The End of Dominance?

Evaluating Measures of Socioeconomic Background in Stratification Research

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Abstract

We analyze how to best combine information on both parents' socio-economic status (SES) in intergenerational research. This can be done by utilizing separate measures for each parent, taking averages over parents, modeling interactions, or only using the highest value across parents – the latter commonly referred to as the dominance approach. Our brief literature review suggests: (1) that the dominance tradition is widespread, although seldom theoretically or empirically justified, and (2) parental interactive models are not widely used. We assess how much of the sibling correlations in continuous measures of education, occupation, and earnings that are explained by parents' SES in the same dimensions using the different operationalizations. The dominance approach performs poorer than other models of parental SES. For the total contribution of socioeconomic background we find a bias of about 4 to 6 percent for children's education and occupational outcomes compared to other approaches. We also conduct a separate evaluation of nominal EGP social class operationalizations and find that the dominance approach is the most suboptimal choice compared to the alternatives. In conclusion, parental averages is preferred over dominance, as an attractive and parsimonious one variable alternative, although the highest explanatory power is attributed to models using two parental measures and an interaction term.

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Introduction

Mobility research is, broadly, about how socio-economic status (SES) correlates across generations. SES refers to an individual's position within a hierarchical social structure, which can be measured through different stratification variables (e.g., class, occupation, education, and income). SES background is then the SES status of the individual's parents. Mobility research was originally only interested in men and analyzed father-son associations (Goldthorpe 1983; Goldthorpe 1984), but recent research has brought mothers and daughters into the analyses. However, the current research practice is often to take the highest value of SES across father and mother pairs to represent the family, especially for education and occupation. This is the conventional dominance operationalization, which more often than not downplay the totality of SES resources. In a review of recent articles in the intergenerational inequality research field, we find that the dominance approach is common, but rarely justified on theoretical or empirical grounds. Erikson (1984) originally outlined the dominance coding for social class, arguing that a household's living condition is more often structured by a dominant parental class position. In common practice, dominance has become equal to the highest of the mother's and father's SES position. Although Erikson (1984) often is used as a reference in support of a dominance operationalization, his social class evaluation was only based on an *intra*generational setup. Given that the conventional dominance approach to EGP social class is widely used in intergenerational research, it is odd that there are, to our knowledge, no evaluations of nominal social class with an intergenerational focus.

In this paper, we analyze how information from both mothers and fathers can be combined to measure socioeconomic background most effectively. Our main evaluation concerns the intergenerational transmission of inequality in three continuous measures of SES: education, earnings, and occupation. We will contrast the *dominance* approach with individual measures for both the mother and father (a *mother/father* model), a model with interaction between the mother and the father (*M/F interaction*), assuming that they either

may compensate or reinforce each other's resources, and a measure that takes the average value of the combined parental resources (the *average* model). We also test the rarely used *modified dominance* model (Korupp, Ganzeboom and Van Der Lippe 2002), which in addition to the coding of the dominant parents' SES also includes the non-dominant parents' SES as a separate covariate. We additionally introduce a modified dominance interaction model (*MD interaction*). As a supplementary analysis, we evaluate the most optimal operationalization of nominal EGP social class background over the three child outcomes discussed above together with children's probability of entering the salariat.

We use sibling correlations in outcomes as a benchmark of the total influence of the family, and then assess how much variance the different socioeconomic background measures explain in children's outcomes. Swedish full population register data is utilized, which due to its large scale, detailed and reliable characteristics allows for a decomposition of multiple parental SES variables. Sweden is a relatively gender egalitarian society with a high labor force participation of women, making it a strong case for evaluating different operationalizations simply because most mothers have an occupation and income, but also because most Swedish women are true breadwinners and do not just provide a secondary income.

We find that dominance explains less of the family effect than the other measures. The highest level of explained variance is achieved by the interaction models (which use three variables, i.e. two main effects + interaction term). However, for the continuous measures parental averages is an attractive one-variable alternative, especially for children's education and occupation.

Theoretical background

Family or individual?

The conventional framework in mobility studies originally assumed that (1) the family in itself was the unit of analysis (cf. Watson and Barth 1964) and (2) that this unit was either defined by the male (Goldthorpe 1983; Goldthorpe 1984) or by the exclusionary dominance of one of the parents (Erikson 1984). Kalmijn (1994) states three reasons for this practice: "First, because maternal and paternal status characteristics are highly correlated, it was often assumed that mother's characteristics would be of little help in explaining additional variance in educational and occupational outcomes. Second, because few mothers were working outside the home when status attainment research was developing, socioeconomic differences among employed mothers were not believed to be as consequential as socioeconomic differences among fathers. Third, data on the socioeconomic characteristics of mothers in nationally representative surveys have been scarce (p. 257)."

In effect, the male centered and the conventional dominance approach alike most often resulted in neglecting women's work and status positions (simply because fathers most often had the highest status), although the original idea with the dominance approach was not to restrict the analysis to men. However, criticism against this one-sided research practice included empirical as well as a theoretical concerns against the assumption that the family (in opposition to the individual) always should be considered as the relevant unit of analysis. Even as far back as in the beginning of the sixties, Watson and Barth (1964), by using household, marital and labor market statistics, noted that the model of a patriarchal nuclear family deviated considerably from empirical data. Watson and Barth argued that social stratification was further complex and scholars had to extend their analysis to within family relationships and thus beyond the established male breadwinner approach. Pushing the argument further, Acker (1973) reasoned that generalizations about population mobility

patterns and stratification trends where too narrowly inferred from studies based on (white) males. Acker called for an abandonment of the assumption of female dependence on males as well as the notion of the family being the unit of analysis, paving the way for research on female experiences of stratification.

Along these lines, McDonald (1977) argued instead that adolescents' identified with the most powerful parent, independent of the gender – a framework he labelled the Power model. A couple of years later, Erikson (1984) provided the 'dominance' solution to the problem. Since social class is nominal, taking average values of different nominal categories would make little sense. Erikson argued that it was often the class position of one of the family members, i.e. the dominant, that was more decisive for the life chances and socioeconomic situation of the family. The underlying assumption was that "the market situation of the family is more dependent upon the work position of one of the parents than of the other, provided the positions are different" (p. 503), and that the dominant position is the one with "the greatest impact upon ideology, attitudes, behavior and consumption patterns of the family members [… and] has most importance for the life chances of the children in the family (p. 504)". A key argument in the dominance tradition relied on a conceptual split between market situation (distribution of production) and work position (organization of production), where the former can be determined by a family (dominance) unit of analysis and the latter by the individual occupation (Erikson 1984). In Erikson's operationalization, and to simplify a bit, more qualified jobs dominated over less qualified jobs, non-manual jobs dominated over manual jobs, self-employment dominated over employment, and gainfully employment dominated over persons outside of the labor force. In practice, this meant that the mother's class position replaces the father's class when former was higher than the male counterpart. Hence, (only) if the female had a higher ranking class, she would represent the family. Erikson's (1984) analysis clearly suggested that a dominance measure outperformed

individual variables for predicting family level outcomes such as living space, standard of equipment, vacation, and cultural activities. But some early findings from the UK showed that women's work mattered over and above the occupational position of their spouses, e.g. in voting and fertility outcomes (Heath and Britten 1984). Later, Sorensen (1994), however, concluded that the male centered or household based approach probably did not lead to grave misrepresentations in empirical research. Nevertheless, she contended that proponents of this framework failed to recognize the research interest of female employment conditions as a value in itself.

Women matter

One of the driving forces behind the critique of the male centered approach was the massive gain in the level of female employment – rising about 50 percentage points from the 1920´s to the 1980´s in the US (Beller 2009). The Swedish case was no different, and Sweden now has one of the highest rates of female labor force participation in the world. Another aspect of this development is the clear rise of dominant mothers, i.e., mothers with equal or higher position in education, income, and/or occupation compared to their husbands (Meraviglia and Ganzeboom 2008). Indeed, there is ample evidence to suggest that mothers are more or less influential in their own right, or as important as the fathers are. For example, Gisselmann and Hemström (2008) found that maternal working conditions matter independently when accounting for class disparities in different child birth outcomes in Sweden. Both Kalmijn (1994), Korupp, Ganzeboom and Van Der Lippe (2002), and Buis (2012) found that there is a considerable independent influence of mothers' resource(s) on children's schooling. Using data from 30 countries, Marks (2008) showed that mothers education was more important compared to fathers' educational attainment for children's school performance. Furthermore, Mood (2017) showed that mother and father social class matter independently in explaining

child earnings in Sweden. The literature contains many more references to similar findings. In sum, given such a dramatic change for women's labor market status over the 20th century, it is highly likely that both the totality of family resources and thus the variation within families as such should have gained importance over time.

The case for accumulation

One of the core question when operationalizing SES of a family is whether parents' resources are cumulative or not. For purely economic variables, it is easy to see how adding incomes in a larger and combined pool allows for larger investments and higher levels of consumption. Hence, it is most likely the totality of the family's combined economic resources produces an economic environment that provides more or less valuable material resources. The case for a mother/father model is often motivated by the need to include mothers in their own right. However, a one variable measure is often desired for easing interpretation, circumventing collinearity, and reducing consumption of degrees of freedom. For the continuous variables, the choice is then between averaging and dominance.[1] For averaging, one must assume an equal influence of mothers' and fathers' SES.[2] In families with a low educated father and a high educated mother, there will be a large difference between the average and the dominance mode of measurement. In the dominance scheme, this family will appear much better off than in the average scheme, with a tendency to ignore cumulative resources. Accordingly, a dominance approach can also lead to unwanted ceiling effects through discarding half of the available information and thus pushing values towards the top of the distribution. Finally,

[1] Because of the nominal nature of EGP social class, averages are not an option, which simplifies EGP evaluation to three operationalization modes (dominance, modified dominance, and mother/father).

[2] In principle, we could also weight mothers' and fathers' with a weighting scheme: $SES = w*SES_{father} + (1-w)*SES_{mother}$, $0 \leq w \leq 1$. However, such a strategy would require a calibration of the weight w, and it is likely that w will vary across time and place, and possibly also by SES itself. However, for an example of a weighting procedure see Hout (2018).

using information from both parents (i.e. two sources) instead of basing the measure of just one source, should also lower measurement error.

Parental compensation or reinforcement

Over and above the main effects of a mother and father, it is also possible that their SES resources interact. We can see two scenarios: compensation or reinforcement (Erola and Kilpi-Jakonen 2017). In the first, having e.g., a low educated father is compensated for if the mother is highly educated. We would then expect a negative interaction between parents' SES so that the value of mother's education is higher (lower) when father's education is low (high). In the other reinforcement scenario, the value of parent education increases when both are highly educated, i.e., a positive interaction. This could also apply to gender neutral conception of parents by dominant/non-dominant.

