Multidimensional Intergenerational Inequality

Resource Specificity in Education, Occupation, and Income

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Abstract: Multidimensionality in intergenerational transmission of inequality is examined by focusing on how multiple resources (education, occupation, and income) are transmitted over corresponding child outcomes. I assess to what degree transfers are generic or specific over resources and whether misspecification results in bias. High quality Swedish administrative register data is used in order to minimize parental measurement error and child life course bias. A sibling correlation approach is employed to establish the influence of each parental resource. The results show that intergenerational inequality is subject to resource specificity. First, same resource transmission implies that the same parental resource as the child outcome matter most in the transmission of advantage. In this sense, educational elites foster educational elites, while economic advantage favor children's own economic status. The bias due to excluding same resource transmission is estimated to about 5 to 13 percent. Second, resource transmission follows a proximity pattern, where parental education explains the least of child income, and parental income is the most suboptimal predictor of children's education – with parental occupation in between. The conclusion is that resource specificity cannot be neglected without the risk of underestimating the true rate of intergenerational inequality.

Introduction

Socioeconomic background is often measured in an unidimensional sense and assessed only through a one variable proxy following the characteristic of one of the parents. If the objective is not to describe a one-to-one variable elasticity, this approach misrepresents the influence of family background because it neglects the multidimensionality of intergenerational transmission of inequality. Adopting a multidimensional perspective on socioeconomic background means that several, and not just one, resource*s* in the family of origin are important in structuring the outcomes of the individual. For instance, occupational attainment and education certainly overlap, but they also contribute with unique information on the intergenerational association (Marks 2011). Decomposing the complexity and multidimensionality of socioeconomic background has turned out to be an emerging research field. There are several examples of studies that attempt to address this issue in regard to children's education (Bukodi and Goldthorpe 2013; Erikson 2016; Hällsten and Pfeffer 2017; Hällsten and Thaning 2017; Jæger and Holm 2007; Meraviglia and Buis 2015; Vauhkonen et al. 2017), with fewer analyzes focusing on children's earnings (Mood 2017) and occupational attainment (Erola, Jalonen and Lehti 2016). Moreover, neglecting this multidimensionality may lead to confusion over divergent findings in the effect and trends of parental socioeconomic standing (SES) over various child outcomes (Jæger 2007; Mare 1981).

While this research field is growing, there exists no studies (to my knowledge) that address the intergenerational transmission pattern over several parental-child resources and assess to what degree transfers are generic or specific over resources. A further advantage of this study is using an exceptionally large dataset, spanning over 40 years. A sibling correlations method (cf. Solon et al. 1991) is employed, which is suitable for decomposing the family influence on child outcomes in three SES resources: Education, occupation and income.

Resource specificity posits that SES attainment is transferred most strongly within the same (parental-child) resource, i.e. parents' status in a given resource is more important for child attainment in that same particular resource and not as important in other kinds of child resource outcomes. The results show that intergenerational inequality is subject to same resource transmission, suggesting broadly that educational elites foster educational elites, while economic advantage favor children's own economic status. Moreover, resource specificity also implies that there is a higher degree of similarity among education and occupation, on the one hand, and occupation and income on the other – as suggested by the division of resources into a sociocultural vis-à-vis an economic field (cf. Bourdieu 2010

[1984]). The results confirm this proximity pattern, where parental education explains least of child income, and parental income account least for children's education – with parental occupation in between.

Multidimensional socioeconomic background

Socioeconomic background is multidimensional, consisting of *several* resources that are controlled by the parents. This notion is acknowledged in various research traditions (Blau and Duncan 1967; Bourdieu 2010 [1984]; Bukodi and Goldthorpe 2013; Meraviglia and Buis 2015). However, a contrasting but indeed common approach is to treat SES or background as a generic, singular dimension captured by any unitary SES measure (Bollen, Glanville and Stecklov 2001). One example of this is Lazarsfeld (1939), who suggested that SES indicators could be used interchangeably. In contrast, Bollen, Glanville and Stecklov (2001) argue that the composite approach allows for varying factors, or dimensions of SES. Applying a multidimensional perspective thus introduces several distinct parental resources (for example education, occupation, and income), each in which the family of origin has different levels of attainment.

The unidimensional practice has been criticized by Hauser (1972) and, more recently, by Bukodi and Goldthorpe (2013) from a multidimensional standpoint. Durkin et al. (1994) and Härkönen et al. (2018) find that a multiple SES approach is vital when addressing outcomes in health inequality. Moreover, neglecting multidimensionality might cause discrepant findings in trends of social mobility and educational inequality, i.e. when socioeconomic background resources are used interchangeably and assumed to have more or less identical effects (Jæger 2007; Mare 1981).

Resource specificity

Blau and Duncan (1967) argued that conditions in the upbringing should be perceived from the viewpoint of the child, i.e. it did not matter whether potential (dis)advantages came as a result of, say, fathers' education or occupation. In order to further examine the multidimensional influence of socioeconomic background, there is a need to reconsider this assumption. I focus on the three central labor market resources: Education, occupation, and income.

[Figure 1 about here]

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As presented in figure 1, these separate resources can be differentiated by broader fields, in particular the *socio-cultural* and the *economic*. This conceptual split belongs in part to Weber (1946), who discriminated between an economic order, concerned with the distribution and usage of economic goods as well as services, and a social order, which entails the distribution of social honor in a society. A parallel theoretical separation is present in the contemporary work of Bukodi and Goldthorpe (2013). However, Bourdieu (2010 [1984]) more specifically developed a dualism, separating the economic vis-à-vis the cultural (capital) dimensions – both which seem to incorporate a logic and culture of their own..

Furthermore, as suggested by this field differentiation, the particular resources are more or less proximate each other. Education is more similar to occupation than income, and on the contrary, income is more proximate to occupation than education.

Same resource and field transmission

The overarching term, resource specificity, partly draws on the idea of asset specificity in transaction cost economics (cf. Williamson 1981). The concept of asset specificity implies that investments can be particular, or specific, to a given transaction – where transaction, in the present case, refers to the relationship between a parental resource and a child outcome. From this follows that if investments are transferred or converted to another kind of transaction (i.e. parental resource in relation to child outcome), there can be transactions costs.

