



The effect of grandparents' economic, cultural, and social capital on grandchildren's educational success



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ABSTRACT

This paper analyzes the effects of grandparents' economic, cultural, and social capital on grandchildren's educational success. We analyze data from Denmark and hypothesize that grandparents' economic capital should be of little importance in the Scandinavian context, while their cultural and social capital should be relatively more important. Our results partly confirm these hypotheses since, after controlling for parents' capital, we find that grandparents' cultural capital (but not their economic and social capital) has a positive effect on the likelihood that grandchildren choose the academic track in upper secondary education over all other tracks. These results suggest, at least in the Scandinavian context, that the ways in which grandparents affect grandchildren's educational success is via transmission of non-economic resources.

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1. Introduction

In recent years research on family background and children's educational and socioeconomic success has begun adopting a multi-generation approach (for example, a recent special issue of *Research in Social Stratification and Mobility* focused on inequality across multiple generations). This new approach is motivated by growing empirical evidence that, in addition to parents, other family members such as grandparents and aunts and uncles also affect children's outcomes. This new evidence challenges the traditional two-generation approach (e.g., Bourdieu, 1977; Becker & Tomes, 1986) prevalent in social stratification research, which argues that parents affect children but in which there are no direct transmissions from other family members (Björklund & Salvanes, 2010; Mare, 2011; Pfeffer, 2014; Solon, 2014).

Drawing on Bourdieu's concept of capital, this paper adds to existing multi-generation research by empirically measuring grandparents' economic, cultural, and social capital and by analyzing the effects of these forms of capital on grandchildren's choice of secondary education. We analyze three-generation data from Denmark and argue that, net of parents' capital, grandparents' economic, cultural, and social capital are likely to affect

grandchildren's educational choices in different ways in this national context. Grandparents' economic capital should be of comparatively little importance because Denmark is characterized by free education, low income inequality, and universal social security. Grandparents' cultural and social capital, on the other hand, should matter because Danish secondary education is stratified into an academic and a vocational track, and success in each track is contingent upon either familiarity with the dominant cultural codes in this track (the academic track) or having the right social connections (the vocational track). Grandparents' cultural capital, manifest in for example a family culture that valorizes highbrow culture and an academic education, might provide grandchildren with cultural capital over and above that provided by parents which increases the likelihood that they complete the academic track. Similarly, grandparents' social capital, which we argue is only partly overlapping with parents' social capital, might have a positive effect on the likelihood that grandchildren complete the vocational track because successful completion of this track is contingent upon the grandchild finding an apprenticeship position with an employer. In both cases, we argue that cultural and social capital possessed by grandparents has the potential to directly affect grandchildren's educational choices over and above parents' capital.

The main contribution of this paper is that we distinguish the three different types of capital in the grandparent and parent generations and analyze the effects of these capitals on educational outcomes in the grandchild generation. Previous multi-generation research has only to a limited degree distinguished different types

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of resources in the grandparent generation. Most studies use grandparents' social class as a proxy for the available resources in the grandparent generation (e.g., Goyder & Curtis, 1977; Beck, 1983; Biblarz, Bengtson, & Bucur, 1996; Erola & Moisiu, 2007; Chan & Boliver, 2013; Hertel & Groh-Samberg, 2014). Other studies include direct measures of grandparents' socioeconomic resources, for example education and income (e.g., Peters, 1992; Warren & Hauser, 1997; Sacerdote, 2005; Loury, 2006; Sauder, 2006; Lindahl, Palme, Sandgren Massih, & Sjogren, 2011; Piraino, Mullera, Cilliersb, & Fourie, 2014; Wightman & Danziger, 2014; Zeng & Xie, 2014), while a third group of studies uses data on siblings and cousins to infer about the total effect of the extended family (including grandparents) on children's outcomes (e.g., Jæger, 2012; Hällsten, 2014). Our data allow us to measure qualitatively different types of resources in the parent and grandparent generations that have not been included in previous multi-generation research, in particular non-economic resources. Furthermore, because we measure the three types of capital both in the parent and grandparent generations, we are able to control for indirect ("Markovian") transmissions of capital from grandparents to parents and to isolate the direct effects of grandparents' capital on grandchildren's educational choices.

Results from the empirical analysis suggest that, net of parents' capital, grandparents' cultural capital has a positive effect on the likelihood that grandchildren choose academic versus a vocational or no secondary education and, moreover, there are no discernible effects of their economic and social capital. We interpret these findings to suggest that, at least in the Scandinavian context, cultural resources in the extended family may operate across more than two generations while economic and social resources tend to follow a Markov process.

2. Theoretical background

2.1. Two-generation models

Most theoretical models of intergenerational transmissions are based on two generations and focus on the effect of parents on children (or on the effect of mothers and fathers, respectively). In economics, the human capital model proposes that, in addition to transmitting innate endowments to children via genes, parents also actively invest resources in fostering skills in children (e.g., Becker & Tomes, 1986; Goldberger, 1989). Thus, parents use economic and other resources to produce human capital in children, for example cognitive and non-cognitive skills, which facilitate long-term success.

