

Age at parental separation and children's school grades

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Abstract

We analyze how children's age at parental separation affects their school grades at 9th grade using sibling fixed effects models on Swedish population register data. Our main result is that parental separation close in time to the age at which the grade point averages are measured has a clearly more negative influence on grades than separations taking place at younger ages. The effect of parents separating during the 9th grade is -0.15 standard deviations compared to a parental separation during the child's first year of life. We also find that our results are sensitive to measurement error in parental separation; some registered address changes can be misclassified as parental separations, which leads to underestimation of the age-at-separation gradient. We discuss these findings in light of theories of parental separation effects and previous research.

Introduction:

A large literature has consistently shown that children exposed to a parental divorce during childhood fare worse, on average, in educational achievement compared to their peers who grow up in households with both parents present (i.e., Amato 2010; Bernardi and Boertien 2016a; Grätz 2015; Härkönen, Bernardi, and Boertien 2017; McLanahan, Tach, and Schneider 2013; Sigle-Rushton et al. 2014). While this relationship is well-established, recent literature has been focused on understanding the extent to which the association may vary along various dimensions (Härkönen et al. 2017).

We contribute to this literature by analyzing effects of age at parental separation on school performance. Specifically, we focus on the effects of parental separation in childhood on grades (GPA) in ninth grade. The main contribution of this study comes from the identification of the parental separation effect. We use sibling fixed-effects models to account for unobserved family-level characteristics, and exploit within-family variation in age at exposure (Sigle-Rushton et al. 2014; Thomson and Eriksson 2013). We also analyze the sensitivity of our results to measurement error in parental separation.

Background:

The effects of parental separation on educational outcomes has been explained through socioeconomic, psychological, and social pathways. Separation often leads to a loss in socioeconomic resources, especially for women (DiPrete and McManus 2000). The loss of resources as a result of parental separation may decrease investments in children, as well as disrupt children's lives that subsequently negatively impact their educational performance (Bernardi and Boertien 2017; Björklund and Sundström 2006; Jonsson and Gahler 1997; Thomson, Hanson, and McLanahan 1994).

Parental separation may also negatively impact the psychological well-being of children which can affect their educational performance (Amato 2010; Amato and James 2010). Existing evidence suggest that, both in the short-term and long-term, children exposed to parental separation report poorer outcomes across several measures of psychological well-being (Amato 2010; Hango and Houseknecht 2005). In addition to the decreases in child well-being, the psychological stress induced from the separation on the parents may lead to poorer quality of parenting, reduce parental involvement in their children's lives especially by the non-resident parent (Grätz 2017), and lead to the deterioration of in the parent-child relationship (Albertini and Garriga 2011).

Although there is little disagreement that parental separation negatively impacts the educational outcomes of children, there is little consensus as to whether certain children are more vulnerable to family structure changes (Amato and Anthony 2014; Amato and James 2010; Bernardi and Boertien 2017; Cherlin et al. 1991; Härkönen et al. 2017). One of the key debates that remain open relates to the timing of parental separation, and specifically whether children exposed to a separation in early childhood are more affected as compared to those exposed at older ages (Allison and Furstenberg 1989; Cherlin et al. 1991; Emery 1982; Ermisch, Francesconi, and Pevalin 2004; Sigle-Rushton et al. 2014).

On the one hand, it has been argued that the effects of parental separation are negative and cumulative. As a result, children who experience a parental separation at younger ages compared to an older age are exposed to a longer period of time living in a household without both biological parents present, which leads to potential exposure to additional family transitions and overall instability. As a result, these children may be more vulnerable to the negative consequences of parental separation (Beck et al. 2010; Heckman and Masterov 2007; Sigle-Rushton et al. 2014; Sun and Li 2009). At the same time, however, a younger age at exposure may also mean less exposure to the deterioration of the parental relationship.

On the other hand, one may view age at parental separation from a crisis model perspective. This assumes that the effects of parental separation may be most pronounced around the time the separation occurs. It is the disruption caused by a parental separation that may have a strong, immediate effect that gradually weakens over time. This implies the strongest effects on children may be observed when the outcomes are measured within a short time window of the parental separation. Thus, although younger children may be most vulnerable, they may have bounced back by the time an outcome is measured (Sigle-Rushton et al. 2014). As a result, the observed effects by age at exposure are likely to depend on the outcome of interest, and, specifically when in the life course the event and the outcome take place. Results by Sigle-Rushton and colleagues' (2014) results from Norway were in line with this perspective, showing how parental separations occurring close to the year in which school grades were set had a small negative effect on grades, whereas the effects at younger ages were negligible.