Same resource transmission (SRT) posits that intergenerational transfers are strongest within the same resource. For instance, parental education explains most of children's status in education, while parental occupation is the main predictor of children's occupational attainment etcetera. Below, I present two probable mechanisms through which SRT might operate, a rational and a normative explanation. Both are seen as complementary rather than mutually exclusive.

SRT can be viewed from a rational action perspective (cf. Breen and Goldthorpe 1997; Goldthorpe 1996). In this sense, the family composition and control of resources affects the constraints as well as the opportunities that families face in the process of status attainment. Therefore family composition and control of resources influences the cost and benefit analysis of pursuing child status attainment in a particular resource. Given that status attainment over the different resources is valued more or less equally, parental advantage in a specific resource serves as basis for a (rational) consideration to pursue status attainment in that same resource – simply because it is the most optimal choice given the context.

Nevertheless, norms and relative valuations of different resources most certainly affect these considerations as well (and should be correlated with advantage in a particular resource). For example, a family rich in economic resources might see economic affluence as a goal in itself (compared to pursuing higher education as an intrinsic goal). In this sense, SRT also relates to Bourdieu's reproduction thesis:

> "The fractions richest in cultural capital do in fact tend to invest in their children's education as well as in the cultural practices likely to maintain and increase their specific rarity; the fractions richest in economic capital set aside cultural and educational investments in favor of economic investments (…)".
> (Bourdieu 2010 [1984]:116)

A transmission across resources, e.g. investing in children's educational attainment by means of parental income, is associated with severe transaction costs since it involves a resource conversion. In other words, knowledge, information, norms and behavior reflected by parental income are suboptimal in supporting the child in educational attainment. This is because the educational resource requires other forms of capacities, which the parent cannot supply.

SRT is illustrated in figure 2 below.

[Figure 2 about here]

However, given the similarity of resources by socioeconomic fields (as seen in figure 1), it is further possible that the field closest to the specific parental resource at hand imply a smaller transaction cost compared to the other field. This is labelled *same field transmission* (SFT) and operates at a higher level of abstraction compared to the detailed SRT process. Effectively, SFT suggests that parental occupation will influence both child education as well as income more than the parental resource belonging to the other field in regard to the child outcome.

The empirical review of previous studies is limited by the fact that the relative explanatory power of the parental resources can only be assessed if studies include the three parent-child resources under consideration. Hence, in order to ensure a rough comparability of estimates both of these criterions must be fulfilled. However, in one of the earliest studies on multidimensionality in stratification, Hauser (1972) focuses on four socioeconomic background measures and do find a SRT pattern for occupational and income transmission – although, since then mainstream research have departed from this line. However, in some

more recent work, Andrade (2016) finds that a detailed measure of social class explains more of the sibling correlations in long-term income, than parental income. Additionally, Erola, Jalonen and Lehti (2016) state that parental education is the single most important variable in predicting children's occupational attainment. In Sweden, Mood (2017) suggests that parental income accounts for most of the variance in child's income, compared to parental class and education. Hence, previous research gives a mixed picture of SRT, but at least support the SFT perspective.

Income, occupation, and income

To further discuss what each resource might serve as an indicator of and also to expand on its relation to the broader fields, I review each resource in more detail.

Parental income reflects the economic means available by the parent(s) to access material resources. In turn, economic resources can be invested in the socioeconomic attainment of the offspring by virtue of either a direct investment, such as an imbursement of tuition fees, or an indirect investment, which relates to more general financial aid (Jæger 2007). According to the Investment model, families with greater access to economic resources can provide more support in developing the child, whereas families facing greater economic hardship are more focused on basic and immediate needs (Becker and Tomes 1986; Conger, Conger and Martin 2010). Financial strain might also in this sense have a bearing on child rearing practices associated with adverse child outcomes (Linver, Brooks-Gunn and Kohen 2002). Economic measures might range from affording to live in neighborhoods with more or less profitable socioeconomic contacts and high quality schools to having living conditions that reassures a quiet space for recreation and homework. In regard to subsequent life events, these measures translate into insulating the child from economic deprivation during periods of economic difficulty. For instance, buying/subsidizing the child's home and supporting him or her with money for (unexpected) expenses or unpaid internships.

Parental occupation is located in the nexus between the economic and the sociocultural field as it represents both intangible status rewards and also is an indicator of long term economic standing. Occupational social class has been conceptualized by Goldthorpe (2000) as employment contracts on the labor market, which has clear and stable associations with income security, earnings stability and future prospects (Goldthorpe and McKnight 2004). As such it is a measure of long-term economic position on the labor market. However, due to a substantial and increasing economic heterogeneity within the classes (Bihagen 2005; Mood 2017; Savage et al. 2013; Weeden et al. 2007), parental income represent a further fine-tuned

factor of economic resources. In addition to serving as an economic proxy, occupation can also be said to reflect a socio-cultural environment, which the family or the individual is constrained to through class related work roles (Stephens, Markus and Phillips 2014), consumption (Carey and Markus 2016), psychological resources or status (Adler and Rehkopf 2008; Kan et al. 2014), and life chance opportunities (cf. Jonsson et al. 2009). As such, it is an indicator of lifestyle in a broader sense (Weber 1978 [1922]). Importantly, the skills that parents' obtain through their occupational career, such as managerial, professional and communicative abilities, can be transferred to their children (Faas, Benson and Kaestle 2013). In an even more detailed fashion, a particular occupation generates occupation specific skills and culture that can be used to influence and assist children in intergenerational transfers (Jonsson et al. 2009). Furthermore, when other aspects of education and income are controlled for, occupation might serve as a more distinct proxy of resources available through social networks accessed through working life (cf. Andersson, Edling and Rydgren 2017; Jæger 2007). Hence, occupation is viewed as a factor of job related skills and capacities, but also a proxy of social standing, potential networks and resources in the occupational social environment.