Theories in sociology have emphasized that, in addition to economic resources, parents use different types of non-monetary resources to promote children's success (e.g., Bourdieu, 1977; Coleman, 1990). In this paper we use Bourdieu's concepts of economic, cultural, and social capital to conceptualize qualitatively different types of family resources. We use Bourdieu's concepts because, first, they enable us to address a comprehensive range of (economic and non-monetary) family resources that might affect children's educational outcomes, second, we hypothesize that they might work differently in a multi-generation context than in a two-generation context and third, our data allow us to construct empirical approximations of each type of capital both in the parent and grandparent generation.

Economic capital refers to monetary assets such as income, wealth, property, and other material possessions. *Cultural capital* refers to familiarity with dominant cultural codes and to the ability to exploit this familiarity, whether internalized via knowledge and behaviors, institutionalized via educational credentials, or objectified via possession of cultural objects, to one's own advantage.

Social capital refers to the scope and quality of social networks that can be used to promote one's interests or to convert one form of capital into another (Bourdieu, 1986)¹.

Bourdieu argues that families possess different amounts and compositions of capital and that each type of capital, invested in children, may yield a comparative advantage in the educational system. Economic capital may be used to finance the direct costs of education, for example tuition fees, or indirect costs such as those associated with housing or extracurricular activities. Cultural capital is transmitted from parents to children through investment and socialization, and it contributes to educational success by equipping children with an understanding of the implicit "rules of the game" in the educational system, an appreciation of higher education, and the ability to present an impression of academic brilliance to teachers. Social capital may promote educational success if parents possess social connections that facilitate access to, for example, prestigious educational institutions or educational tracks that require students to find an apprenticeship position with an employer.

Bourdieu's theory provides a multidimensional approach to conceptualizing the different resources that parents possess and which they invest to promote children's educational success. However, like most theories of intergenerational transmissions, Bourdieu's theory focuses on two generations and does not take into account that other family members, for example grandparents, may also possess resources that directly affect children's outcomes. We now discuss this possibility.

2.2. A three-generation approach

In an influential paper Mare (2011) argues that two-generation models may be insufficient for capturing all the different ways in which family background affects children's outcomes (see also Pfeffer, 2014; Solon, 2014). In particular, he argues that most theoretical models of intergenerational transmissions assume a *Markov process* in which resources and endowments are transmitted sequentially from one generation to the next. There is empirical evidence that members of the extended family, and especially grandparents, play an important role in most children's lives (Hirshorn, 1988; Bengtson, 2001). There is also evidence that grandparents' resources have a direct effect on child outcomes that may be consequential for long-term success, for example cognitive development (Tinsley & Parke, 1987; Modin & Fritzell, 2009; Ferguson & Ready, 2011) and academic achievement (Falbo, 1991; Scholl Perry, 1996). Consequently, grandparents' resources may contribute to children's outcomes over and above parents' resources.

In this paper we propose that, in the same way as parents' resources, grandparents' resources may also be conceptualized via Bourdieu's forms of capital. The relative importance of each type of capital in the grandparent generation depends on the institutional setting and on the extent to which the intergenerational transmission of each type of capital follows a Markov process. We illustrate this process in the model in Fig. 1 which includes three generations: grandparents, parents and grandchildren.

Grandparents transmit their economic, cultural, and social capital to parents. This process is illustrated by the dotted arrows in

¹ Bourdieu defined social capital as "... the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (Bourdieu & Wacquant, 1992: 119). This definition, which emphasizes that social capital is possessed by individuals and groups, is somewhat different from Coleman's (1988) definition in which social capital is embedded in particular physical and social settings (for example, schools or communities). We rely on Bourdieu's definition in this paper.

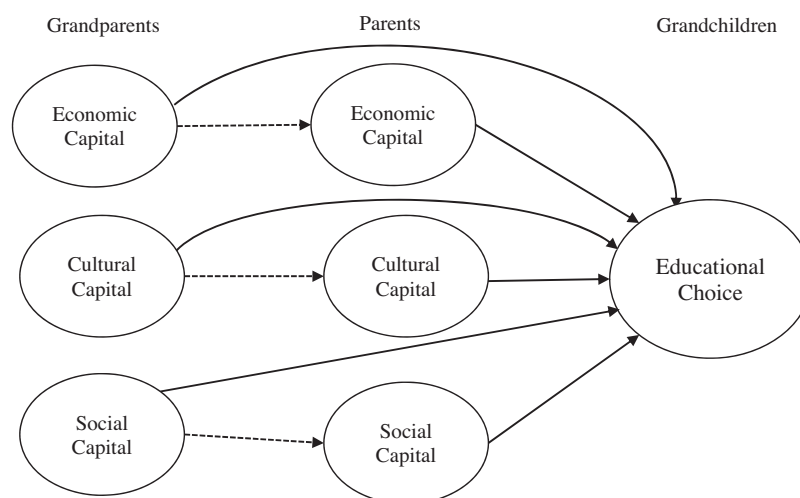


Fig. 1. Illustration of conceptual framework.

