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**Link Between Cause of Paternal Death and  
Children's Education Depends on  
Family Background**

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# Link Between Cause of Paternal Death and Children's Education Depends on Family Background

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(Equal contributions, alphabetical order)

## **Abstract**

Early parental death has been linked to problems in children's educational paths. We add to the literature by examining children's education by cause of paternal death and family background. We compare whether a father's death due to suicide, alcohol, accident or somatic causes is related to the children's university education and examine these connections by childhood socioeconomic conditions.

Using Finnish register data and linear random-effects models, we analyse the university attendance of 108,875 children born between 1982–1992 by cause of paternal death and parental resources.

Results indicated lower education in bereaved children, especially in children who lost a highly educated father due to alcohol, suicide or accident. However, having a highly educated surviving mother related to a decrease in lower education in those children, suggesting maternal protection against adversities related to death. Causes of death and overall family circumstances should be considered when analysing child outcomes after parental death.

**KEYWORDS:** parental death, cause of death, children, education, family background

## 1. Introduction

Parental loss in childhood is a traumatic life event that has been linked to many negative outcomes, such as lower educational performance (e.g., Amato and Anthony, 2014; Berg et al., 2014; Fronstin et al., 2001), mental health problems and health behaviour (Cerel et al., 2006, 1999); all of these factors can predict later educational attainment. However, there is inconclusive overall evidence on whether parental death is linked to worse educational outcomes compared to children who have not experienced parental death (Amato and Anthony, 2014; Corak, 2001; Fronstin et al., 2001; Jonsson and Gähler, 1997; Prix and Erola, 2016). Some children appear to suffer more from the death of a parent, which we argue relates both to the cause of death and the family context the child belongs to.

In this paper, we examine whether the relationship between paternal death and children's education depends on the cause of death and family background. Strain existing in a family environment and stress for children diverge between causes of death, which are shown in a number of studies that examine the psychological consequences of early parental death by causes of death (Cerel et al., 2006; Lin et al., 2004; Pfeffer et al., 2000). Suicide and alcohol-related deaths are more likely to involve less advantaged family environments for a child for a longer period around the death than most somatic causes of death and accidents, which are expected to entail fewer changes to family stability and quality of parenting. Thus, overlooking causes of death might result in insufficient knowledge on parental death and child outcomes.

In addition, a growing body of evidence indicates that family background and environment affect the amount of distress caused by negative life events (see e.g., Berg et al., 2014). This finding indicates that children from better socioeconomic positions often have better abilities to cope because of educational, occupational and social resources buffering against adverse developments. Therefore, according to the idea of cumulative (dis)advantages (e.g., O'Rand, 2009), we expect that a child who has many burdens in life is less likely to do worse. A child from a less advantaged family background whose parent dies likely suffers more than a child from a more privileged family background (or who does not experience an early parental death), and we assume that the distress is even higher if a non-somatic cause of parental death, such as suicide, coincides with the other negative factors.

Conversely, as Finland has a universal social security system, free-of-charge education and financially supported non-compulsory education, the negative educational outcomes after a parental loss are expected to be small. If this is not the case, a child has been affected in a manner that could not be compensated for by institutional means, which is mainly economic support. Furthermore, this development would suggest that the negative child outcomes relate to factors other than family finances, such as inadequate parenting before alcohol-related death, lack of social networks and support, or inherited vulnerabilities shared by the deceased parent and the child. In this case, the institutional support should be better targeted to the non-financial needs.

This paper has two main objectives. The first is to examine whether the cause of paternal death is linked to the transition to university education. To our knowledge, only four papers (Berg et al., 2014; Chen et al., 2009; Gimenez et al., 2013; Prix and Erola, 2016) have earlier addressed the cause of parental death and children's education. Our study adds to this literature by analysing suicides and alcohol-based deaths separately from accidents and in a Western societal context. We also contribute by examining education beyond the compulsory level and by observing paternal deaths until children's early adulthood.

The second objective is to analyse whether higher parental resources enable parents to better protect children from negative educational outcomes related to parental loss and whether this protection only applies to specific types of death. All analyses are based on the Finnish register data comprising of 108,876 children born during 1982–1992.

## **2. Background and hypotheses**

In Finland, approximately 5 % of children lose a father by the age of 22, most by a somatic cause (51 %), 32 % due to alcohol or suicide, and 17 % due to an accident (own calculations). Previous studies have linked cause of parental death to lower school grades and higher school drop-out at compulsory schools in Sweden (Berg et al., 2014) and to lower college and university enrolment in Taiwan (Chen et al., 2009; Gimenez et al., 2013). The importance of causes of death for education varies across studies; however, unexpected death or death by problematic causes, such as suicide, have been more

negatively associated with education (Berg et al., 2014; Chen et al., 2009; Gimenez et al., 2013). One Finnish study on educational attainment (Prix and Erola, 2016) examined causes of death in the robustness analyses, finding no substantial effects; however, further research considering family resources and compensation was encouraged. In this paper, our objective is to answer that need.

What are the mechanisms regarding how the cause of death would matter for children? Most of the previous literature on parental death focuses on the father-absence hypothesis often used in the divorce literature. In short, this hypothesis claims that it is adverse to lose a father from everyday life, because it means losing a role model. Moreover, a general assumption holds that parental loss through death would be more exogenous and suffers less from endogeneity bias than parental separation (Corak, 2001). We argue that the possible negative links to child outcomes result from a more complex process, because families bereaved by different causes of death likely differ in many characteristics: in the family environment and its stressors, in the social support available from the parents, and in the social background.

