Family Matters? Do Relatives other than Parents Matter to Social Outcomes, England 1780-2016?

Gregory Clark, UC Davis,
Neil Cummins, LSE

Do relatives other than parents – grandparents, uncles and aunts, cousins – play a causal role in generating social outcomes for children? Or do they just provide more information on the inheritable social characteristics of the parents? We test these possibilities using a 67,000 person multigenerational database for lineages of English families 1780-2016, where we know which relatives are alive and dead when children are born, and which are geographically proximate at birth, and which distant. We find all relatives are equally predictive of social outcomes: whether alive or dead, distant or near. Relatives seemingly provide only information about the underlying characteristics of parents. Parents alone determine child social outcomes.

Introduction

Recent studies make clear that in predicting the social outcomes for children, the status of relatives other than the parents is generally predictive, even when we control for the characteristics of the parent.[1] This is true for the lineage data used in this study. The outcomes we have for children include occupational status, wealth at death, two measures of educational status, survival to age 21, and adult

[1] See, for example Chan and Boliver, 2013; Dribe and Helgertz, 2014; Ferrie, Massey and Rothbaum, 2016; Knigge, 2016; Møllegaarda and Jæger, 2015; Zeng and Xie, 2014

age at death. Tables 1-2 show, controlling for father characteristics, the coefficients on each of these variables for grandfathers and uncles, and for grandfathers and cousins. If you have a high status grandfather, then controlling for your father's status, you will have higher status yourself. The same holds for your uncles and cousins.

Why does the status of relatives other than parents predict outcomes in this way? One prominent school of thought in both anthropology and sociology believes that relatives play a causal role in the outcomes for children. In evolutionary anthropology, part of the reasoning behind this is the puzzle as to why women enter menopause long before the end of their natural lifespan. A proposed solution to this puzzle is the "grandmother hypothesis." Grandmothers forego reproduction at later ages in order to improve the reproductive success of their children (Williams, 1957, Lahdenperä et al., 2004, Hawkes, 2004). Sarah Hrdy argued more generally that humans evolved as cooperative breeders — relatives other than the parents, such as the grandparents, and older siblings – all contribute to the rearing of children (Hrdy, 1999, Mace and Sear, 2004). Such arguments have been made for the contribution of childless uncles, for example, to their nieces and nephews in the inclusive fitness literature.

Sociologists have also on empirical grounds argued that there is evidence of transfers from collateral relatives in child rearing. Zeng and Xie, 2014, for example, have evidence for rural China that the educational level of grandparents influences that of grandchildren, but only where they are co-resident with the grandchildren. Dead or living non co-resident grandparents educational attainment has no influence.[2] The results from Knigge (2016), however, do not indicate a substantial role for causal grandfather effects.[3]

[2] The empirical evidence for this effect in Zeng and Xie is rather weak, however, given the very large sample size.

[3] See Knigge, 2016, table 3. The coefficient on the interaction terms for the grandfather effects by space and time are less than the standard errors for the main grandfather effect estimate.

Table 1: The Influence of Relatives on Outcomes, Controlling for Fathers – Grandfathers and Uncles

	Ln Wealth	Occupational Rank	Education	At School 14-20	Age at Death, Normed (>21)
Father	0.246**	0.380**	0.130**	1.607**	0.168**
	(0.019)	(0.031)	(0.012)	(0.327)	(0.015)
Grandfather	0.137**	0.196**	0.051**	1.377**	0.068**
	(0.015)	(0.031)	(0.012)	(0.346)	(0.017)
Uncle	0.084**	0.146**	0.090**	0.736*	0.046**
	(0.017)	(0.027)	(0.012)	(0.365)	(0.013)
R^2	0.33	0.48	0.14	0.15	0.07
N	6,487	2,777	9,596	2,013	9,354

* $p<0.05$; ** $p<0.01$. Errors clustered at the grandfather level. For schooling the independent variable is occupational rank.

Table 2: The Influence of Relatives on Outcomes, Controlling for Fathers – Grandfathers and Cousins

	Wealth	Occupational Rank	Education	At School, 14-20	Age at Death, Normed
Father	0.268**	0.427**	0.105**	1.976**	0.110**
	(0.012)	(0.020)	(0.006)	(0.224)	(0.009)
Grandfather	0.149**	0.128**	0.036**	0.641**	0.026*
	(0.009)	(0.021)	(0.006)	(0.212)	(0.010)
Cousin	0.061**	0.217**	0.096**	1.338**	0.048**
	(0.011)	(0.018)	(0.008)	(0.210)	(0.007)
R^2	0.33	0.52	0.13	0.17	0.07
N	14,543	4,470	24,780	4,140	26,468

* $p<0.05$; ** $p<0.01$. Errors clustered at the grandfather level. For schooling the independent variable is occupational rank.

In either of these models, where the grandparents and other relatives play a role by supplying resources, or being models for children, then two things should potentially matter to the size of that effect. First, is the relative alive at the time of the birth of the child? Dead relatives will play no direct causal role.[4] Second, does the relative live close enough to the family to interact with the child? Distant relatives may be able to send money to support a child, but they will not be able to supply childcare, education, or cooked meals. Nor will they be able to shape a child by social interaction.

Another possibility, though, is that relatives other than parents play no causal role. Instead they merely provide information as to the true underlying status of the parents, which is what alone determines the outcomes for the children. This "parents only" transmission could stem from purely social and cultural mechanisms of transmission. However, it would also be the pattern of transmission were the main mechanism of transmission to be genetics. In this case social status is a determined by a first order Markov process where the only thing that matters is the status of the parents. Grandparents serve only to give information on the underlying genetic status of parents. In this interpretation dead grandparents are just as informative about outcomes as living ones. Also geographically distant relatives are just as informative as geographically proximate ones in predicting outcomes.

