Universal Family Background Effects on Education Across and Within Societies

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Abstract:

The extent to which siblings resemble each other measures the total impact of family background in shaping life outcomes. We study sibling similarity in cognitive skills, school grades, and educational attainment in Finland, Germany, Norway, Sweden, the United Kingdom, and the United States. We also compare sibling similarity by parental education and occupation within these societies. The comparison of sibling correlations across and within societies allows us to characterize the omnibus impact of family background on education across social landscapes. We find similar levels of sibling similarity across social groups. Across countries, we find only small differences. In addition, rankings of countries in sibling resemblance differ across the three educational outcomes we study. We conclude that sibling similarity is largely similar across advanced, industrialized countries and across social groups within societies contrary to theories that suggest large cross-national differences and variation of educational mobility across social groups within societies.

Introduction

Social mobility refers to the associations between the educational and socioeconomic outcomes of individuals and their parents. If social mobility is high, then an individual's educational and socioeconomic attainment are largely independent of that of her or his parents, whereas if it is low, most children achieve the same level of education, enter the same occupation, and have a similar income as their parents. In this study, we focus on the intergenerational transmission of education, which is of particular relevance in advanced, industrialized societies in which education is an important predictor of life chances. We compare educational mobility across Finland, Germany, Norway, Sweden, the United Kingdom, and the United States, as well as between social groups, in particular by family socioeconomic background, within these countries.

An important school of thought has long held that modernization should lead to greater social mobility within societies; that is in societies which experienced industrialization, educational expansion, urbanization, and greater geographical mobility, the outcomes of children should be determined less by family background (Treiman 1970). In line with this expectation, some authors argue that the degree of social mobility is remarkably similar across societies, despite substantial cross-national differences in educational systems, welfare regimes, and levels of inequality (Clark 2014; Erikson and Goldthorpe 1992; Featherman, Jones, and Hauser 1975; Ishida, Müller, and Ridge 1995; Lipset and Zetterberg 1959; Müller and Karle 1993). Others, however, argue that there remain substantial differences between contemporary societies in their degree of intergenerational mobility and that countries that have greater socioeconomic inequality also have lower social mobility (Andrews and Leigh 2009; Björklund and Jäntti 2009; Corak 2013). Our comparative study, across countries that vary widely on the aforementioned characteristics, sheds important light on the extent to which policy differences between advanced, industrialized countries affect educational

mobility.

In addition, many scholars assert that social mobility varies between social groups within societies. It has long been thought that, due to credit constraints, socioeconomically disadvantaged families experience less intergenerational mobility than socioeconomically advantaged families (Becker and Tomes 1976; Blau and Duncan 1967; Erikson and Goldthorpe 1992; Mazumder 2005). An opposing point of view argues that compensatory parental investment strategies lead to lower social mobility among socioeconomically advantaged families than among socioeconomically disadvantaged families (Conley 2004, 2008; Griliches 1979; Hsin 2012). Our study also tests these claims by estimating educational mobility for different social groups within societies.

We test differences in educational mobility within and across societies using an approach that employs the similarity between siblings in educational outcomes to measure educational mobility. This method allows us to take into account both observed and unobserved aspects of family socioeconomic background (Björklund and Jännti 2012). We use this method to shed light on educational mobility by examining sibling correlations in educational attainment—a cornerstone measure of socioeconomic status—in six countries. Furthermore, we examine sibling similarity in cognitive skills and in school grades. These educational outcomes give us a window into how sibling resemblance develops through early and middle childhood investments (cognitive skills), through the combined role of cognitive and non-cognitive skills as well as through influences of teachers in adolescence (school grades), and through educational aspirations and decision making, expectations, and financing (final educational attainment).

We apply this approach to data on six countries, covering the three main types of welfare states in contemporary, advanced, industrialized societies (Esping-Andersen 1990, 1999). We use survey data on Germany (Socio-Economic Panel Study; SOEP), the United

Kingdom (Understanding Society), and the United States (Panel Study of Income Dynamics; PSID and National Longitudinal Study of Adolescent to Adult Health; Add Health) as well as register data for Finland, Norway, and Sweden. These data sources allow us to estimate sibling correlations using the highest-quality data available for each country. We make these data comparable by applying the same sample selection criteria, definition of variables, and methods of analysis to all data. The set of countries covers all three types of welfare regimes Esping-Andersen (1990, 1999) distinguishes, i.e., using his terminology, conservative (Germany), liberal (United Kingdom, United States), and social democratic (Finland, Norway, Sweden) welfare regimes.

Our approach allows us to give a broad overview over the variation of educational mobility both within and across advanced, industrialized societies. Whilst our analysis is descriptive, it provides important insights into the variation of educational mobility across societies and the mechanisms underlying this cross-national variation by examining variation between social groups within societies.

BACKGROUND AND THEORETICAL CONSIDERATIONS

Using Sibling Similarity to Measure Universal Family Background Effects

Most analyses of educational mobility estimate the resemblance in education between parents and offspring (Bradbury et al. 2015; Breen et al. 2009; Ermisch, Jäntti, and Smeeding 2012; Pfeffer 2008; Shavit and Blossfeld 1993). An alternative way to measure the intergenerational openness of a society is to estimate sibling similarity in education. This approach is motivated by the idea that siblings share the same family and immediate environment and that the similarity of siblings can capture, therefore, the universal influence of family background on children's educational outcomes.

A number of studies estimated educational mobility using sibling correlations and data

on Australia, several European countries, and the United States (Anger and Schnitzlein 2017; Benin and Johnson 1984; Björklund and Jännti 2012; Björklund and Salvanes 2011; Conley 2008; Conley and Glauber 2008; Conley, Pfeiffer, and Velez 2007; de Graaf and Huinink 1992; Duncan, Boisjoly, and Harris 2001; Grätz 2018; Hauser and Mossel 1985; Hauser and Wong 1989; Jencks et al. 1972, 1979; Kuo and Hauser 1995; Marks and Mooi-Reci 2016; Mazumder 2008; Nicoletti and Rabe 2013; Olneck 1977; Schnitzlein 2014; Sieben and de Graaf 2001, 2003; Sieben, Huinink, and de Graaf 2001; Teachman 1995; Toka and Dronkers 1996).