First, home environment is likely more disturbed in families where children are bereaved by a suicide or alcohol-related cause than by a somatic cause or accident. Problematic causes of death may entail larger numbers of psychologically stressful events and a disorganized home environment before the parent dies. Living with an alcoholic or suicidal parent is often abnormal with multiple stressors due to a parent's mental illness or alcoholism (Anda et al., 2002; Shepherd and Barraclough, 1976). Consequently, children might suffer from long-term excessive stress and their own mental health problems and thus become less equipped to cope with further strains later in life. In particular, prolonged and accumulated stress (stress accumulation model: Cerel et al., 2006) is known to interfere with attention, learning and memory through over-activation of the stress system, which can affect children's educational performance and health (Amato, 2000; Shonkoff et al., 2012).

Second, psychological support from parents is important, and its level may differ by causes of death. Children who have experienced parental suicide have shown higher levels of depression than children whose parent died of cancer (Pfeffer, Karus, Siegel, & Jiang, 2000) or other cause of death (Cerel et al., 1999). This finding can indicate both parenting of lower-quality due to mental health problems that often precede a suicide and

inherited vulnerability for depression. In addition, high levels of warmth and discipline and low levels of mental health problems of the surviving caregiver have been linked to better outcomes of the bereaved children (Akerman and Statham, 2014). In addition, bereaved children's own mental health problems are associated with lower levels of warmth and support by a caregiver, which may lead to a negative circle if the parent is less mentally stable.

Moreover, part of the prior research has indicated that unexpected deaths such as accidents are more adverse than somatic causes of death (Chen et al., 2009; Gimenez et al., 2013). That finding is because there is no time for adaptation and parental support before the death, whereas deaths by most illnesses are expected at a certain level, and there is usually time between the diagnosis and the bereavement, allowing time for the family to adapt. The seriously ill parent may also prepare the child for the death and for life thereafter. However, sudden deaths most likely precede a less adverse family environment than alcohol-related deaths or suicides (although certain accidents may be technically suicides).

In sum, causes of parental death appear to be associated with children's mental health and home environment, which both define children's performance (Fröjd et al., 2008), possibly leading to lower educational attainment. Thus, we propose the following hypotheses:

*H1. Losing a father due to suicide or alcohol-related cause predicts lower education than death by a somatic cause or accident, compared to non-bereaved children (suicide and alcohol-related death hypothesis).*

*H2. Losing a father due to accident predicts lower education than a somatic cause of death, compared to non-bereaved children (accidental death hypothesis).*

Previous literature on social inheritance suggests that the influence of losses may be different for children from different social backgrounds (e.g., Grätz, 2015). Similarly, future research on parental loss has been encouraged to examine the nonlinear effects as well, i.e., whether children in different parts of social strata are affected differently, instead of only analysing the average effects (Corak, 2001). In addition, the theoretical framework of cumulative (dis)advantages holds that experiences, events and resources or the lack of them accumulate over the life course and different life domains, and this

accumulation has an influence on a child's future attainments. According to this model, children from a disadvantaged family background could suffer more from the parental death, because further strains may be difficult to cope with, whereas children from a more advantaged family background might do better because of more resources and fewer experiences of negative events.

In addition, a bereaved family might receive external support and protection from relatives (see: Prix and Erola, 2016), friends or school. Furthermore, regardless of the consistent evidence of the link between exposure to stressors and child well-being, some individuals appear more able to manage adversity. This resiliency appears to be tied to protective factors such as better parenting and social support (Smith and Carlson, 1997). Therefore, analytical models that enable to examine variable interactions, asymmetrical effects, and compensatory elements, can identify parts of the complexity (O'Rand, 2009). According to the stress process framework which is very similar to the cumulative advantage theory, different individual's resources moderate the influence of early "stressors" on normal functioning (O'Rand, 2009). Thus, a child whose parent has died of alcohol or suicide is more likely to have experienced more negative life events and stress and to have less family resources and support compared to children bereaved by somatic causes. Furthermore, high family resources might lead to less deleterious child outcomes also because the other resources can compensate for the lost ones (Erola and Kilpi-Jakonen, 2017). Consequently, we argue that children from more privileged backgrounds, in general, cope better with parental deaths that are regarded as more destabilising for the family environment and child mental health.

As a proxy for family background and resources we use both parental education and family income. Parents' education is a strong indicator of the family resources, because educational attainment provides a proxy for both economic standing and non-material resources such as knowledge, skills and individual traits defined genetically and by learning. Highly educated parents are likely to be better informed of how to help children to cope with stress and strains after parental loss and navigate in educational pathway, which can affect child's achievements in the future. Conversely, if the deceased parent had higher education, and especially when the surviving parent does not, educational resources are no longer (at least directly) available. This means that the remaining parent, higher or lower educated, may become a stronger role model for the educational choice-making (c.f. Prix and Erola, 2016).

In addition, a family's strong economic situation has been positively associated with children's outcomes (e.g., Acemoglu & Pischke, 2001), and after a parental death, the economic situation often worsens because the family loses one source of income. However, the effect of income as such on children's success has been shown to be very small (Erola et al., 2016; Mayer, 1997). Additionally, lost economic resources are partly compensated for in Finland, as the surviving spouse and children under the age of 18 generally receive survivors' pension, based on the primary beneficiary's (i.e., the deceased parent) gainful employment (Population Register Centre, 2017). Therefore, a family's economic situation is expected to play a smaller role than the parents' education in how paternal death relates to child outcomes.