For example, in the simple model of status transmission posited in Clark, Cummins et al., 2014, observed social status y is derived from a slow changing underlying status x, where

$$y_t = x_t + u_t$$
$$x_t = bx_{t-1} + e_t$$

This model of transmission is first order Markov. Only the parents matter. But grandparent characteristics will correlate with those of grandchildren, even controlling for parents with such a structure. If social traits are transmitted genetically it would also be

[4] In the case of wealth relatives can leave assets to as yet unborn children in the English legal system. But if the will specifies "£x to each of my grandchildren" then only grandchildren alive at the time of death qualify. Only if the will specifies such as "£x to each of my grandchildren at age 18" then all children born after the testators death, but before the oldest child reaches age 18, inherit.

the case that relatives other than the parents would play no causal role, but merely communicated information about the underlying genotype of the parents.

In this paper we use an extended lineage of English families 1780-2016 to test these various accounts of the role of relatives in social outcomes, which constitutes in total 67,000 individuals. For this lineage we have birth and death dates for all family members, as well as their geographic location at birth, marriage and death. We also have various social outcomes: wealth at death, occupational status, attainment of higher education, length of education, child survival rates, and adult longevity. Typically we have social outcomes only for people born 1780-1920, an era where women did not have social status independent of their husbands. In terms of transfers of resources across generations it could be argued that women matter more: grandmothers rather than grandfathers. However, below we can also proxy for the influence of grandmothers through the status of their husbands.

We can thus first estimate for each child outcome, y_i, each the parameters in the expressions

$$y_i = a + b_F y_{iF} + b_O y_{iO} + d_{OL}(a_{OL} + b_{OL} y_{iO}) \qquad (1)$$

where y_{iF} = father's social outcome
y_{iO} = social outcome of other relative (grandfather, grandmother, uncle)
d_{iOL} = indicator for other relative alive at time of birth of child.

The coefficient of interest here is b_{OL}. Since dead relatives cannot interact with children there can be no causal connection between their social status and the subsequent social status of the child. Thus if $b_{OL} = 0$, then the relatives other than parents are playing no causal role. Only if $b_{OL} > 0$ do we have an indication that relatives other than parents are playing a causal role in child outcomes. $a_{OL} \neq 0$ does not indicate a causal role for living relatives, since as we shall see below, children with living rather than dead relatives may be a select group.

We estimate similarly for relatives alive at time of child birth,

$$y_i = a + b_F y_{iF} + b_O y_{iO} + d_{iOC}(a_{OC} + b_{OC} y_{iOC}) \quad (2)$$

where

d_{iOC} = indicator for other living relative located closer than 20 km

y_{iOC} = outcome of living relative located closer than 20 km[5]

The distance of 20km is used since the bulk of the data concerns children born 1800-1920 before automobile travel became common. Here $b_{OC} > 0$ would indicate that close relatives have more influence on child outcomes that distant relatives. This would support a causal role for other relatives. $b_{OC} = 0$ would indicate again that other relatives are playing no causal role. Again $a_{OC} \neq 0$ does not indicate a causal role for other relatives, since as we shall see below, children living closer to relatives may be a select group.

It may be objected that children with dead grandfathers, or uncles are differently located in social space in unobservable ways than those with living grandparents. For example, such children are more likely higher in the birth order than the average child, and have fathers who are also higher in the birth order. Table 3 shows the characteristics of children with living/dead grandfathers and uncles. Children with dead grandfathers tend to be lower in the birth order. But they also tend to be from higher status families. For children with dead uncles they again tend to be lower in the birth order, with older fathers. But they are not significantly higher in social status.

If a child is going to be geographically distant at birth from their grandparents, or uncles, or cousins, then that will most often be because their father moved. But again people who move are likely distinct in other ways from people who stay in the location they were born in. Table 4 shows the average characteristics of stayers versus movers, where a mover is someone who dies more than 20 km distance from their place of birth. In general movers are more educated, wealthier, with higher occupational status and greater adult longevity.

[5] We use the geodetic distance (calculated using the *geodist* package in Stata) between the birth location of the child and the death location of selected relatives.

Table 3: Characteristics of Children with Alive/Dead Relatives

Grandfather at Child Birth	Alive N	Mean	SE	Dead N	Mean	SE	Diff. t-stat
Birth Order Child	14,890	2.75	0.02	14,447	3.81	0.02	-36.5
Ln(Wealth) Child	5,153	-1.05	0.04	6,383	-0.54	0.04	-10.0
Occ. Rank Child	2,634	0.85	0.001	2,922	0.86	0.001	-8.3
Educated Child	6,412	0.09	0.003	7,768	0.11	0.004	-4.0
Ln(Wealth) Father	11,477	-1.40	0.03	12,437	-0.87	0.03	-13.2
Occ. Rank Father	9,845	0.85	0.0005	10,601	0.86	0.0005	-14.9
Educated Father	11,661	0.13	0.003	12,259	0.19	0.004	-12.7
Father Age at Child Birth	12,600	31.3	0.06	13,400	36.7	0.07	-59.6
Uncle at Child Birth							
Birth Order Child	17,328	3.33	0.02	5,871	3.78	0.04	-10.8
Ln(Wealth) Child	7,381	-0.83	0.03	2,469	-0.88	0.05	0.8
Occ. Rank Child	3,741	0.86	0.001	1,188	0.85	.001	2.5
Educated Child	8,561	0.10	0.003	2,681	0.11	0.006	-1.5
Ln(Wealth) Father	14,996	-1.22	0.02	5,123	-1.38	0.04	3.2
Occ. Rank Father	13,567	0.85	0.0004	4,537	0.85	0.0007	1.9
Educated Father	15,256	0.15	0.003	4,992	0.15	0.005	0.0
Father Age at Child Birth	16,435	33.6	0.06	5,452	35.5	0.12	-13.9

However, for our purposes what matters is how stayers and movers compare within the same family. Table 5 thus shows the average characteristics of pairs of brothers, one of whom is a stayer and one a mover. Movers are wealthier. But there is no significant difference, in either quantitative or statistical terms, in occupational rank or educational attainment. Only in the case of adult longevity is there a quantitatively and statistically significant difference. But this may be a product mechanically of the fact that men who die young have less chance of moving. Thus by controlling for parent characteristics when we look at the effect of close versus far relatives we should be successfully able to control for family characteristics.

