

Family Structure Changes and Children's Health, Behavior, and Educational Outcomes*

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February 28, 2009

Abstract

More and more children do not grow up in traditional nuclear families. Instead they grow up in single parent households or in families with a step-parent. Hence it is important to improve our understanding of the impact of "shocks" in family structure due to parental relationship dissolution on children. In this study I empirically test whether children are traumatized by shocks in the family structure during childhood. I focus on both educational, behavioral, and health outcomes. A population sample of Danish children born in January to May 1983, 1984, and 1985 is used for the analysis. The empirical cross-sectional analysis indicates a negative relation between the number of family structure changes and children's educational outcomes. Children experiencing many family structure changes also seem to have worse health outcomes.

JEL Classification: D13, I12, I21, J12

Keywords: Family structure, child outcomes, health, crime, education

*Financial support from The Danish Social Science Research Council is gratefully acknowledged. Comments and suggestions from participants at the Microeconomic Lunch Workshop at Aarhus University and seminar participants at University of Bergen are greatly appreciated. Moreover, Leslie Stratton and Nabanita Datta Gupta have given me many helpful suggestions. The usual disclaimer applies.

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1 Introduction

More and more children do not grow up in traditional nuclear families. Instead they grow up in single parent households or in families with a step-parent. Hence it is important to improve our understanding of the impact of "shocks" in family structure due to parental relationship dissolution on children. To give an example, in 1980, almost 83% of all Danish children in the ages 0 to 17 lived with both of their parents, but this number steadily decreased to 73% in 2005 as shown in Figure 1. That is, more than 25% of all Danish children do not live with both of their parents in 2005. In many other western countries the divorced population is increasing as well and for these countries we expect to see a similar picture as that depicted in Figure 1 for Denmark.

After a nuclear family breaks up, the majority of children stay with their mother the following year. This is shown for Denmark in 2008 in Figure 2. For families that break up, about 14.5% of the children live with the father the following year,¹ whereas more than 80% of the children live with their mother. Some of the oldest children choose to live alone the following year. In Denmark as of 2008, 96.6% of all nuclear families were categorized as nuclear families the previous year.

The topic of family structure changes has been studied extensively in the psychology and sociology literature and recently also in the economics literature. International studies mainly suggest a negative relationship between non-nuclear family structure and child outcomes. There are two potential explanations for this. First, families that split up may possess characteristics that are different (and worse) than what is seen in nuclear families, i.e. non-nuclear families are a *selected* group of families.² Another explanation is that there may be negative *causal* effects of separation.³

To properly analyze the effect of a change in family structure on child outcomes, detailed data are required. Many international studies only have access to datasets where family structure is observed once during a child's life and this "value" is then extrapolated to the entire childhood.⁴ This approach leads to imprecise results and is known as the "window problem" (Wolfe et al. (1996)). Danish register data makes it possible to avoid the window problem and to make quantitative economic analyses which can

¹This most often occurs for the oldest children.

²Studies pointing in this direction are Björklund and Sundström (2006) and Björklund et al. (2007).

³See Ermisch and Francesconi (2001).

⁴E.g. Manski et al. (1992).