Third, we hypothesise:

*H3. Children with an advantaged family background are less negatively affected by paternal death in terms of education than are children with low parental resources, especially in the case of death by alcohol or suicide (high resources protect hypothesis).*

Conversely, regarding achievements in life, negative life events can actually be relatively more harmful for children from better off family backgrounds despite better parental support and compensation and better coping. The reason is that these children usually have "more to lose", and parental death may interfere with educational inheritance and lead to downward mobility. Therefore, the link between parental death and a child's university education can actually be stronger for advantaged families than less advantaged ones. In addition, downward mobility is more likely for those who are further from the bottom of the social stratum, where children are less likely to enter university in the first place. Finally, we propose our fourth hypothesis:

*H4. Children with an advantaged family background are more negatively affected by paternal death in terms of education than are children with low parental resources, especially in case of death by alcohol or suicide (more to lose hypothesis).*

Eventually, family background is both a moderating and confounding variable in our research. 1) Early parental death is rare in Western countries; thus, parents who die prematurely are somewhat selected, and certain causes of death, such as suicides and



accidents, are over-represented (Torssander and Erikson 2010; OSF 2015a, 2015b). Those who belong to lower social classes have a higher risk for early death than those who belong to higher social classes (Erikson and Torssander 2008, 2009). Thus, any analysis on the influence of premature parental death is likely to be strongly influenced by socioeconomic selection. 2) Conversely, the influence of parental death and cause of parental death is likely different in different families, as suggested in the last hypotheses. Therefore, we cannot causally interpret for the results on the cause of paternal death and children's education. However, we attempt to address this concern descriptively by showing how different causes of death are distributed in our sample. In this paper, we argue that the cause of early paternal death is both an indicator of selection process and an indicator of home environment before the father dies.

### **3. Data and methods**

The study is based on a longitudinal Finnish Growth Environment Panel (FinGEP) on 108,875 children born between 1982 and 1992. The original data is a 10 percent sample of individuals who lived in Finland in 1980. The sample persons were then linked to all family members, forming a dataset that is clustered by families. Individuals whose education we analyse in this study are the biological children of the sample persons. All individuals in the data are followed from birth until 2014.

All analyses are conducted using random-effects linear multilevel modelling. For investigating the joint effects between cause of death and family resources (hypotheses 3 and 4), we add interaction terms for cause of death and each parental resource, i.e., father's education, mother's education and family income.

#### *Measures*

The outcome variable is the highest educational level attended by the age of 22, which we recoded to a binary measure of whether or not a child has attended (enrolled or completed) university education. The main independent variable is the cause of the father's death, which was observed at the age of 0–22 and before the child's university enrolment. The analytical sample includes 5,203 paternal deaths by children's age of 22. We excluded children who lost their father before university enrolment, providing a total

number of 3,485 deaths, of which 1,129 deaths (32 %) were categorised as suicide and alcohol, 1,774 deaths (51 %) as somatic and 582 (17 %) as accidents.

The data apply the 54-group time series classification for primary causes of death, which we re-categorised for our research purposes. Information on secondary causes of death is not available in the data. In *accidents*, we included all kinds of accidents (42–49); in the *suicide and alcohol* group, we included suicides and alcohol-related deaths (50 and 41). In *somatic causes*, we included all other causes of death (1–39), except for deaths of an uncertain cause (40, 52–54) as well as murders and manslaughters (51), which we did not have in our analytical sample.

In this study, we do not analyse children who have lost both of their parents ( $n = 236$ ), because we want to study how the remaining parent matters after the loss. Children who have lost both parents are also likely a more selected and small group to be compared with those having one parent alive. In addition, maternal deaths ( $n=1,820$ ) are too rare in the data for running reliable analyses on causes of death by family background.

The models are controlled for *child's sex*, *child's year of birth* (cohort effects), *stepfather*, *single parent*, *birth order*, *highest parental educational level*, *household income* (100 centiles) and *father's age at birth*. Child's sex is used to control for possible interactions, such as the finding that the absence of the biological father might be more harmful for boys (e.g., Buchmann & DiPrete, 2006). Certain studies have reported the negative child effects of living in a stepfamily (Biblarz and Gottainer, 2000; Jonsson and Gähler, 1997) or in a single parent household (parental separations) (Grätz, 2015); therefore, we examine if a child has lived in a stepfamily or single parent household between ages 0–18. We also adjust for birth order because of the firstborn premium in education (e.g., Black, Devereux, & Salvanes, 2005; Bu, 2016). We observe the highest level of parental education (dominance principle) during 0–18 years of a child's age to control for the high educational inheritance between parents and children (Table 1).

**Table 1. Descriptive statistics of children by paternal death.**

<i>Variable</i>	Alive	<i>Cause of death</i>		
		Alcohol / suicide	Somatic	Accident
University education %	19	10	12	10
Parental education %				
primary	6	13	14	13
secondary	73	76	72	76
tertiary	21	11	14	12
Birth order %				
1st	35	27	22	29
2nd	39	44	39	40
3rd/later	26	29	39	31
Female %	49	46	50	48
Single parent %	30	98	97	97
Stepfather %	10	42	24	38
		<i>Mean (sd)</i>		
Family income, €	590,404 (198,213)	528,030 (203,006)	540,677 (203,031)	529,251 (204,719)
Family income, € (100 centiles)	57(26)	49(26)	51(26)	49(26)
Father's age at birth	31(5)	32(6)	36(7)	32(6)
N	105,390	1,129	1,774	582
%	96.8	1.0	1.6	0.5

In the interaction models, we use the education of both mother and father separately. Family income is measured as total median income between a child's age of 5 and 18, further divided into 100 categories to balance the effect of highest and lowest income. Family income includes all taxable income such as income from employment and benefits from a social insurance institution.