Table 4: Characteristics of Movers versus Stayers (children)

	Stayers N	Stayers Average	Movers N	Movers Average
Distance, miles, birth to death	1,857	6.1	3,401	142.8
Ln(Wealth)	1,857	-1.89	3,401	-1.11
Ln(Wealth) Father	1,857	-2.19	3,401	-1.19
Occupational Rank	1,095	0.837	1,899	0.855
Educated (Indicator)	1,365	0.06	2,675	0.11
Average Age at Death (21+)	1,855	64.3	3,401	68.5
Female	1,857	0.17	3,401	0.20

Table 5: Characteristics of Movers versus Stayers, Brothers

	Stayers			**Movers**			**Diff t-stat**
	N	Mean	SE	N	Mean	SE	
Ln(Wealth)	888	-1.93	0.075	1,008	-1.72	0.070	-2.05
Occ. Rank	583	0.840	0.002	671	0.843	0.002	-1.25
Educated	700	0.05	0.009	818	0.06	0.008	-0.84
Age at Death (21+)	944	64.7	0.542	1,064	68.0	0.566	-4.21

It is also not expected that selectivity towards higher status movers would influence the estimated coefficients in equation (2). If we think that the status of movers on any measure, y_{iR}, is just the status of stayers in a family, y_{iC}, plus some random shift λ, which on average is positive, so that

$$y_{iR} = \lambda + y_{iC}$$

then this selectivity will not affect how strongly the close versus remote relatives affect the status of a child. If closeness determines the influence of relatives, and my close uncles are all unsuccessful while my uncles in London are successful, then it will still be the case that my outcomes will be predicted more strongly by my close relatives.

Equation (1) assumes that the relatives are either alive or dead for the whole childhood of children. In practice some grandfathers or uncles alive at the time the child is born are dead before the child reaches age 21. Thus in the estimations below we also use measures of years of exposure to relatives as the variables of interest. We also discuss below how to implement equation (1) when children have partial exposure to relatives in terms of only a partial period in childhood where both child and relative are alive.

As noted we have location for individuals at birth, marriage and death. We match children at birth to their relatives (other than father who is assumed to be at the same location) at their location at death. There is thus a potential mismatch. A distant uncle may have lived in the same locality as the child during their childhood, but moved away later in life. A child may have moved away from relatives in the course of their childhood. This means that there will be some bias in that stayers will typically have been present for the whole childhood of children, while movers will have been absent for less than the entire childhood. We consider the effects of this bias below.

The Data

The data used in this study comes from a genealogical database of 67,000 English and Welsh people who had rare surnames, born 1750-2016. To qualify a surname had to appear less than 41 times in the 1881 census. Since the data was collected to study social mobility in

England from 1800 to 2012, the initial surnames used were deliberately oversampled from the top and bottom of the wealth distribution for those dying 1858-1887.[6] There are 26,000 individuals from the rich lineages, 28,000 from the poor, and 13,000 of intermediate wealth.

Throughout this period England was characterized by a nucleated family structure. Parents mainly resided with their children without the presence of grandparents or siblings. But there was no social taboo against co-residence. So there were modest numbers of co-resident three generation families, or families where siblings of parents co-resided. The family structure throughout this period is thus characteristic of that of modern western Europe.

All births, deaths and marriages were registered in England from 1837 on. After 1865 the death register includes age at death. So for rare surname individuals we can link their births, deaths and marriages (though less easily for births before 1865). The censuses of 1841-1911, and a 1939 population register provide information on parentage (see the list of data sources below). For marriages before 1880 there is considerable information available from parish records of baptisms, which recorded parents' names, and from parish records of marriages, which recorded the names and ages of those marrying as well as their fathers' names. There are many ancillary records which show, particularly for higher status families, family relationships: accounts, for example, of all men matriculating at Oxford and Cambridge universities prior to 1893, their fathers and their marriages, and also probate records.

By focusing on rare surnames, and by employing the whole set of records available for England we achieve much higher matching rates than is typical for linking parents and children in 19th century censuses.[7] But the nature of the sources means we cannot identify parentage for all the people in our sample. Thus for 4,562 recorded rare surname births 1860-1879, we identify a father or mother for 86%.[8] The reasons for failing to find at least one parent in the other 14% of cases are various. In some cases the name likely was misspelled in the birth record, and the person does not belong in the surname lineages used to form the sample. Of those not linked 60% show no further appearance in any record after their birth

[6] See, for example, Clark and Cummins, 2015a.
[7] Ferrie and Long, 2013, for example, link only 20% of adult sons to their fathers in England between 1851 and 1881.
[8] In some cases, where the child is illegitimate, only the mother is listed on birth records.

under the birth name. Likely in most of these cases the name is just misspelled on the birth register. In others the child dies before appearing in a census, or their father dies, or they are living with grandparents in the census, or the family emigrates.[9] Thus one third of those born not linked to a parent died before age 10. However, for children identified as living to at least 21, 3,485 births 1860-79, the match rate is much better, with only 2.1% without at least one parent identified.