Parental education is considered the main resource of the socio-cultural field. Central to this perspective is the fostering of academic skills, where disadvantaged children are less exposed to learning materials and experiences that foster intellectual and cognitive development (Bradley and Corwyn 2002). In this sense, parental education can be viewed as human capital (Becker and Tomes 1986). However, parental education is sometimes referred to as or likened to the broader category of cultural capital, which is elaborated by Bourdieu (2010 [1984]) as well as in Bourdieu and Passeron (1977). Having parents with higher educational qualifications most often implies a familiarity with education and the norms of the dominant culture, which certainly encourages and facilitates academic studies but also the adaptation to the (more profitable) middle class social environment. Nevertheless, De Graaf, De Graaf and Kraaykamp (2000) find that it is not parental participation with 'highbrow' or fine arts per se that lead to academic success, but rather the reading behavior – much related to the development of analytical and cognitive skills (strongly structured by parents human capital) – which in turn is transferred to the offspring. Educational attainment, cultural skills or cultural capital can also be transmitted to the individual by more time spent with children (Sayer, Gauthier and Furstenberg 2004). Additionally, potential mechanisms include engagement in school activities, knowledge of the academic system, encouragement of further studies, familiarity with norms and institutional knowledge, to be used both in school and in

subsequent labor market careers (Ball 2003). Also, family expectation of educational attainment partially establishes a mediating link between family resources and children's educational outcomes (Faas, Benson and Kaestle 2013).

Data

In this study I use Swedish register data for a population delimited to children born between 1955 and 1972. Since data is available to 2012, children are observed in their mid to late labor market careers (between 40 and 57 years old). Parents are matched with children through the Multigenerational register, which is based on individual birth records. Parental characteristics are recorded for fixed periods of time and are thus not sensitive to any specific age of children, which not pose a major problem (Erola, Jalonen and Lehti 2016). The prime interest in the data construction is to use long periods of information and to average characteristics in order to reduce measurement error.[1] Only individuals for whom data (on all the variables) for both the mother and the father is available are retained. Parental SES is operationalized according to the mother/father model, which also generates a higher explanatory value compared to conventional usages of the dominance approach (Thaning and Hällsten 2018).

Education

Children's education is obtained from the educational registers, it is collected from 1990 and onwards, using the highest attained educational level. The educational level is then recoded into years of education (i.e. pseudo years of education), which vary from six years of primary school attainment to a doctor's degree. Parental education is collected from the 1990 census and cover the same range as for children. Hence, a further inclusion requirement is that parents survive up until at least 1990 in order to obtain an educational status in the data.

To supplement the vertical dimension of education with the horizontal inequality resulting from disparities in field of study choice and selection (Gerber and Cheung 2008), parent's education is supplemented with a measure of expected earnings based on a semi-detailed level of educational field.[2] The field of study is collected from the employment registers in 1985. Expected earnings of cohorts born between 1930 and 1940 (which is representative of the parental generation) are estimated by a field of study fixed effects regression on the same cohorts earnings from 1985 to 1995 (cf. Björklund and Sundström 2006). This final measure is then transformed into percentile ranks.

Occupation

Children's occupational social class is based on information of occupation coming from the employer reported occupational register between 2001 and 2012.[3] The national occupational classification code (SSYK) is used for each individual and cross-classified with industry information, which in turn corresponds to a modal Socioekonomisk Indelning, SEI, (SCB 1982) category. The modal SEI categories are calculated from information on occupation and industry in the census of 1990, where direct information of SEI was available. SEI is then translated to Erikson-Goldthorpe-Portocarero (EGP) classes (Erikson and Goldthorpe 1992) and the highest attained category under this period is used as the value of the binary variable, entry into the salariat (i.e. the first and second class). Parents' occupational class is obtained from the Swedish censuses, conducted between 1970 and 1990, with five year intervals. The information on parental class is again inferred from standardized occupation codes and based on self-reports. I use the highest attained level up until 1990. If there is missing data on any of the later time periods, the highest value prior to that is used. Hence, information from all the censuses is utilized in order to minimize missing cases, since intragenerational mobility among adults is relatively low (Jonsson 2001), this should not pose a significant problem to the analysis.

Given that the interest is in occupational influence per se, the measure of parental social class is supplemented with occupational SIOPS scores. The underlying information is attained in the same way, but recoded into occupational prestige (following Ganzeboom and Treiman 1996; Treiman 1977)

Income

Child income is collected from the Income and taxation database (IoT) and LISA (from 1990 and onwards), which includes annual records ranging from 1968 and onwards. In order to minimize the risk for life-cycle bias, all available information on income for each individual is used and recalculated to mean values. Income here refers to disposable income, meaning that it is the sum left after tax deductions and government transfers. Income is adjusted to 2003 prices. The source data and income concept is the same for parents. This means that it covers most of the parent's active labor market years (from at least mid to end of the individual income careers), coming close to a concept of lifetime or permanent income. This is clearly an advantage since measurement error is a crucial problem when it is present in independent variables (cf. Wooldridge 2009).

Summary descriptive statistics are presented in table 1.

[Table 1 about here]

Methods

The virtue of employing a sibling correlations approach is that it captures the entire parent-child status transmission, i.e. also in unobservables (Mazumder 2008). [4] This could refer to everything from parental involvement in school to family socioeconomic resources, neighborhood effects and genetic heritability. In other words, sibling correlations can be said to be an omnibus measure of family background effects because it reflects the component that is shared between siblings. Thus it serves as a benchmark from which one can evaluate how various (observable) aspects of socioeconomic background contribute in explaining the sibling similarities in a given outcome – i.e. by reducing the correlations.

