0.067 ***			0.079 ***	
University						0.323 ***			0.246 ***	
Stepmother's highest level of education										
Primary						ref			ref	
Secondary						0.044 **			0.001	
University						0.160 **			0.111 ***	