Previous research

It is difficult to trace the contemporary practice of dominance, or the "highest value approach", for various family background variables back to any single root. Most work using this operationalization do not provide an explicit argument or refer to any specific study. Instead, this may be driven by a mimicry of prior published works, which becomes a self-propelling practice once widely used. However, as mentioned above, the discussions in the class analysis tradition have been important and most probably set the ground for this practice. Nevertheless, it is important to note that Erikson was entirely focused on social class, and not on education, income or any continuous measure of occupational status. In fact, Erikson (1984) never proposed that the dominance approach should be used on other SES factors than a nominal class scheme, and was certainly open for e.g. taking averages for continuous measures such as income. Still research on intergenerational inequality and

mobility have, over time, come to refer to the approach of taking the highest value across parents as a dominance coding regardless of the SES factor under study (cf. Korupp, Ganzeboom and Van Der Lippe 2002; Meraviglia and Buis 2015).

There is only limited research on how to best combine information of mothers and fathers into measures of family resources. Erikson's (1984) empirical analysis of dominance was a rare exception, but was later followed by Korupp, Ganzeboom and Van Der Lippe (2002). Due to data restrictions, Erikson (1984) was unable to analyze children's outcomes, and so whether or not dominance coding also worked for intergenerational transfer of advantage remained unsettled. This is somewhat ironic because of the predominant use of dominance in intergenerational analyses. Korupp, Ganzeboom and Van Der Lippe (2002) on the other hand had an explicit focus on intergenerational effects. They assessed influence of parent's education and occupation on children's education in the Netherlands, Germany and the US. Their analyses contrasted all of the models outlined above (and some more; they also considered e.g., separate father and mother models). They found that modified dominance explained most of children's education, closely followed by the average and in turn the combined mother/father models. The conventional dominance model performed worst of the five models. Hence, it is somewhat puzzling that the dominance approach has remained to be used so widely.

[Table 1 about here]

Operationalizing socioeconomic background

The literature on how to best combine information of mothers and fathers into measures of family resources contains five models: separate mother/father measures, the same model extended with an interaction between mother's and father's SES, taking averages across parents, taking the highest value across parents (conventional dominance), and the so called modified dominance approach in which both parents enter, but not by their gender but instead by their status dominant order. The modified dominance thus contains two measures: the SES of the "dominating" and the SES of the "non-dominating" parent. To this we then add a sixth alternative: The modified dominance interaction model, i.e., where we interact the dominating and non-dominating parent's SES.Table 1 summarizes the six models we test. They differ by the level of analysis and the key assumptions involved. Our expectation is that the dominance model should be more inferior to the other models, simply because it uses the least information. This is also what the limited previous research has shown (Korupp, Ganzeboom and Van Der Lippe 2002). The other models reflect different assumptions regarding gendered roles and power but also how much information they use. Furthermore, one would generally expect the household measures to be inferior to parent-level measures because of the amount of less degrees of freedom used, yet if both parents are equally important to children (so that the $w = 0.5$ is realistic; see Table 1), the average scheme will not lag much behind. Finally, the interaction models are the most extensive, adding a third variable over and above separate parental variables.

State of the art in current literature

To assess the state of art in the current literature, we have documented how researchers operationalize socioeconomic background in three journal outlets: European Sociological Review (ESR), American Sociological Review (ASR) and Research in Social Stratification

and Mobility (RSSM). While these journal are not representative of all of intergenerational research, they are typical outlets for such studies. ESR and ASR are general journals, with different emphasis on European and American research, and the RSSM is a specialist journal. We have downloaded all articles in 2017, and screened for quantitative studies using parental SES either as a focal variable or as control. We have then coded these studies by (a) the operationalization mode used, (b) if motivation or references to prior work is included in order to justify the operationalization, and (c) if any sensitivity analyses of alternative operationalizations are reported.

[Table 2 about here]

When screening for relevant articles, we focus on those that have some form of intergenerational perspective and operationalizes the SES of parents using data from both father and mother. We exclude articles that focus on only one parent, whatever the reason for doing so. While dominance could also be used to link households to other outcomes than intergenerational, such as in Erikson's (1984) original analysis, such analyses are rare and do not correspond to our focus, which is why we exclude them from our sample. First, we coded whether the articles were of relevance by the above criterions. For the relevant articles, we then coded if they used dominance, averaging, mother/father specific measures, interactions, or some other method of operationalization. We code the mode of operationalization primarily for education or occupation (whatever is present). Income is rarely operationalized in any other way than household income (i.e., an average). Our simple analysis is based on frequency counts in these four dimensions by outlet.

Table 2 shows that the dominance approach is the most common among the five research practices we study. A majority of the works utilizes this approach. It is also the case

that motivations for this is very rare. We interpret this as an indication of how established this practice is: apparently neither reviewers nor editors find dominance any controversial. However, given the ad hoc sample, one should not put too much emphasis on this variation, not least because the ASR contained so few relevant articles. We find most studies that use some alternative to dominance predominantly in ASR and RSSM, and it is then primarily separate measures of mothers' and fathers' SES. Averaging is a further rarer model of operationalization. Table 2 also shows that few studies attempt any sensitivity analyses. It should be pointed out that what we code as sensitivity analysis is not the type of analysis as is pursued in this paper, but whether or not dominance is used together with an alternative operationalization. Finally, and notably, we do not find any single study that model interactions between parents' SES in any of the outlets.

To conclude, our brief review of articles suggest that dominance is indeed dominating in empirical studies, but on rather arbitrary theoretical and/or methodological grounds and that interaction models are absent in our limited sample.

Analytical strategy

We use sibling correlations as a benchmark of family effects to separate out the relative influence of the different approaches to socioeconomic background operationalization. The advantage of using sibling correlations is that we capture the entire variation shared by individuals born in the same family, which makes it a broad omnibus measure of the influence of family background (cf. Solon 1999). We thus get a good baseline to compare the different SES models to. The only cost of using this methodology is that we lose singletons, but this likely has minor implications. Close to 90 % of all kids have a sibling, which means that we still can generalize to 90 % of the population. Sibling correlations are equal to the intra-class correlation (ICC), since it is the ratio of covariance between siblings relative to the sample

variance.[3] We have also conducted a standard intergenerational analysis where we decompose R2 or intergenerational correlations in regression models of children's SES on parents' SS, which yields very similar results (not shown). The results thus appear not to be contingent on methodological approach.[4]

We compute the six models of SES as displayed in Table 1. It should be noted that we do not consider the following common cases: (1) using information on only one parent, whatever the reasons for doing so (2) when information is partially missing for any of the parents. Our approach also measure parental resources regardless of exposure during childhood. For example, to what extent the SES of a non-residential parent matter, or the SES of a step-parent matters, is beyond the scope of our study.

Data

We utilize Swedish register data, and restrict the cohorts in the child generation to be born between 1955 and 1972. The choice of cohorts is made in order for the children to be old enough to be established in the labor market and provide us with enough data on their outcomes. We then link children to their parents using the Multigenerational register, which is based on birth records. The sibling correlations are delimited to closely spaced siblings (seven years), since they share more environmental conditions compared to siblings with greater age

[3] The relationship between the sibling correlation (ICC) approach and the conventional intergenerational correlation (IGC) is the following: given that the variance structure is approximately the same over the child and parent generations, the $\text{ICC} = \text{IGC}^2 + \text{unobserved heterogenity}$ (Solon 1999).

[4] We have also tested for sibling vs. singleton discrepancies in intergenerational transmissions. The intergenerational correlations in SES are generally of similar magnitude for singletons and non-singletons. We can observe close to identical correlations for occupation and income (less than 3 % difference). For education, we observe a 7 % difference. Singleton correlations are generally weaker. It should also be noted that singletons is not just the smallest family size, but this state may have been caused by exogenous events such as involuntary fertility stops (disease or complications in the first birth). This exogenous variation may also eschew the intergenerational correlation. We would thus not in baseline expect that a non-bias scenario would mean identical intergenerational correlations across singleton status. Seen in this light, it is reassuring that estimates show a high degree of similarity.

distance (Eriksson et al. 2016). Table A1 shows the descriptive statistics for the variables used in the models.

Earnings

Information on earnings are based on tax records. In order to construct long-run earnings measures for children, data from 1990 to 2012 is collected for ages 34 to 40. For parents, earnings are measured in similar tax data from 1980 to 1989. To arrive at a less noisy measure, we derive the mean earnings of these periods, and then take log values.

Education

Education is collected from the education registers from 1990 and onwards for both parents and children, and coded to years of education.[5] Note that since information on education is an inclusionary criterion, we thus require parents to survive until 1990.

Occupation

For parents, occupation is self-reported and collected from the quintennial censuses (1985 to 1990), and coded to occupational prestige, ISEI (Ganzeboom and Treiman 1996), and for the purposes of our supplementary analysis, also EGP (Erikson and Goldthorpe 1992). For children, occupation is collected from the occupation register (2001 and onwards), which consists of employer reports and coded to ISEI. For the supplementary analysis, we also code the probability of entering the salariat (which in the EGP scheme = the service classes I and II of a total of seven classes). Data on parents' EGP class is collected from censuses (1970 to 1990, again, conducted with five year intervals). Children's EGP status is instead based on

[5] We do not have data on years of education as such, but since the measure is derived from educational levels it is pseudo-years of education. In most cases, this will reduce measurement error, e.g., social desirability biases.

Swedish national occupational classifications (SSYK) collected from registers over the period 2001 to 2012. The SSYK code is cross-classified with detailed industry information, which is translated into EGP using a modal coding from the 1990's census (Erikson and Jonsson 1993). We use highest observed ISEI score and EGP status for both children and parents.[6] Of all occupational scales, we favor the ISEI since it shows the highest intergenerational correlation vis-à-vis other continuous occupational indicators (Hällsten 2019), both in regard to occupational education (Hauser and Warren 1997), and when other SES factors are accounted for.

Methods

We employ a multilevel regression framework to model sibling correlations. The outcome (Y) of sibling *i* is clustered to family *j*.

(1) $Y_{ij} = \beta_0 + \boldsymbol{\beta X_{ij}} + \varepsilon_{ij}$,

$\boldsymbol{X_{ij}}$ defines a vector of independent variables on individual and family level. The residual term of the equation, ε_{ij}, contains two components:

(2) $\varepsilon_{ij} = a_j + b_{ij}$.

[6] Seen in the light of this article, this choice may itself be subject to further scrutiny. For the purposes of this study, however, we rely on established practice of measuring peak careers, however fragile this may turn out to be.

The two components represent a shared family term (a_j) complemented by an individual part (b_{ij}). The variance of the residual term, σ_ε^2 , then translates to the sum of the variances of the family and individual components:

(3) $\sigma_\varepsilon^2 = \sigma_a^2 + \sigma_b^2$.

Finally, we assess the intra-class correlation (ICC), which can be thought of as the correlation between a pair of randomly drawn siblings (ρ). The ICC equals the ratio of family background influence relative to the sum of variances of individual and family components:

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

All singletons are dropped in the analysis, since they do not contribute to the estimation of the intra-class correlation. Solon et al. (1991) suggest that including singletons, which may sometimes be used to arrive at a better estimate of the family variance component, carries the risk of introducing outlier biases.