Fig. 1. Parents in turn use their capital (some of which is inherited from grandparents) to promote grandchildren's outcomes. This is the Markovian process of social reproduction described by Bourdieu. As discussed above, parents may use their economic capital to pay tuition fees, their cultural capital to ensure that children have a comparative advantage in the educational system, and their social capital to get their child into a prestigious educational institution or track. All of these investments lead to a higher likelihood of educational success. The question then is how grandparents, in addition to transmitting capital to parents, use their remaining (or later acquired) capital to promote grandchildren's success.

We argue that grandparents may use their *economic capital* in two ways. First, in addition to transmitting economic capital to parents (via, for example, in vivos loans or others forms of economic transfers), grandparents may also channel economic resources directly to grandchildren (via, for example, savings, gifts or other material possessions). Second, grandparents' economic capital may act as a buffer which protects grandchildren if parents experience adverse social events such as illness or unemployment (Jæger, 2012). There is indirect evidence to substantiate these ideas since extended families have been found to pool economic resources in order to reduce the negative consequences of economic shocks (e.g., Altonji, Hayashi, & Kotlikoff, 1992; Lacroix, Picot, & Sofer, 1998).

Grandparents may also use their *cultural capital* to promote grandchildren's educational success. In addition to transmitting their cultural capital to parents whom in turn transmit it to grandchildren (Bourdieu, 1977), grandparents may also transmit their cultural capital directly to grandchildren. Research shows that children spend considerable amounts of time with grandparents during childhood (Bengtson, 2001), which means that they are exposed to a larger family environment than that provided by their parents (this "extended-family environment" also consists of aunts and uncles and nieces and nephews; see Loury, 2006; Jæger, 2012). Grandparents may inculcate cultural capital in grandchildren via this extended-family environment, for example by providing a stimulating learning environment, by organizing cultural activities (for example trips to the theatre or extracurricular activities), or by acting as role models in ways that shape grandchildren's educational preferences (Kohn, 1977; Kohn & Slomczynski, 1990; King & Elder, 1997).

Finally, in addition to transmitting their *social capital* to parents (e.g., Weiss, 2012), grandparents may also possess social capital (possibly acquired after that initially transmitted to parents) that could help grandchildren. For example, grandparents may know the right people in school admissions board or those in charge of

extracurricular activities that signal high academic potential (Picou & Carter, 1976; Sandefur, Meier, & Campbell, 2006). Although the role of social capital in generating educational success is rather indirect in Bourdieu's theory, our data include indicators of social capital that directly capture if grandparents have social connections related to educational outcomes.

This section has presented several channels through which grandparents' economic, cultural, and social capital might have a direct effect on grandchildren's educational success. The relative importance of these direct channels depends on, one the one hand, the strength of the indirect, Markovian transmission of capital from grandparents to parents and, on the other hand, the institutional context. We now address these questions.

2.3. Institutional context and hypotheses

The institutional context of this study is secondary education in Denmark. This country, which belongs to the Scandinavian mobility regime (DiPrete, 2002), is characterized by a high level of income redistribution, free (elementary, secondary, and higher) education, and a universal social security system. We argue that in this institutional context some types of capital are more valuable than others with regard to promoting (grand)children's educational success.

The combination of a high level of income redistribution, free education and social security means that parents' and grandparents' *economic capital* should generally be of little importance for (grand)children's educational outcomes. The main reason for this hypothesis is that it is difficult to convert economic capital into direct educational advantage. One possibility would be to send children to a private elementary school². The proportion of students who attend private elementary schools in Denmark is low (around 15 percent), and on average private schools do not produce better academic performance than public schools (most private schools focus on alternative pedagogical principles rather than on academic achievement). Thus, there is no long-term pay-off with regard to academic performance by sending children to a private school and, consequently, there is little reason to expect that parents' and grandparents' economic capital in itself would lead to a higher likelihood of educational success. Previous research provides some

² Private elementary schools in Denmark receive a state subsidy which covers around 85% of the normal costs of running the school. Parent fees cover the remaining 15%. There are practically no private secondary or higher education institutions in Denmark.

support for this assertion as social class differences in educational outcomes in Denmark are only to a limited extent attributable to differences in parents' economic resources (e.g., Davies, Heinesen, & Holm, 2002; Jæger & Holm, 2007).

In contrast to economic capital, we hypothesize that non-monetary resources such as *cultural* and *social capital* are relatively more important for children's educational choices in the Danish context. The motivation underlying this hypothesis is that the Danish secondary education system is internally stratified and path-dependent in ways that make cultural and social capital particularly valuable. Upon completion of nine years of elementary school (at approximately age 16), students must choose between either leaving school or entering one of two main tracks in secondary education: upper secondary education or vocational education.

Upper secondary education is the academic track in Danish secondary education and usually takes three years to complete. There are two types of tracks in upper secondary education: the regular track and three vocationally oriented tracks. Both the regular and the vocationally oriented tracks provide eligibility for higher education at university or University College, but they differ in terms of curriculum and the types of higher education that students typically attend upon completion. The curriculum in the regular track is very academically oriented and is directed toward traditional subjects taught at university (mandatory subjects include, for example, science, foreign languages, history, literature, and art history). The curriculum in the vocationally oriented tracks is more practically oriented and focuses on, for example, technical subjects (mechanical engineering, IT, physics, etc.) or mercantile ones (accounting, business economics, math, etc.).