The birth, death and marriage registers give geographic location at the level of the registration district (originally a Poor Law Union) which encompassed a number of parishes. Throughout the period of study, 1837-19, there were around 600 registration districts in England and Wales. Figure 1 shows the geographic coverage of the data in our lineage database.

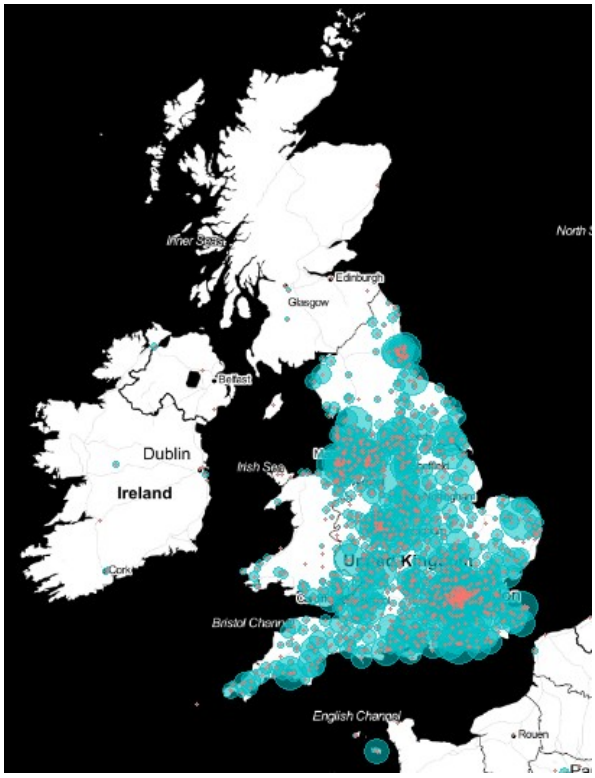

Figure 1: The Geography of the Lineage Data, Births 1780-2016

[9] We could identify the father by getting the birth certificate, but this is prohibitively costly

The information we have for social outcomes is:

Schooling 14-20 - For a subset of all children we observe whether they were explicitly in school or in an apprenticeship aged 11-20 then they appear in a census 1851-1911 at these ages.[10] We also have a measure of whether they were explicitly in employment (exclusive of apprenticeships) ages 11-20 for these cases. Since most children were still in school we make this variable more informative of educational status by looking at schooling ages 14-20.

Higher Educational Attainment - For sons only we can construct an indicator variable for higher educational attainment. This is set at 1 under the following: the son enrolled at a university (Oxford, Cambridge, or London) [11]; enrollment at the Army Officer training school at Sandhurst; training as an attorney (1756-1874); enrollment as a registered doctor (1859-1956); was a member of an engineering society (Civil Engineers, 1818-1930, Mechanical Engineers, 1847-1930, Electrical Engineers, 1871-1930); was a trained cleric.

Occupational status - For sons there are measures of adult occupational status from the censuses of 1841-1911, from the population register of 1939, or from probate and other records (probate records 1858-1909 frequently give the occupation of the deceased). The occupations are translated into a status score using data from the 1911 census on average survival probabilities of children by occupation.[12] This ranges from around 0.75 to 0.94.

Wealth at death - For all children dying 1858 and later we have whether they were probated or not, and estimated wealth at death for the probated and non-probated. We normalize for changes in wealth over time by dividing wealth by the average wealth at death of the entire population for the decade of death. Again we use in the estimations the natural log of this real wealth measure (to have an outcome variable that is closer to normal in distribution).

Life Span – For all people born 1919 and earlier we have an (almost complete) record of adult life span (ages for those dying 21 and above).

---

[10] In the census some children have their occupational status just left blank.
[11] This measure looks only at those probated. But it does provide a ranking of occupations by wealth.
[12] This probability is calculated from a census question on how many children were born to each married women, compared to how many were still living in 1911.

Table 6: Summary Statistics

	N	mean	min	max
Unique Fathers	10,427			
Unique Grandfathers	5,154			
Grandfather Alive at Child Birth	29,327	0.51	0	1
Birth Order	37,676	3.36	1	19
Ln(Wealth) of Child	14,582	-0.85	-7.81	8.97
Ln(Wealth) of Father	29,415	-1.19	-7.81	8.97
Ln(Wealth) of Grandfather	23,942	-1.37	-7.81	8.97
Occ. Rank, Child	7,546	0.86	0.75	0.93
Occ. Rank, Father	25,617	0.85	0.75	0.93
Occ. Rank, Grandfather	23,874	0.86	0.75	0.93
Educated, Child	18,104	0.10	0	1
Educated Father	30,311	0.15	0	1
Educated Grandfather	26,802	0.13	0	1
At School 14-20, Child	6,556	0.38	0	1
Age at Death 21+, Child	18,128	66.4	20	110
Age at Death, 21+, Father	32,820	68.7	20	102
Age at Death, 21+, Grandfather	28,009	68.2	20	102
Distance Grandfather to Child	16,875	85	0	988
Close Grandfather	16,875	0.45	0	1
Female	37,676	0.48	0	1
Year of Birth, Child	37,512	1896	1736	2016