In order to delineate the contributions of different SES components, we use different specifications of the $\boldsymbol{X_{ij}}$ vector in equation (2), which will produce different estimates of the shared family component (Mazumder 2008). Comparing a baseline estimate with alternative configurations ($\Delta\sigma_a^2 = \sigma_a^2 - \sigma_a^{2*}$) gives the relative explanatory power of the different models. We use this procedure in two separate ways: (1) we add SES factors to an otherwise empty model, and; (2) we remove (jackknife) factors sequentially from a full model (with all SES measures in). The former provides the gross contribution, which may overlap a great deal across SES measures, while the latter (jackknife) method establishes the net contribution. Net influences are only covering the small portion of the variance that is uniquely attributed to any

single operationalization. We focus our analysis on the gross measure, and use the net measure for sensitivity analysis.

The decomposition of sibling correlations in the various outcomes are calculated on mixed siblings, but complementary sensitivity analyzes of brother and sister correlations do not change the conclusions (available in an online appendix, tables S1 and S2). In the appendix, we also present results from using a rank-rank transformation of the data (Chetty et al. 2014), see Tables S3 and S4; which also support our conclusions.[7]

Results

We present our findings for the continuous SES variables in Table 3. The Table shows the estimated sibling correlations (ICC), its standard errors and the reductions in ICC (↓%) by different operationalizations of SES. This is the contribution of a given factor in explaining the sibling correlation, or put in substantive terms, the degree to which it represents how family background structures the outcome. All models control for child birth year and gender.

[Table 3 about here]

Gross contributions

For the gross contributions of parents education on children's years of education (the first column), we find that the conventional dominance approach only contributes in explaining the

[7] In this estimation, SES is measured as percentile ranks using the cumulative distribution function (Chetty et al. 2014). This coding is straightforward, but whenever we encounter ties (cases with the same values), we take the average rank across all tied values. Ranks are estimated on separate distributions not only for each SES, but also for each variable in the different modes of operationalization (i.e. ranks for mothers, fathers, averages, dominant, and non-dominant all come from their own distribution).The virtue of employing a rank measure is that the functional form is more realistic (Chetty et al. 2014), but it also minimize attenuation and life-cycle bias compared to elasticity and loglinear correlations (Nybom and Stuhler 2017). The reason why we don't adopt a rank approach in the main analysis is that most researcher use non-transformed scales for education and occupation, and logged transformation for earnings/income. Hence, we want to primarily evaluate these measures.

sibling correlations with 25.6 percent, while the average model and both the two variable parental measures (modified dominance and mother/father models) of education contribute with 30.1 percent. Both the interactive models (mother/father and modified dominance) explain roughly 2 to 3 percentage points more, which is non-trivial. Since the interaction coefficients are always positive (and that the marginal effects of parents SES increase over the SES distribution of the reciprocal parent), this suggests that some reinforcement takes place: having one high SES parent is associated with stronger association also from the other parents' SES.[8] These results suggest the following order, from the lowest explanatory power to the highest: dominance < modified dominance | average | mother/father < M/F interaction < MD interaction.[9]

For parents' occupation on children's education, the dominance model is again the most inferior choice, contributing with only 13.2 percent, while both the average and mother/father models perform substantially better with around 23 percent contributions, and the M/F interactive model at almost 24 percent. Modified dominance here comes out between the leading trio and dominance, quite similar to the MD interaction model as well. Hence, the order is dominance < modified dominance < MD interaction < average | mother/father < M/F interaction.

For parent's earnings on children's education, the relative order of the operationalization alternatives are completely different, but the differences are also small, with no discernable contrast between dominance and average. The modified dominance

[8] We further elaborate on the substantive interpretations of the interaction models in the appendix. Note that the reinforcing interaction pattern is observed, to a varying degree, over all of the parental-child SES configurations.

[9] Significance test are not shown since the standard errors are marginal. However, consider a two-sided t-test: $\frac{\widehat{\beta}_i - \widehat{\beta}_j}{\sqrt{(S.E.\widehat{\beta}_i)^2 + (S.E.\widehat{\beta}_j)^2 - 2cov(\widehat{\beta}_i, \widehat{\beta}_j)}}$. Since the $2\text{cov}(\hat{\beta}_i, \hat{\beta}_j)$ term is hard to estimate with conventional methods it is omitted. However, given that this term is always positive, the test will be conservative since the omitted term automatically would decrease the denominator and thus increase the test statistic. In general, a 0.01 difference in ICC or 1% reduction corresponds to a t-value of about 4.5. An ICC of 0.005 or 0.5 percent difference in turn is roughly equal to a t value of 2.2 or 2.3. In other words, a 0.5 percentage contribution or above can always be regarded as significant.

interaction comes out strongest, above modified dominance, and with conventional dominance and average in between, and the mother/father and its interactive model performing weakest. To this point, the performance of operationalization schemes are dependent on the parental characteristics we consider.

When we shift focus to children's occupation as outcome in column 2, and examine the role of parent's education, the average, mother/father and M/F interaction models all contributes with about 32 percent, while dominance explains 27 percent. The modified dominance interactive model is slightly above with almost 33 percent. This order is the same as for children education.

Also for parent's occupation and parents earnings on children's occupation, the results follow closely those for children's education. For parents' occupation, the dominance approaches are poorest, with little differences between the other schemes. For parents' earnings, modified dominance interaction wins again, followed by modified dominance, average, then dominance, and last M/F interactive and father/mother.

Finally, for children's earnings in column 3, we see the same three patterns for parental SES as our analyses of children's education and occupation revealed. The intergenerational associations are generally weaker, and the differences across operationalizations smaller, yet the relative order and grouping is the same. The pattern of results strongly suggests that the performance of operationalization schemes are dependent on the parental characteristics we consider, and lesser dependent on the outcome we study. Even though the strength of the operationalization alternatives are dependent of the SES dimension of parents, average is in most cases substantially stronger than dominance. Dominance comes out as inferior for parents education and occupation, but somewhat surprisingly it performs better for parents earnings, but, again, never stronger than the average model – from this we conclude that averages is a better one variable measure of parental background than (conventional)

dominance. It should also be noted that earnings is more difficult to measure, not least because of its volatility over time, which could play a role here. However, even when we use an equivalent to parents' lifetime income (disposable income measured through tax records from 1968 to 2012, in ages 18 to 65), we find a similar pattern (results not shown).

Net contributions

We then analyze net influences in the bottom of Table 3. These are naturally much smaller since all of the overlaps are portioned out of the contributions. The pattern we found for the gross contributions (i.e. including overlaps) is generally reproduced also here. The differences are generally smaller, suggesting that the overlap across SES dimensions is more prone to follow different operationalizations compared to the unique contributions.

Nevertheless, one difference is that for parents' earnings, dominance now has a modestly higher contribution compared to the average model. The differences are in the range of at most .001 of the sibling correlation, which would not make much differences when we compare to the gross estimates. For parents' education and occupation, dominance comes out worst.

Total contributions of parents SES by operationalization model

In Table 4, we shift perspective to a more realistic case for researchers: how the choice of operationalization affects all the SES contributions together over the different outcomes. While the gross analysis may be blurred because it included overlaps across SES dimensions that may involve double counting (and the net analysis simply ignored them), the total perspective assess all dimensions jointly which includes the overlaps without any double counting. We compare how the operationalization models affect the total amount of variation accounted for by parents' education, occupation and income together. We apply the same

schemes as above, but also complement with an approach that uses dominance for education and occupation, but takes average for the earnings part. We call this the *standard* model since it is what we most frequently encounter in research and represent a more reasonable operationalization than using dominance measures for income or earnings (which is an operationalization we have not seen in the literature). However, for reference and consistency purposes we do include a model utilizing dominance for all SES factors.

[Table 4 about here]

The results for children's education and occupation, again, suggest that the dominance and the standard model are inferior compared to the average, modified dominance and the mother/father models. The M/F interactive model has a further advantage when we analyze children's' education, but for occupation it comes out on a par with the mother/father and modified dominance. The highest explanatory power is attributed to the modified dominance interactive model. This means that the order of performance is dominance < modified dominance | average | mother/father < M/F interactive < MD interactive for education, and is dominance < modified dominance < average | mother/father < M/F interactive < MD interactive for occupation, similarly as in the gross analyses above – except that MD interactive approach is the most optimal choice for children´s occupation as well, when we consider operationalization of all parental dimensions together. The dominance and the standard approaches explain slightly more than 30 percent of the sibling correlation in education, and about 38-39 percent of the sibling correlation in occupation, while the average, the modified dominance, and mother/father models contribute to roughly 35-37 percent of the sibling correlation in education, and some 42-43 percent of the sibling correlation in occupation. For children's earnings, it is an even closer call. The two and three variable

models perform slightly better than the one variable approaches – although, average contributes more than the dominance model.

In the lower panel of table 4 we also show the actual bias between the standard model vs. the other approaches. We single out the bias using the standard model as a reference since this is the most common approach used, when education, occupation and economic variables are used. It is thus the most realistic and practical example of a dominance framework, since economic measures generally are averaged (or summed). For children's education and occupational prestige, we find that bias is non-negligible, with some 4 to 6 percent difference in ICC between the standard model vs. the rest. For children's earnings, the interactive modified dominance model is the most optimal choice, and second to that is the mother/father model and its interactive extension, but averages still perform better than the standard model – although the differences is more marginal.

Evaluating the dominance approach for nominal social class

Although the focus of the paper is on continuous SES variables, we also present an evaluation of how the dominance approach works in regard to the nominal EGP social class variable. This is because EGP dominance is still widely used in intergenerational research, but has never been evaluated (to our knowledge) for an intergenerational perspective but only in regard to intragenerational inequality (Erikson 1984). Since EGP is nominal, we drop the average operationalization.

Again, we see that the conventional dominance model underperforms versus all other operationalizations. This is regardless of the outcome dimensions. There are only marginal differences within the other operationalizations. We find the largest difference between dominance and the other schemes for children's occupation variables (ISEI and EGP itself), where the gross difference between dominance and the two other approaches amount to

roughly 7 percentage points. The gross difference is slightly less pronounced in children's education (about 5 percentage points) and lower for children's earnings (roughly 2.5 percentage points). This result hold for the gross as well as net analyses.[10]

[Table 5 about here]

Discussion

We have used Swedish register data to evaluate different modes of operationalizing socioeconomic background when we have information on both mothers and fathers. Our brief review of recent articles suggests that the use of the dominance approach, i.e., taking the highest value across parents, is widespread in current literature, and as a rule, there is no motivation of this operationalization. However, in our analysis we find that dominance is capturing the least amount of variation and thus is a suboptimal measure of socioeconomic background. This is most evident for parent's occupation and education, but less so for parent's earnings. However, contrasting the two different household (i.e. one variable) measures, averaging outperforms or is at least on par with the dominance approach. The differences are important on the margin, but not necessarily that alarming. When we compare a standard model (dominance for parental education/occupation and average for earnings) to the average, modified dominance, and mother/father approaches, the relative bias is at most 4 to 6 percent, with the interactive models explaining most variance.