A variance component analysis of the sibling correlations is executed as follows, the outcome (Y) for sibling i and family j is obtained by means of multilevel regression modeling to cluster individuals on a common family identification variable:

(1) $\qquad Y_{ij} = \beta_0 + \boldsymbol{\beta X_j} + a_j + b_{ij}$,

where $\boldsymbol{X_j}$ denotes a vector of explanatory variables for family j. The first residual term, a_j, is the shared family part of the siblings, while the second one, b_{ij}, gives the individual variation. The share of the individual outcome, Y_{ij}, that is attributed to family background effects can thus be expressed (in variance terms) as:

(4) $\qquad \rho = \dfrac{\sigma_a^2}{\sigma_a^2 + \sigma_b^2}$,

in which ρ is equal to sibling correlations – in generic terms called intra-class correlations (ICC).

Following Mazumder (2008), the analysis proceeds by changing or adding variables in the $\boldsymbol{X_j}$ vector of equation (1) to form a new explanatory configuration, making it possible to evaluate the different models. This process gives a new residual variation and a different estimate of the family variance component, σ_a^{2*}. By comparing the respective estimates ($\sigma_a^2 - \sigma_a^{2*}$), the difference in explanatory power of the given $\boldsymbol{X_j}$ model is assessed.

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To see this in more detail, I estimate the gross influence of resource specific transmission by separately and respectively adding a resource to an otherwise empty model. The measure of the gross percentage reductions (↓%) is acquired by the following procedure: I calculate the baseline correlation (the unconditional sibling correlation), ICC_{base}, and the model specific ICC, ICC_{model} (including only one resource of interest), and then take the difference between them, divide by the baseline estimate (and multiply by 100 to get percentages):

$$(5) \qquad \downarrow \%_{gross} = \frac{(ICC_{base} - ICC_{model})}{ICC_{base}} * 100$$

Additionally, I calculate net correlations in a similar fashion, but instead I estimate the full model (ICC_{full}), containing all parental variables. I then take the difference in regard to a model that lacks the given variable of interest, ICC_{model^*}, and relate the difference to the baseline in order to generate a comparable estimate:

$$(6) \qquad \downarrow \%_{net} = \frac{(ICC_{model^*} - ICC_{full})}{ICC_{base}} * 100$$

Hence, the larger the importance of a given factor, the greater the difference in $ICC_{model^*} - ICC_{full}$, which leads to a higher $\downarrow \%_{net}$. The interpretation of results will thus depart from percentage reductions, or rather, contributions (↓ %).

In the second stage of the analysis, I calculate the relative importance of each resource. Despite that the regressors are correlated, the LMG-Shapley decomposition (Lideman, Merenda and Gold 1980; Shapley 1953), applied by e.g. Mood (2017), provide such an estimate. The relative importance is also based on reductions in ICC, and is calculated by estimating a given focal component's (x^y) contribution (in outcome y) relative to the other components ($z_1^y [...] z_k^y$) for all combinations of variables.[5] When the importance of all the possible focal variables are isolated separately from the configurations of z_k^y, one can calculate the mean importance of each focal variable for every outcome. The Shapley statistic is obtained by dividing each x^y contribution to the sum of the focal variable's means, which then by definition is standardized into a value between 0 and 1.

Results

Education

The upper section of table 2 gives the baseline and gross correlations when controlling for each resource respectively. To ease the interpretation, I will refer to percent reductions as contributions, since a model with explanatory value equals a *reduction* in the ICC estimate, which means that it *contributes* to explain the sibling similarity. All models control for birth year in order to account for cohort effects.

[Table 2 about here]

In table 2, the benchmark sibling similarities in years of education are about .38 to .39 for mixed and sister siblings, while they are higher, roughly .45, for brothers. This suggest that brothers are slightly more similar than sisters in their educational attainment. Parental education and occupation contribute respectively with between 25 and 32 percent in explaining the gross correlation in education, while parent's income matter less (10 to 14 percent). At a first glance, the considerable difference between the resource estimates for both gross and net correlations suggest that using only one of these resources as proxy for the total impact of social origin fail to capture full extent of the inequality process. Although parental income is measured better than in most studies, it clearly is a suboptimal indicator for social origin in regard to children's education. For example, the gross contribution of parental income is lower than half of parent's education, while the influence of parent's education and occupation are more similar.

The lower section of table 2 refers to the net contributions of each resource. The full model estimate shows the ICC when all resources are controlled for. However, I will avoid interpreting this estimate since it is only used in order to assess the unique contribution of each resource. The ICC for parental education thus gives the estimate for a model containing all variables except parental education. The difference between this estimate and the full model ICC (divided by the baseline correlation) gives the unique contribution of the given variable. Parental education is clearly the most important resource for children's years of education meaning that there is support for same resource transmission.[6] The net contribution of parent's education ranges from between 5 to 6 percent, while the second most important resource, parental occupation, explains about 3 percent. The net influence of parental income is more marginal (roughly 1 percent). The net contribution of parental income is at best one sixth compared to parental education. The low explanatory power of parental income for

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children's education and the importance of the intermediate field resource, parents' occupation, suggest that there is same field transmission. The differences over sibling types are less marked.[7]

Occupation

As given in table 3, the baseline correlations in entry to the service class range from .25 to .29. Parental occupation and education explain children's social class attainment better than parental income, although the differences are not as marked as for children's education. However, as with children's educational attainment, intergenerational inequality in children's social class position is not unidimensional since there is relatively large differences between the contributions of each parental resources. For example, the gross importance of parental income is between roughly one half to two thirds compared to parental occupation.

[Table 3 about here]

The net correlations show a same resource transmission pattern, since parental occupation is the resource that matter most in children's class attainment. For mixed siblings, parental occupation contributes with 4.9 percent, while parent's education account for 4.0 percent and parental income with just 1.7 percent – a rank order that is consistent over all sibling types. Compared to the previous outcome, parental income matter relatively more for children's occupation. Moreover, parental education is almost on par with the explanatory power of parental occupation. Both these results support same field transmission, although occupation seems to be more proximate to the sociocultural field (indicated by education) rather than the economic field (as represented by income).[8]

Income

For children's income, the baseline sibling correlations range from .22 to .31, where same gender siblings, and especially brothers, show higher similarities. The various resource contributions for gross correlations are clearly not of equal weight. Parental education, which matter the least, explains from about one third to 40 percent of the gross influence of parental income. In other words, children's income attainment is not very well captured by the educational level of parents and income inequality is thus also subject to a multi- rather than unidimensional intergenerational transfer.