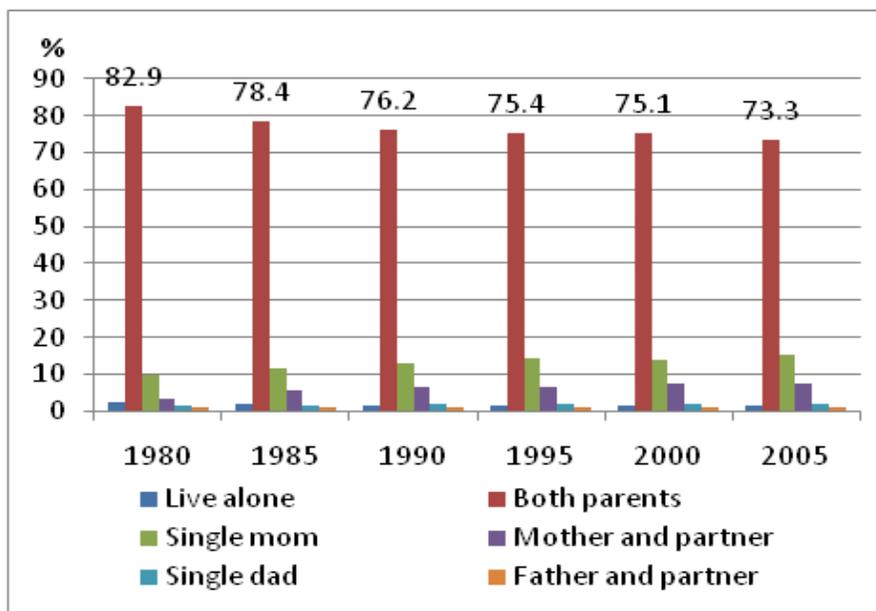


Figure 1: Type of family for children aged 0-17. Denmark, 1980-2005.

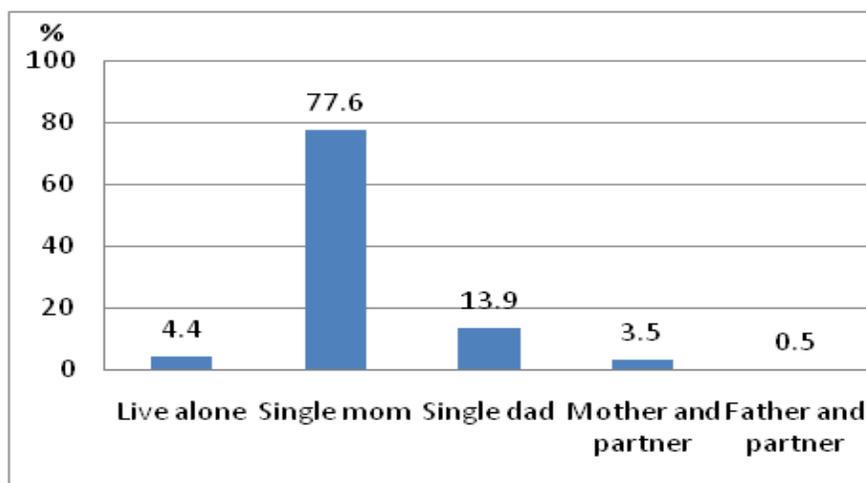


Figure 2: Family type for children who lived with both mother and father the previous year but not in the current year, Denmark 2008.

shed light on the selection and causation explanations. However, until now, register data from Denmark has not been exploited to systematically analyse family structure and its relation to child outcomes.

Though descriptive in its nature, this study contains multiple contributions to the Danish and international literature. One contribution is to use detailed data for the quantitative economic analyses to avoid the window problem and obtain more precisely identified results. Another is to illuminate new aspects of family structure by investigating a variety of short and long-term child outcomes. In particular, focus is on the relation between family structure and child outcomes such as health (hospitalizations), behavior (crime), and education (high school enrolment and high school GPA). A third is to propose new questions to this area such as the importance of the timing of family dissolution and the short and long-term impact of several family structure changes. Also the time spent in a single parent household will be investigated. Finally, this study can be used as a reference point for further studies.

The remainder of the paper proceeds as follows. In Section 2, a literature review is presented and in Section 3 the estimation strategy is explained. Section 4 gives an introduction to the datasets used in the estimations, and the empirical results are presented in Section 5 along with a sensitivity analysis. Finally, the results are summarized and a brief discussion of policy implications is presented in Section 6.