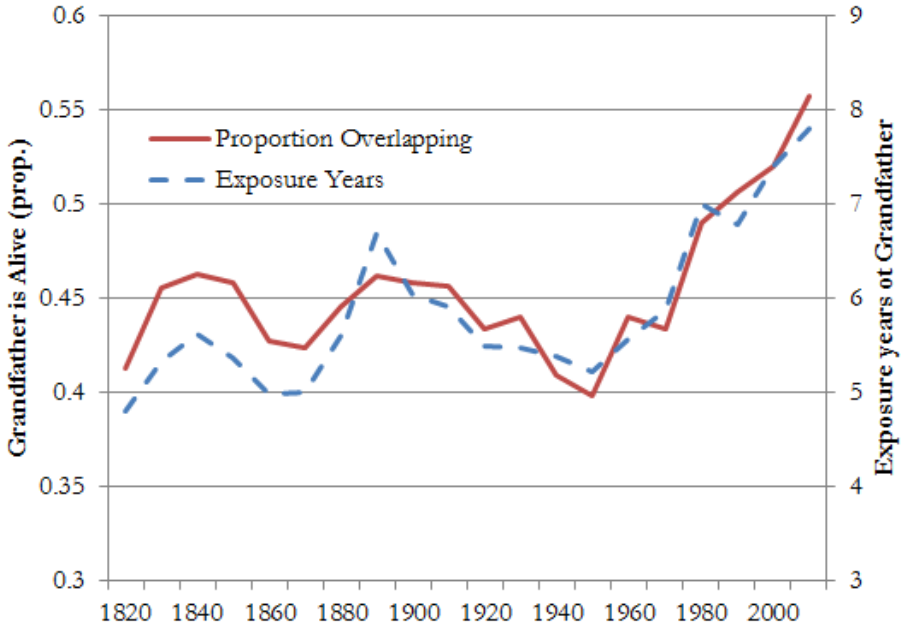

Figure 2: Grandfather Exposure, 1820-2010

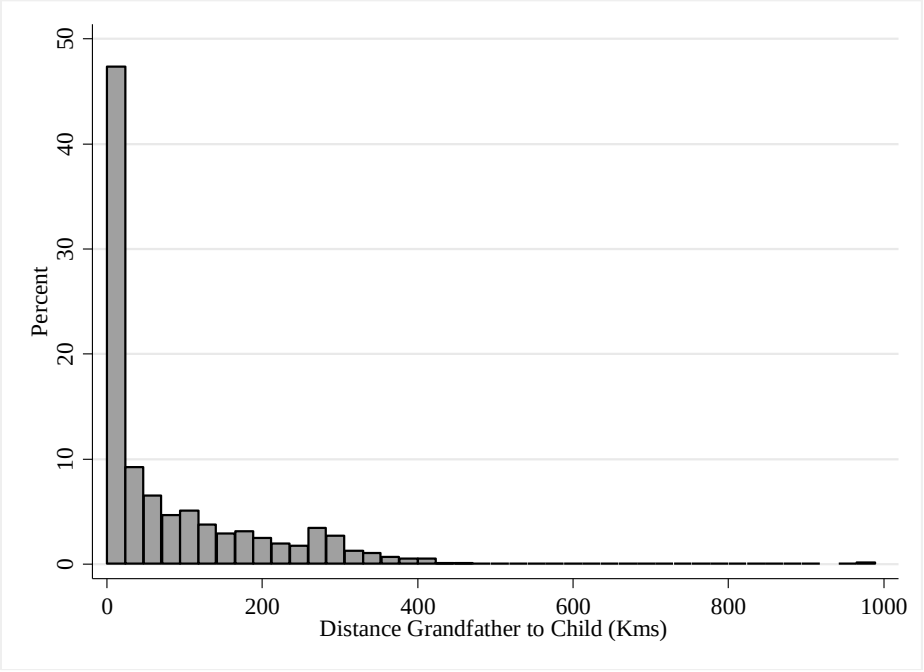

Figure 3: The Geodetic Distance between Grandfathers and Grandchildren

Figure 2 shows the average exposure of children to their paternal grandfathers, by decade of birth from 1820-9 on. The solid line shows the proportion of children whose paternal grandfather was alive at their birth. The dotted line shows the number of years both grandchild and grandfather were both alive on average (years to age 15 by grandchildren). The proportion with paternal grandfathers alive when they were born was generally around 0.45 for the years we have data on the social outcomes for grandchildren. This is plenty of time for grandfather's to positively impact upon their grandchild's development and to name them as inheritors. If we look instead at grandmothers as the ones more likely to have an influence on the outcomes for their grandchildren, we find 66% of grandchildren had a living paternal grandmother at their birth.

Figure 3 shows the distribution of geodetic distance between grandchildren and grandfathers in our sample. 47% of grandchildren were born within 20 km of the place of death of their paternal grandfather, for grandfathers alive at grandchild birth. Table 8 shows the summary statistics for our data.

Dead versus Living Relatives

We begin by looking at the potential influence of living versus dead relatives on childrens' outcomes. For paternal grandfathers this gives a nice even split of children, with 45% having their grandfather alive when they were born. For adult uncles, the fraction alive at the time of the child birth is higher, 89%. But given the variation in lifespans, and the spacing of births within families, there are plenty of observations also on dead versus living uncles.

Table 7 shows the comparative effect of dead versus living grandfathers on the outcomes of grandchildren. In all cases we control for the characteristics of fathers: ln wealth, occupational rank, an indicator for higher education, and their normed age at death. Then there is a general term for the status of the grandfather, and a separate intercept and slope coefficient for cases where the grandfather is alive at the birth of the child. In all cases except ln wealth – occupational rank, education, normed longevity, schooling 14-20 - the grandfather being alive does not increase the coefficient on their status as predicting the status of the child. Thus for four of the five measures dead grandfathers have the same predictive power for child outcomes as alive ones. In the case of wealth there is a closer connection between child and grandfather wealth in the case where the grandfather was alive at the birth of the child.