Data and Methods:

The data for this study comes from Swedish registers containing detailed socio-economic, demographic, and education information on the entire Swedish population born between 1973 and 1995, as well as their parents born outside the main sampling window, with coverage from 1968 until 2011. Information about each individual is merged between administrative registers using unique identification numbers assigned to each individual. Using the Multigeneration register, we are able to link individuals to their parents, thus allowing us to identify siblings. The study population was restricted to include all Swedish born individuals with Swedish born parents. The final population included 590,235 individuals from 383,477 families.

Our dependent variable is a child's grade point average (GPA) at age 16, which was obtained from the educational register and is available between 1989 and 2011 (corresponding to birth cohorts 1973 to 1995). The GPA was standardized by cohort to account for the well-documented differences in cognitive performance across cohorts, changes in grading schemes, and cohort composition differences (Flynn 1987; Weber, Dekhtyar, and Herlitz 2017). As a result, the scores reflect performance relative to the entire national graduating cohort for a given year.

Our main explanatory variable is the age at which a child experienced a parental separation. In order to define this variable, we identified the year in which biological parents were no longer residing in

the same dwelling unit after having previously resided together consecutively from the year of the child's birth (Thomson and Eriksson 2013). In order to reduce measurement error in parental separation due to short-term residence changes (due to one parent working in another municipality, for instance), we defined the parents separated if they were not registered in the same building for three consecutive years. In the present study, we restrict our analyses to children exposed to a parental separation between the ages of 1 and 19. Although children complete the ninth grade at the age of 16, on average, ages 16 to 19 were included to examine the effects of separations that have occurred shortly following the measurement of the grades. These cases should not have been affected by the separation, at least to the same extent, since their grade were recorded prior; however, they may have still be exposed to the parental conflicts prior to the physical separation (Bernardi and Boertien 2016b). In addition, we control for the quarter of birth of the child in order to adjust for further measurement errors in the age at separation variable.

All of the analyses were conducted using full-sibling fixed effects models to account for the endogeneity in the relationship between parental separation and grade performance. This approach allows us to account for all factors shared by biological siblings, specifically those that are unobserved, in order to estimate a less-biased relationship. Thus, we exploit within family variation in each sibling's age at the time of the separation allowing us to more precisely measure the exposure, as well as thoroughly examine critical ages.

Results:

Table 1 presents the descriptive statistics of the population. It is worth noting that the average zGPA of the population is approximately 14% of a standard deviation below the mean. GPA was standardized by graduating cohort, but the individuals included in the analysis are those that have been exposed to a parental separation. This indicates that the average GPA of children included in this analysis is lower than the mean of their graduating cohorts.

Table 1. Descriptive Statistics

	N/Mean	%/SD
zGPA	-0.138	.994
Child's age at separation		
1	38,445	6.51
2	46,654	7.90
3	45,234	7.66
4	42,551	7.21
5	40,002	6.78
6	37,096	6.28
7	35,053	5.94
8	32,717	5.54
9	31,047	5.26
10	29,065	4.92

11	27,587	4.67
12	26,401	4.47
13	25,383	4.30
14	25,151	4.26
15	24,085	4.08
16	24,527	4.16
17	22,109	3.75
18	19,699	3.34
19	17,429	2.95
Gender		
Male	299,230	50.7
Female	291,005	49.3
Birth order		
1	352,151	59.66
2	181,409	30.74
3	45,988	7.79
4+	10,687	1.81
Highest parental education		
Compulsory	34,202	5.79
Upper Secondary	303,218	51.37
Tertiary	252,815	42.83
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Number of children	590,235	
Number of families	383,477	
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Table 2 presents the results from the analyses on heterogeneities in the effects of separation across parental education. Model 1 presents the results from the pooled analysis. Here, the results indicate that there is a strong gradient in the effect by age at exposure. Specifically, children exposed to a parental separation early in childhood perform better in terms of GPA at age 16 relative to the reference category (age 15). For example, children exposed to a parental separation at the age of 1 display an advantage of 15.3 percent of a standard deviation relative to the reference group. Figure 1 presents coefficient plots from model 1.

We find a clearer age gradient in parental separation effects than what Sigle-Rushton and colleagues (2014) reported. When we measured parental separations as registered moving apart rather than based on three consecutive years living apart, we are able to reproduce Sigle-Rushton and colleagues' (2014) results almost entirely. We interpret this as reflecting the role of measurement error in parental separation, where some registered address changes are misclassified as separations.

Table 2. Effects of parental separation on children's ninth grade GPA (GPA standardized by birth cohort) for birth cohorts 1973-1995. All models estimated using family FE.