There are several advantages associated with using the similarity of siblings in education to measure educational mobility. The use of sibling correlations allows researchers to estimate the effects of observed and unobserved characteristics which are shared by siblings on education. These characteristics include the family environment and the neighborhood. Sibling correlations, therefore, provide omnibus measures of family background that capture the combined effects of shared genetics, common environment, and sibling-reciprocal socialization.

There are three potential disadvantages associated with the use of sibling correlations to measure social mobility. First, a disadvantage of sibling correlations may be that because of their summative nature sibling correlations cannot be decomposed into the different processes of genetic influences, family and neighborhood effects, and inter-sibling influences. We maintain, however, that this is also not the purpose of our descriptive analysis of educational mobility. We understand the similarity between siblings in education as an important descriptive statistic informing us about the variation of educational mobility across contexts.

Second, a further concern with regard to sibling correlations is that siblings may have different experiences within the family. For instance, evidence from family fixed-effects models demonstrates that birth order differences lead to inequality in educational outcomes

between siblings (Black, Devereux, and Salvanes 2005; Conley et al. 2007; Grätz 2018; Härkönen 2014). These and other sibling-specific influences are not captured by sibling correlations. Further examples include gender and age differences; other factors that produce inequalities between siblings may be unobserved. Sibling correlations in education can, therefore, best be understood as providing lower bound estimates of the total effect of family background on education (Björklund and Jännti 2012).

Third, the identification of educational mobility through sibling correlations focuses necessarily on siblings. The reliance on families with siblings to estimate educational mobility could introduce bias if educational mobility differs between singletons and siblings (Breen and Jonsson 2005). We, however, maintain that most children grow up with siblings, i.e. it is only a small part of the population who does not contribute to the estimation of educational mobility using sibling correlations. In addition, there is no empirical evidence that educational mobility does indeed differ between singletons and siblings.

Variation of Universal Family Background Effects Across Social Groups

An advantage of employing sibling correlations to measure educational mobility is that they allow us to estimate socioeconomic differences in the transmission of educational advantage across generations. Estimates of educational mobility which focus on the similarity of parents and children (or the similarity of siblings) at the population level do not take into account that educational mobility may vary across social groups within societies. There are, however, strong theoretical reasons to expect such variation. In particular, socioeconomic differences in parental investment strategies may lead to variation in sibling similarity, and, hence, educational mobility, by family socioeconomic background.

Two main theories with respect to parents' allocation of resources among siblings can be distinguished. First, theories of parental reinforcement argue that well-resourced parents

invest more in the human capital of better endowed children, thereby increasing within-family inequality as compared to socioeconomically disadvantaged parents who face budget constraints in optimally investing into their children (Becker 1991; Becker and Tomes 1976). As a consequence, this theoretical perspective predicts a higher similarity between siblings, and, hence, lower educational mobility, in socioeconomically disadvantaged than in socioeconomically advantaged families.

Second, an alternative model of resource allocation within families argues that parents use resources to compensate for ability differences between siblings (Behrman, Pollak, and Taubman 1982). The ability of parents to implement compensatory strategies is likely to depend on the amount of resources available to them and, therefore, it may mainly be socioeconomically advantaged families who employ compensatory investment strategies that attenuate within-family differences (Conley 2004, 2008; Griliches 1979). In this latter paradigm, with limited resources, disadvantaged families may invest less equitably but more efficiently given budget constraints, thereby exacerbating sibling disparities in abilities by providing more resources to better endowed offspring. This model leads to the opposite prediction than the model assuming reinforcing parental investment strategies. Under compensatory parental investment behavior, we expect a higher similarity between siblings, and, therefore, lower educational mobility, in socioeconomically advantaged than in socioeconomically disadvantaged families.

Evidence on the variation of sibling similarity by family socioeconomic background is mixed and results are so far limited to two countries. Previous research analyzing the variation of sibling similarity between social groups in the United States (Conley 2008; Conley and Glauber 2008; Conley et al. 2007) and Germany (Grätz 2018) found no variation in sibling similarity by family socioeconomic background with respect to cognitive skills and educational attainment. However, Conley and Glauber (2008) found higher levels of sibling

resemblance in earnings and household income in the United States for siblings from socioeconomically advantaged families compared with siblings from socioeconomically disadvantaged families. In addition, Conley et al. (2007) in the United States and Anger and Schnitzlein (2017) in Germany found a higher sibling similarity in non-cognitive skills in socioeconomically advantaged families than in socioeconomically disadvantaged families. The variation of sibling similarity by family socioeconomic background has never been systematically investigated across countries. The present study aims to fill this gap by examining sibling similarity in education in a comparative perspective. Such a study is important as there are many theoretical reasons to expect cross-national variation in sibling similarity by family background, as we detail in the next section.

In addition to studies analyzing socioeconomic differences in sibling similarity, there are a number of studies analyzing the underlying mechanism which is supposed to bring about differences in sibling similarity, i.e. socioeconomic differences in parental responses to birth endowments or early abilities, directly. We are aware of three empirical studies comparing the allocation of parental investments between siblings or twins to test whether parents' reinforcing or compensatory responses to ability differences between their offspring vary by family socioeconomic background. These three studies used data on the United States but led to contradictory results. In line with the compensatory parental investment model, Hsin (2012) and Restrepo (2016) found compensatory parental responses to birth weight differences between siblings in socioeconomically advantaged and reinforcing behavior in socioeconomically disadvantaged families. Contrary to these results, however, Grätz and Torche (2016) found no parental responses to birth weight differences between twins and reinforcing parental responses to twin differences in early abilities concentrated in socioeconomically advantaged families. Due to these contradictory results and the lack of studies investigating socioeconomic differences in parental responses to ability differences

between twins or siblings in other countries than the United States, it is an open empirical question whether and when sibling similarity in education varies by family socioeconomic background.