2 Literature Review

Economic theory suggests *human capital* (HC) as an explanation of family structure's (causal) effect on child outcomes (Becker (1991) and Becker (1993)). The intuition is that households are time and money constrained. With fewer adults in the household there is less time and money to invest in the children and this may reduce child outcomes through decreased parent-child interaction and fewer goods that can potentially increase child outcomes, e.g. books and childcare. Becker's theories of the family suggest that two adults are better than one as it allows pooling of resources and specialization, thereby increasing total market and household production. However, HC theory cannot explain why children growing up in non-nuclear families seem to have lower outcomes even with a step-parent present (Genetian (2005)). Explanations of this can be *asymmetric information and monitoring* (Weiss and Willis (1985)), or different *bargaining power* among biological and step parents (Lundberg and Pollak (1996)).

Recent theoretical studies on child development and child outcomes suggest that skills beget skills and capabilities foster future capabilities through *self-productivity* and *dynamic complementarity*. That is, higher stocks of skills in one period create higher stocks of skills in the next period, and stocks of skills acquired in one period make investment in future periods more productive (Cunha and Heckman (2007) and Heckman (2008)). Thus, early investments in children are often most fruitful and even more so if they are followed up by later investments, but this depends on the exact technology of skill formation. Cunha and Heckman (2007) demonstrate that some periods may be more effective in producing certain skills (*sensitive periods*), or it may be the case that only one period is effective in producing a certain skill (*critical period*). With this theory in mind, the timing of family structure changes might be extremely important for child outcomes. We will therefore return to this question in the hypotheses and the empirical analysis.

The sociological and psychological literatures have also developed theories of the relation between family structure and children's outcomes. One example is *learning theories* which suggest the importance, especially for boys, of having a male role model for acquiring information about how to operate in society. Another example is *loss of parental control theories* which focus on trauma or shocks experienced during childhood, e.g. changing family structure. I will refer to the latter theory as the *stress theory*. Ginther and Pollak (2004) summarize these theories in more detail.

In general, the empirical literature cannot agree on whether *selection* or *causation* (or maybe both) explain how children's outcomes are related to family structure. The selection theory claims that families that split up may possess characteristics that are different (and worse) than what is seen in nuclear families, i.e. non-nuclear families are a selected group of families. Studies pointing in this direction are Björklund and Sundström (2006), Björklund et al. (2007), and Piketty (2003). On the other hand, Ermisch and Francesconi (2001) argues for causal effects of separation, i.e. negative effects on child outcomes caused by a change in family structure.

Furthermore, a practical issue pointed out in Manski et al. (1992) emphasize that assumptions about the actual process generating family structure and child outcomes are important for the estimation strategy. Strong assumptions lead to more precisely estimated effects but at the cost of maybe being less realistic. Thus, we need to consider this, when choosing the estimation strategy.

The main problem in empirical analyses of family structure is specification of a counterfactual to divorce and separations (Ginther and Pollak

(2004)). "No divorce" is not a reasonable counterfactual since parents cannot be forced to live together. This problem of identifying the effect of divorce etc. can be solved by using an instrument as a natural experiment, e.g. a reform in the rules of divorce. This has been done in the studies by Gruber (2004) and Francesconi et al. (2005) but unfortunately there are no suitable reforms available for Denmark and thus no good instruments. Furthermore, using divorce laws as an exogenous cause of divorce does not solve the problem that changes in divorce regimes may directly affect the nature of intrafamily bargaining - and this may lead to different implications for the children (Stevenson and Wolfers (2006)). Alternatively, one can consider the death of one parent as an exogenous shock to family structure as in Corak (2001) and Francesconi et al. (2005). The problem with using this 'exogenous' shock is, that it might not be completely exogenous if, for example, the parent's death is the result of several years of sickness. Then it might be perfectly expected and the effect on the child of losing a parent might be reduced due to 'preparation' for the event. If the parent's death is due to e.g. a traffic accident, the loss is truly an exogenous and unexpected event. Losing a parent permanently due to parental death may not be compared to losing a parent due to divorce. In the latter case the parent is still alive and may still participate actively in the child's daily life.