Furthermore, we estimate the particular contributions of various EGP social class operationalizations (an evaluation which has not been done in previous research as far as we

[10] Since Erikson (1984) was writing in a different context, where a male only model was standard, we also checked how dominance performs relative to separate mother and father model specifications. Dominance is a superior measure of class background compared to only using either the EGP status of the father, or just the mother. This holds over all four outcomes, for both gross and net estimations.

know). We find that a dominance approach explains the smallest amount of the sibling correlations in all outcomes (including children's own EGP) compared to the modified dominance and mother/father models. Hence, for EGP, we conclude that a two or three variable model instead of the dominance solution is a better representation of class background.

The risks involved with using the dominance operationalization is that intergenerational associations are underestimated. Additionally, socioeconomic background will functions more poorly as a control or as a confounder when analyzing associations between other covariates, which will cause (an upward) bias of the association of interest.

The most optimal models are the three variable operationalizations, based on mothers + fathers or status dominant + non-dominant parents. When operationalizing all parental SES dimensions in the same way, the interactive modified dominance explains most variance over all outcomes (although the difference relative the mother/father interactive operationalization is quite marginal). In our limited literature review, we nevertheless find that interactive models are not used in standard specifications of parental SES. Given that these models yield the highest explanatory power, research might benefit in exploring the possibilities of modelling parental SES interaction. Our results suggest that the interactive models conform to a reinforcing pattern of intergenerational inequality, i.e. that for example mothers SES matter more for higher levels of father's SES – and vice versa. While the interactive operationalizations appear superior, we show that taking averages (for the continuous SES measures) across parents will provide an effective and yet parsimonious middle ground with relatively little loss of explanatory power.

It is important to be clear on the various assumptions involved in the different operationalizations. A dominance approach will only concern itself with the variation in the outcome that can be attributed to a singular dominant parent, the other parent does not matter.

The mother/father method or modified dominance suggest that both mothers and fathers are important, either by their gendered role or by their hierarchical status position. The average approach assumes a simple accumulation, or summation, where both parents matter more equally for the total family resources. Furthermore, an interactive model allows the influence of the parent to differ relative the status of the other parent. In other words, when using either one of these approaches, researchers should be more careful and explicit on what the underlying assumptions are when a specific operationalization of socioeconomic background is used. Accordingly, our finding that the conventional dominance model underperforms relative to other operationalizations of socioeconomic background has theoretical implications. It supports the accumulation perspective on parental resources, meaning that the family environment is influenced by both of the parents. Families in which resources across parents are polarized, such as the type with one home-maker low in SES and one breadwinner high in SES, will be a very different environment compared to a family where both parents are high (or low) in SES. For interactions, we find a reinforcing pattern, where the association of particular parent's SES on child outcome increase for higher levels of the reciprocal parent's SES.

The finding that both parents are important may appear trivial, but it is clearly at odds with how the established research practice operates. One reason for why the simple summation performs so well relative to its single dimension may be because of its ability to remove random (measurement) errors, as if the family had a latent status and where the mothers and fathers status was some erroneous realization of that status. Summation over data points is known to reduce measurement errors in intergenerational associations (Solon 1992).

Even if one would not perceive the inferiority of dominance as suggested by our results to be large enough to cause serious biases, there is no reason to use a suboptimal measure. Already some fifteen years ago, Korupp, Ganzeboom and Van Der Lippe (2002) showed that

conventional dominance was an inferior model to use to predict children's education, but somehow research practice did not incorporate this result and change practise. Following our results, we suggest that the research community should explicitly discuss choices of operationalization, but also harmonize socioeconomic background measures for consistent comparisons over countries and time – and such decisions should be made based on empirical evaluations, rather than ad hoc traditions.

In sum, is this the end of dominance as we know it? A preliminary answer is yes - our results suggest that using a single variable, or conventional dominance approach to operationalize socioeconomic background is the least optimal choice available. When one needs a simple interpretation, averages should be preferred over dominance, but if the goal is to maximize explanatory power an interactive model is the most optimal choice.

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Table 1. Different operationalizations of parent's SES.

Model	Level (no. variables)	Assumption	Expression
Dominance	Household (1)	Only dominant parent matter	$SES = Max(SES_{father}, SES_{mother})$
Average	Household (1)	Equal influence of both parents	$SES = w\ SES_{father} + (1\text{-}w)\ SES_{mother}$ $w = 0.5$
Mother/Father	Parent (2)	Gender-specific contribution	SES_{father}, SES_{mother}
Mother/father Interaction	Parent (3)	Gender-specific contribution + interaction term	SES_{father}, SES_{mother}, $SES_{father} \times SES_{mother}$
Modified Dominance	Parent (2)	Dominance-specific contribution	$SES_{dominant} = Max(SES_{father}, SES_{mother})$ $SES_{non\text{-}dominant} = Min(SES_{father}, SES_{mother})$
Modified Dominance Interaction	Parent (3)	Dominance-specific contribution + interaction term	$SES_{dominant}$, $SES_{non\text{-}dominant}$, $SES_{dominant} \times SES_{non\text{-}dominant}$

Table 2. Usage of dominance coding in 2017 articles.

	ASR	ESR	RSSM	Total
Relevant articles				
Non-codable	1	2	2	5
Codable	4	14	10	28
Operationalization				
Dominance	1	10	4	15
Averaging	1	2	1	4
Mother/father	2	1	5	8
Interactions	0	0	0	0
Other	0	1	0	1
Reference or motivation				
No	4	13	6	23
Yes	0	1	4	5
Sensitivity analysis				
No	3	12	9	24
Yes	1	2	1	4

Note: See text for details on coding. Total n = 33.

Table 3. Decomposition of sibling correlations in education, occupation, and earnings, by mode of operationalization.

	Children's…								
	(1) Education (years)			(2) Occupation (ISEI)			(3) ln Earnings		
	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline sibling correlation	0.391	0.001	–	0.298	0.002	–	0.134	0.002	–
Gross contribution of parents' SES:									
Dominance Education[1]	0.290	0.002	25.6	0.217	0.002	27.4	0.120	0.002	10.7
Modified Dom Education[2]	0.273	0.002	30.1	0.203	0.002	31.8	0.117	0.002	12.6
MD Interaction Education[3]	0.262	0.002	32.8	0.200	0.002	32.8	0.116	0.002	13.5
Average Education[1]	0.273	0.002	30.1	0.204	0.002	31.7	0.117	0.002	12.6
Mother/father Education[2]	0.273	0.002	30.1	0.203	0.002	31.8	0.117	0.002	12.6
M/F Interaction Education[3]	0.267	0.002	31.6	0.202	0.002	32.3	0.116	0.002	13.2
Dominance ISEI[1]	0.339	0.001	13.2	0.236	0.002	20.9	0.121	0.002	9.9
Modified Dom ISEI[2]	0.320	0.001	18.0	0.217	0.002	27.2	0.116	0.002	13.4
MD Interaction ISEI[3]	0.319	0.002	18.4	0.217	0.002	27.2	0.116	0.002	13.4
Average ISEI[1]	0.302	0.002	22.6	0.195	0.002	34.6	0.112	0.002	16.4
Mother/father ISEI[2]	0.302	0.002	22.8	0.195	0.002	34.7	0.112	0.002	16.5
M/F Interaction ISEI[3]	0.299	0.002	23.4	0.195	0.002	34.7	0.112	0.002	16.6
Dominance Earnings[1]	0.344	0.001	12.0	0.238	0.002	20.2	0.109	0.002	18.9
Modified Dom Earnings[2]	0.342	0.001	12.4	0.236	0.002	21.0	0.107	0.002	19.8
MD Interaction Earnings[3]	0.333	0.001	14.7	0.227	0.002	23.9	0.105	0.002	21.4
Average Earnings[1]	0.344	0.001	12.0	0.237	0.002	20.5	0.108	0.002	19.3
Mother/father Earnings[2]	0.351	0.001	10.2	0.245	0.002	17.7	0.110	0.002	17.9
M/F Interaction Earnings[3]	0.347	0.001	11.1	0.242	0.002	18.7	0.109	0.002	18.6
Net contribution of parents' SES:									
Dominance Education[1]	0.268	0.002	8.0	0.175	0.002	4.6	0.103	0.002	0.5
Modified Dom Education[2]	0.259	0.002	10.3	0.172	0.002	5.8	0.103	0.002	0.8
MD Interaction Education[3]	0.253	0.002	11.7	0.172	0.002	5.9	0.103	0.002	0.8
Average Education[1]	0.259	0.002	10.3	0.172	0.002	5.8	0.103	0.002	0.8
Mother/father Education[2]	0.258	0.002	10.3	0.172	0.002	5.8	0.103	0.002	0.8
M/F Interaction Education[3]	0.256	0.002	11.1	0.172	0.002	5.8	0.103	0.002	0.8
Dominance ISEI[1]	0.262	0.002	1.4	0.178	0.002	3.8	0.104	0.002	1.1
Modified Dom ISEI[2]	0.260	0.002	1.9	0.176	0.002	4.6	0.103	0.002	1.4
MD Interaction ISEI[3]	0.260	0.002	1.9	0.176	0.002	4.7	0.103	0.002	1.4
Average ISEI[1]	0.258	0.002	2.3	0.172	0.002	6.1	0.103	0.002	1.6
Mother/father ISEI[2]	0.258	0.002	2.3	0.172	0.002	6.1	0.103	0.002	1.6
M/F Interaction ISEI[3]	0.258	0.002	2.5	0.172	0.002	6.1	0.103	0.002	1.6
Dominance Earnings[1]	0.258	0.002	0.4	0.171	0.002	1.6	0.103	0.002	5.4
Modified Dom Earnings[2]	0.258	0.002	0.5	0.171	0.002	1.6	0.102	0.002	5.7
MD Interaction Earnings[3]	0.257	0.002	0.6	0.170	0.002	1.8	0.102	0.002	6.3
Average Earnings[1]	0.259	0.002	0.2	0.171	0.002	1.3	0.103	0.002	5.4
Mother/father Earnings[2]	0.258	0.002	0.3	0.172	0.002	1.2	0.103	0.002	5.2
M/F Interaction Earnings[3]	0.258	0.002	0.4	0.172	0.002	1.3	0.103	0.002	5.4

Note: the models are estimated for mixed siblings. [1] One variable household measure; [2] Two variable parental measures; [3] Three variable measure, i.e. two variable parental measure + interaction term. M/F = Mother and father, MD = Modified dominance.

Table 4. Decomposition of sibling correlations into total contributions by mode of operationalization.