To describe the analytical sample (Table 1), 10–12 percent of bereaved children and 19 percent of children with no parental loss are university educated. Bereaved children have lower family income, less educated parents and older fathers (especially when they died of somatic causes), and they have lived more often in step- and single-parent families than non-bereaved children. In sum, these children appear to come from less advantaged family backgrounds.

## 4. Results

### 4.1 Cause of death and child's education

The analysis shows that experiencing paternal death is negatively associated with a child's university education, and those children have 7.3 percentage points lower probability for university education (Table 3, Baseline). When causes of death are analysed separately, we find that the negative association is stronger for accidents, suicides and alcohol-related deaths than for somatic deaths (Model 1). When we include family demographic variables (father's age at birth, birth order, single parent and stepfather), the associations between causes of death and a child's education become much smaller (Model 2) and further weaken particularly when adding parental education (Model 3). The results in Model 4 and 2 are very similar, which suggests that controlling for family income does not play a significant role when explaining the role of parental death.

In the fully adjusted model (Model 5) we find that, when controlling all measures for family background, losing a parent due to a somatic cause has the strongest, accident the second strongest, and suicide and alcohol-related death hardly any connection to education, in contrast to the interpretations made from the Model 1. Thus, we do not find support for *hypothesis 1*, proposing that losing a father due to suicide or alcohol-related cause would be more negatively associated with educational outcomes than bereavement by accident or somatic cause compared to non-bereaved children when all socio-demographic background characteristics are controlled for. According to the full model (5), we did not find support for *hypothesis 2*, which proposed that transition to university education is lower among children who lost a father in accident than by any somatic cause, compared with non-bereaved children. However, we find that children who have lost their father due to somatic causes are less likely to be university educated than children whose parents are alive. The estimate is similar to that of accident but significant because the large number of somatic paternal deaths provides better statistical power.

These results mean that controlling for various family background characteristics explains most of the negative association between cause of paternal death and a child's university education, and that the estimates between causes of death did not differ from each other statistically (comparisons not reported). We also noticed that the estimates of the accidental and alcohol and suicide-related deaths, in particular, decreased when considering children's socioeconomic growth environment.

In general, our adjusted models in Table 3 show that women attend university more than men do, and firstborns are more likely to enter university than non-firstborns. The results for family income and education are consistent with earlier studies on children's achievements, finding that parental resources matter. A father's higher age at birth is also positively associated with a child's educational outcomes. Single-parenthood and having a stepparent are negatively correlated with a child's education, which have earlier emerged in certain studies examining early parental death and parental separations (e.g., Biblarz and Gottainer, 2000; Grätz, 2015). One explanation for those findings is that having a stepparent is correlated with negative family characteristics, such as parental divorce.

**Table 3. Cause of paternal death and child's attendance to university education. Predicted probabilities from linear random-effects models.**

	Baseline	Model 1	Model 2	Model 3	Model 4	Model 5
Father dead <sup>1</sup>	-0.073*** (0.006)					
Cause of death <sup>1</sup>						
alcohol / suicide		-0.084*** (0.013)	-0.023 (0.013)	-0.002 (0.012)	-0.023 (0.013)	-0.001 (0.012)
somatic		-0.072*** (0.010)	-0.037*** (0.010)	-0.020* (0.010)	-0.037*** (0.010)	-0.020* (0.010)
accident		-0.095*** (0.018)	-0.039* (0.018)	-0.019 (0.017)	-0.039* (0.018)	-0.019 (0.017)
Birth order <sup>2</sup>						
1st			0.110*** (0.003)	0.085*** (0.003)	0.109*** (0.003)	0.085*** (0.003)
2nd			0.043*** (0.003)	0.028*** (0.003)	0.043*** (0.003)	0.028*** (0.003)
Father's age at birth			0.007*** (0.000)	0.006*** (0.000)	0.007*** (0.000)	0.006*** (0.000)
Single parent			-0.066*** (0.003)	-0.058*** (0.003)	-0.065*** (0.003)	-0.058*** (0.003)
Stepfather			-0.043*** (0.005)	-0.030*** (0.004)	-0.043*** (0.005)	-0.030*** (0.004)
Parental education <sup>3</sup>						
secondary				0.087*** (0.005)		0.087*** (0.005)
tertiary				0.360*** (0.006)		0.359*** (0.006)
Family income <sup>4</sup>					0.000*** (0.000)	0.000*** (0.000)
Female	0.040*** (0.002)	0.040*** (0.002)	0.041*** (0.002)	0.041*** (0.002)	0.041*** (0.002)	0.041*** (0.002)
Constant	6.535*** (0.719)	6.511*** (0.719)	3.847*** (0.726)	10.028*** (0.703)	4.019*** (0.730)	10.178*** (0.706)
<i>N</i>	108,875	108,875	108,875	108,875	108,875	108,875