The counterfactual problem can (partly) be overcome by focusing only on families that are dissolved. This is the topic of a later study. In this current study (as in most of the existing studies in the literature), the problem of not having a reasonable counterfactual is ignored and the results of the empirical analysis in Section 5 thus have to be interpreted with caution. The estimation strategy is not completely naïve, however, as I will estimate using differences-in-differences(-in-differences) (D-i-D) as also done by Sanz-de Galdeano and Vuri (2007). For reasons of comparison, I will also carry out simple cross-section estimation strategies.

3 Empirical Model

In the empirical analysis I attempt to test the stress theory, i.e. whether children are traumatized by shocks in family structure during childhood. I investigate how the timing and sum of family structure shocks affect children to get information on negative impacts (stress) accompanying a change in family structure. The hypotheses considered in the empirical study are the following:

Hypothesis 1 A family structure change is a (negative) shock for the child

and thus has negative implications for the child’s outcomes both in the short and long run

Hypothesis 2 The number (and timing) of family structure changes might affect child outcomes

At this point it is useful to define precisely what is meant by a family structure change. Throughout this study, family structure changes will be defined as follows except if anything else is explicitly noted:

Definition 1 *A family structure change is any change in the family structure that the child experiences. It does not have to be a legally binding change as divorce or remarriage*

Thus, any observed change in the number or identity of the (biological or social) parents in the household from one year to the next is considered a family structure change.

Estimates are based on a linear version of the education production function model (Todd and Wolpin (2003)). Assume that achievement for child i , T_i , can be expressed as a linear function of the explanatory variables

$$T_{ija} = \beta_0 + \beta_1 D_{ija} + \beta_2 F_{ij}(a) + \gamma_j + \nu_{ija}, \quad (1)$$

where T_{ija} is achievement for child i from family j at age a ; education, behavior (criminal activity), or health; D_{ija} is family structure changes (measured as year-to-year changes); F is a vector with child and family background information: child gender, parental education, labor market attachment, and number of siblings; γ_j is a family fixed effect, e.g. norms and values in the family; and, finally, ν_{ija} is an error term.

For the differences-in-differences model assume there are only two periods, 1 and 2. $D(i, t) = 1 (0)$ if (no) divorce in period t . Changing the notation slightly we get the following expression for child achievement as a function of family structure changes:

$$T(i, t) = \beta_0(t) + \beta_1 D(i, t) + \gamma(i) + v(i, t), \quad (2)$$

where $\beta_0(t)$ is a time-specific component; β_1 is the impact of parental divorce; $v(i, t)$ is a serially uncorrelated transitory component; and $\gamma(i)$ is an individual-specific component representing unobserved pre-disruption characteristics, e.g. stress associated with an unhappy family life. $D(i, t)$ is probably correlated with $\gamma(i)$, i.e. we cannot identify the effect of parental divorce or family dissolution.

Differencing Equation (2) with respect to t and adding covariates implies:

$$T(i, 2) - T(i, 1) = \beta_0 + \beta_1 D(i, 2) + \beta_2 X(i) + (v(i, 2) - v(i, 1)), \quad (3)$$

where $\beta_2 = \beta_2(2) - \beta_2(1)$ and $X(i)$ is a vector of observed characteristics assumed uncorrelated with $v(i, t)$.

The model in Eq. (3) is identified if the conditional restriction is fulfilled

$$P(D(i, 2) = 1 | X(i), v(i, t)) = P(D(i, 2) = 1 | X(i)) \\ \text{for } t = 1, 2,$$

i.e. identification if changes in the outcome variable over time would have been exactly the same in both treatment and control groups in the absence of divorce or separation (parallel trend assumption) at least when including the covariates. Further differencing might lead to better identification (D-i-D-i-D) by taking another pre-divorce period into account as well.