	Children's…								
	(1) Education (years)			(2) Occupation (SIOPS)			(3) ln Earnings		
	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline sibling correlation	0.391	0.001	–	0.298	0.002	–	0.134	0.002	–
Total contributions of parents' SES:									
Dominance[1]	0.273	0.002	30.2	0.182	0.002	38.9	0.104	0.002	22.5
Modified Dom[2]	0.259	0.002	33.6	0.174	0.002	41.6	0.102	0.002	23.5
MD Interaction[3]	0.250	0.002	36.1	0.169	0.002	43.3	0.101	0.002	24.9
Average[1]	0.259	0.002	33.7	0.171	0.002	42.5	0.103	0.002	23.2
Standard[1,a]	0.275	0.002	29.6	0.185	0.002	38.0	0.104	0.002	22.2
Mother/father[2]	0.258	0.002	33.8	0.172	0.002	42.4	0.103	0.002	23.0
M/F Interaction[3]	0.255	0.002	34.6	0.171	0.002	42.6	0.103	0.002	23.3

Bias	ΔICC	%	ΔICC	%	ΔICC	%
Standard vs. Modified Dom	0.015	3.9	0.011	3.6	0.002	1.3
Standard vs. MD Interaction	0.025	6.4	0.016	5.2	0.004	2.7
Standard vs. Average	0.016	4.0	0.013	4.5	0.001	1.0
Standard vs. Mother/father	0.016	4.2	0.013	4.4	0.001	0.8
Standard vs. M/F Interaction	0.019	5.0	0.014	4.6	0.001	1.1

Note: the models are estimated for mixed siblings. [1] One variable household measure; [2] Two variable parental measures; [3] Three variable measure, i.e. two variable parental measure + interaction term; [a] Standard model = Dominance principle in education and ISEI, but averages in earnings. M/F = Mother and father, MD = Modified dominance.

Table 5. Decomposition of sibling correlations in education, occupation, and earnings, by EGP (social class) mode of operationalization.

	Children's…											
	(1) Education (years)			(2) Occupation (ISEI)			(3) Social class (EGP)			(4) ln Earnings		
	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline sibling correlation	0.391	0.001	–	0.298	0.002		0.253	0.002	–	0.134	0.002	–
Gross contribution of parents' SES:												
Dominance EGP[1]	0.305	0.002	21.8	0.215	0.002	27.9	0.187	0.002	25.9	0.116	0.002	13.6
Modified Dom EGP[2]	0.287	0.002	26.5	0.194	0.002	34.9	0.169	0.002	33.0	0.112	0.002	16.2
MD Interaction EGP[3]	0.287	0.002	26.6	0.194	0.002	34.9	0.169	0.002	33.1	0.112	0.002	16.2
Mother/father EGP[2]	0.288	0.002	26.3	0.194	0.002	34.8	0.169	0.002	33.1	0.112	0.002	16.1
M/F Interaction EGP[3]	0.286	0.002	26.7	0.194	0.002	35.0	0.169	0.002	33.1	0.112	0.002	16.3
Net contribution of parents' SES:												
Dominance EGP[1]	0.253	0.002	1.5	0.168	0.002	1.3	0.150	0.002	1.5	0.102	0.002	0.7
Modified Dom EGP[2]	0.251	0.002	1.9	0.166	0.002	2.0	0.148	0.002	2.5	0.102	0.002	1.0
MD Interaction EGP[3]	0.251	0.002	1.9	0.166	0.002	2.0	0.148	0.002	2.5	0.102	0.002	1.0
Mother/father EGP[2]	0.251	0.002	1.8	0.166	0.002	2.0	0.148	0.002	2.4	0.102	0.002	1.0
M/F Interaction EGP[3]	0.251	0.002	2.0	0.166	0.002	2.0	0.147	0.002	2.5	0.102	0.002	1.1

Note: the models are estimated for mixed siblings. [1] One variable household measure; [2] Two variable parental measures; [3] Three variable measure, i.e. two variable parental measure + interaction term.

Table A1. Descriptive statistics.

	n	
Individuals	669,407	
Families	310,849	
	Mean	St. Dev
Family size	2.2	0.5
Children's characteristics		
Percent female	49.0%	0.5
Age	47.3	4.4
Years of education	12.5	2.2
ISEI	50.5	17.4
Percent Salariat	56.5%	0.5
ln (earnings)	5.3	0.7
Mothers' characteristics		
Birth year	1939.1	5.9
Years of education	10.0	3.1
ISEI	38.9	16.0
ln (earnings)	3.8	0.6
Fathers' characteristics		
Birth year	1936.3	6.3
Years of education	9.9	3.5
ISEI	44.1	16.5
ln (earnings)	4.4	0.5

EGP (Social class)	n	%
Mother		
I	40,057	6.0%
II	113,301	16.9%
IIIa	144,436	21.6%
IVab	25,758	3.8%
IVcd	14,156	2.1%
VI	17,901	2.7%
VII	313,796	46.9%
Total	669,405	100%
Father		
I	86,401	12.9%
II	145,758	21.8%
IIIa	87,018	13.0%
IVab	55,431	8.3%
IVcd	25,808	3.9%
VI	147,757	22.1%
VII	121,230	18.1%
Total	669,403	100%

Table S1. Decomposition of sister correlations in education, occupation, and earnings, by mode of operationalization.

	Sisters…								
	(1) Education (years)			(2) Occupation (ISEI)			(3) ln Earnings		
	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline sibling correlation	0.390	0.003	–	0.297	0.003	–	0.131	0.003	–
Gross contribution of parents' SES:									
Dominance Education[1]	0.302	0.003	22.5	0.225	0.003	24.3	0.120	0.003	8.8
Modified Dom Education[2]	0.288	0.003	26.1	0.213	0.003	28.1	0.117	0.003	10.5
MD Interaction Education[3]	0.281	0.003	28.0	0.210	0.003	29.1	0.116	0.003	11.3
Average Education[1]	0.289	0.003	26.1	0.213	0.003	28.1	0.117	0.003	10.5
Mother/father Education[2]	0.288	0.003	26.2	0.213	0.003	28.1	0.117	0.003	10.5
M/F Interaction Education[3]	0.284	0.003	27.2	0.212	0.003	28.6	0.117	0.003	11.1
Dominance ISEI[1]	0.343	0.003	12.1	0.237	0.003	20.2	0.120	0.003	8.7
Modified Dom ISEI[2]	0.329	0.003	15.6	0.223	0.003	24.6	0.117	0.003	10.9
MD Interaction ISEI[3]	0.328	0.003	15.9	0.223	0.003	24.7	0.117	0.003	10.9
Average ISEI[1]	0.315	0.003	19.2	0.209	0.003	29.6	0.115	0.003	12.4
Mother/father ISEI[2]	0.315	0.003	19.2	0.209	0.003	29.6	0.115	0.003	12.4
M/F Interaction ISEI[3]	0.313	0.003	19.7	0.209	0.003	29.7	0.115	0.003	12.6
Dominance Earnings[1]	0.354	0.003	9.2	0.250	0.003	15.7	0.115	0.003	12.0
Modified Dom Earnings[2]	0.353	0.003	9.4	0.248	0.003	16.3	0.114	0.003	13.2
MD Interaction Earnings[3]	0.344	0.003	11.8	0.239	0.003	19.6	0.111	0.003	15.0
Average Earnings[1]	0.355	0.003	9.1	0.249	0.003	16.1	0.114	0.003	13.4
Mother/father Earnings[2]	0.360	0.003	7.7	0.256	0.003	13.7	0.115	0.003	12.0
M/F Interaction Earnings[3]	0.356	0.003	8.8	0.252	0.003	15.0	0.114	0.003	13.0
Net contribution of parents' SES:									
Dominance Education[1]	0.286	0.003	7.1	0.193	0.003	4.3	0.110	0.003	0.6
Modified Dom Education[2]	0.279	0.003	9.0	0.190	0.003	5.4	0.109	0.003	1.0
MD Interaction Education[3]	0.275	0.003	10.0	0.190	0.003	5.5	0.109	0.003	1.1
Average Education[1]	0.279	0.003	9.0	0.190	0.003	5.4	0.109	0.003	0.9
Mother/father Education[2]	0.278	0.003	9.2	0.190	0.003	5.4	0.109	0.003	0.9
M/F Interaction Education[3]	0.276	0.003	9.7	0.190	0.003	5.5	0.109	0.003	1.1
Dominance ISEI[1]	0.281	0.003	1.2	0.193	0.003	4.1	0.109	0.003	1.1
Modified Dom ISEI[2]	0.280	0.003	1.5	0.192	0.003	4.5	0.109	0.003	1.2
MD Interaction ISEI[3]	0.279	0.003	1.6	0.192	0.003	4.5	0.109	0.003	1.2
Average ISEI[1]	0.278	0.003	1.9	0.190	0.003	5.1	0.109	0.003	1.1
Mother/father ISEI[2]	0.278	0.003	1.9	0.190	0.003	5.3	0.109	0.003	1.2
M/F Interaction ISEI[3]	0.278	0.003	2.0	0.190	0.003	5.3	0.109	0.003	1.3
Dominance Earnings[1]	0.278	0.003	0.1	0.189	0.003	0.8	0.109	0.003	2.7
Modified Dom Earnings[2]	0.278	0.003	0.2	0.189	0.003	0.8	0.109	0.003	3.2
MD Interaction Earnings[3]	0.277	0.003	0.4	0.188	0.003	1.2	0.108	0.003	3.9
Average Earnings[1]	0.279	0.003	0.0	0.189	0.003	0.7	0.109	0.003	3.2
Mother/father Earnings[2]	0.278	0.003	0.1	0.190	0.003	0.6	0.109	0.003	2.9
M/F Interaction Earnings[3]	0.278	0.003	0.2	0.189	0.003	0.7	0.109	0.003	3.3

n = 197 336. The sum of brothers and sisters is not equal to the amount of total siblings due to the definition of closely spaced siblings (7 years) marginally alter which individuals who are included in the analyses. [1] One variable household measure; [2] Two variable parental measures; [3] Three variable measure = two variable parental measure + interaction term.

Table S2. Decomposition of brother correlations in education, occupation, and earnings, by mode of operationalization.