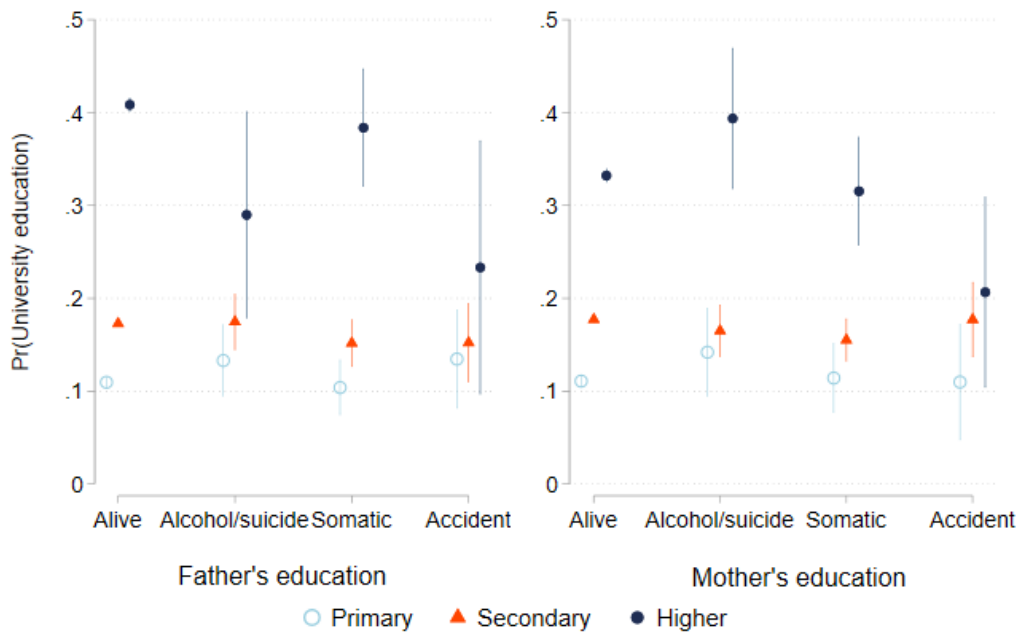
Standard errors in parentheses, \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Ref. category: <sup>1</sup> alive, <sup>2</sup> 3<sup>rd</sup> or later, <sup>3</sup> primary. Note: <sup>4</sup> Family income between ages 5 and 18. Controls in all models: Year of birth (linear).

## 4.2 Differences according to child's family background

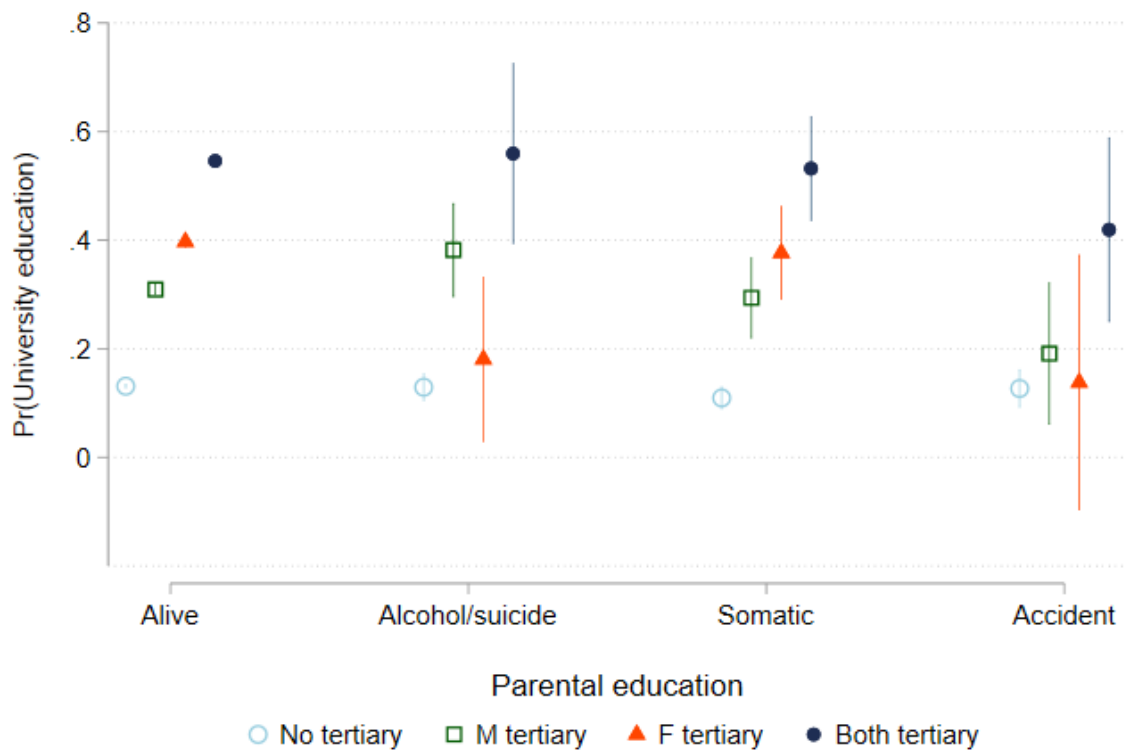
To study whether the association between cause of paternal death and child's education differs by child's social background, we conducted interaction models between the parental resources and causes of death. Analyses on the joint effects between a father's death and parental education in Fig. 1 show that, independent of all (available) control variables, the cause of death matters for children's education; interaction analysis predicting university attendance suggests that, if the deceased father was highly educated (figure on the left) and died of suicide, alcohol or especially an accident, a child is less likely to attend university by the age of 22 than a child whose father died by somatic causes or is alive. At primary and secondary educational stages, the differences between causes of death (and compared to non-bereaved children) are substantially small, not more than a couple of percentage points.