The D-i-D approach follows Sanz-de Galdeano and Vuri (2007). The control group consists of those children that have not experienced divorce, and the treatment group is the children that have experienced divorce from period 1 to period 2. The dataset has to be set up in a certain way for this to work. First, in period 1, none of the children have experience a divorce, i.e. children who do not have their father in the household during the first calendar year of their life have to be deleted from the sample. Secondly, this strategy is only possible for the health outcomes using my datasource since it requires outcome measures that change over time, not only in the last few years we observe the child.

Child outcomes also depend on the child's unobservable endowed ability which is often proxied by birthweight (e.g. Behrman et al. (1994)). Thus, consistent estimation requires information on contemporaneous and historical inputs. All relevant background information such as labor market information for the "social" parents (the parents living in the household) and biological parents not living in the household is included in the analysis, as well as information on the child, siblings, child's age at the time of the shock(s), etc.

As outcome measures I use education, measured as high school enrolment and high school grade point average. Further, behavioral measures such as criminal activity (type of crime, number of sentences) will be used, and finally, health outcomes (sum of hospitalizations in a year, doctor visits) will be investigated. By studying this wide variety of outcomes, different aspects of the effect of family structure changes are illuminated.

There are two main problems with empirically analyzing the effect of family structure on child outcomes. First, family structure is clearly not random so simple OLS parameter estimates may be biased. OLS is nevertheless used in most of the existing literature and will therefore also be used here for comparison. In addition to OLS estimation of Eq. 1, I exploit longitudinal data to take observed and unobserved individual and family fixed effects (FE) into account. Under standard assumptions I get consistent and unbiased estimates of child outcomes and can address the issue of causation. Furthermore, as mentioned above, I use D-i-D analysis to difference away unobserved individual specific components. These might be components that can be directly related to family dissolution decisions and thus would bias a simple cross-section analysis as in Eq. 1. In other words, the D-i-D analysis allows for the possibility that parental divorce is correlated with unobserved family characteristics that may influence child outcomes.

4 Data

Estimations are based on an administrative register dataset consisting of the entire population of Danish children born from January to May 1983, January to May 1984, and January to May 1985. About 50,000 children are born *per year* in Denmark in this time period and I have about 36,000 unique children per cohort in the dataset. The data source contains yearly, rich information on family background along with other information on children, parents and siblings. This rich datasource implies more reliable estimates of the effect of family structure changes on child outcomes than what is seen in most existing studies.

In the Danish tax and income registers created by Statistics Denmark, these individuals and their parents are followed on a yearly basis from the year of birth to 2005 if they have not left the country or died. The included parents are based on the household the child lives in. Thus, if the child lives with both biological parents, parental information concerns the biological parents. If, on the other hand, the child lives with one biological parent and one step-parent, then the parental information concerns these individuals. I will distinguish between biological and non-biological parents by referring to either 'biological' or 'social parents'.

The registers provide information on the parents' and children's marital status, residence, education, income, wage, labor market activities, etc. This includes information on the children's completed education in 2005 when they are 21 years of age. Some Danish children take an optional 10th grade

before enrolling in high school and they may therefore still be enrolled in high school at the age of 21. It is also very popular among the Danish youth to take a sabbatical year between high school and college. Thus, higher educational goals may not be clear when the children are 21 years old. When investigating educational outcomes, I will therefore focus on high school enrolment and high school completion, which in short will be referred to as high school enrolment.

Furthermore, information on criminal activity and health is available in the data, which enables analysis of both short and long-term outcomes - both cognitive and non-cognitive. With respect to health I will use the number of hospitalizations and the number of days in hospital to indicate the child's health. This information is available from 1991. For criminal activity I use the number of convictions and in some cases just a dummy for being convicted in the year in question as measures of the child's behavior. The age of criminal responsibility is 15 in Denmark so I cannot investigate these behavioural outcomes before the child is 15 years old. Educational, health and behavioral outcomes are important outcomes both for the children themselves and more generally for society. These variables will therefore be the focus of this study.