Table 7: The Effect of Dead/Alive Grandfather Status on Children

	Wealth	Occupation	Education	At School, 14-20	Age at Death Normed
Ln(Wealth) of Father	0.265**	3.081**	0.016**	0.018**	-0.001
	(0.016)	(0.265)	(0.002)	(0.004)	(0.004)
Occ. Rank, Father	0.006**	0.317**	0.001**	1.055**	0.000
	(0.001)	(0.025)	(0.000)	(0.332)	(0.000)
Educated Father	0.110	2.419	0.076**	-0.044	0.035
	(0.107)	(1.758)	(0.013)	(0.034)	(0.032)
Age at Death, Father	-0.008	0.383	-0.001	0.024	0.089**
	(0.042)	(0.878)	(0.006)	(0.016)	(0.016)
Grandfather Alive at Child Birth	-0.16**	-0.588	-0.005	-0.088	-0.044
	(0.060)	(21.003)	(0.009)	(0.318)	(0.038)
Ln(Wealth) of Grandfather	0.093**				
	(0.016)				
Occ. Rank, Grandfather		0.194**		1.049**	
		(0.028)		(0.359)	
Educated Grandfather			0.041*		
			(0.016)		
Age at Death, Grandfather					0.045*
					(0.020)
Interactions: Grandfather Alive					
Ln(Wealth) of Grandfather	0.040**				
	(0.014)				
Occ. Rank, Grandfather		-0.001		0.000	
		(0.024)		(0.000)	
Educated Grandfather			-0.002		
			(0.020)		
Age at Death, Grandfather					0.002
					(0.034)
R2	0.39	0.55	0.22	.08	0.10
N	7,538	3,682	7,644	3,458	10,487

* $p<0.05$; ** $p<0.01$, Errors clustered at Grandfather. All models include controls for father's status, female, age at death, and year of death. Controls included but not reported: Female, birth year, birth order, age of father at child birth, age of death.

Table 8: The Effect of Uncle Status on Children

	Wealth	Occupation	Education	At School, 14-20	Age at Death, Z
Ln(Wealth), Father	0.249**	2.780**	0.016**	0.016**	-0.002
	(0.021)	(0.354)	(0.002)	(0.006)	(0.005)
Occ. Rank, Father	0.010**	0.378**	0.001**	1.949**	0.001
	(0.001)	(0.032)	(0.000)	(0.474)	(0.000)
Educated Father	0.037	4.041	0.107**	-0.015	0.017
	(0.140)	(2.353)	(0.017)	(0.049)	(0.035)
Age at Death, Father	0.057	1.229	0.005	0.038	0.085**
	(0.063)	(1.281)	(0.008)	(0.022)	(0.017)
Uncle Alive at Child Birth	-0.011	41.639	-0.028	0.481	-0.129
	(0.161)	(63.715)	(0.023)	(0.742)	(0.082)
Ln(Wealth) of Uncle	0.053		-0.013		
	(0.042)		(0.012)		
Occ. Rank, Uncle		0.189*		0.795	
		(0.074)		(0.887)	
Educated Uncle			0.079		
			(0.042)		
Age at Death, Uncle					0.060
					(0.061)
*Interactions: Uncle Alive**					
Ln(Wealth) of Uncle	0.067				
	(0.040)				
Occ. Rank, Uncle		-0.046			
		(0.073)			
Educated Uncle			-0.031	-0.548	
			(0.044)	(0.872)	
Age at Death, Uncle					-0.041
					(0.062)
R2	0.38	0.57	0.27	0.09	0.10
N	3,710	1,657	3,656	1,488	8,033

* $p<0.05$; ** $p<0.01$, Errors clustered at Uncle. Controls included but not reported: Female, birth year, birth order, age of father at child birth, age of death.

Table 9: Effect of Grandfather's Status on Children, Grandmother alive at Birth

Grandfather:	Wealth	Occ Rank	Education	At School, 14-20	Age at Death (21+)
Main Effect	0.078**	0.153**	0.007	1.349*	0.049
	(0.027)	(0.041)	(0.026)	(0.570)	(0.056)
Intercept Close	0.137	-0.004	-0.003	-0.120	0.089
	(0.107)	(0.042)	(0.011)	(0.612)	(0.073)
Marginal Effect, Close	0.049	0.003	0.027	0.146	-0.045
	(0.027)	(0.050)	(0.052)	(0.737)	(0.072)
R^2	0.39	0.46	0.18	0.08	0.10
N	2,351	1,142	2,034	1,126	2,888

Notes: Errors clustered at Grandfather. All models include controls for father's status (wealth, occupational rank, education, and age at death) female, birth order, age of father at child birth, child age at death, and year of birth.

Table 8 shows the equivalent set of estimates for uncles dead and alive at the time of child birth. Again there is little sign that uncles alive at the time of a child's birth have any more effect on the outcomes for the child.

Finally, table 9 shows the links between grandfather status and grandchild outcomes, by whether the paternal grandmother was alive or dead when the child was born. The literature has been more focused on the potential transfers from grandmothers to grandchildren then on the role of grandfathers. In our data, however, grandmothers do not have independent status measures, being mostly born before 1880, except for wealth at death. But even for wealth the resources of the family are likely more accurately reflected in the wealth at death of the husband than in the wealth of the wife. So we measure their status and resources by those of their husbands. As noted above, at the time of grandchild birth, many more having living grandmothers than have living grandfathers. So table 9 shows the effects of grandmother status on grandchild outcomes, when the grandmother was alive at the time of the grandchild birth. As with grandfathers the only case where the grandmother being alive has sign of any independent connection with outcomes is for wealth. For the other outcomes – occupational rank, higher education, schooling aged 14-20, and adult longevity - there is no sign that living grandmothers have any greater effect on child outcomes.