Variation of Universal Family Background Effects Across Societies

A central question in research on educational mobility is whether and how much the intergenerational transmission of educational advantage varies across countries (Breen and Jonsson 2005). Institutionalist theories argue that differences in educational institutions lead to variation in the degree of educational mobility across countries (Pfeffer 2008; van de Werfhorst 2015). Robust evidence on causal influences of educational institutions on educational mobility is, however, difficult to achieve. Descriptive comparisons of educational mobility across countries cannot identify the factors bringing about cross-country variation in educational mobility as countries differ in more aspects from each other than it can be controlled for (Torche 2015). The analysis we present in this paper falls into this category. We do not argue, therefore, that our analysis identifies factors influencing educational mobility. However, we believe it is important to provide descriptive evidence on the variation of educational mobility across countries. Our analysis reports descriptive results demonstrating the variation of educational mobility across the three main types of welfare states that can be found in advanced, industrialized countries (Esping-Andersen 1990).

A number of previous studied analyzed cross-country variation in educational mobility. Table 1 gives an overview over studies which estimated cross-country differences in educational mobility. The table reports how these studies ranked different countries in terms of educational mobility.

The comparison of the different studies shows that there is no unambiguous ranking of countries according to their level of educational mobility. This conclusion was already drawn

Table 1. Overview over Previous Research Analyzing Cross-National Variation in Educational Mobility.

Study	Data	Method	Ranking of countries (from most to least mobile)
Treiman and Yip (1989)	Political Action, Scandinavian Welfare Study, Oxford National Occupational Mobility Inquiry, ZUMABUS, Determinants of Occupational Mobility, National Labor Force Survey, 1975 Social Stratification and Mobility Survey, Occupational Changes in a Generation II	Association between father's education and son's educational attainment	United States, Ireland, (West) Germany/ Japan, Norway, Austria, Finland, England and Wales, Israel, Netherlands/ Sweden, Italy, and Denmark
Treiman and Yip (1989)	Political Action, Scandinavian Welfare Study, Oxford National Occupational Mobility Inquiry, ZUMABUS, Determinants of Occupational Mobility, National Labor Force Survey, 1975 Social Stratification and Mobility Survey, Occupational Changes in a Generation II	Association between father's occupation and son's educational attainment	Denmark, Ireland, Austria/ Italy, Netherlands, Finland, Israel, (West) Germany, Norther Ireland, United States, Sweden, Japan, England and Wales, and Norway
Pfeffer (2008)	International Adult Literacy Survey (IALS)	Association between parental education and children's educational attainment	Finland, Northern Ireland, New Zealand, Denmark, Great Britain, United States, Canada, Czech Republic, Sweden, Poland, Chile, Ireland, Italy, Norway, Hungary, Switzerland, Belgium, Germany, and Slovenia
Hertz et al. (2008)	International Adult Literacy Survey (IALS), International Social Survey Programme (ISSP)	Association between parental education and children's educational attainment	Denmark, Great Britain, Northern Ireland, Finland, Norway, Netherlands, Belgium (Flanders)/ Sweden, United States/ Ireland/

			Switzerland, and Italy
Bol and van de Werfhorst (2013)	European Social Survey	Association between parental education and children's educational attainment	United Kingdom, Greece, Sweden/ Denmark, Finland, Ireland, Netherlands/ Slovakia/ Slovenia, Germany/ Israel, Czech Republic, Belgium, Norway, Hungary, Austria, Italy, France, and Luxembourg
Chmielewski and Reardon (2016)	*Progress in International Reading Literacy Study (*PIRLS), Early Childhood Longitudinal Study, Kindergarten Class (ECLS-K)	Association between parental income and children's test scores	Iceland, Sweden, Norway, Netherlands, Canada (Ontario), England, Canada (Quebec), New Zealand, Slovenia, Germany, Slovak Republic, Greece, and United States
Chmielewski and Reardon (2016)	Programme for International Student Assessment (PISA) 2006, ECLS-K	Association between parental income and children's test scores	Iceland, Denmark, Poland, Korea, New Zealand, Germany, United States, Portugal, Luxembourg

in an older review of studies on educational mobility by Breen and Jonsson (2005). It is, therefore, interesting to see how the rankings of countries we obtain with our approach compare to rankings obtained by previous research which applied different methodologies and data sets to study educational mobility.

We contribute to research on the cross-country variation in educational mobility by providing estimates of country differences in sibling similarity for three educational outcomes (cognitive skills, school grades, and final educational attainment) using high-quality data from administrative registers and nationally representative surveys with large sample sizes. An important innovation of our study, compared to previous research, is that we not only analyze cross-country differences in educational mobility but that we also test whether the variation of educational mobility (i.e., sibling resemblance) across social groups varies across countries. Thus, this study tests not only if educational mobility varies across societies but also whether the underlying pattern of inequality in educational mobility varies across countries.

We expect both sibling similarity at the population level and differences in sibling similarity between social groups to vary across countries. Following the literature connecting income inequality and income mobility (Andrews and Leigh 2009; Björklund and Jäntti 2009; Corak 2013), we expect a higher sibling similarity in education in countries with more income inequality and less developed welfare states. We expect this to be accompanied by a higher similarity of siblings in socioeconomically advantaged families in these countries (Conley 2004, 2008; Griliches 1979). The alternative expectation is no or only little variation in educational mobility across countries, which would indicate that sibling similarity in education is mainly due to processes at the family-level which are similar across countries and not strongly affected by variation in the policy landscape (Clark 2014).