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The net correlations in table 4 gives a clear result in favor of same resource transmission: The importance of parental education is practically nonexistent, while parental occupation matter marginally (about 1 percent) and parents' income explain the highest proportion by far (between 9 to 14 percent). Children's income is thus most importantly transferred over generations by means of parental income attainment. There is support for same field transmission, since parents' occupation matter more than education (both for gross and net correlations), albeit the difference is rather small – and suggests, yet again, that parental occupation is more similar to education rather than income.

[Table 4 about here]

Bias estimation

To examine the resulting bias from not including SRT and all parental resources in modeling SES background, I estimate the relative bias comparing single and two resource models to a full model (which includes all three variables). The results are shown in table 5, implying that the most extensive bias (22 to 24 percent) is given by only including parental income when accounting for children's education and social class attainment. For children's income, it is clearly the opposite, where only including parental education or occupation results in a bias of about 14 to 16 percent compared to a full model.

Finally, for same resource transmission, I find that a model including all variables (i.e. also the same parental resource as the child outcome) compared to a model only including the *other two* parental resources than the given child outcome, produces a substantial bias ranging from 5 to 13 percent. It is least severe for children's occupation and most critical for income.

[Table 5 about here]

Relative importance (LMG-Shapley decomposition)

The relative importance estimation of each component supports both same resource and field transmission patterns as displayed in table 6.[9] Since the differences between sibling types are quite marginal, I focus mainly on the results for mixed siblings. For children's education, parental education is the relatively most important predictor with 55.1 percent explanatory power, followed by parental occupation (38.3 percent). Parental income is clearly less important (6.6 percent). Although parental occupation and education are more similar in relative importance for children's social class, the former matter most (46.4 percent)

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compared to parental education (40.7 percent). Parental income is a bit more important for this outcome in comparison to children's education (12.9 percent). Finally, for children's income, there is a clear dominance of the relative importance of parental income (85.4 percent), while occupation matter substantially less (12.2 percent) and, especially, education (2.4 percent) show a marginal importance. Regarding sibling type differences, I mainly find that parental income seem to matter more for brothers than for sisters over all the outcomes.

In sum, although the same parental resource as the child outcome is the most important over all resources and sibling types, the relative importance of parental education and occupation is much more similar in children's education and occupation compared to the hegemonic dominance of parental income for children's income.

[Table 6 about here]

Discussion

The results of this study suggests that intergenerational transmission is multidimensional and subject to resource specificity. First, same resource transmission is confirmed in all of the examined outcomes and over all sibling types, implying that the same parental resource as each respective outcome contributes with the largest explanatory power. Hence, status (re)production for families rich in a given particular resource seems to operate through transfer advantage within the same resource to the child. This aligns with the idea of asset specificity in transaction cost economics (Williamson 1981), where optimal returns on an investment can be tied to specific transactions, in this case same intergenerational resource transmission. Accordingly, Bourdieu (2010 [1984]) argues that social reproduction occurs through the logic of capital specialization, i.e. parents advantaged in cultural (or educational) capital generally pursue investment and child advancement in the same capital form. For the fractions of the population that are relatively rich in economic capital, reproduction is instead favored by means of economic transmission. In other words, educational elites foster educational elites, while families rich in economic capital more easily transfer advantage to children's economic attainment (cf. Hällsten and Thaning 2018a on field of study choice). This could be related to family norms and dispositions on what kind status attainment that is preferred, e.g. families advantaged in economic capital thus value and orient status orientations toward economic goals. Furthermore, it might also be attributed to family resource specialization or skills. However, an alternative, or complementary explanation could be that families make rational choices given their composition and control over

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resources. These conditions affect cost and benefit analyses in pursuing routes of status attainment, for example favoring educational or economic status.

Second, the socioeconomic structure is divided into a sociocultural and an economic field, where the first is represented by education and the latter by income – suggesting that education and income are most dissimilar, while occupation is situated in between. The results generally support same field transmission of inequality. Parental occupation – situated in an intermediate position– is shown to be the most general of resources. Similarly, parental education and income are more important for children's social class, compared to how well they explain a child outcome in the other field to which they belong. However, the results also suggest that occupation and education are clearly more proximate relative to that of parental occupation and income. Although the parental occupation influence on children's income is higher than that of parental education, it still quite marginal.

Transmission from one parental field to the other child field – or, alternatively put, transmission from a parental resource that is most dissimilar to the child resource – is suboptimal relative to transfers within the same field or same resource. The independent contribution of parental income on children's educational attainment is as low as 1 percent (the relative importance corresponds to about 7 percent), suggesting that a strict economic resource is relatively irrelevant to educational outcomes. This could possibly be an effect of the Swedish context, where educational inequality is intentionally mitigated by means of low cost student loans and generous benefits for higher education. Moreover, the independent contribution of parental education in explaining children's income is virtually nonexistent (.1 percent, while relative importance is equal to about 2 percent). This implies that capacities and conditions related to parental education (net of above parental occupation and economic status) is rather unimportant for children's income career.

The bias of not accounting for same resource transmission is estimated to between 5 to 13 percent. Using a single, and the most distant indicator for socioeconomic background to predict either children's education or income results in a bias between 16 to 24 percent and thus seriously risk underestimating the influence of unequal conditions in the family of origin.

In contrast to the results presented, the alternative view have long been that socioeconomic background resources are interchangeable (cf. Lazarsfeld 1939) and constitute general assets, which can be invested over different child resources without losing transmission strength. Even though this is not a dominant theoretical idea in contemporary sociology, the empirical practice often revert into such a framework, simply by using only one indicator of socioeconomic background (Meraviglia and Buis 2015). To challenge this

discrepancy between theory and practice, a multidimensional approach is warranted in order to distinguish between different transmission processes in intergenerational inequality.