We argue that successful completion of both tracks in upper secondary education, and especially the regular track, depends to a considerable extent on possessing cultural capital (Jæger & Holm, 2007; Jæger, 2009). The reasons why are that, first, the curriculum, teaching, and social environment in both tracks are academically oriented (which means that mastering the cultural codes in these educational environments presents an important comparative advantage) and, second, both tracks are stepping stones into higher education (which means that their true value does not materialize until sometime in the future³). Controlling for parents' cultural capital, we expect students from families in which grandparents possess more cultural capital to have a higher likelihood of choosing upper secondary education over the other educational options compared to students whose grandparents possess less cultural capital. Moreover, we expect that, within upper secondary education, those whose grandparents possess more cultural capital will be more likely to choose the regular track rather than one of the vocationally oriented ones (which we combine into one group in the empirical analysis).

The vocational track in Danish secondary education (for example, training to become a plumber, electrician, or hairdresser) typically takes three or four years and combines school-based training with an apprenticeship position with an employer. Students enter the labor market directly upon completing their vocational education, often getting their first job with the employer with

whom they served as an apprentice. Vocational education does not provide eligibility for higher education, for example at university, and credentials earned in the vocational education system cannot be transferred to other types of secondary (or higher) education. What is special about vocational education in Denmark is that in order to successfully complete a vocational education the student must find an apprenticeship position with an employer. Vocational education institutions can sometimes help the student find an apprenticeship position, but if he or she is unable to find an apprenticeship position it is not possible to complete the vocational education⁴. This institutional setup means that having social connections that can help with finding an apprenticeship position is highly beneficial for students who enroll in vocational education. Based on these arguments, we expect social capital, and especially social connections with employers who might provide an apprenticeship position, to have a positive effect on the likelihood that grandchildren choose vocational education. Moreover, we expect grandparents' social capital to be potentially as important as parents' social capital because, in addition to transmitting social capital to parents, grandparents may have cultivated new social connections that could benefit grandchildren.

In summary, we hypothesize grandparents' economic, cultural, and social capital to yield different returns when students choose among different options in Danish secondary education. We hypothesize that grandparents' economic capital should have little direct effect on children's choice of secondary education, while their cultural and social capital should matter. Grandparents' cultural capital, operating via long-term exposure to a culturally stimulating environment in the extended family, should affect the likelihood that grandchildren choose upper secondary education over other educational options (and the likelihood that they choose the regular track over the vocationally oriented tracks). By contrast, their social capital should affect the likelihood that grandchildren choose vocational secondary education (but should not matter with regard to choosing upper secondary education).

3. Data and variables

3.1. Data

We analyze data from the Danish Longitudinal Survey of Youth (DLSY). The DLSY is an ongoing cohort study of 3151 individuals born in or around 1954. The respondents in the DLSY were first interviewed in 1968 when they were around 14 years old and have since been interviewed in 1970, 1971, 1973, 1976, 1992, 2001, and in 2004 when they were around 50 years old. Response rates have remained high over time, with around 75 percent of the original sample members being interviewed in the latest round of data collection. In addition to the main DLSY respondents, the DLSY also includes a separate survey with the parents of the DLSY respondents (carried out in 1969) and a survey which samples all children born to all DLSY respondents (carried out in 2010). In total, we have information on three generations from in the same family: grandparents (born around 1925–1935), parents (born around 1954), and grandchildren (born around 1975–1985).

We analyze the choice of secondary education for the grandchild generation. The response rate in the grandchild survey which

³ In addition to completing upper secondary education (which provides formal eligibility for higher education), students' grade point average (GPA) from upper secondary education is the single most important factor that determines which university programs they can enroll in. Since almost all higher education institutions admit students solely on the basis of their GPA, extracurricular activities or non-academic merit play little or no role in admission. Furthermore, unlike in some other countries, students in Danish upper secondary education cannot improve their GPA after having completed upper secondary education, for example by (re)taking courses or doing extra credit coursework. This means that the student's GPA must be maximized while in school.

⁴ Some vocational education institutions offer in-house apprenticeship positions for students who are unable to find a regular apprenticeship position with an employer. Even if offered, in-house apprenticeship positions are less desirable than regular ones because, first, they do not provide the same "on the job" qualifications as regular apprenticeship positions, second, they signal that the student, being unable to find a regular apprenticeship position, is a low-quality worker and third, students in in-house apprenticeship positions receive an educational grant which is lower than the wage offered in a regular apprenticeship position.

Table 1
Summary statistics. Means and standard deviations.