We selected a sample of advanced, industrialized societies that vary in their degree of

inequality, extensiveness of the social safety net, and institutional arrangements of their educational systems: Finland, Germany, Norway, Sweden, the United Kingdom, and the United States. These countries represent the liberal (United Kingdom and United States), conservative (Germany), and social democratic (Finland, Norway, and Sweden) welfare regimes in Esping-Andersen's (1990, 1999) influential terminology. The differences in welfare regimes are reflected in the different education systems that can be found in these countries. The Scandinavian social democratic countries have inclusive education systems in which pupils learn together for a long time, an extensive amount of public child care, and tuition-free universities. Germany's education system is characterized by early tracking between schools and Germany has a lack of early child care facilities. The United States have a high level of ability-tracking within schools. In the United Kingdom, pupils are tracked in the public school system at a comparatively late age (age 16) but there is a large private school sector to which upper class families often send their children. The United States and the United Kingdom also stand out with their high levels of tuition fees at the university level. These fees are especially high at the most prestigious universities.

Finally, the six countries differ in terms of income inequality. According to the World Bank, Germany's Gini coefficient, measuring income inequality, was 31.7 in 2015, Finland's 27.1, Norway's 27.5, Sweden's 29.2, the United Kingdom's 33.2, and the United States 41.5 (in 2016) (World Bank 2018). For all these reasons, the countries we analyze vary widely in their institutional structures which may lead to cross-country differences in the overall amount of educational mobility and in the variation of educational mobility between social groups within societies.

DATA AND METHODS

Data

We use survey data in Germany, the United Kingdom, and the United States. The German data come from the German Socio-Economic Panel Study (SOEP) (SOEP 2016; Goebel et al. 2018). For the United Kingdom, the United Kingdom Household Longitudinal Study (Understanding Society) is used (University of Essex, Institute for Social and Economic Research, and NatCen Social Research 2016). For the United States, we use the Panel Study of Income Dynamics (PSID) (PSID 2016) and the National Longitudinal Study of Adolescent to Adult Health (Add Health) (Harris 2009). Finland, Norway, and Sweden are analyzed using data from registers from the specific countries. We undertake extensive efforts to harmonize the data and variables as good as possible across countries. We limit the discussion of data sets and the construction of variables in the manuscript to the most necessary elements. Full details on the data sources and the construction of variables within each country are provided in the *Online Supplement, Appendix A. Details on the Specific Data Sets.*

Variables

We measure three educational outcomes, harmonized across the different data sets: cognitive skills, school grades, and final educational attainment. Not all outcomes are available for all countries, but we have information available on each outcome for at least three countries. Table 2 gives an overview over the sample sizes used to obtain the estimates of sibling similarity for each outcome in each country.

Cognitive skills are measured based on different tests that aim to measure the intellectual development of respondents. These tests were conducted as part of the survey in case of the PSID, Add Health, and the SOEP. Cognitive skills in the Norwegian and Swedish

Table 2. Sample Sizes of the Models Estimating Sibling Correlations.

Outcome	Finland	Germany	Norway	Sweden	United Kingdom	United States (PSID)	United States (Add Health)
Panel A: Cognitive Skills							
N Individuals		2,006	284,110	652,940		2,265	2,269
N Families		1,441	230,896	536,224		1,567	1,072
Panel B: School Grades							
N Individuals			403,661	1,026,673			1,620
N Families			271,162	683,546			1,040
Panel C: Final Educational Attainment							
N Individuals	79,467	1,034	643,701	2,302,256	5,017	5,578	
N Families	60,766	815	412,328	1,371,369	4,131	2,866	

Sources: Finland: Registers. Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United Kingdom: United Kingdom Household Longitudinal Study (Understanding Society), 8th Edition (DOI: 10.5255/UKDA-SN-6614-9). United States: Panel Study of Income Dynamics (PSID); National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

data refer to military conscription tests. Therefore, in Norway and Sweden this information is only available for men.[1] All measures of cognitive skills are standardized within each country. The age at which these cognitive skills are measured varies between 16–17 (Germany), 17–20 (Norway, Sweden), and 3–18 (United States).

We use *school grades* to construct in each country a measure of grade point sum or Grade Point Average (GPA). We standardize these measures within each country. Children are between ages 14 and 18 in the United States and between ages 16 and 17 in the remaining countries at the time school grades are measured.

Finally we study *final educational attainment*. This is a continuous variable which is based on years of education. Respondents are at least 25 years old when their final educational attainment is measured.

Table 3 presents the age and cohorts for which these variables are measured in each country.

In order to estimate the variation of sibling similarity by *family socioeconomic background* we distinguish between a low and a high social origin based on father's education, mother's education, and parental occupation. Father's and mother's education depend on the highest educational degree obtained by either parent. We identify in each country a major educational cut-off point which defines a high and a low level of education for the father and the mother. Parental occupation refers to whether the highest level of occupation of either parent is in a professional (high parental occupation) or in a non-professional (low parental occupation) position. In the *Online Supplement,* we also report separate results by maternal and paternal occupation.

Analytical Strategy

We measures sibling correlations using the intraclass correlation coefficients (ICC) of

Table 3. Overview over Respondent's Age and Birth Year by Outcome and Country.

Panel A: Cognitive Skills

Country	Age	Birth Year
Germany	16–17	1987–1997
Norway	17–20	1967–1976
Sweden	17–20	1965–1977
United States (PSID)	3–18	1985–1997
United States (Add Health)	11–18	1976–1984

Panel B: School Grades

Country	Age	Birth Year
Norway	16	1985–1992
Sweden	16	1982–1991
United States	14–18	1976–1980

Panel C: Final Educational Attainment (Years of Education)

Country	Age	Birth Year
Finland	30	1974–1980
Germany	25–38	1976–1989
Norway	30	1970–1980
Sweden	30	1960–1982
United Kingdom	25–43	1954–1989
United States	25–56	1954–1986

Sources: Finland: Registers. Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United Kingdom: UK Household Longitudinal Study (Understanding Society), 8th Edition (DOI: 10.5255/UKDA-SN-6614-9). U.S.: Panel Study of Income Dynamics (PSID); National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

multilevel models in which respondents (i) are nested within families (j) (Conley et al. 2007; Conley and Glauber 2008; Mazumder 2008; Schnitzlein 2014). The estimated models with outcome y_{ij} can be written as:

$$y_{ij} = \beta \, X_{ij} + \varepsilon_{ij} \tag{1}$$

with X_{ij} being the vector of control variables. Since we are purely interested in the intraclass correlations, we estimate empty models without any control variables.