Model 1	
Child's age at separation	
1	0.153*** (0.021)
2	0.156*** (0.019)
3	0.147*** (0.017)
4	0.136*** (0.016)
5	0.130*** (0.015)
6	0.126*** (0.014)
7	0.117*** (0.013)
8	0.094*** (0.012)
9	0.083*** (0.012)
10	0.064*** (0.011)
11	0.046*** (0.010)
12	0.022* (0.010)
13	0.012 (0.010)
14	-0.009 (0.010)
15	Ref.
16	0.035*** (0.010)
17	0.046*** (0.010)
18	0.078*** (0.011)
19	0.056*** (0.012)
Constant	-0.275*** (0.010)
Observations	590,235
BIC	634950.071

Standard errors in parentheses

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

Model 1 includes controls for sex, birth order, and quarter of birth

Model 2 includes interactions between highest completed education of parents and all covariates from model 1

In addition, we see that the children exposed to a parental separation after ninth grade GPA is registered, aged 16 to 19, display 4 to 8 percent of a standard deviation higher grades than those exposed in the two years prior. This advantage, however, is smaller in magnitude as compared to the

children who experienced the separation much earlier in childhood. This indicates that ages 13 to 15 reflect the crisis period with respect to ninth grade GPA.

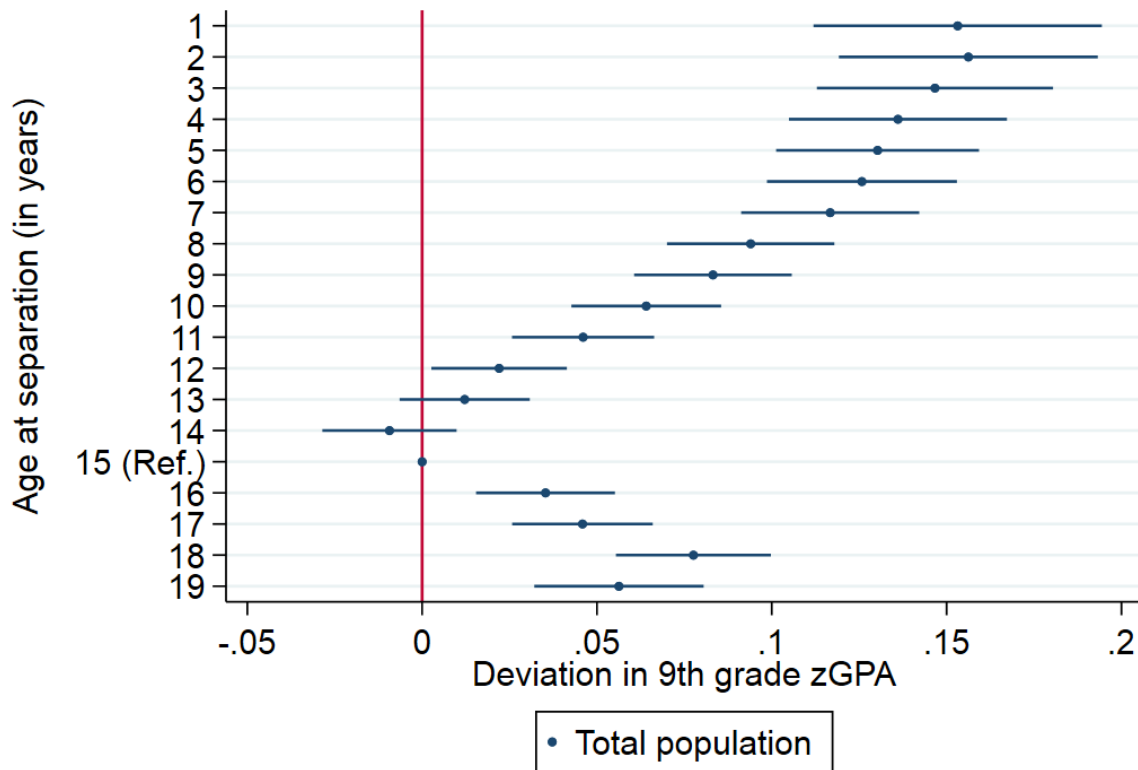


Figure 1: Coefficient plots from Model 1

Preliminary conclusions:

In this study, we examined the effects of parental separation on ninth grade GPA, focusing specifically on heterogeneities by age at exposure, parental education, and gender. We find a significant age gradient that suggests the years prior to ninth grade may represent a crisis period. Specifically, the effects of parental separation seem to be the most negative for children’s ninth grade school grades between the ages of 13 and 15.

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