	Share	Mean	SD	Year of measurement [*]
Grandchildren				
Choice of secondary education		0.87	0.94	2010
1. No education beyond elementary school	0.07			
2. Vocational education	0.18			
3. Vocationally oriented secondary education	0.31			
4. Regular secondary education	0.44			
Sex (female)		0.52	0.50	2010
Age		27.91	4.80	2010
Cognitive ability		9.67	3.33	2010
Grandparents				
Economic capital ^a		0.00	0.93	
Income		32.17	14.86	1969
Car ownership		0.76	0.43	2001R
Summer house ownership		0.15	0.36	2001R
Cultural capital ^a		0.00	0.94	
Years of education		9.55	2.63	1969
Newspaper subscription		0.79	0.41	1969
Attends classes		0.17	0.38	1969
Social capital ^a		-0.01	0.85	
Connections: apprenticeship		0.30	0.46	2004R
Connections: work/study abroad		0.06	0.24	2004R
Connections: educational advice		0.24	0.43	2004R
Parents				
Economic capital ^a		-0.00	0.82	
Income		32.23	12.67	1992
Car ownership		0.84	0.37	2001
Summer house ownership		0.13	0.33	2001R
Cultural capital ^a		-0.00	1.02	
Years of education		13.34	2.35	1992
Newspaper subscription		0.67	0.47	1992
Attends classes		0.45	0.50	1992
Social capital ^a		-0.01	0.99	
Connections: apprenticeship		0.48	0.50	2001
Connections: work/study abroad		0.37	0.48	2001
Connections: educational advice		0.50	0.50	2001

Note: N = 2383.

^{*} "R" indicates that parents provide retrospective information on grandparents.

^a Variable derived from PCA.

was carried out in 2010 is 82 percent. We use the DLSY because, it includes, first, three generations from the same family, second, information on choice of secondary education for grandchildren and, third, empirical indicators of economic, cultural, and social capital for both the parent and grandparent generations (empirical indicators are presented below). This information allows us to analyze if there is a direct effect of grandparents' capital on grandchildren's educational choices net of parents' capital.

We should make it clear that we do not observe economic, cultural, and social capital for both maternal and paternal grandparents, but only for one set of grandparents: the parents of the main DLSY parent. As a consequence, we cannot analyze all the potential effects of grandparents on grandchildren. We discuss the implications of this limitation below. Moreover, we only include grandchildren age 18 and older, which leaves a sample of 2383 respondents. Table 1 provides summary statistics on all variables included in the analysis.

3.2. Dependent variable

Our dependent variable is grandchildren's choice of secondary education. We distinguish four educational categories: (1) no education beyond elementary school; (2) vocational education; (3) vocationally oriented upper secondary education; and (4) regular upper secondary education. Table 1 shows the distribution of educational choices in the data, which is roughly similar to that observed in the population (our data have a slight overrepresentation of highly educated grandchildren because these respondents are more likely than low-educated respondents to participate in surveys).

3.3. Explanatory variables

We use two batteries of explanatory variables in the analysis. The first battery is a set of empirical items used to capture economic, cultural, and social capital in the parent and grandparent generation. With few exceptions, we use the same indicators in both generations and, as discussed in more detail below, we conceptualize the different forms of capital as latent variables. The second battery is a set of control variables pertaining to the grandchild generation (demographic characteristics and cognitive ability).

We include three empirical indicators of *economic capital*: (1) household income, (2) car ownership, and (3) summer house ownership. Our measure of household income in the grandparent generation is total gross income for the main provider in the family in 1967 measured in thousands of Danish Kroner (DKK). In most cases the main provider in the family is the father. The income data are from administrative registers rather than from the survey data. In the parent generation our measure of household income is the combined gross earnings of the DLSY respondent and his or her spouse (if any) in 1992. If information on income is missing in 1992, we impute missing information using income data from the 2001 wave. Our measure of car ownership is a dummy variable coded 1 if (grand)parents report owning their own car and 0 otherwise. Information on whether grandparents owned their own car was provided by the DLSY respondents in the 2001 wave. Finally, our measure of summer house ownership is a dummy indicating whether (grand)parents own(ed) their own summer house. We include the indicators of car and summerhouse ownership to provide a richer measurement of economic capital than simply relying

on household income. In particular, owning a summerhouse is considered a luxury in Denmark and is an indicator of wealth.

We include three empirical indicators of *cultural capital* which are available both for parents and grandparents: (1) educational attainment, (2) newspaper subscription, and (3) participation in classes or courses. Our measure of educational attainment measures years of completed schooling for the (grand)parent with the highest educational attainment. Information on grandparents' educational attainment was obtained from the 1969 wave, while information on parents' educational attainment was obtained from the 1992 wave. Missing information on parents' educational attainment in 1992 was imputed based on their reported educational attainment in 1973. Our second measure of cultural capital is a dummy variable indicating if (grand)parents subscribe(d) to a daily newspaper. Information on grandparents was provided by parents in the 2001 wave. Our third measure of cultural capital is a dummy variable indicating if (grand)parents regularly participate(d) in classes and courses in their leisure time (for example, lectures or arts/crafts classes). Information on grandparents is from the 1969 wave, while information on parents is from the 1992 wave. We include multiple indicators to capture different aspects of cultural capital.