The residual ε_{ij} can be decomposed into family-specific and individual-specific components under the assumption that the covariance between these two parts is zero:

$$\varepsilon_{ij} = a_j + b_{ij} \tag{2}$$

The intraclass correlation coefficients (ICC) ρ of these models are the sibling correlations. The ICC is given by the following relation of the variances:

$$\rho = \sigma_a^2 \, / \, (\sigma_a^2 + \sigma_b^2) \tag{3}$$

We estimated these models via restricted maximum likelihood estimation (REML) (Mazumder 2008; Schnitzlein 2014). The standard errors were estimated using the delta method. We report figures summarizing our main results below. The full results, including the precise point estimates and the corresponding standard errors, are reported in Tables S1 to S3 in the *Online Supplement*. The confidence intervals reported in the figures below were obtained by transforming the normal-based confidence intervals using the logit function so that the lower and the upper bound are limited to vary between 0 and 1.[2] All analyses were

conducted using the xtmixed or mixed command in recent versions (12 to 14) of Stata.

We included singletons in the estimation of the main models. We tested the robustness of our estimates to excluding singletons and obtained nearly identical results estimating models on samples including only respondents with at least one sibling with valid information in the data. These results are reported in Tables S4 to S6 in the *Online Supplement*.

We tested whether the sibling correlations are statistically significantly different across countries as well as whether the sibling correlations are statistically significantly different across social groups within countries using two-tailed tests. Before conducting these tests we applied Fisher's z-transformation to the sibling correlations. We tested differences between countries by comparing the z-transformed sibling correlation in a country to the sample-size-weighted average of the z-transformed sibling correlations in all other countries. We refer to these significance tests in the manuscript and report all significance tests in Tables S1 to S6 in the *Online Supplement*.

RESULTS

We summarize our results in three figures. Each figure refers to one of the three educational outcomes. Figure 1 reports sibling correlations and their variation by family socioeconomic background as well as between countries with respect to cognitive skills. Figure 2 shows sibling correlations in school grades. Finally, Figure 3 presents our estimates of sibling resemblance in final educational attainment (i.e. years of schooling). The estimates on which these figures are based are fully reported in Tables S1 to S3 in the *Online Supplement*.

The first column in each figure reports the population-level estimate of sibling similarity in each country. In most cases the sibling correlation for each country is statistically significantly different from the weighted average of the sibling correlations in the

other countries (significance tests are reported in the *Online Supplement*, Tables S1 to S3). However, the size of the differences in the sibling correlations between countries are rather small, suggesting that most of the intergenerational transmission of education is constant across countries.

Differences in sibling similarity across countries are smaller for cognitive skills and school grades than for final educational attainment (although we have information on fewer countries for these outcomes). In addition, the ranking of countries in terms of educational mobility measured by siblings correlations differs depending on whether we analyze cognitive skills or school grades. The results for cognitive skills show a higher sibling similarity, and, hence, lower educational mobility, in the United States than in Germany, Norway, and Sweden. The largest difference in sibling correlations is 0.12 (0.45 in Norway and 0.57 in the United States [PSID]).

Contrary to the results for cognitive skills, sibling similarity in school grades is lower in the United States than in Norway and in Sweden. The largest difference in sibling correlations in school grades is 0.10 (0.42 in the United States and 0.52 in Sweden). Hence, these findings suggest that educational mobility in school grades is slightly higher in the United States than in Sweden and in Norway.