Conversely, more advantaged maternal educational backgrounds appear to protect children from the negative educational consequences relating to paternal death (Fig. 1, on the right) but not from an accidental cause of paternal death. Possible explanations will be further discussed in the concluding chapter.



**Fig. 1. Predicted probability of university education by father's death and *father's* (on the left) and *mother's* education.**

To more closely examine how and whose parental education matters, we created a variable that distinguishes whether both or one of the parents have tertiary education (Fig. 2). Parental tertiary education is more uncommon in bereaved families, which widens the confidence intervals (c.f. Table 1). The interaction analyses show that children of tertiary educated parents are the least “affected” by paternal death in terms of the child’s educational attainment. We also find that, in families where the mother is highly educated but the father is not, the child’s educational performance follows quite much the same pattern as that of non-bereaved children. However, if only the father is highly educated and died by alcohol, suicide or accident, children attain lower education.



**Fig. 2. Predicted probability of university education by father’s death and parental education.**

We also investigated the interaction between family income and cause of paternal death on children’s education; however, these models were not significant (results not presented, available from authors). Therefore, we conclude that *hypothesis 4* is partly supported, because high parental resources protect only if the remaining parent, in this case, the mother, is highly educated. *Hypothesis 5* is also partly supported. Children of a



highly educated deceased father attain less education if the father died by accident, suicide or alcohol than do children who are bereaved by somatic causes or who have parents alive; however, the latter applies only if the father was the only highly educated parent in the family.

## **5. Discussion and conclusion**

The claim that experiencing early parental death matters for educational attainment has been both supported and doubted empirically. The lack of studies considering cause of death and its (cumulative) joint effects with family background led to examining whether the cause of paternal death is associated with children's university education and how the childhood family origin moderates these links.

First, associations between an experience of paternal death and a transition to university education were not strong, which suggests that safety nets of different kind are working in Finland. Second, the connection between lower education and alcohol-based, suicidal and accidental paternal deaths were explained by more disadvantaged family environments than the expected adversity of the death. Third, the educational outcome differed between children who experienced different types of death and children with no paternal loss when considering their social background; children with a highly educated deceased father appeared to suffer in educational terms especially if the father died by accident, suicide or alcohol and the father was the only highly educated parent. When contrasted with the idea of cumulative (dis)advantage processes in the access to resources over the life course and across different domains of life (e.g., O'Rand, 2009), this finding is surprising. The same applies to the stress process framework, stating that an individual's resources moderate the influence of early "stressors" on normal functioning. Based on these theories, one would expect that those from less privileged family backgrounds would be generally less able to cope with unnatural causes of death.

This unexpected result could be interpreted as a larger amount of lost resources, such as essential human capital of better off families, possibly leading to a steeper decline in children's educational aspirations and capacities and finally to a lower educational inheritance. The children of highly educated parents are also more likely to enter university, which enables a larger decrease in university attendance, whereas the

probability of lower family background children to study in university is lower regardless, which can show as minor educational differences by cause of death. However, the weakness of this explanation lies in what the results further indicated: that the group of children with two highly educated parents (the highest odds on high education) remained the most likely to attend university, despite paternal loss.

This discussion leads us to our fourth main finding indicating that high maternal education appears to protect children from the negative consequences of suicide and alcohol-related paternal death but not much from those of accidental death if the mother was the only highly educated parent. The idea of the mother buffering against the adverse consequences of paternal death and the preceding insecurities in the family environment, such as alcohol and mental problems, is in accordance with the literature stressing the importance of the mother's education in intergenerational attainment, in particular (e.g., Beller, 2009). Our finding can also be interpreted as the resources of the remaining parent matter more, which is a similar phenomenon as a strengthened influence of the mother after parental separation (see Erola & Jalovaara, 2016).

However, why could high maternal education not protect children from the negative outcomes of accidental death? One explanation for this finding is that, although highly educated mothers might have better abilities and knowledge to buffer against declined or inadequate parenting affected by the father's alcohol abuse and mental problems *prior to* death, this kind of support is not possible before accidents, which can explain why maternal protection is not observed (compare Chen et al., 2009; Gimenez et al., 2013). However, conclusions from this finding should be made with caution because of a relatively small number of accident cases.

It is likely that the father's resources could also buffer against the negative consequences related to maternal loss. Unfortunately, we did not have a sufficient number of cases for each cause of maternal death to test this and, currently, these results only apply to the death of the father. However, we performed several other robustness checks and extra analyses. It has previously been shown (Kailaheimo and Erola, 2016) that younger children appear to be more susceptible to negative outcomes of parental death; however, we observed no moderation by age. We also found no significant differences between women and men, although paternal loss could matter more for men (same-sex role model). Additionally, because university education is a very selective educational

outcome, we also tested completing secondary-level education by the age of 18 (see Appendix Table A.1 & Fig. A.1). These findings were quite similar to those we presented for the transition to tertiary-level.

The main strength of the study is the data that allowed the analysis of causes of paternal death and a wide range of socio-demographic background characteristics, which is rare in many datasets due to lack of power and information. Register data do not suffer from non-response or selection bias. However, registry data do have limitations. A notable limitation of our study is that we cannot control for self-selection into specific causes of death, because we were unable to observe biologically inherited characteristics (genetic variance) that may affect paternal death and children's education. Our data also does not allow for measuring the quality of parenting or the (psychological) health of the child, both of which are potential correlates and mechanisms of cause of death. Different unobserved protective factors can also moderate the effects of stress caused by adverse life events, such as a child's resiliency abilities and external support from friends and the extended family. In the future, studying how all those factors are related to the association between cause of parental death and child outcomes is highly encouraged. In addition, analysing maternal deaths with this study setting and applying a larger or over-sampled dataset would be welcome future steps in the forthcoming research.