Although the results show that there is resource specificity involved in intergenerational transmission of inequality, there is reason to proceed with some caution. The results could be sensitive to coding practices and measurement error. For example, in forthcoming work, the inclusion of parental wealth seem to further corroborate the resource specificity perspective, but perhaps also explain a part of what is underlying the income transmission in the present analysis (Hällsten and Thaning 2018b). Future research have to further investigate if these transmission patterns hold over models specified in various different ways. Such suggestions include if the results are consistent when controlling for family structure and separation. For example, Erola and Jalovaara (2017) state that not only are sibling correlations lower for individuals from single-mother households, but also that the importance of fathers (characteristics) not living with the family decreases. A deeper understanding of the actual operative mechanisms, that each resource is proxy for, is also warranted together with test for resource specificity in other country settings.

Notes

1. Minimizing measurement error in the independent variable is critical in this kind of decomposition study. If there are problems with error in any parental variable, the other parental variables will pick up the variation and thus distort the distribution of how the different variables contribute to predict the outcome (Kelley 1973).

2. Fields of study range from specific programs of secondary education to various orientations in college/university, with study length and educational institution type as the main principles of differentiation.

3. The number of missing cases in occupations range from 15.4 percent in 2001 to 4.7 percent in 2012. The occupational register is of lowest quality in the earliest year (2001), but increasingly cover the working population better and better. Hence, the best approach is to use information over the whole period, starting from 2012 and subsequently complementing missing information by going back a year at a time.

4. Singletons may be included in a sibling correlations framework to increase the precision of the between family variance component (cf. Lindquist et al. 2016). However, the present focus is limited to the ICC and since singletons do not contribute the estimation of ICC and might induce outlier bias, they are dropped (Solon et al. 1991). Moreover, siblings represent about 90 percent of the population, making inference bias less problematic.

5. For example, by subtracting the ICC reduction caused by x^y and z_1^y from the reduction just caused by z_1^y, and the difference between x^y, z_1^y and z_2^y to the reduction of just z_1^y and z_2^y and so on, isolates the added contribution of just x^y, in a given configuration.

6. I do not display any significance tests because the standard errors are small and statistical power is substantial. To exemplify, consider a two-sided t-test: $\frac{\widehat{\beta_\iota} - \widehat{\beta_J}}{\sqrt{(S.E.\widehat{\beta_\iota})^2 + (S.E.\widehat{\beta_J})^2 - 2cov(\widehat{\beta_\iota}, \widehat{\beta_J})}}$.

The $-2cov(\widehat{\beta_\iota}, \widehat{\beta_J})$ term is hard to estimate with standard methods and therefore omitted. However, this covariance term is always positive, which makes the test more conservative since this term shrinks the denominator and thus increase the test statistic (and the level of significance). A typical finding is that .01 ICC unit difference in any given model estimate relative to the baseline gives a t value of 4.9 for the mixed sibling sample. For the slightly smaller brother and sister samples, a .01 ICC difference results in a t value of about 2.7 or 2.8. This means that a percentage point difference in the ICC always can be regarded as significant.

7. I have conducted a sensitivity check for not including the (horizontal) expected educational earnings measure in parental education. This analysis is shown in the appendix, table A1. The support for resource specificity is not altered by this change in operationalization.

8. A robustness analysis in which children's EGP is substituted to occupational prestige is shown in the appendix, table A2. Resource specificity is even stronger for children's SIOPS. Again, it is present over all sibling types as well as for gross and net estimations.

9. See figure A1 in the appendix for a version of the results in bar graph format.

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Tables

Table 1. Descriptive statistics.

	Mixed		Sisters		Brothers	
Individuals	740478		386572		402667	
Families	379347		284298		292049	
	Mean	**St. dev.**	**Mean**	**St. dev.**	**Mean**	**St. dev.**
Family size	2.42	0.71	2.46	0.73	2.46	0.73
Birth year	1965	4.37	1965	4.47	1965	4.45
Years of education	12.54	2.21	12.82	2.16	12.25	2.23
% service class	0.57	0.50	0.58	0.49	0.55	0.50
Income average (ln)	4.90	0.33	4.80	0.28	4.99	0.35
Mothers' education	9.97	3.16	9.92	3.16	9.94	3.17
Fathers' education	9.95	3.54	9.92	3.54	9.93	3.54
Mothers' expected earnings[1]	0.43	0.27	0.43	0.27	0.43	0.27
Fathers' expected earnings[1]	0.56	0.29	0.56	0.29	0.56	0.29
% mothers' service class	0.23	0.42	0.23	0.42	0.23	0.42
% fathers' service class	0.35	0.48	0.35	0.48	0.35	0.48
Mothers' SIOPS	38.91	13.05	38.72	13.05	38.81	13.07
Fathers' SIOPS	43.25	12.61	43.15	12.61	43.22	12.62
Mothers' income average (ln)	4.57	0.39	4.57	0.39	4.56	0.39
Fathers' income average (ln)	5.07	0.34	5.07	0.34	5.07	0.34
Mothers' birth year	1939	5.95	1939	5.94	1939	5.93
Fathers' birth year	1936	6.36	1936	6.35	1936	6.34

Note: [1] Mothers and fathers expected field of study earnings are given in percentiles.

Table 2. Decomposition of sibling correlations in education.

	Mixed			Sisters			Brothers		
Gross	**ICC**	**s.e.**	**↓%**	**ICC**	**s.e.**	**↓%**	**ICC**	**s.e.**	**↓%**
Baseline	*0.383*	*0.001*	–	*0.386*	*0.003*	–	*0.447*	*0.002*	–
Education$_{parents}$	0.259	0.002	32.3	0.282	0.003	27.0	0.310	0.003	30.6
Occupation$_{parents}$	0.272	0.002	28.9	0.290	0.003	25.0	0.326	0.003	27.0
Income$_{parents}$	0.331	0.001	13.4	0.346	0.003	10.3	0.386	0.002	13.5
Net									
Full model	0.241	0.002	–	0.265	0.003	–	0.290	0.003	–
Education$_{parents}$	0.266	0.002	6.6	0.286	0.003	5.4	0.319	0.003	6.4
Occupation$_{parents}$	0.253	0.002	3.1	0.277	0.003	3.3	0.302	0.003	2.6
Income$_{parents}$	0.245	0.002	0.9	0.267	0.003	0.7	0.295	0.003	1.0

Table 3. Decomposition of sibling correlations in Social class attainment (EGP).