The cross-country variation in sibling correlations is more pronounced in final educational attainment than in cognitive skills and in school grades. The correlation between siblings in educational attainment is comparatively high in the United States (0.51) and in Germany (0.51) and comparatively low in Finland (0.36), Norway (0.41), Sweden (0.44), and the United Kingdom (0.42). Overall, these country differences are, however, small. It is also interesting to note that the difference between Finland and Sweden, measuring the variation among the Nordic countries, is larger than the difference between Sweden and the two least mobile societies in our sample (Germany and the United States).
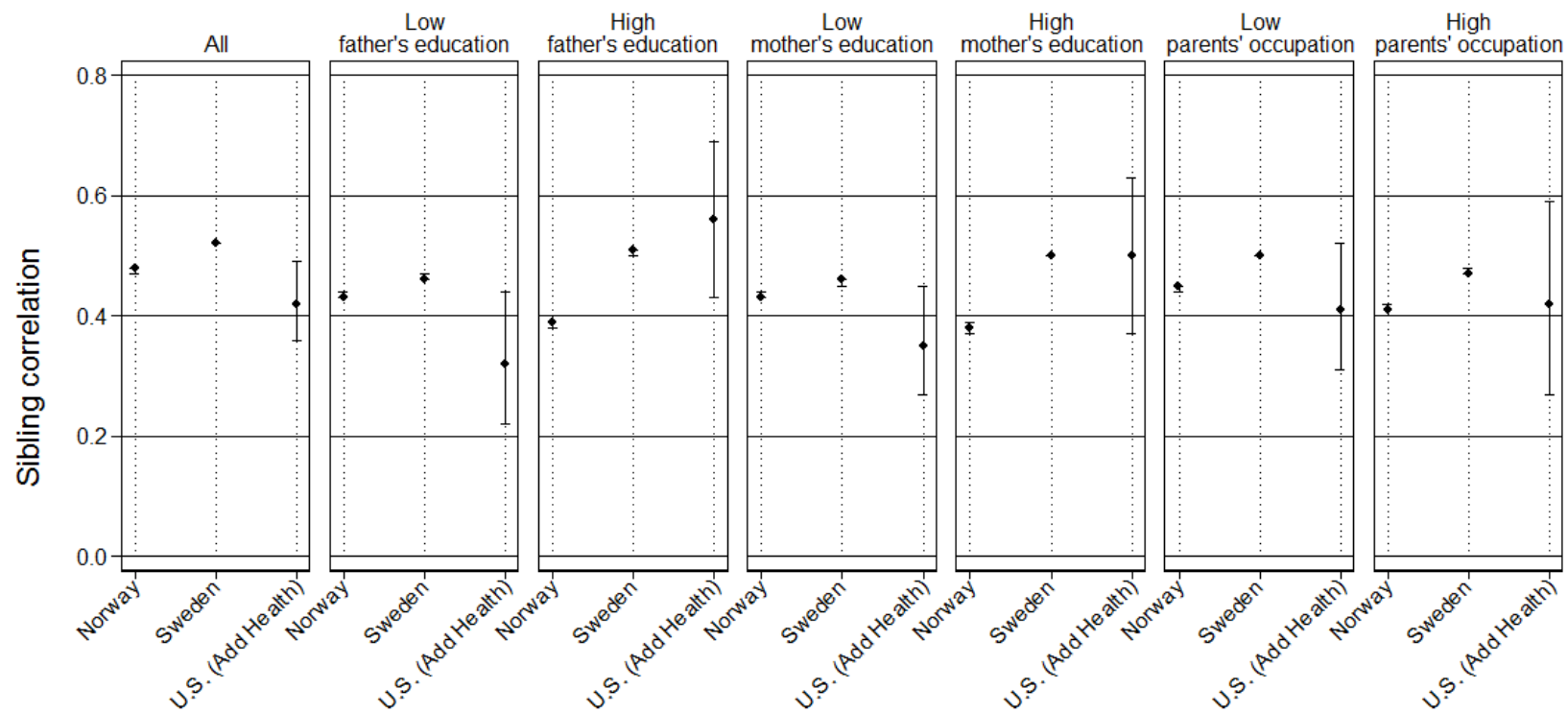
Figure 1. Sibling Correlations in Cognitive Skills.
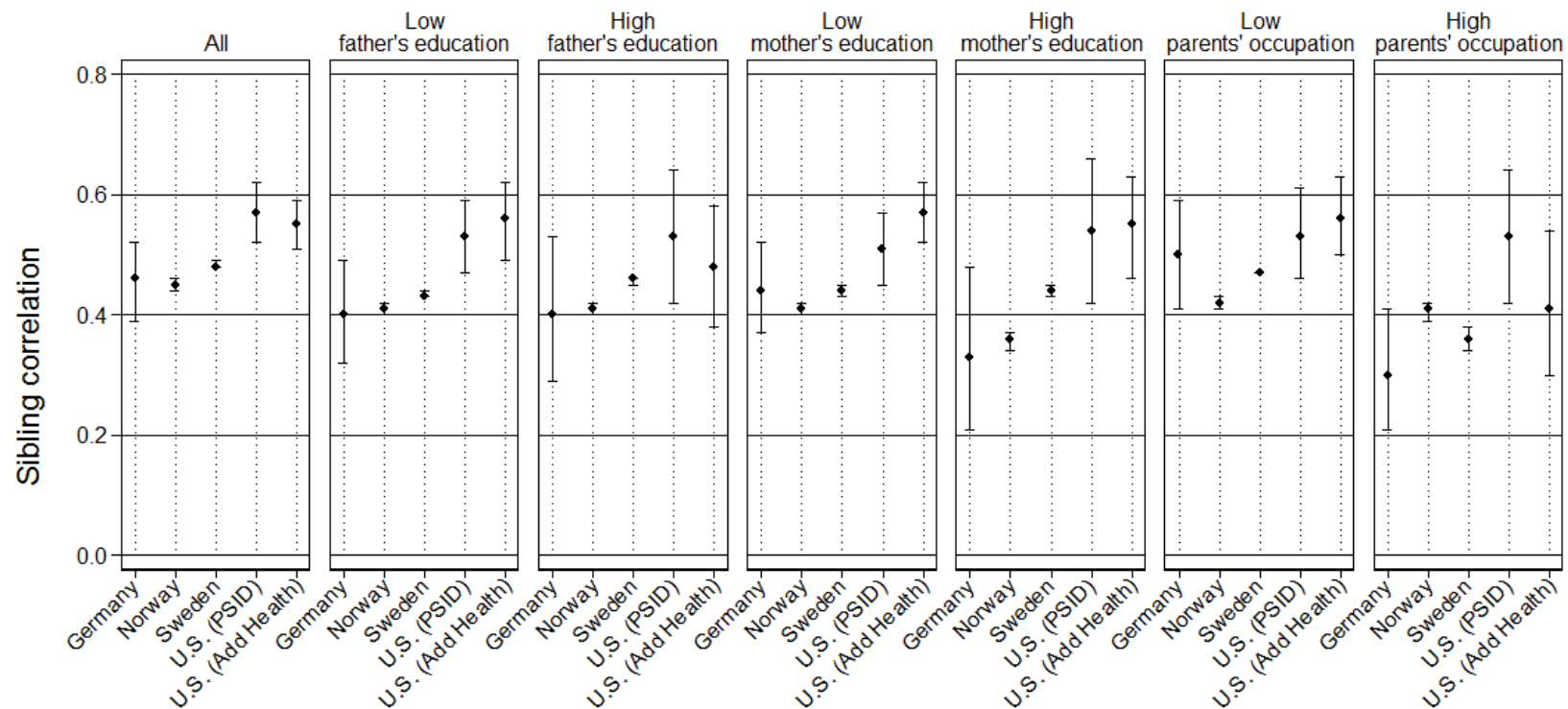
Note: 95% confidence intervals are bound to vary between 0 and 1.
Sources: Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United States: Panel Study of Income Dynamics (PSID); National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.
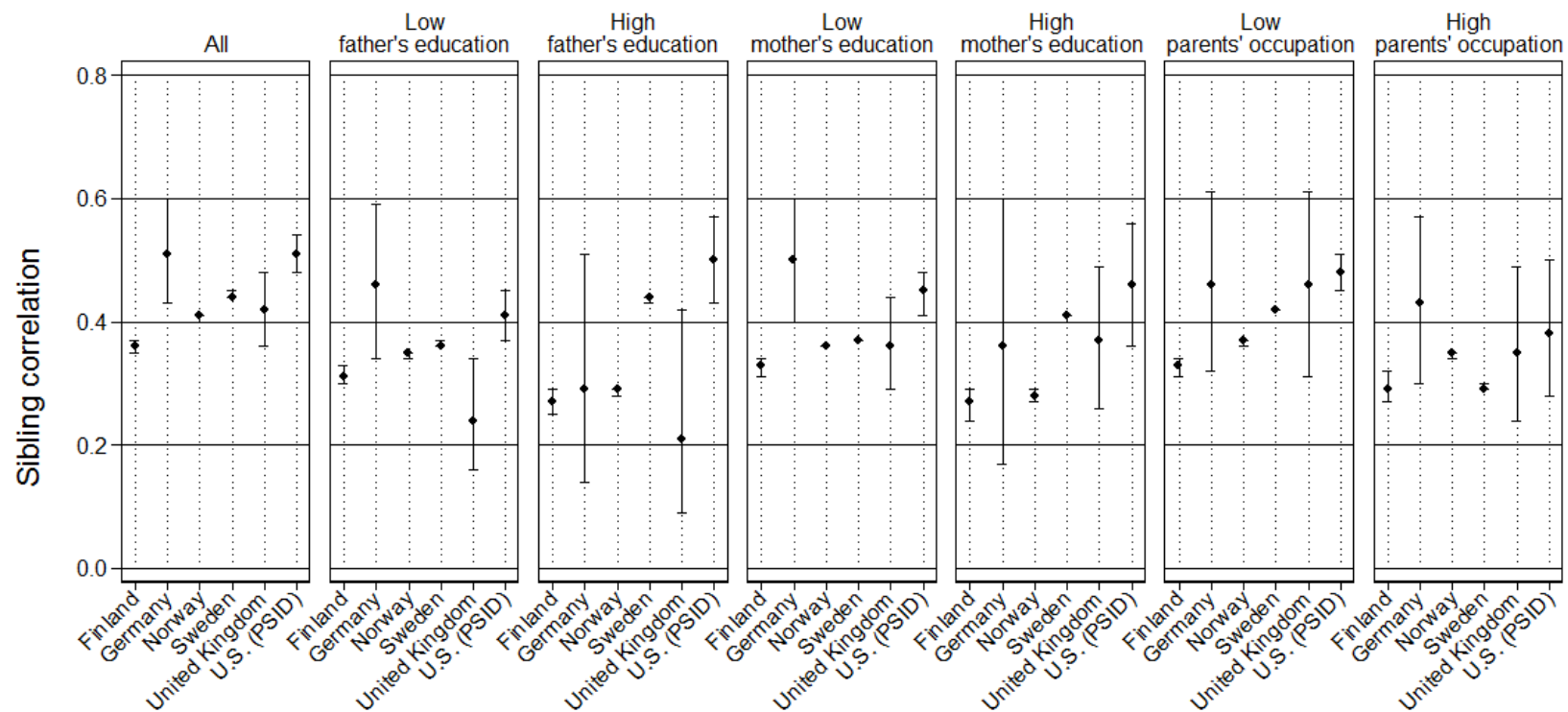
Figure 2. Sibling Correlations in School Grades.