We include three indicators of *social capital* capturing if (grand)parents report having social connections or contacts that could (1) help with finding an apprenticeship position; (2) help if a child wanted to study or work abroad; and (3) give advice on choice of education. In the 2001 wave parents were asked if they possessed the types of social connections described above. For each indicator, parents could either reply "yes" (coded 1) and "no" (coded 0). In the 2004 wave parents were asked to respond to the same questions, but this time on behalf of their parents. Consequently, the empirical indicators of social capital for the grandparent generation are retrospective and pertain to social connections that could help the parent generation. Although our indicators of grandparents' social capital do not refer to the grandchild generation, we interpret these indicators as proxies for whether grandparents possess social connections that could benefit grandchildren.

In addition to these indicators of (grand)parents' capital, we also include three control variables pertaining to grandchildren. These controls are sex (dummy variable for women), age in years, and the respondent's score on a cognitive ability test⁵.

4. Empirical setup

We now present the empirical strategy. First, we discuss how we model the effect of grandparents' economic, cultural, and social capital on grandchildren's choice of secondary education. Second, we discuss how we conceptualize the different types of capital as latent variables.

We treat the dependent variable as an unordered categorical variable and use multinomial logistic regression to model the effect of grandparents' and parents' capital on grandchildren's educational choice. The different educational options are associated with different academic demands and future economic and social returns. Among the four options, not completing any education after elementary school is associated with a comparatively high risk of low income and socioeconomic status in adulthood. Vocational education, on the other hand, yields higher economic and social returns than no education but does not provide access to higher education. The two types of tracks in upper secondary education, the regular and the vocationally oriented tracks, both provide

access to higher education and, in the long run, high-income and high-status occupations. Also, within upper secondary education, the regular track is more academically demanding than the vocationally oriented tracks and is more often associated with later enrolment in prestigious university programs (law, medicine, etc.; Holm, Jæger, Karlson, & Reimer, 2013).

We use Principal Component Analysis (PCA) to construct empirical measures of economic, cultural, and social capital. We have three observed indicators of each type of capital in each generation (see Table 1). In line with Bourdieu (1984, 1986), we think of the different types of capital as latent variables and, based on PCA models run on the set of items for each type of capital, we estimate an observed variable for each type of capital which captures (grand)parents relative position within the distribution of capital (we standardize each variable). We estimate the latent factors individually for each generation and use polychoric correlation matrices to take into account that several of the indicators are categorical rather than continuous variables (Kolenikov & Angeles, 2004). Table A1 provides summary information on the results from the PCA models.

Finally, as our data include siblings in the grandchild generation we adjust all standard errors for clustering of respondents (grandchildren) within families (parents).

5. Results

This section presents results from the empirical analysis. Table 2 summarizes results from multinomial logistic regressions of grandchildren's educational choice on grandparents' and parents' economic, cultural, and social capital. The table shows results from two model specifications: Model M1 which includes grandparents' capital (and the controls) and M2 which also includes parents' capital. We use regular upper secondary education as the reference category in all model specifications, which means that we estimate the effect of (grand)parents' capital on the likelihood that grandchildren choose each of the three other educational options.

Model M1 is our baseline specification which includes grandparents' capital (and the control variables). In this specification – in which we estimate the direct effects of grandparents' capital but ignore any indirect effects running through parents' capital (the Markovian pathway described in Fig. 1) – we find that grandparents' cultural capital has a negative effect on the likelihood that grandchildren choose all other educational options than regular upper secondary education. Moreover, grandparents' economic and social capital has no effect. The results for grandparents' economic and cultural capital are in line with expectations, while the insignificant result for social capital is not. We hypothesized that in the egalitarian Danish context it is difficult for grandparents to directly use their economic capital to improve grandchildren's educational outcomes. Our baseline empirical results support this idea. We also hypothesized that grandparents' cultural capital would be more important, and our results support this idea. Finally, we hypothesized that social capital would affect the likelihood of choosing vocational secondary education, but the empirical evidence does not support this idea (moreover, using alternative reference categories does not change results).

Model M1 represents an incomplete test of our theoretical framework because it does not take into account Markovian transmissions of capital from grandparents to parents. In model M2 we include the variables capturing parents' economic, cultural, and social capital in order to isolate the *direct* effect of grandparents' capital on grandchildren's educational choice from the *indirect* effect running through parents' capital. The results from model M2 show that adding parents' capital to the model does not change the main results. As in the previous specification, grandparents'

⁵ The cognitive ability test is a sub battery of the IST (Intelligence Structure Test) 2000R test. This test is similar to the Raven Progressive Matrices test and measures general cognitive ability. It is scored 0–20.

Table 2

Results from multinomial logistic regression models of grandchildren's choice of secondary education. Parameter estimates and standard errors in parenthesis. Reference category is regular upper secondary education.