Finally, our findings suggest that conclusions regarding whether the cause of paternal death matters for a child's educational attainment depend on family background. In the future, the cause of death and the overall childhood family circumstances should be considered when studying parental death and its intergenerational links to children's outcomes.

## References

- Acemoglu, D., Pischke, J.-S., 2001. Changes in the wage structure, family income, and children's education. *Eur. Econ. Rev.* 45, 890–904.  
[https://doi.org/10.1016/S0014-2921\(01\)00115-5](https://doi.org/10.1016/S0014-2921(01)00115-5)
- Akerman, R., Statham, J., 2014. Bereavement in childhood: The impact on psychological and educational outcomes and the effectiveness of support services. *Child. Wellbeing Res. Cent.* 38.
- Amato, P.R., 2000. The consequences of divorce for adults and children. *J. Marriage Fam.* 62, 1269–1287. <https://doi.org/10.1111/j.1741-3737.2000.01269.x>
- Amato, P.R., Anthony, C.J., 2014. Estimating the Effects of Parental Divorce and Death With Fixed Effects Models. *J. Marriage Fam.* 76, 370–386.  
<https://doi.org/10.1111/jomf.12100>
- Anda, R.F., Whitfield, C.L., Felitti, V.J., Chapman, D., Edwards, V.J., Dube, S.R., Williamson, D.F., 2002. Adverse Childhood Experiences, Alcoholic Parents, and Later Risk of Alcoholism and Depression. *Psychiatr. Serv.* 53, 1001–1009.  
<https://doi.org/10.1176/appi.ps.53.8.1001>
- Beller, E., 2009. Bringing intergenerational social mobility research into the twenty-first century: Why mothers matter. *Am. Sociol. Rev.* 74, 507–528.  
<https://doi.org/10.1177/000312240907400401>
- Berg, L., Rostila, M., Saarela, J., Hjern, A., 2014. Parental death during childhood and subsequent school performance. *Pediatrics* 133, 682–9.  
<https://doi.org/10.1542/peds.2013-2771>
- Biblarz, T., Gottainer, G., 2000. Family structure and children's success: A comparison of widowed and divorced single-mother families. *J. Marriage Fam.* 62, 533–548. <https://doi.org/doi/10.1111/j.1741-3737.2000.00533>
- Black, S., Devereux, P., Salvanes, K., 2005. The more the merrier? The effect of family size and birth order on children's education. *Q. J. Econ.* 120, 669–700.
- Bu, F., 2016. Examining sibling configuration effects on young people's educational aspiration and attainment. *Adv. Life Course Res.* 27, 69–79.  
<https://doi.org/10.1016/j.alcr.2015.09.003>
- Buchmann, C., DiPrete, T., 2006. The growing female advantage in college completion: The role of family background and academic achievement. *Am. Sociol. Rev.* 71, 515–541.
- Cerel, J., Fristad, M.A., Verducci, J., Weller, R.A., Weller, E.B., 2006. Childhood Bereavement: Psychopathology in the 2 Years Postparental Death. *J. Am. Acad. Child Adolesc. Psychiatry* 45, 681–690.  
<https://doi.org/10.1097/01.chi.0000215327.58799.05>

- Cerel, J., Fristad, M.A., Weller, E.B., Weller, R.A., 1999. Suicide-Bereaved Children and Adolescents: A Controlled Longitudinal Examination. *J. Am. Acad. Child Adolesc. Psychiatry* 38, 672–679. <https://doi.org/10.1097/00004583-199906000-00013>
- Chen, S., Chen, Y., Liu, J., 2009. The impact of unexpected maternal death on education: First evidence from three national administrative data links. *Am. Econ. Rev.* 99, 149–153. <https://doi.org/10.1257/aer.99.2.149>
- Corak, M., 2001. Death and Divorce: The Long-Term Consequences of Parental Loss on Adolescents. *J. Labor Econ.* 19, 682–715. <https://doi.org/10.1086/322078>
- Erola, J., Jalonen, S., Lehti, H., 2016. Parental education, class and income over early life course and children's achievement. *Res. Soc. Stratif. Mobil.* 44, 33–43. <https://doi.org/10.1016/j.rssm.2016.01.003>
- Erola, J., Jalovaara, M., 2016. The Replaceable: The Inheritance of Paternal and Maternal Socioeconomic Statuses in Non-Standard Families. *Soc. Forces* 95, 971–995. <https://doi.org/10.1093/sf/sow089>
- Erola, J., Kilpi-Jakonen, E., 2017. Compensation and other forms of accumulation in intergenerational social inequality, in: Erola, J., Kilpi-jakonen, E. (Eds.), *Social Inequality Across the Generations*. Edward Elgar, pp. 3–24. <https://doi.org/10.4337/9781786432568>
- Fröjd, S.A., Nissinen, E.S., Pelkonen, M.U.I., Marttunen, M.J., Koivisto, A.-M., Kaltiala-Heino, R., 2008. Depression and school performance in middle adolescent boys and girls. *J. Adolesc.* 31, 485–498. <https://doi.org/10.1016/j.adolescence.2007.08.006>
- Fronstin, P., Greenberg, D., Robins, P., 2001. Parental disruption and the labour market performance of children when they reach adulthood. *J. Popul. Econ.* 14, 1073–1103. <https://doi.org/10.1007/s001480050163>
- Gimenez, L., Chou, S., Liu, J., Liu, J., 2013. Parental Loss and Children's Well-Being. *J. Hum. Resour.* 48, 1035–1071. <https://doi.org/10.3368/jhr.48.4.1035>
- Grätz, M., 2015. When growing up without a parent does not hurt: parental separation and the compensatory effect of social origin. *Eur. Sociol. Rev.* 31, 546–557.
- Jonsson, J.O., Gähler, M., 1997. Family dissolution, family reconstitution, and children's educational careers: Recent evidence for Sweden. *Demography* 34, 277–293. <https://doi.org/10.2307/2061705>
- Kailaheimo, S., Erola, J., 2016. The effect of early parental death on children's university education. *Work. Pap. Soc. Econ. Issues* 1–28.
- Lin, K., Sandler, I., Ayers, T., Wolchik, S., 2004. Resilience in parentally bereaved children and adolescents seeking preventive services. *J. Clin.* 33, 673–683. [https://doi.org/10.1207/s15374424jccp3304\\_3](https://doi.org/10.1207/s15374424jccp3304_3)