Note: 95% confidence intervals are bound to vary between 0 and 1.
Sources: Norway: Registers. Sweden: Registers. United States: National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

Figure 3. Sibling Correlations in Final Educational Attainment.

Note: 95% confidence intervals are bound to vary between 0 and 1.
Sources: Finland: Registers. Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United Kingdom: UK Household Longitudinal Study (Understanding Society), 8th Edition (DOI: 10.5255/UKDA-SN-6614-9). United States: Panel Study of Income Dynamics (PSID).

Analyzing variation in sibling similarity between social groups allows us to explore the patterns underlying sibling similarity at the population level and to better understand cross-country differences. Our cross-country comparisons showed that sibling similarity in final educational attainment at the population level was higher in Germany and in the United States than in the Nordic countries and in the United Kingdom. The following analysis tests whether these country differences can be explained by differences in the variation of sibling similarity by family socioeconomic background. Our results contradict this expectation. In all countries there are no, or only very small, differences in sibling similarity between social groups and these differences do not vary across countries as a function of sibling similarity at the population level.

There are several statistically significant differences between social groups for final educational attainment as an outcome variable (for significance tests see Tables S1 to S3 in the *Online Supplement*). However, only in Finland and Norway differences between social groups are consistently higher in socioeconomically disadvantaged than in socioeconomically advantaged families for father's education, mother's education, and parental occupation. These differences are very small with the largest difference being 0.06 between high and low maternal education in Finland and 0.08 in Norway. We find no evidence for differences by family socioeconomic background that are robust to employing different indicators of social origin in Germany, the United Kingdom, Sweden, and the United States.

In no country systematic differences between social groups can be found with respect to cognitive skills. Variation in sibling resemblance by family socioeconomic background in school grades is very small and only in Norway siblings are consistently more similar in socioeconomically disadvantaged than in socioeconomically advantaged families. The largest difference is found for maternal education with sibling similarity being 0.06 higher for children with low educated mothers than for children with highly educated mothers. This is

certainly a substantively very small difference. In all other countries, there are no differences in sibling similarity between social origin groups that are robust to applying different indicators of family socioeconomic background. For instance, in the United States, the difference between siblings similarity in school grades in low and high father's education is 0.24 and, hence, larger than in Norway. However, no differences in sibling similarity in school grades by parental occupation are found in the United States. Hence, socioeconomic differences in sibling similarity in school grades are not robust to changing the indicator of social origin in the United States.