Table 1 shows mean values for selected variables for the children born in 1984 and their parents. The mean values for children are from 2004 and the values for parents are from 1983, i.e. the year before the child's birth. The sample statistics for the other cohorts are very similar and are shown in Appendix A [to be inserted]. However, one difference between the cohorts is that years living with a single father increase across cohorts and thus depicts some sort of cultural change.

We can see in Table 1 that about 50% of the children enrol in high school compared to about 30% of their parents. The children's grade point average (GPA) after completing high school is fairly close to the mean, which in the Danish system by 2004 is 8. In Denmark, GPAs from high school range from 0 to 13 with 8 as the middle grade. 6 is equivalent to passing the exam. However, by looking at the number of observations it is clear that we only have a measure of GPA for those that actually complete high school. Thus, using high school enrolment as the main outcome variable for educational outcomes seems reasonable. It is also clear from the table that only 7% of the children are hospitalized during 2004. This is of course due to their young age. The most common reason for being hospitalized is problems during a pregnancy.

Crime: [to be written when the data is properly merged]

It is also clear from Table 1 that after a separation, most of the children

Variable	mean	std.dev	obs
<i>Outcomes</i>			
High school (0/1)	0.52	0.50	34294
HS GPA (6;12.2)	8.20	0.99	15780
Hopitalized (0/1)	0.07	0.26	34016
Hospitalizations (0;18)	0.10	0.46	34016
Days in hospital (0;288)	0.28	2.87	34016
<i>Family structure</i>			
Total changes (0;13)	1.07	1.66	34294
Yrs with single parent (0;18)	2.69	4.56	34294
Yrs with single mother (0;18)	2.38	4.40	34294
Yrs with single father (0;18)	0.31	1.43	34294
Age 0-2, single mom	0.26	0.72	34294
Age 3-5, single mom	0.37	0.88	34294
Age 6-10, single mom	0.70	1.51	34294
Age 11-16, single mom	0.90	1.88	34294
Age 0-2, single dad	0.01	0.11	34294
Age 3-5, single dad	0.03	0.24	34294
Age 6-10, single dad	0.08	0.50	34294
Age 11-16, single dad	0.16	0.81	34294
<i>Child and parental characteristics</i>			
Child is a boy (0/1)	0.51	0.50	34294
Siblings at age 10 (0;11)	1.18	0.85	34073
High school, mother (0/1)	0.33	0.47	34276
High school, father (0/1)	0.28	0.45	33757
Ann. wage inc., mother /100,000	1.95	1.23	34276
Ann. wage inc., father /100,000	2.68	2.09	33757
Work experience, mother (0;37)	16.25	7.87	34276
Work experience, father (0;37)	19.55	8.45	33757

Note: Mean values for children are from 2004, whereas mean values for parents are from 1983. The cohort includes children born in 1984.

Table 1: Sample statistics for the 1984 cohort in 2004.

Total family structure changes	percent of sample
0	58
1	13
2	13
3	6
4	5
5	2
6	2
7	1
≥ 8	1

Table 2: Total family structure changes during childhood by 2004, all cohorts.

live with their mother. The children that live with their father are usually in the group of 11 to 16 year olds, i.e. the oldest children. Finally, fathers have a higher annual wage income than mothers and fathers' work experience is also higher. Most of the children have one sibling by the age of 10 and the gender composition of the sample is almost 50/50.

In Table 2 the number of family structure changes for all three cohorts are shown. The highest number of family structure changes experienced by a child is 13 but it is not common to experience that many family structure changes. Even when I collect 8 and more family structure changes into one single category, only 1 percent of the sample is present here. The most common number of family structure changes is 0, i.e. the child grows up in a nuclear family. 26 percent of the children have experienced 1 or 2 family structure changes during childhood.