	M1			M2		
	NE	VE	VSE	NE	VE	VSE
Grandparents						
Economic capital	-0.080 (0.109)	-0.129 (0.087)	-0.064 (0.063)	0.092 (0.113)	-0.046 (0.090)	-0.011 (0.066)
Cultural capital	-0.429 (0.118)***	-0.506 (0.091)***	-0.221 (0.067)***	-0.320 (0.114)**	-0.405 (0.092)***	-0.169 (0.068)*
Social capital	-0.169 (0.117)	0.006 (0.084)	0.018 (0.064)	0.012 (0.120)	0.057 (0.087)	0.045 (0.066)
Parents						
Economic capital				-0.501 (0.137)***	-0.025 (0.097)	0.046 (0.076)
Cultural capital				-0.847 (0.110)***	-0.728 (0.082)***	-0.405 (0.065)***
Social capital				-0.107 (0.108)	0.017 (0.079)	-0.017 (0.060)
Controls						
Sex (female)	-1.273 (0.176)***	-2.007 (0.137)***	-0.417 (0.101)***	-1.437 (0.184)***	-2.121 (0.142)***	-0.475 (0.102)***
Age	0.020 (0.020)	0.095 (0.014)***	0.043 (0.011)***	-0.007 (0.020)	0.073 (0.015)***	0.032 (0.011)***
Cognitive ability	-0.230 (0.028)***	-0.164 (0.020)***	-0.056 (0.015)***	-0.219 (0.028)***	-0.158 (0.020)***	-0.051 (0.015)**
N		2434		2434		
Pseudo R ²		0.092		0.128		
Log likelihood		-2722.80		-2613.94		

Note: Abbreviations: NE = no education beyond compulsory school, VE = vocational education, VSE = vocational oriented secondary education, RSE = regular secondary education.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table 3

Summary of average marginal effects for model M2.

	NE	VE	VSE	RSE
Grandparents				
Economic capital	-	-	-	-
Cultural capital	-0.008	-0.035	-0.006	0.049
Social capital	-	-	-	-
Parents				
Economic capital	-0.032	0.005	0.022	0.005
Cultural capital	-0.030	-0.051	-0.027	0.108
Social capital	-	-	-	-

Note: Abbreviations: NE = no education beyond elementary school, VE = vocational education, VSE = vocationally oriented secondary education, RSE = regular secondary education.

economic and social capital has no direct effect on grandchildren's choice of secondary education. Grandparents' cultural capital continues to have a statistically significant and negative direct effect on the likelihood that grandchildren choose other all other educational options than regular secondary education⁶. These effects are consistent with our hypothesis that grandparents' cultural capital may create a cultural environment in the extended family that fosters grandchildren's cultural capital, for example their academic orientations and appreciation of higher education, which affects the likelihood that they choose the most academically demanding track in upper secondary education.

Table 3 presents Average Marginal Effects (AME) of (grand)parents' capital on (grand)children's educational choices. The AMEs express the percentage point change in the probability of choosing each of the four educational categories that follows from a change in (grand)parents' capital of one standard deviation (while holding all other factors constant). For grandparents' cultural capital, we find that increasing cultural capital by one standard deviation increases the likelihood that grandchildren

choose regular upper secondary education by 4.9 percentage points and decreases the likelihood that they choose all other alternatives. As suggested above, Interestingly, the AMEs show that higher cultural capital among grandparents almost exclusively shifts grandchildren from vocational education to regular upper secondary education (the positive AME of 4.9 percentage points for regular upper secondary education arises mainly from the negative AME of 3.5 percentage points for vocational education). From a theoretical perspective this results makes sense since cultural capital is particularly valuable in general upper secondary education (the most academically oriented track) and, in relative terms, is least valuable in vocational education. We observe a similar pattern for the effect of parents' cultural capital, although the substantive effect of cultural capital is larger: children whose parents possess more cultural capital are more likely to choose regular upper secondary education than all other educational alternatives, and in particular vocational education. We also find that parents' economic capital has a negative effect on the likelihood that children choose not to continue in upper secondary versus completing regular upper secondary education.

Overall, our analysis shows that grandparents' cultural capital is the only form of capital that has a direct effect on grandchildren's educational choices. This result adds to existing research on multi-generational effects (which has mainly used proxy measures such as social class and SES to infer about resources in the grandparent generation) by suggesting that multigenerational effects are more likely to operate via non-monetary than economic resources. In other words, while economic and social capital (and their effects on the outcomes of the next generation) tends to follow a Markovian pattern of transmission, it may be that cultural capital operates in a different way that creates multigenerational effects. We imagine three reasons why this might be the case. First, unlike economic capital which cannot be "reused" after having been transmitted to parents, grandparents may keep providing cultural capital to grandchildren after they transmitted their cultural capital to parents (thus, cultural capital may have a multigenerational effect because grandparents do not exhaust this type of capital). Second, grandparents may transmit cultural capital to grandchildren throughout childhood, which means that grandchildren experience a longer (and more sustained) exposure to grandparents' cultural capital than to their other forms of capital. Third, it may be that

⁶ The parameter estimates associated with the alternative educational categories (NE, VE, VSE) are all negative and of similar magnitude. We tested – and found empirical support for – the hypothesis that these estimates are not statistically significantly different. This means that grandparents' cultural capital affects the likelihood that grandchildren choose the regular track in upper secondary education over all other alternatives but is not informative about the likelihood of choosing among these different alternatives.

for grandparents the long-term costs associated with transmitting cultural capital to grandchildren are lower than those associated with transmitting economic resources (which cannot be reused) and social networks (which require constant maintenance).