The conclusion here is thus that at least part of the association between social outcomes for grandparents, uncles and cousins stems just from the information they provide on the underlying status of parents. But there is still the possibility that relatives play some causal role. In particular, living relatives include grandparents, for example, who are quite distant from their grandchildren and those who live in close geographic proximity. If the son moves from his fathers' farm in Lincoln several hundred miles away to London, then the influence of the grandfather in providing support to the grandchild will be much more limited than when all three generations reside in the same London parish. Thus in the next section we test whether proximate relatives have a closer association with outcomes than distant relatives.

Close versus Distant Relatives

As figure 3 shows, some grandparents lived in close geographic proximity to their grandchildren, others lived at considerable distance. In tables 10-13 we consider the effect of relatives living at the time of child birth on the status outcomes for the children, distinguishing between relatives living closer than 20 km from the child at birth, and those living far away. Did the status of geographically close relatives have more connection with the status of children than that of distant relatives? Distant relatives again have little opportunity to promote the welfare of children causally through childcare, interactions, or modelling of successful behaviors. They could, however, provide financial support even at a distance, or provide employment opportunities through their connections.

As noted above, movers tend to be of higher status than stayers. So a child being distant from their grandparents may reflect higher status. However, the status association with moving is largely a class effect. Lower status families were less geographically mobile in general. Within individual families when we compare brothers who stay where they were born versus those who move, as in table 5, we find that the higher status of movers is much more modest. Thus we can largely control for the status differences of movers versus stayers by controlling for the status of the child's father, as is done in tables 10-12.

For most of the five social outcomes – ln wealth at death, occupational rank, higher education, schooling 14-20, or longevity – we do find positive and significant connections between the outcomes for living relatives – grandfathers, uncles, and cousins – and outcomes for children. But in no case, for any of the outcomes, is the connection stronger for relatives who are in geographic proximity to the child. The conclusion is the same, as table 15 shows, when we consider living grandmothers instead of grandfathers.

Table 10: Close versus Distant Grandfathers and Grandchild Outcomes

Grandfather	Wealth	Occ Rank	Education	At School, 14-20	Age at Death (21+)
Main Effect	0.086**	0.148**	0.030	0.302	0.052*
	(0.028)	(0.041)	(0.027)	(0.614)	(0.025)
Intercept Close	-0.083	0.041	-0.008	0.405	0.038
	(0.136)	(0.044)	(0.013)	(0.791)	(0.035)
Marginal Effect, Close	0.026	-0.050	-0.025	-0.438	-0.092*
	(0.040)	(0.051)	(0.055)	(0.935)	(0.043)
R^2	0.37	0.51	0.21	0.06	0.11
N	1,803	850	1,592	839	3,758

Notes: Errors clustered at Grandfather. All models include controls for father's status (wealth, occupational rank, education, and age at death) female, birth order, age of father at child birth, child age at death, and year of birth.

Table 11: Close versus Distant Uncles and Nephew Outcomes

Uncle	Wealth	Occ Rank	Education	At School, 14-20	Age at Death (21+)
Main Effect	0.086**	0.148**	0.030	0.302	0.052*
	(0.028)	(0.041)	(0.027)	(0.614)	(0.025)
Intercept Close	-0.083	0.041	-0.008	0.405	0.038
	(0.136)	(0.044)	(0.013)	(0.791)	(0.035)
Marginal Effect, Close	0.026	-0.050	-0.025	-0.438	-0.092*
	(0.040)	(0.051)	(0.055)	(0.935)	(0.043)
R^2	0.37	0.51	0.21	0.06	0.11
N	1,803	850	1,592	839	3,758

Notes: Errors clustered at Uncle. All models include controls for father's status (wealth, occupational rank, education, and age at death) female, birth order, age of father at child birth, child age at death, and year of birth.

Table 12: Close versus Distant Cousins

Cousin	Wealth	Occ Rank	Education	At School, 14-20	Age at Death (21+)
Main Effect	0.122**	0.138**	0.049**	1.005**	0.031*
	(0.018)	(0.029)	(0.018)	(0.334)	(0.014)
Intercept Close	-0.127	2.884	-0.000	0.687	0.030
	(0.068)	(5.858)	(0.007)	(0.365)	(0.020)
Marginal Effect, Close	0.009	-0.004	0.021	-0.808	-0.008
	(0.024)	(0.035)	(0.034)	(0.433)	(0.021)
R^2	0.40	0.44	0.16	0.10	0.09
N	7,260	2,257	5,672	2,645	10,192

Notes: Errors clustered at Cousin. All models include controls for father's status (wealth, occupational rank, education, and age at death) female, child age at death, and year of birth.

Table 13: Close versus Distant Grandmothers and Grandchild Outcomes

	Wealth	Occupation	Education	At School, 14-20	Age at Death Normed
Grandmother Alive at Child Birth	0.024	0.009	0.019*	-0.328	-0.023
	(0.064)	(0.021)	(0.009)	(0.346)	(0.029)
*Interactions: Grandmother Alive**					
Ln(Wealth) of Grandfather	0.033*				
	(0.015)				
Occ. Rank, Grandfather		-0.008		0.411	
		(0.025)		(0.407)	
Educated Grandfather			0.024		
			(0.022)		
Age at Death, Grandfather					0.036
					(0.031)
R2	0.39	0.55	0.22	0.08	0.11
N	7,079	3,397	7,188	3,212	9,694

* $p<0.05$; ** $p<0.01$, Errors clustered at Grandmother. All models include controls for father's status, female, age at death, and year of death. Controls included but not reported: Female, birth year, birth order, age of father at child birth, age of death.