	Brothers…								
	(1) Education (years)			(2) Occupation (ISEI)			(3) ln Earnings		
	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline sibling correlation	0.452	0.002	–	0.356	0.003	–	0.189	0.003	–
Gross contribution of parents' SES:									
Dominance Education[1]	0.341	0.003	24.5	0.265	0.003	25.7	0.171	0.003	9.5
Modified Dom Education[2]	0.320	0.003	29.1	0.251	0.003	29.6	0.168	0.003	11.0
MD Interaction Education[3]	0.308	0.003	31.7	0.248	0.003	30.4	0.167	0.003	11.7
Average Education[1]	0.320	0.003	29.1	0.251	0.003	29.6	0.168	0.003	11.0
Mother/father Education[2]	0.320	0.003	29.2	0.250	0.003	29.8	0.168	0.003	11.1
M/F Interaction Education[3]	0.313	0.003	30.7	0.249	0.003	30.1	0.167	0.003	11.5
Dominance ISEI[1]	0.396	0.003	12.4	0.292	0.003	17.9	0.173	0.003	8.3
Modified Dom ISEI[2]	0.373	0.003	17.5	0.268	0.003	24.8	0.166	0.003	11.9
MD Interaction ISEI[3]	0.371	0.003	17.9	0.268	0.003	24.8	0.166	0.003	11.9
Average ISEI[1]	0.351	0.003	22.4	0.240	0.003	32.5	0.160	0.003	15.0
Mother/father ISEI[2]	0.349	0.003	22.7	0.238	0.003	33.1	0.160	0.003	15.4
M/F Interaction ISEI[3]	0.346	0.003	23.4	0.238	0.003	33.1	0.160	0.003	15.4
Dominance Earnings[1]	0.395	0.003	12.6	0.285	0.003	19.9	0.154	0.003	18.5
Modified Dom Earnings[2]	0.393	0.003	12.9	0.283	0.003	20.6	0.153	0.003	18.8
MD Interaction Earnings[3]	0.383	0.003	15.2	0.275	0.003	22.9	0.151	0.003	20.0
Average Earnings[1]	0.396	0.003	12.4	0.285	0.003	19.9	0.155	0.003	17.6
Mother/father Earnings[2]	0.403	0.003	10.8	0.293	0.003	17.6	0.156	0.003	17.2
M/F Interaction Earnings[3]	0.399	0.003	11.7	0.291	0.003	18.4	0.155	0.003	17.7
Net contribution of parents' SES:									
Dominance Education[1]	0.312	0.003	7.2	0.216	0.003	4.1	0.148	0.003	0.3
Modified Dom Education[2]	0.302	0.003	9.6	0.212	0.003	5.2	0.148	0.003	0.5
MD Interaction Education[3]	0.296	0.003	10.9	0.212	0.003	5.2	0.148	0.003	0.5
Average Education[1]	0.302	0.003	9.6	0.212	0.003	5.2	0.148	0.003	0.5
Mother/father Education[2]	0.302	0.003	9.6	0.212	0.003	5.2	0.148	0.003	0.5
M/F Interaction Education[3]	0.298	0.003	10.4	0.212	0.003	5.2	0.148	0.003	0.5
Dominance ISEI[1]	0.307	0.003	1.2	0.222	0.003	2.8	0.149	0.003	1.0
Modified Dom ISEI[2]	0.304	0.003	1.7	0.219	0.003	3.8	0.148	0.003	1.2
MD Interaction ISEI[3]	0.304	0.003	1.8	0.218	0.003	4.0	0.148	0.003	1.3
Average ISEI[1]	0.302	0.003	2.3	0.213	0.003	5.5	0.148	0.003	1.6
Mother/father ISEI[2]	0.302	0.003	2.3	0.212	0.003	5.6	0.148	0.003	1.6
M/F Interaction ISEI[3]	0.301	0.003	2.5	0.212	0.003	5.7	0.148	0.003	1.6
Dominance Earnings[1]	0.301	0.003	0.6	0.211	0.003	1.7	0.147	0.003	5.6
Modified Dom Earnings[2]	0.301	0.003	0.6	0.211	0.003	1.7	0.147	0.003	5.7
MD Interaction Earnings[3]	0.300	0.003	0.8	0.211	0.003	1.8	0.146	0.003	6.0
Average Earnings[1]	0.302	0.003	0.3	0.213	0.003	1.4	0.149	0.003	4.8
Mother/father Earnings[2]	0.302	0.003	0.5	0.212	0.003	1.4	0.148	0.003	5.4
M/F Interaction Earnings[3]	0.301	0.003	0.6	0.212	0.003	1.4	0.148	0.003	5.5

n = 211 724. The sum of brothers and sisters is not equal to the amount of total siblings due to the definition of closely spaced siblings (7 years) marginally alter which individuals who are included in the analyses. [1] One variable household measure; [2] Two variable parental measures; [3] Three variable measure = two variable parental measure + interaction term.

Table S3. Decomposition of sibling correlations in ranks of education, occupation, and earnings, by mode of operationalization.

	Children's rank in…								
	(1) Education (years)			(2) Occupation (ISEI)			(3) ln Earnings		
	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline sibling correlation	0.394	0.001	–	0.296	0.002	–	0.196	0.002	–
Gross contribution of parents' SES:									
Dominance Education[1]	0.291	0.002	26.0	0.212	0.002	28.3	0.169	0.002	14.1
Modified Dom Education[2]	0.281	0.002	28.8	0.203	0.002	31.3	0.166	0.002	15.5
MD Interaction Education[3]	0.270	0.002	31.4	0.198	0.002	33.1	0.163	0.002	17.0
Average Education[1]	0.289	0.002	26.7	0.209	0.002	29.3	0.168	0.002	14.4
Mother/father Education[2]	0.281	0.002	28.6	0.204	0.002	31.2	0.166	0.002	15.6
M/F Interaction Education[3]	0.277	0.002	29.8	0.201	0.002	32.0	0.164	0.002	16.3
Dominance ISEI[1]	0.324	0.001	17.6	0.211	0.002	28.8	0.164	0.002	16.5
Modified Dom ISEI[2]	0.317	0.002	19.5	0.200	0.002	32.5	0.159	0.002	18.7
MD Interaction ISEI[3]	0.308	0.002	21.8	0.196	0.002	33.9	0.158	0.002	19.6
Average ISEI[1]	0.315	0.002	19.9	0.199	0.002	32.8	0.160	0.002	18.6
Mother/father ISEI[2]	0.319	0.001	19.1	0.201	0.002	32.1	0.159	0.002	18.8
M/F Interaction ISEI[3]	0.314	0.002	20.3	0.199	0.002	32.7	0.158	0.002	19.2
Dominance Earnings[1]	0.341	0.001	13.4	0.229	0.002	22.7	0.153	0.002	22.0
Modified Dom Earnings[2]	0.339	0.001	14.0	0.224	0.002	24.3	0.150	0.002	23.6
MD Interaction Earnings[3]	0.333	0.001	15.4	0.220	0.002	25.8	0.148	0.002	24.3
Average Earnings[1]	0.341	0.001	13.4	0.226	0.002	23.8	0.151	0.002	22.8
Mother/father Earnings[2]	0.341	0.001	13.5	0.226	0.002	23.6	0.150	0.002	23.3
M/F Interaction Earnings[3]	0.339	0.001	13.9	0.225	0.002	23.9	0.150	0.002	23.5
Net contribution of parents' SES:									
Dominance Education[1]	0.274	0.002	9.4	0.174	0.002	5.4	0.142	0.002	1.0
Modified Dom Education[2]	0.267	0.002	11.1	0.170	0.002	6.6	0.142	0.002	1.3
MD Interaction Education[3]	0.261	0.002	12.8	0.169	0.002	7.0	0.141	0.002	1.5
Average Education[1]	0.271	0.002	10.0	0.172	0.002	6.1	0.142	0.002	1.1
Mother/father Education[2]	0.267	0.002	11.0	0.170	0.002	6.5	0.142	0.002	1.3
M/F Interaction Education[3]	0.265	0.002	11.8	0.170	0.002	6.8	0.141	0.002	1.4
Dominance ISEI[1]	0.269	0.002	1.2	0.174	0.002	3.6	0.143	0.002	0.8
Modified Dom ISEI[2]	0.267	0.002	1.5	0.170	0.002	4.8	0.142	0.002	1.3
MD Interaction ISEI[3]	0.265	0.002	2.2	0.169	0.002	5.0	0.141	0.002	1.5
Average ISEI[1]	0.267	0.002	1.7	0.170	0.002	5.0	0.142	0.002	1.3
Mother/father ISEI[2]	0.267	0.002	1.5	0.170	0.002	4.7	0.142	0.002	1.3
M/F Interaction ISEI[3]	0.266	0.002	1.9	0.170	0.002	4.8	0.141	0.002	1.4
Dominance Earnings[1]	0.267	0.002	0.7	0.170	0.002	2.2	0.143	0.002	5.8
Modified Dom Earnings[2]	0.267	0.002	0.8	0.170	0.002	2.2	0.142	0.002	6.3
MD Interaction Earnings[3]	0.266	0.002	1.0	0.169	0.002	2.4	0.141	0.002	6.5
Average Earnings[1]	0.268	0.002	0.5	0.170	0.002	2.0	0.142	0.002	5.8
Mother/father Earnings[2]	0.267	0.002	0.7	0.170	0.002	2.0	0.142	0.002	6.3
M/F Interaction Earnings[3]	0.267	0.002	0.8	0.170	0.002	2.1	0.141	0.002	6.3

Note: the models are estimated for mixed siblings. [1] One variable household measure; [2] Two variable parental measures; [3] Three variable measure = two variable parental measure + interaction term.

Table S4. Decomposition of sibling correlations into total contributions by mode of operationalization for ranked SES.

	Children's rank in…								
	(1) Education (years)			(2) Occupation (SIOPS)			(3) ln Earnings		
	ICC	s.e.	↓%	ICC	s.e.	↓%	ICC	s.e.	↓%
Baseline sibling correlation	0.394	0.001		0.296	0.002		0.196	0.002	
Total contributions of parents' SES:									
Dominance[1]	0.276	0.002	29.9	0.179	0.002	39.6	0.145	0.002	26.0
Modified Dom[2]	0.267	0.002	32.2	0.170	0.002	42.7	0.142	0.002	27.8
MD Interaction[3]	0.259	0.002	34.2	0.168	0.002	43.3	0.141	0.002	28.3
Average[1]	0.272	0.002	31.1	0.171	0.002	42.2	0.143	0.002	27.2
Standard[1,a]	0.277	0.002	29.8	0.178	0.002	39.9	0.144	0.002	26.5
Mother/father[2]	0.267	0.002	32.1	0.170	0.002	42.5	0.142	0.002	27.8
M/F Interaction[3]	0.264	0.002	33.0	0.170	0.002	42.7	0.141	0.002	28.1
Bias	ΔICC	%		ΔICC	%		ΔICC	%	
Standard vs. Modified Dom	0.010	2.4		0.008	2.7		0.003	1.3	
Standard vs. MD Interaction	0.017	4.4		0.010	3.4		0.003	1.8	
Standard vs. Average	0.005	1.3		0.007	2.3		0.001	0.6	
Standard vs. Mother/father	0.009	2.3		0.007	2.5		0.002	1.3	
Standard vs. M/F Interaction	0.013	3.2		0.008	2.8		0.003	1.5	

Note: the models are estimated for mixed siblings. [1] One variable household measure; [2] Two variable parental measures; [3] Three variable measure = two variable parental measure + interaction term; [a] Standard model = Dominance principle in education and ISEI, but averages in earnings.