5 Preliminary Estimation Results

First, I will focus on descriptive evidence regarding the correlation between years in a single parent household and child outcomes measured as GPA after high school, whether the child enrolled in high school, the number of hospitalizations, and finally the number of days in hospital. Again, the focus is on the 1984-cohort but the results for the other cohorts are similar and available from the author upon request. These correlations are depicted in Table 3.

According to Table 3 there is a negative correlation between high school enrolment and the years the child has lived in a single parent household. I.e.

	Years in single parent household		
	total	single father	single mother
GPA	-0.0392	-0.0283	-0.0318
High school enrolment (0/1)	-0.1168	-0.0424	-0.1076
# hospitalizations	0.0267	0.0004	0.0276
# days in hospital	0.0378	0.0018	0.0386

Table 3: Raw correlations between child outcomes and years in a single parent household, 2004, the 1984-cohort.

there could be a negative effect of separations on child outcomes. However, this could just be the selection effect. There is also heterogeneity in the educational outcomes. The negative 'effect' on high school enrolment is much higher than the 'effect' on GPA. Thus, those children that enrol and complete high school might be a selected group and therefore the negative effect of separations on GPA is smaller than the effect on the decision of whether to enrol in high school or not. With respect to hospitalizations and days in hospital we see a positive correlation with years in single parent household and thus again a negative relation between the outcome variables and family dissolution.

Splitting the sample by child gender (not shown here) it is seen that there is a somewhat higher correlation for girls (mainly) for health outcomes. If we instead investigate the total family structure changes instead of the years in a single parent household it is found that there is a somewhat higher correlation between total family structure changes and the outcome variables compared to when using years in a single parent household instead. The latter correlations are not shown here but are available from the author upon request.

When analyzing the relationship between GPA and years in a single parent household or alternatively the total number of family structure changes during childhood using OLS, we get highly significantly estimated coefficients. All estimates point to a negative relation between single parent households or family structure changes and children's GPA after high school. When instead investigating high school enrolment using a probit estimation procedure we find the same pattern as for GPA. Finally, probit analysis for hospitalizations reveals the expected positive relationship between the outcome variable and years in single parent households or family structure changes. The coefficient for years in a single father household is only significant on a 10% level, though. This might be attributed to the relatively

Estimation	outcome variable	coefficient	t-stat
GPA			
1	Years single mother	-0.0085	-4.21
1	Years single father	-0.0239	-3.67
2	Years single household	-0.0098	-5.03
3	# fam.structure changes	-0.0596	-9.99
	Obs	16520	
HS			
1	Years single mother	-0.0327	-21.01
1	Years single father	-0.0431	-8.97
2	Years single household	-0.0336	-22.44
3	# fam.structure changes	-0.1648	-37.01
	Obs	38401	
Hospitalized			
1	Years single mother	0.0167	8.18
1	Years single father	<i>0.0123</i>	1.87
2	Years single household	0.0163	8.27
3	# fam.structure changes	0.0654	11.96
	Obs	37484	

Table 4: OLS and probit estimation results for the effect of years in a single parent household on various child outcomes. The 1984-cohort in 2004, no other covariates added.

few children living in single father households compared to single mother households.

Now focusing only on years in a single mother household as in most of the literature, and again investigating the 1984 cohort in 2004 by OLS and probit (without covariates), we see in Table 5 that for the different outcome variables, the effects differ by the age of the child. This confirms what has also been seen previously in the literature. For GPA, the period 0-2 years of age seems to be most important, whereas for high school enrolment all age groups up to 10 years old are important. Finally, for hospitalizations the age group 0-2 again seems to be important. Thus, living in a single mother household in the age 0 to 2 years seem to have the most detrimental effect for health and one of the educational outcomes, whereas for the other educational outcome, high school enrolment, living with a single mother up