Before claiming that grandparents' cultural capital affects grandchildren's educational choices, we wish to discuss three aspects of our empirical design that might limit the extent to which we can generalize our findings. The first aspect is our institutional context. As we have argued, high income redistribution, free education and a comprehensive welfare state means that, relative to the other forms of capital, grandparents' cultural capital may play a particularly important role in Denmark. This may not be the case in other contexts with, for example, higher income inequality and a market oriented educational system in which grandparents have better opportunities to use their economic capital to promote grandchildren's educational outcomes.

The second aspect is that we only observe one set of grandparents in our analysis (and no aunts or uncles) and, as a consequence, we have no information on cultural capital for the rest of the extended family. It is difficult to assess the consequences of this design limitation for our results. Research by [Warren and Hauser \(1997\)](#) which included both maternal and paternal grandparents showed no differential effects of maternal and paternal grandparents on grandchildren's outcomes. Moreover, there is some evidence that aunts and uncles have a direct effect on children's outcomes ([Loury, 2006](#)). The most likely scenario is that our estimates of the effect of grandparents' cultural capital also pick up the effect of cultural capital among aunts and uncles (which contribute to the cultural environment in the extended family), which means that they may be upwardly biased. Unfortunately, we are unable to address this issue with the DLSY data.

The third aspect is that the effect of grandparents' cultural capital may capture aspects of grandparents' resources that are not strictly cultural. For example, our indicator of cultural capital includes grandparents' education, which might capture human rather than cultural capital. We would argue that the effect of grandparents' cultural capital should be interpreted as capturing cultural (rather than human) capital because we control for a wide range of factors both in the grandparent (economic and social capital), parent (all three forms of capital), and grandchild (cognitive ability) though which grandparents' human capital might operate. Consequently, we believe that the effect of grandparents' cultural capital which we estimate is net of the effect of grandparents' human capital.

6. Discussion

In this paper we analyze the effect of grandparents' economic, cultural, and social capital on grandchildren's choice of secondary education. The paper is inspired by Bourdieu's conceptualization of family resources as qualitatively different types of capital and by previous multi-generation research suggesting that socioeconomic resources in the extended family affect children's outcomes. The main contribution of the paper is that it includes direct measures of economic, cultural, and social capital both in the grandparent and parent generation, which means that we can isolate the direct effect of grandparents' capital on grandchildren's educational choices net of parents' capital. We hypothesize that grandparents' economic capital should be of comparatively little importance in the Danish context, which is characterized by a high income redistribution, free education, and comprehensive social security. By contrast, the compartmentalized and highly path-dependent structure of Danish secondary education means that grandparents' cultural and social capital should be more useful.

Our empirical results partly confirm theoretical expectations. We find that grandparents' economic and social capital have no effects on grandchildren's educational choices. However, we find that children whose grandparents possess much cultural capital are more likely to enroll in the academically oriented track in upper secondary education than in all other types of education (or no education). This result fits theoretical expectations, and we interpret it to capture that grandparents who possess much cultural capital provide a culturally rich environment in the extended family which has a direct effect on children's educational outcomes (over and beyond the indirect effect running through parents' cultural capital). We note that due to data limitations our empirical proxies for grandparents' cultural capital are crude, and future research should identify which specific aspects of grandparents' cultural capital (cultural knowledge, behaviors, expectations, etc.) shape the cultural environment in the extended family and, by extension, grandchildren's educational decisions. Future research should also analyze the how differences in grandchildren's exposure to grandparents' cultural capital (which might vary across families and individuals) affect outcomes and, moreover, how the cultural capital of other members of the extended family (aunts/uncles and nieces/nephews) contribute to creating an enriching cultural environment in the extended family.

The main message from this paper is that, at least in the Danish setting, non-monetary (rather than economic) resources in the extended family appear to have non-trivial multigenerational effects. This finding highlights a (cultural) mechanism that might account for some of the association between grandparents' social class/SES and grandchildren' outcomes that have been reported in previous research ([Chan & Boliver, 2013](#); [Hertel & Groh-Samberg, 2014](#); [Wightman & Danziger, 2014](#); [Zeng & Xie, 2014](#)). We encourage future research to explore this cultural mechanism.

Appendix A.

See [Table A1](#).

Table A1

Summary information on principal factor analysis. Eigenvalues, proportion explained and factor loadings of first derived latent factor.

	G1	G2
Economic capital		
Eigenvalue	1.755	1.492
Proportion explained	0.585	0.497
Factor loadings		
Income	0.500	0.474
Car ownership	0.234	0.181
Summer house ownership	1.009	1.015
Cultural capital		
Eigenvalue	1.373	1.519
Proportion explained	0.458	0.506
Factor loadings		
Years of education	0.675	0.632
Newspaper subscription	0.098	0.317
Attends classes	1.020	0.458
Social capital		
Eigenvalue	1.946	1.883
Proportion explained	0.649	0.628
Factor loadings		
Connections: apprenticeship	0.708	0.490
Connections: work/study abroad	0.974	0.548
Connections: educational advice	0.783	0.481

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