	Mixed			**Sisters**			**Brothers**		
Gross	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline	*0.251*	*0.002*	–	*0.264*	*0.003*	–	*0.291*	*0.003*	–
Education$_{parents}$	0.167	0.002	33.7	0.187	0.003	29.0	0.200	0.003	31.3
Occupation$_{parents}$	0.162	0.002	35.6	0.184	0.003	30.2	0.193	0.003	33.7
Income$_{parents}$	0.199	0.002	20.7	0.222	0.003	15.7	0.230	0.003	21.0
Net									
Full model	*0.145*	*0.002*	–	*0.169*	*0.003*	–	*0.175*	*0.003*	–
Education$_{parents}$	0.155	0.002	4.0	0.179	0.003	3.8	0.185	0.003	3.5
Occupation$_{parents}$	0.157	0.002	4.9	0.182	0.003	4.9	0.188	0.003	4.5
Income$_{parents}$	0.149	0.002	1.7	0.172	0.003	1.3	0.180	0.003	1.8

Table 4. Decomposition of sibling correlations in income attainment.

	Mixed			**Sisters**			**Brothers**		
Gross	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline	0.221	0.002	–	0.260	0.003	–	0.305	0.003	–
Education$_{parents}$	0.200	0.002	9.5	0.238	0.003	8.2	0.282	0.003	7.4
Occupation$_{parents}$	0.194	0.002	12.2	0.235	0.003	9.7	0.274	0.003	10.1
Income$_{parents}$	0.167	0.002	24.6	0.212	0.003	18.3	0.238	0.003	21.9
Net									
Full model	*0.164*	*0.002*	–	*0.208*	*0.003*	–	*0.234*	*0.003*	–
Education$_{parents}$	0.164	0.002	0.1	0.209	0.003	0.1	0.234	0.003	0.1
Occupation$_{parents}$	0.166	0.002	1.2	0.211	0.003	1.1	0.237	0.003	1.1
Income$_{parents}$	0.193	0.002	13.1	0.232	0.003	9.3	0.272	0.003	12.5

Table 5. Bias estimation.

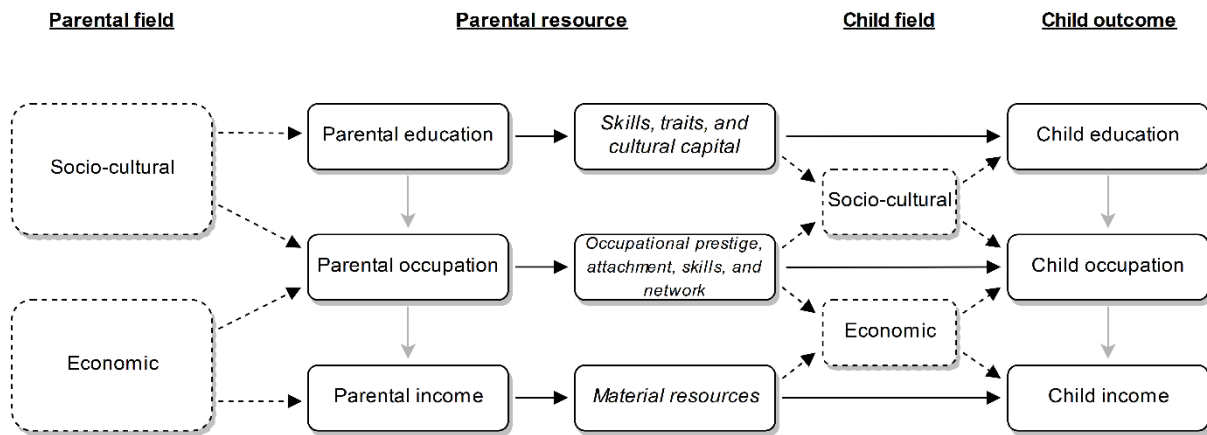|	**Children's…**					
	(1) Education (years)		**(2) Social class (EGP)**		**(3) Income**	
Bias	ΔICC	%	ΔICC	%	ΔICC	%
Full model vs. parental education	0.018	4.7%	0.022	8.8%	0.036	16.3%
Full model vs. parental occupation	0.031	8.1%	0.017	6.8%	0.03	13.6%
Full model vs. parental income	0.090	23.5%	0.054	21.5%	0.003	1.4%
Including vs. excluding SRT	0.025	6.5%	0.012	4.8%	0.029	13.1%

Note: the models are estimated for mixed siblings. Bias = ΔICC between the full model (all three parental resources) and each single resource. The SRT bias is based ΔICC between the full model (i.e. including SRT) and a two parental resource model excluding the particular SRT resource.

Table 6. LMG-Shapley decomposition of relative importance.

| Parents'… | Children's… | | | | | | | | |
| | (1) Education | | | (2) Social class (EGP) | | | (3) Income | | |
	Mixed	Sisters	Brothers	Mixed	Sisters	Brothers	Mixed	Sisters	Brothers
Education	55.1	53.1	55.5	40.7	42.0	38.7	2.4	3.6	1.8
Occupation	38.3	41.7	36.4	46.4	48.2	46.0	12.2	13.2	11.8
Income	6.6	5.1	8.0	12.9	9.8	15.2	85.4	83.2	86.4
Sum	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*

Figures

Figure 1. The influence of parental SES on children's outcomes.

Note: the figure draws partly on Erola, Jalonen and Lehti (2016:34). Straight lines = same resource transmission; dotted lines = same field transmission; grey lines represent the (intragenerational) causal relationship between individual resources.

Figure 2. Resource specificity.