Conclusions

We see in tables 1 and 2 that even controlling for the status of parents, the characteristics of other relatives – grandfathers, uncles, and cousins – all are predictive of social outcomes for children. There is a significant literature in anthropology, sociology, and economics that ascribes a causal role to these associations. In this paper we have tested for sign of causal effects by looking to see if the association between the status of relatives and that of a child is stronger when the relative had the opportunity to play a causal role: the relative was alive at the birth of the child, or the relative was living in geographic proximity. In almost all cases we do not detect such an effect. We cannot test for this effect by looking at whether living or close relatives improve the social status of children, since this is observational data and children with living or close relatives can have differences in status from those with dead or distant relatives. But we can test for whether there is more information conveyed about child status when relatives have at least an opportunity to play a much greater causal role. The connection, however, between dead relatives' status and social outcomes is as close as for living. The connection between living distant relatives' status and social outcomes is as close as for living distant relatives.

The interpretation is that at least in the context of English families with children born in the interval 1830-1925, relatives other than parents did not play a significant causal role in child outcomes. This was a period with already significant investments in child education and training. As shown in table 6 38% of children in the sample observed aged 14-20 were still at school or in an apprenticeship. Relatives other than parents had plenty of opportunity to help get children into more lucrative careers through their social and work connections, and through financial support. The results thus seem generalizable to all modern Western European societies, which have very similar family structures in terms of the co-residence of grandparents and other relatives.

These results are consistent with a model of status transmission across generations, such as that of Clark, Cummins, et al. 2014, where the process is actually first-order Markov, but the observed social outcomes in each generation are affected also by transitory elements, so that the status of other relatives conveys information about the likely outcomes for children independent of the status of the parents. One variant of such a process would be the case where the transmission from parents to children is through genetics.

References

Adermon, Adrian, Mikael Lindahl and Mårten Palme. 2016. "Dynastic Human Capital, Inequality and Intergenerational Mobility." Working Paper, Mimeo, University of Gothenburg.

Braun, S. and J. Stuhler 2014. "The Transmission of Inequality Across Multiple Generations: Testing Recent Theories with Evidence from Germany" Mimeo, November 2014, Universidad Carlos III de Madrid.

Chan, Tak Wing and Vikki Boliver. 2013. "The grandparents effect in social mobility: Evidence from British birth cohort studies," *American Sociological Review*.

Clark, Gregory, Neil Cummins, et al. 2014. *The Son Also Rises: Surnames and the History of Social Mobility*. Princeton: Princeton University Press.

Clark, Gregory and Neil Cummins. 2015. "Intergenerational Wealth Mobility in England, 1858-2012. Surnames and Social Mobility." *Economic Journal, 125*(582): 61-85.

Dribe, Martin and Jonas Helgertz 2014. "The lasting impact of grandfathers: Class, occupational status, and earnings over three generations (Sweden 1815-2010)."

Ferrie, Joseph, Catherine Massey and Jonathan Rothbaum. 2016. "Do Grandparents and Great-Grandparents Matter? Multigenerational Mobility in the US, 1910-2013." NBER Working Paper, 22635, September.

Hawkes, Kristen. 2004. "Human longevity: The grandmother effect". *Nature*, *428*: 128–129. doi:10.1038/428128a. PMID 15014476.

Hrdy, Sarah Blaffer. 1999. *Mother Nature: A History of Mothers, Infants and Natural Selection*. New York: Pantheon.

Knigge, Antonie. 2016. "Beyond the Parental Generation: The Influence of Grandfathers and Great-grandfathers on Status Attainment," *Demography*: 1–26.

Lahdenperä, M., Lummaa, V., Helle, S., Tremblay, M. and Russell, A. F. "Fitness benefits of prolonged post-reproductive lifespan in women." *Nature* 428, 178–181 (2004).

Lindahl, M., M. Palme, S. Sandgren Massih, and A. Sjögren 2015. "Long-term intergenerational persistence of human capital: an empirical analysis of four generations" *Journal of Human Resources 50*(1): 1–33.

Long, Jason, and Joseph Ferrie. 2012. "Grandfathers matter (ed): Occupational mobility across three generations in the US and Britain, 1850-1910." Working Paper

Mace, Ruth, and Rebecca Sear. 2004. "Are Humans Communal Breeders?" In Voland, E., Chasiotis, A. and Schiefenhoevel, W. *Grandmotherhood – the Evolutionary Significance of the Second Half of Female Life*. Rutgers University Press.

Mare, Robert D. 2014 "Multigenerational aspects of social stratification: Issues for further research," *Research in Social Stratification and Mobility*, *35*, 121–128.

Modalsli, J. 2016. "Intergenerational mobility in Norway, 1865-2011". Forthcoming in *Scandinavian Journal of Economics*.

Møllegaarda, Stine, Mads Meier Jæger. 2015. "The effect of grandparents' economic, cultural, and social capital on grandchildren's educational success." *Research in Social Stratification and Mobility, 42*: 11–19.

Olivetti , Claudia & M. Daniele Paserman & Laura Salisbury, 2016. "Three-generation Mobility in the United States, 1850-1940: The Role of Maternal and Paternal Grandparents," Boston College Working Papers in Economics 903, Boston College Department of Economics.

Pfeffer, Fabian T, 2014. "Multigenerational approaches to social mobility. A multifaceted research agenda," *Research in social stratification and mobility*, *35*, 1-

Williams, G C. 1957. "Pleiotropy, natural selection, and the evolution of senescence". *Evolution*, *11*(4): 398–411. doi:10.2307/2406060. JSTOR 2406060.

Zeng, Zhen and Yu Xie. 2014. "The Effects of Grandparents on Children's Schooling: Evidence from Rural China" *Demography*, *51*(2): 599–617. doi:10.1007/s13524-013-0275-4.