Table S5. Full model (alternative) specifications for children's years of educations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Birth year	0.0260***	0.00886***	0.00590***	0.00998***	0.00590***	0.00582***	0.00795***	0.0220***	0.0220***	0.0222***	0.0210***	0.0211***	0.0215***	0.0201***	0.0213***	0.0222***	0.0240***	0.0224***	0.0228***	0.00824***
Female	0.592***	0.592***	0.592***	0.592***	0.592***	0.592***	0.592***	0.593***	0.593***	0.593***	0.593***	0.593***	0.593***	0.591***	0.591***	0.590***	0.590***	0.590***	0.590***	0.593***
Dominant education		0.258***	0.158***	0.0934***																
Nondominant education			0.149***	-0.0862***																
MD interaction education				0.0268***																
Average education					0.307***															
Mother education						0.155***	0.0756***													0.0726***
Father education						0.152***	0.0682***													0.0486***
M/F interaction education							0.0149***													0.01000***
Dominant ISEI								0.0380***	0.00483***	-0.00704***										
Nondominant ISEI									0.0461***	0.0211***										
MD interaction ISEI										0.000442***										
Average ISEI											0.0570***									
Mother ISEI												0.0249***	0.00426***							0.00722***
Father ISEI												0.0319***	0.0134***							0.00805***
M/F interaction ISEI													0.000442***							0.0000643***
Dominant earnings														1.467***	1.382***	-1.213***				
Nondominant earnings															0.163***	-3.030***				
MD interaction earnings																0.735***				
Average earnings																	1.583***			
Mother earnings																		0.336***	-1.581***	-0.278***
Father earnings																		0.996***	-0.655***	0.0289
M/F interaction earnings																			0.447***	0.0513***
Intercept	-43.92***	-11.76***	-5.882***	-13.43***	-5.861***	-5.711***	-9.535***	-37.38***	-37.79***	-37.55***	-36.32***	-36.64***	-36.65***	-38.79***	-41.29***	-31.87***	-46.47***	-42.34***	-36.09***	-10.52***
ln σ_a^2	0.306***	0.0818***	0.0387***	0.0123***	0.0388***	0.0388***	0.0247***	0.195***	0.153***	0.149***	0.111***	0.109***	0.103***	0.205***	0.202***	0.182***	0.206***	0.221***	0.213***	-0.00607
ln σ_b^2	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***	0.529***

Note: T-statistics and standard errors are suppressed, but level of significance is given by * p<0.05, ** p<0.01, and *** p<0.001. The two bottom estimates represent the logged variance of the family level (σ_a^2) and the logged variance of the individual level (σ_b^2). These estimates correspond to the gross decompositions for children's education in table 3.

Table S6. Full model (alternative) specifications for children's ISEI.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Birth year	0.0924***	-0.0410***	-0.0630***	-0.0449***	-0.0630***	-0.0606***	-0.0517***	0.0511***	0.0496***	0.0497***	0.0393***	0.0402***	0.0406***	0.0344***	0.0477***	0.0535***	0.0686***	0.0581***	0.0606***	-0.0363***
Female	-1.065***	-1.069***	-1.074***	-1.072***	-1.075***	-1.075***	-1.075***	-1.060***	-1.061***	-1.061***	-1.065***	-1.066***	-1.066***	-1.077***	-1.087***	-1.092***	-1.094***	-1.088***	-1.090***	-1.074***
Dominant education		1.761***	1.087***	0.804***																
Nondominant education			1.000***	-0.0317																
MD interaction education				0.118***																
Average education					2.090***															
Mother education						0.987***	0.657***													0.491***
Father education						1.095***	0.749***													0.450***
M/F interaction education							0.0617***													0.0171***
Dominant ISEI								0.309***	0.0605***	0.0531***										
Nondominant ISEI									0.346***	0.330***										
MD interaction ISEI										0.000275**										
Average ISEI											0.457***									
Mother ISEI												0.207***	0.188***							0.180***
Father ISEI												0.250***	0.233***							0.168***
M/F interaction ISEI													0.000396***							-0.00117***
Dominant earnings														12.27***	11.35***	-6.938***				
Nondominant earnings															1.771***	-20.72***				
MD interaction earnings																5.182***				
Average earnings																	13.43***			
Mother earnings																		3.152***	-9.484***	-2.892***
Father earnings																		8.290***	-2.589***	-0.164
M/F interaction earnings																			2.943***	0.775***
Intercept	-130.5***	120.8***	164.3***	130.9***	164.5***	159.9***	143.9***	-61.43***	-60.64***	-60.46***	-45.10***	-47.06***	-47.01***	-70.52***	-99.31***	-31.84**	-139.6***	-111.1***	-69.53***	103.7***
ln σ_a^2	2.250***	2.035***	1.996***	1.986***	1.996***	1.996***	1.991***	2.091***	2.037***	2.037***	1.970***	1.969***	1.968***	2.096***	2.089***	2.066***	2.093***	2.116***	2.108***	1.890***
ln σ_b^2	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***	2.678***

Note: T-statistics and standard errors are suppressed, but level of significance is given by * p<0.05, ** p<0.01, and *** p<0.001. The two bottom estimates represent the logged variance of the family level (σ_a^2) and the logged variance of the individual level (σ_b^2). These estimates correspond to the gross decompositions for children's ISEI in table 3.

Table S7. Full model specifications of children's ln earnings.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Birth year	0.0258***	0.0236***	0.0232***	0.0236***	0.0232***	0.0233***	0.0235***	0.0250***	0.0249***	0.0249***	0.0247***	0.0248***	0.0248***	0.0243***	0.0246***	0.0247***	0.0251***	0.0247***	0.0248***	0.0237***
Female	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.413***	-0.414***	-0.414***	-0.413***	-0.414***	-0.413***
Dominant education		0.0259***	0.0149***	0.00874***																
Nondominant education			0.0163***	-0.00615***																
MD interaction education				0.00256***																
Average education					0.0312***															
Mother education						0.0142***	0.00588***													0.00365***
Father education						0.0167***	0.00799***													0.00210***
M/F interaction education							0.00156***													0.000446***
Dominant ISEI								0.00491***	0.000330***	0.0000947										
Nondominant ISEI									0.00636***	0.00586***										
MD interaction ISEI										0.00000878*										
Average ISEI											0.00745***									
Mother ISEI												0.00315***	0.00227***							0.00217***
Father ISEI												0.00428***	0.00350***							0.00177***
M/F interaction ISEI													0.0000187***							-0.0000106**
Dominant earnings														0.274***	0.251***	-0.0733***				
Nondominant earnings															0.0439***	-0.355***				
MD interaction earnings																0.0920***				
Average earnings																	0.301***			
Mother earnings																		0.0637***	-0.183***	-0.104***
Father earnings																		0.198***	-0.0136	0.0216*
M/F interaction earnings																			0.0574***	0.0317***
Intercept	-45.16***	-41.02***	-40.27***	-41.03***	-40.27***	-40.38***	-40.81***	-43.78***	-43.71***	-43.71***	-43.36***	-43.41***	-43.41***	-43.41***	-44.16***	-42.96***	-45.06***	-44.15***	-43.33***	-41.43***
ln σ_a^2	-1.436***	-1.501***	-1.513***	-1.519***	-1.513***	-1.513***	-1.517***	-1.495***	-1.518***	-1.518***	-1.538***	-1.539***	-1.539***	-1.555***	-1.561***	-1.572***	-1.558***	-1.549***	-1.553***	-1.586***
ln σ_b^2	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***	-0.503***

Note: T-statistics and standard errors are suppressed, but level of significance is given by * p<0.05, ** p<0.01, and *** p<0.001. The two bottom estimates represent the logged variance of the family level (σ_a^2) and the logged variance of the individual level (σ_b^2). These estimates correspond to the gross decompositions for children's earnings in table 3.

Table S8. Marginal effects, mother and father model.

Child outcome	Parental SES	Focal	Reciprocal	Reciprocal %tile	Margin	s.e.
Education	Education	m	f	1	0.090	0.001
Education	Education	m	f	25	0.090	0.001
Education	Education	m	f	50	0.165	0.001
Education	Education	m	f	75	0.180	0.001
Education	Education	m	f	99	0.284	0.002
Education	Education	f	m	1	0.083	0.001
Education	Education	f	m	25	0.083	0.001
Education	Education	f	m	50	0.143	0.001
Education	Education	f	m	75	0.158	0.001
Education	Education	f	m	99	0.232	0.002
Education	ISEI	m	f	1	0.014	0.000
Education	ISEI	m	f	25	0.018	0.000
Education	ISEI	m	f	50	0.021	0.000
Education	ISEI	m	f	75	0.029	0.000
Education	ISEI	m	f	99	0.043	0.000
Education	ISEI	f	m	1	0.020	0.000
Education	ISEI	f	m	25	0.024	0.000
Education	ISEI	f	m	50	0.031	0.000
Education	ISEI	f	m	75	0.036	0.000
Education	ISEI	f	m	99	0.045	0.000
Education	Earnings	m	f	1	-0.310	0.014
Education	Earnings	m	f	25	0.286	0.006
Education	Earnings	m	f	50	0.372	0.006
Education	Earnings	m	f	75	0.473	0.006
Education	Earnings	m	f	99	0.871	0.012
Education	Earnings	f	m	1	0.139	0.018
Education	Earnings	f	m	25	0.939	0.007
Education	Earnings	f	m	50	1.076	0.007
Education	Earnings	f	m	75	1.192	0.008
Education	Earnings	f	m	99	1.435	0.011
ISEI	Education	m	f	1	0.719	0.012
ISEI	Education	m	f	25	0.719	0.012
ISEI	Education	m	f	50	1.027	0.008
ISEI	Education	m	f	75	1.089	0.009
ISEI	Education	m	f	99	1.521	0.019
ISEI	Education	f	m	1	0.811	0.012
ISEI	Education	f	m	25	0.811	0.012
ISEI	Education	f	m	50	1.058	0.007
ISEI	Education	f	m	75	1.120	0.007
ISEI	Education	f	m	99	1.428	0.013
ISEI	ISEI	m	f	1	0.197	0.003
ISEI	ISEI	m	f	25	0.200	0.002
ISEI	ISEI	m	f	50	0.204	0.002
ISEI	ISEI	m	f	75	0.210	0.002
ISEI	ISEI	m	f	99	0.223	0.004
ISEI	ISEI	f	m	1	0.239	0.003
ISEI	ISEI	f	m	25	0.243	0.002
ISEI	ISEI	f	m	50	0.248	0.001
ISEI	ISEI	f	m	75	0.253	0.002
ISEI	ISEI	f	m	99	0.261	0.003
ISEI	Earnings	m	f	1	-1.102	0.107
ISEI	Earnings	m	f	25	2.821	0.043
ISEI	Earnings	m	f	50	3.389	0.043
ISEI	Earnings	m	f	75	4.060	0.047
ISEI	Earnings	m	f	99	6.678	0.092
ISEI	Earnings	f	m	1	2.641	0.140