- Mayer, S.E., 1997. *What money can't buy : family income and children's life chances*, 2nd ed. Harvard University Press, London.
- O'Rand, A.M., 2009. The craft of life course research, in: Glen H. Elder, J.Z.G. (Ed.), *The Craft of Life Course Research*. Guilford Press, New York, pp. 121–140. <https://doi.org/10.1017/CBO9781107415324.004>
- Pfeffer, C.R., Karus, D., Siegel, K., Jiang, H., 2000. Child survivors of parental death from cancer or suicide: depressive and behavioral outcomes. *Psychooncology*. 9, 1–10. [https://doi.org/10.1002/\(SICI\)1099-1611\(200001/02\)9:1<1::AID-PON430>3.0.CO;2-5](https://doi.org/10.1002/(SICI)1099-1611(200001/02)9:1<1::AID-PON430>3.0.CO;2-5)
- Prix, I., Erola, J., 2016. Does death really make us equal? Educational attainment and resource compensation after paternal death in Finland. *Soc. Sci. Res.* 64, 171–183. <https://doi.org/10.1016/j.ssresearch.2016.10.012>
- Shepherd, D., Barraclough, B., 1976. The Aftermath of Parental Suicide for Children. *Br. J. Psychiatry* 129, 267–276. <https://doi.org/doi:10.1192/bjp.129.3.267>
- Shonkoff, J.P., Garner, A.S., Siegel, B.S., Dobbins, M.I., Earls, M.F., McGuinn, L., Wood, D.L., 2012. The lifelong effects of early childhood adversity and toxic stress. *Am. Acad. Pediatr.* 129, e232–e246.
- Smith, C., Carlson, B.E., 1997. Stress, Coping, and Resilience in Children and Youth. *Soc. Serv. Rev.* 71, 231–256. <https://doi.org/10.1086/604249>

## Appendix

**Table A.1 Cause of paternal death and child's secondary education. Predicted probabilities from linear random-effects models.**

	Model 1	Model 2	Model 3	Model 4	Model 5
Cause of death <sup>1</sup>					
alcohol / suicide	-0.102*** (0.012)	-0.016 (0.012)	-0.006 (0.012)	-0.014 (0.012)	-0.005 (0.012)
somatic	-0.090*** (0.010)	-0.025* (0.010)	-0.017 (0.010)	-0.024* (0.010)	-0.016 (0.010)
accident	-0.121*** (0.017)	-0.040* (0.016)	-0.032* (0.016)	-0.039* (0.016)	-0.031 (0.016)
Female	0.046*** (0.002)	0.047*** (0.002)	0.047*** (0.002)	0.047*** (0.002)	0.047*** (0.002)
Birth order <sup>2</sup>					
1st		0.063*** (0.003)	0.052*** (0.003)	0.062*** (0.003)	0.051*** (0.003)
2nd		0.043*** (0.003)	0.035*** (0.003)	0.043*** (0.003)	0.035*** (0.003)
Father's age at birth		0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)
Stepfather		-0.054*** (0.004)	-0.049*** (0.004)	-0.054*** (0.004)	-0.049*** (0.004)
Single parent		-0.101*** (0.003)	-0.096*** (0.003)	-0.099*** (0.003)	-0.094*** (0.003)
Parental education <sup>3</sup>					
secondary			0.128*** (0.005)		0.127*** (0.005)
tertiary			0.192*** (0.005)		0.192*** (0.005)
Family income <sup>4</sup>				0.000*** (0.000)	0.000*** (0.000)
Constant	-4.454*** (0.652)	-6.784*** (0.650)	-3.784*** (0.650)	-6.309*** (0.653)	-3.336*** (0.652)
<i>N</i>	109834	109834	109834	109834	109834

Standard errors in parentheses, \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Ref. category: <sup>1</sup> alive, <sup>2</sup> 3<sup>rd</sup> or later, <sup>3</sup> primary. Note: <sup>4</sup> Family income between ages 5 and 18. Controls in all models: Year of birth (linear).

**Fig. A.1 Predicted probability of *secondary* education by father's death and father's (on the left) and mother's education.**