	$Edu_{children}$	$Occ_{children}$	$Inc_{children}$
$Edu_{parents}$	SRT	SFT	-
$Occ_{parents}$	SFT	SRT	SFT
$Inc_{parents}$	-	SFT	SRT

Note: SRT = Same Resource Transmission (light grey); SFT = Same Field Transmission (dark grey); the blank cells represent the most distant transmission configurations.
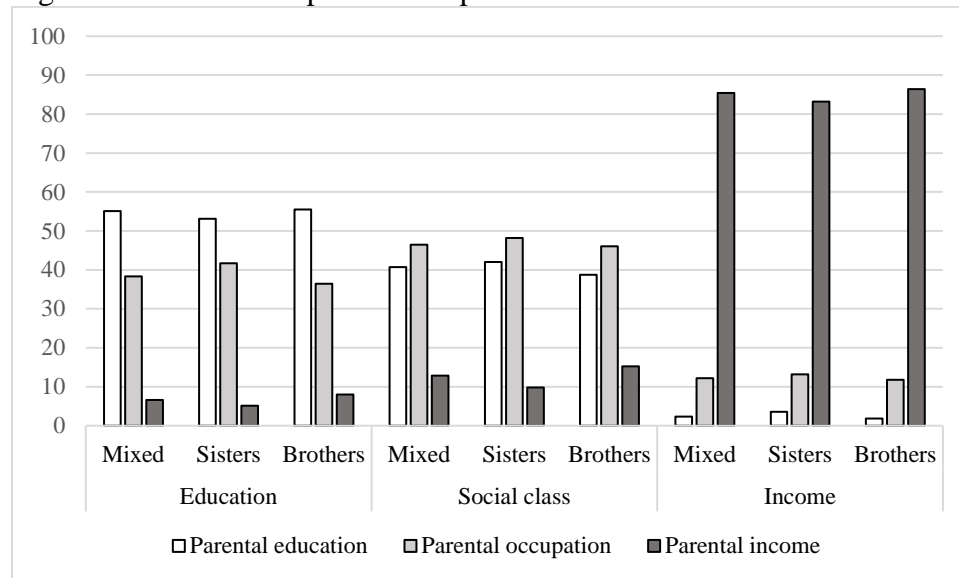
Appendix

Table A1. Decomposition of sibling correlations in education, social class, and income: Resource specificity, without expected educational earnings.

	Mixed			Sisters			Brothers		
	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Sibling correlations in education									
Gross									
Baseline	*0.384*	*0.001*	–	*0.387*	*0.003*	–	*0.447*	*0.002*	–
Education$_{parents}$	0.267	0.002	30.5	0.288	0.003	25.7	0.319	0.003	28.7
Occupation$_{parents}$	0.273	0.002	28.9	0.291	0.003	24.9	0.326	0.003	27.1
Income$_{parents}$	0.333	0.001	13.3	0.348	0.003	10.3	0.387	0.002	13.4
Net									
Full model	0.244	0.002	–	0.267	0.003	–	0.292	0.003	–
Education$_{parents}$	0.267	0.002	6.1	0.287	0.003	5.1	0.318	0.003	5.8
Occupation$_{parents}$	0.259	0.002	3.9	0.283	0.003	4.1	0.307	0.003	3.4
Income$_{parents}$	0.248	0.002	1.0	0.270	0.003	0.8	0.297	0.003	1.1
Sibling correlations in social class attainment									
Gross									
Baseline	0.252	0.002	–	0.265	0.003	–	0.291	0.003	–
Education$_{parents}$	0.173	0.002	31.3	0.192	0.003	27.4	0.207	0.003	28.8
Occupation$_{parents}$	0.162	0.002	35.6	0.184	0.003	30.4	0.192	0.003	33.9
Income$_{parents}$	0.200	0.002	20.6	0.223	0.003	15.7	0.230	0.003	20.9
Net									
Full model	0.146	0.002	–	0.169	0.003	–	0.175	0.003	–
Education$_{parents}$	0.155	0.002	3.7	0.179	0.003	3.5	0.184	0.003	3.2
Occupation$_{parents}$	0.161	0.002	6.0	0.185	0.003	5.7	0.191	0.003	5.5
Income$_{parents}$	0.151	0.002	1.9	0.173	0.003	1.4	0.181	0.003	2.0
Sibling correlations in income									
Gross									
Baseline	0.222	0.002	–	0.259	0.003	–	0.306	0.003	–
Education$_{parents}$	0.204	0.002	8.0	0.241	0.003	7.1	0.287	0.003	6.1
Occupation$_{parents}$	0.194	0.002	12.3	0.234	0.003	9.6	0.274	0.003	10.3
Income$_{parents}$	0.167	0.002	24.6	0.212	0.003	18.3	0.238	0.003	22.0
Net									
Full model	0.164	0.002	–	0.208	0.003	–	0.235	0.003	–
Education$_{parents}$	0.164	0.002	0.0	0.208	0.003	0.0	0.235	0.003	0.0
Occupation$_{parents}$	0.167	0.002	1.3	0.211	0.003	1.1	0.238	0.003	1.2
Income$_{parents}$	0.194	0.002	13.5	0.233	0.003	9.5	0.274	0.003	12.8

Table A2. Decomposition of sibling correlations in SIOPS.

Gross	Mixed			Sisters			Brothers		
	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline	0.295	0.002	–	0.312	0.003	–	0.326	0.003	–
Education$_{parents}$	0.191	0.002	35.0	0.216	0.003	30.7	0.220	0.003	32.6
Occupation$_{parents}$	0.185	0.002	37.2	0.210	0.003	32.6	0.213	0.003	34.7
Income$_{parents}$	0.232	0.002	21.3	0.259	0.003	17.2	0.257	0.003	21.1
Net									
Full model	0.163	0.002	–	0.191	0.003	–	0.190	0.003	–
Education$_{parents}$	0.176	0.002	4.1	0.203	0.003	3.8	0.202	0.003	3.7
Occupation$_{parents}$	0.179	0.002	5.3	0.208	0.003	5.4	0.205	0.003	4.5
Income$_{parents}$	0.170	0.002	2.1	0.196	0.003	1.6	0.197	0.003	2.2

Figure A1. Relative importance of parental resources.