	GPA	t-stat	HS	t-stat	Hosp.	t-stat
Years with single mother						
Age 0-2	-0.0339	-1.85	-0.1205	-9.55	0.0542	3.09
Age 3-5	-0.0189	-1.15	-0.0482	-4.00	0.0275	1.56
Age 6-10	-0.0049	-0.49	-0.0335	-4.49	0.0113	1.04
Age 11-16	-0.0028	-0.44	-0.0080	-1.64	0.0087	1.21
Obs	16520		38401		37484	

Table 5: OLS and probit estimation results for the effect of years in a single mother household at different ages on various child outcomes. The 1984-cohort in 2004, no other covariates added.

to the age of 10 has a negative relation to enrolling in high school.

As mentioned earlier, the families that split up may be a selected group. Thus, if we focus only on families in which either the mother or the father has completed high school, we get an idea about the severity of selection in the Danish sample. Sample statistics for this subgroup is shown in Table 6 and it is clear that this subgroup has more favourable characteristics than what is found in the general sample. Thus, this simple exercise shows, that sample selection probably explains part of the the negative effect of family structure changes on child outcomes. This has to be investigated in more detail of course.

Variable	mean	std.dev	obs
High school (0/1)	0.70 (0.52)	0.46 (0.50)	14488 (34294)
HS GPA (6;12.2)	8.37 (8.20)	0.99 (0.99)	9152 (15780)
Hospitalized (0/1)	0.06 (0.07)	0.23 (0.26)	14302 (34016)
Hospit. (0;18)	0.08 (0.10)	0.44 (0.46)	14302 (34016)
Days in hosp. (0;288)	0.22 (0.28)	2.38 (2.87)	14302 (34016)
Total changes (0;13)	0.89 (1.07)	1.47 (1.66)	14488 (34294)
Yrs single parent (0;18)	2.45 (2.69)	4.39 (4.56)	14488 (34294)
Yrs single mother (0;18)	2.16 (2.38)	4.24 (4.40)	14488 (34294)
Yrs single father (0;18)	0.28 (0.31)	1.33 (1.43)	14488 (34294)

Note: Numbers in parentheses are for the whole 1984 sample

Table 6: OLS and probit estimation results on various child outcomes. The 1984-cohort in 2004 but only for families in which either the mother or the father has completed high school, no other covariates added.

I still need to add estimation tables with crime information included.

This has not been possible yet due to some data problems. Furthermore, the D-i-D analysis has to be added along with general sensitivity analysis. For example, I need to look more into the number of family structure changes versus the number of years in a single parent household as this seems to be an important distinction.

6 Conclusion

More and more children do not grow up in traditional nuclear families. Instead they grow up in single parent households or in families with a step-parent. Hence, this paper aims at improving our understanding of the impact of "shocks" in family structure due to parental relationship dissolution on children. Today, in some countries, more than 25% of all children do not grow up in a household with both of their parents.

Using a Danish administrative register dataset for the estimations I find in the preliminary empirical analysis that children who have experienced family structure changes during childhood seem to have worse educational outcomes and a higher propensity to being hospitalized. The children in the dataset experience up to 13 family structure changes during childhood. More family structure changes implies worse outcomes and might actually be more important than the number of years a child has spent in a single parent household. The age at which the family structure change occurs seems to be important at least for some outcomes. Finally, the preliminary results also show that selection is definitely an issue in the Danish case as well as in other countries.

Particularly for studies using Danish or Scandinavian data, this study is thought to be a useful reference study for further research in the topic of family structure changes. Most of the analyses in other studies in the literature are replicated and extended in this study and I use both short- and long-run outcomes as well as cognitive and non-cognitive outcomes. This study, like most of the studies in the literature, ignore the problem of having a reasonable counterfactual to separation or divorce. Thus, in future research I expect to look more into families that are already separated to avoid the problem of the 'missing' counterfactual.

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A Appendix

Sample statistics for children born in January to May 1983 and children born in January to May 1985...

[To be inserted]