ISEI	Earnings	f	m	25	7.916	0.051
ISEI	Earnings	f	m	50	8.816	0.052
ISEI	Earnings	f	m	75	9.582	0.059
ISEI	Earnings	f	m	99	11.182	0.084
Earnings	Education	m	f	1	0.007	0.000
Earnings	Education	m	f	25	0.007	0.000
Earnings	Education	m	f	50	0.015	0.000
Earnings	Education	m	f	75	0.017	0.000
Earnings	Education	m	f	99	0.028	0.001
Earnings	Education	f	m	1	0.010	0.000
Earnings	Education	f	m	25	0.010	0.000
Earnings	Education	f	m	50	0.016	0.000
Earnings	Education	f	m	75	0.017	0.000
Earnings	Education	f	m	99	0.025	0.000
Earnings	ISEI	m	f	1	0.003	0.000
Earnings	ISEI	m	f	25	0.003	0.000
Earnings	ISEI	m	f	50	0.003	0.000
Earnings	ISEI	m	f	75	0.003	0.000
Earnings	ISEI	m	f	99	0.004	0.000
Earnings	ISEI	f	m	1	0.004	0.000
Earnings	ISEI	f	m	25	0.004	0.000
Earnings	ISEI	f	m	50	0.004	0.000
Earnings	ISEI	f	m	75	0.004	0.000
Earnings	ISEI	f	m	99	0.005	0.000
Earnings	Earnings	m	f	1	-0.019	0.004
Earnings	Earnings	m	f	25	0.057	0.002
Earnings	Earnings	m	f	50	0.068	0.002
Earnings	Earnings	m	f	75	0.081	0.002
Earnings	Earnings	m	f	99	0.133	0.003
Earnings	Earnings	f	m	1	0.088	0.005
Earnings	Earnings	f	m	25	0.191	0.002
Earnings	Earnings	f	m	50	0.209	0.002
Earnings	Earnings	f	m	75	0.224	0.002
Earnings	Earnings	f	m	99	0.255	0.003

Note: The table is broken over two pages. Reciprocal parent m or f equals mother or father and is the opposite of the focal parent. The percentile (%tile) column refers to the value where the *reciprocal* parent (m or f) is held constant. Margin column denotes the average marginal effects coefficient for the *focal* parent (i.e. father if reciprocal parent = mother and vice versa).

Table S9. Marginal effects, modified dominance model.

Child outcome	Parental SES	Focal	Recirpocal	Reciprocal %tile	Margin	s.e.
Education	Education	dom	ndom	1	0.120	0.001
Education	Education	dom	ndom	25	0.120	0.001
Education	Education	dom	ndom	50	0.200	0.001
Education	Education	dom	ndom	75	0.254	0.002
Education	Education	dom	ndom	99	0.388	0.003
Education	Education	ndom	dom	1	-0.059	0.003
Education	Education	ndom	dom	25	0.021	0.002
Education	Education	ndom	dom	50	0.074	0.002
Education	Education	ndom	dom	75	0.155	0.001
Education	Education	ndom	dom	99	0.288	0.002
Education	ISEI	dom	ndom	1	0.000	0.000
Education	ISEI	dom	ndom	25	0.004	0.000
Education	ISEI	dom	ndom	50	0.006	0.000
Education	ISEI	dom	ndom	75	0.012	0.000
Education	ISEI	dom	ndom	99	0.023	0.001
Education	ISEI	ndom	dom	1	0.028	0.001
Education	ISEI	ndom	dom	25	0.032	0.001
Education	ISEI	ndom	dom	50	0.038	0.000
Education	ISEI	ndom	dom	75	0.044	0.000
Education	ISEI	ndom	dom	99	0.052	0.000
Education	Earnings	dom	ndom	1	0.047	0.018
Education	Earnings	dom	ndom	25	1.383	0.008
Education	Earnings	dom	ndom	50	1.611	0.009
Education	Earnings	dom	ndom	75	1.801	0.010
Education	Earnings	dom	ndom	99	2.182	0.013
Education	Earnings	ndom	dom	1	-0.619	0.011
Education	Earnings	ndom	dom	25	0.066	0.006
Education	Earnings	ndom	dom	50	0.197	0.006
Education	Earnings	ndom	dom	75	0.359	0.006
Education	Earnings	ndom	dom	99	1.010	0.012
ISEI	Education	dom	ndom	1	0.922	0.011
ISEI	Education	dom	ndom	25	0.922	0.011
ISEI	Education	dom	ndom	50	1.274	0.011
ISEI	Education	dom	ndom	75	1.509	0.014
ISEI	Education	dom	ndom	99	2.097	0.024
ISEI	Education	ndom	dom	1	0.086	0.023
ISEI	Education	ndom	dom	25	0.438	0.016
ISEI	Education	ndom	dom	50	0.673	0.013
ISEI	Education	ndom	dom	75	1.026	0.011
ISEI	Education	ndom	dom	99	1.613	0.017
ISEI	ISEI	dom	ndom	1	0.058	0.003
ISEI	ISEI	dom	ndom	25	0.060	0.003
ISEI	ISEI	dom	ndom	50	0.061	0.003
ISEI	ISEI	dom	ndom	75	0.065	0.003
ISEI	ISEI	dom	ndom	99	0.072	0.005
ISEI	ISEI	ndom	dom	1	0.334	0.005
ISEI	ISEI	ndom	dom	25	0.337	0.004
ISEI	ISEI	ndom	dom	50	0.341	0.003
ISEI	ISEI	ndom	dom	75	0.344	0.003
ISEI	ISEI	ndom	dom	99	0.350	0.003
ISEI	Earnings	dom	ndom	1	1.938	0.140
ISEI	Earnings	dom	ndom	25	11.352	0.062

ISEI	Earnings	dom	ndom	50	12.962	0.065
ISEI	Earnings	dom	ndom	75	14.303	0.073
ISEI	Earnings	dom	ndom	99	16.988	0.097
ISEI	Earnings	ndom	dom	1	-3.735	0.085
ISEI	Earnings	ndom	dom	25	1.092	0.044
ISEI	Earnings	ndom	dom	50	2.014	0.043
ISEI	Earnings	ndom	dom	75	3.156	0.047
ISEI	Earnings	ndom	dom	99	7.743	0.091
Earnings	Education	dom	ndom	1	0.011	0.000
Earnings	Education	dom	ndom	25	0.011	0.000
Earnings	Education	dom	ndom	50	0.019	0.000
Earnings	Education	dom	ndom	75	0.024	0.001
Earnings	Education	dom	ndom	99	0.037	0.001
Earnings	Education	ndom	dom	1	-0.004	0.001
Earnings	Education	ndom	dom	25	0.004	0.001
Earnings	Education	ndom	dom	50	0.009	0.000
Earnings	Education	ndom	dom	75	0.017	0.000
Earnings	Education	ndom	dom	99	0.030	0.001
Earnings	ISEI	dom	ndom	1	0.000	0.000
Earnings	ISEI	dom	ndom	25	0.000	0.000
Earnings	ISEI	dom	ndom	50	0.000	0.000
Earnings	ISEI	dom	ndom	75	0.000	0.000
Earnings	ISEI	dom	ndom	99	0.001	0.000
Earnings	ISEI	ndom	dom	1	0.006	0.000
Earnings	ISEI	ndom	dom	25	0.006	0.000
Earnings	ISEI	ndom	dom	50	0.006	0.000
Earnings	ISEI	ndom	dom	75	0.006	0.000
Earnings	ISEI	ndom	dom	99	0.006	0.000
Earnings	Earnings	dom	ndom	1	0.084	0.005
Earnings	Earnings	dom	ndom	25	0.251	0.002
Earnings	Earnings	dom	ndom	50	0.280	0.002
Earnings	Earnings	dom	ndom	75	0.304	0.003
Earnings	Earnings	dom	ndom	99	0.351	0.004
Earnings	Earnings	ndom	dom	1	-0.054	0.003
Earnings	Earnings	ndom	dom	25	0.032	0.002
Earnings	Earnings	ndom	dom	50	0.048	0.002
Earnings	Earnings	ndom	dom	75	0.069	0.002
Earnings	Earnings	ndom	dom	99	0.150	0.003

Note: The table is broken over two pages. Reciprocal parent dom or ndom equals dominant or nondominant and is the opposite of the focal parent. The percentile (%tile) column refers to the value where the given *reciprocal* parent (dom or ndom) is held constant. The margin column denotes the marginal effects coefficient for the *focal* parent (i.e. dominant if reciprocal parent = nondominant and vice versa).

Interpretation of interaction models

Since adding interaction terms makes the interpretation of individual coefficients much harder, we clarify the interaction results in this section. The detailed interaction results are found in table S8 for the mother/father model, and in table S9 for modified dominance. First of all, the child-parent resource combination at hand is given by the child outcome and parental SES columns. Since we are dealing with interactions, we need information about the two variables involved in the interdependency, this is specified by the focal and the reciprocal parent (which can be either mother [m] or father [f], alternatively dominant [dom] or non-dominant [ndom]). If, for example, the focal parent is the mother, naturally the reciprocal parent equals the father. The next column gives the percentile value in the distribution in which the reciprocal parent's SES is fixed at. The margin column then refers to the marginal effect of the focal parents SES. This implies calculating partial derivatives on all observations at their observed values – except for the reciprocal parents SES, where the value is fixed at the p^{th} part of the distribution. The last column gives the standard errors of the margin estimate. The sign of the interaction term is always positive (not shown), regardless of parent-child SES configuration and operationalization model.

When taking interactions into account, the results in general point to a reinforcing pattern, which goes for both mother/father and modified dominance models. This suggests that the influence, or association, of focal parent's SES increase over the reciprocal parent's SES distribution. For example, the impact of father's education on children's education is higher at increasing levels of mother's education.

Interpreting the mother/father interaction model in table S8, we find that for children's education, the influence of the focal parent (which in the first row equals the mother) corresponds to an margin of 0.09. To put it in substantive terms, children's education differs by .09 years in average for a small or instantaneous rate of change in father's education, when mother's education is fixed at the 1$^{\text{st}}$ percentile (again, all other variables are fixed at their respective individually observed value). Continuing over the reciprocal parent's distribution of education, we find that the impact of mother's education increases. This, however, happens at and after the 50$^{\text{th}}$ percentile because of the compressed distribution of education (essentially meaning that there is no substantive difference between the 1$^{\text{st}}$ and the 25$^{\text{th}}$ percentile in parental education). Fixing father's education at the 50$^{\text{th}}$ percentile, a small instantaneous change in mother's education corresponds to a marginal effect of 0.17 on children's years of education. This increases to 0.18 for the 75$^{\text{th}}$ percentile and 0.28 for the 99$^{\text{th}}$ percentile – implying quite a dramatic rise.

The pattern is similar for all SES parental-child combinations, of which most focal parent SES impacts tend to increase over the reciprocal parent's distribution. The main anomaly for the mother/father model is that the mother earnings margin estimate is negative when father's earnings are fixed at the 1st percentile. Although this suggests that a minimal to small change in mother's earnings results in lower offspring earnings, the sign changes to positive values for the rest of the distribution – which implies that there is general reinforcing pattern.

For the modified dominance model (table S9), we find some additional negative margin estimates related to non-dominant parent's earnings and education, when dominant parent's corresponding SES is fixed at the 1st percentile. Nevertheless, the pattern is the same as above, with increasing and positive margins over the reciprocal parent's SES distribution – supporting a reinforcement process.