In additional analyses we found no systematic variation in sibling similarity by migration background, family size, or maternal age at birth. These findings hold in all countries included in our study. We report these results in Tables S1 to S3 in the *Online Supplement*. Hence, our finding of limited variation of sibling similarity by family socioeconomic background also applies to parental resources associated with migration background, family size, and maternal age at birth.

DISCUSSION AND CONCLUSION

In this study, we have analyzed the similarity of siblings in cognitive skills, school grades, and final educational attainment across different societies and between social groups within societies. Our findings suggest that the intergenerational transmission of education is partially affected by factors that vary at the country level. Differences between countries are larger for final educational attainment than for cognitive skills and for school grades, suggesting that educational attainment is influenced to a larger degree by factors varying between countries than cognitive skills and school grades.

Reducing sibling resemblance in final educational attainment in Germany and the United States (both 0.51) to the level of Finland (0.36) would reduce sibling similarity by

0.15. This variation shows the largest impact policies and institutions, such as the degree of tracking or the costs of education, possibly can have on educational mobility (Breen et al. 2009; Pfeffer 2008; van de Werfhorst 2015). But there are other possible explanations for differences between countries, for instance, demographic differences could account for the observed variation in educational mobility across countries (Maralani 2013; Mare 2011; Mare and Maralani 2006).

Notwithstanding some variation between countries exists, our study reveals overall a surprisingly high similarity in the level of sibling resemblance across countries.[3] The largest differences between countries are found for sibling correlations in educational attainment. However, sibling similarity in educational attainment varies only between 0.36 and 0.51 at the population level in the countries we study. These findings show that the largest part of sibling resemblance in education does not vary across countries. If we are interested in explaining why there is such a strong intergenerational transmission of education in advanced, industrialized societies, we have to note that educational mobility is to a large degree similar across countries. An additional finding of our study is that countries rank differently depending on whether cognitive skills, school grades, or educational attainment are used to measure education. This finding further complicates the explanation of how institutions affect educational inequality and the role of income inequality in this process (Andrews and Leigh 2009; Björklund and Jäntti 2009; Corak 2013; Pfeffer 2008; van de Werfhorst 2015).

Not only do our rankings of countries differ across different measures of education, they are also at odds with the rankings reported by previous research (Bol and van de Werfhorst 2013; Chmielewski and Reardon 2016; Hertz et al. 2008; Pfeffer 2008; Treiman and Yip 1989). Of course, differences in rankings are likely to be due to methodological differences between studies. However, given that each methodological approach has its own

advantages and disadvantages, a conservative interpretation of the finding of diverging rankings of countries in terms of educational mobility is that there is no unambiguous ranking of countries according to their levels of educational mobility—a conclusion which supports the claim made by Breen and Jonsson (2005).

With respect to variation in educational mobility across social groups, we found no evidence that sibling similarity in education varies by family socioeconomic background. Our findings are in line with previous research which found no such differences in Germany (Grätz 2018) and the United States (Conley 2008; Conley and Glauber 2008; Conley et al. 2007). We replicate and expand these findings to a plurality of educational outcomes (cognitive skills, school grades, and final educational attainment) and societies (Finland, Germany, Norway, Sweden, the United Kingdom, and the United States). Previous research, however, identified stronger socioeconomic differences in sibling similarity in non-cognitive skills in Germany (Anger and Schnitzlein 2017) and in the United States (Conley et al. 2007) and in occupational outcomes in the United States (Conley and Glauber 2008). Further research is needed to analyze whether these socioeconomic differences in sibling similarity in non-cognitive skills and labor market outcomes vary across countries in a systematic way.

Our major finding of a rather high level of similarity in educational mobility across countries leads us to two main conclusions. First, research which analyzes mechanisms bringing about educational inequalities within one country may generalize to other countries given that advanced, industrialized countries show a similar level of educational mobility. Second, factors which vary across countries, such as educational systems and other institutions, are not likely to be the most important factors driving educational mobility. It is more likely that the intergenerational transmission of education is mainly due to factors and processes at the family level which are unlikely to be strongly affected by educational policies. Given that we found no evidence for variation of educational mobility between

social groups within countries, these processes are likely to operate in both socioeconomically advantaged and socioeconomically disadvantaged families.

ENDNOTES

1. There is a possibility that estimates for male siblings may be different than for siblings with mixed gender. We can, however, not take into account this possibility as, due to small sample sizes, we cannot estimate models restricted to male siblings in Germany and in the United States.

2. Normal-based confidence intervals are reported in Tables S7 to S12 in the *Online Supplement*.

3. Because our data are only suitable for examining estimates of educational mobility at the national level, we cannot speak to the geographic variation within countries. While we find that the United States evinces more or less similar levels of educational mobility compared to the other countries in our sample, there may be geographic variation that we cannot account for. Chetty et al. (2014) demonstrated considerable regional variation in income mobility in the United States. We are not aware of similar studies with respect to educational mobility.

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Online Supplement to

Universal Family Background Effects on Education Across and Within Societies

This online supplement includes:

Appendix A. Details on the Specific Data Sets

Appendix B. Tables S1 to S12

Appendix A. Details on the Specific Data Sets

Finland. The Finnish data is based on administrative registers combined by Statistics Finland. The data is based on a ten percent sample of the population alive in 1980. The sample has first been expanded to include information on all children, children's children, or subsequent generations born by 1991. Each of these is matched with spouses (cohabiting or married) by 2010 as well as linked with the biological parents of the spouse. For the analyses conducted here we included the sample persons and their children to ensure representativeness at the population level. The sample included approximately 15 percent of the birth cohort born between 1974 and 1980.

Outcome variable in the Finnish case is the educational degree people have achieved by age 30, measured in years of education. The information for this variable is observed between 2004 and 2010, depending on each annual birth cohort.

Background variables include father's and mother's education, parental occupation, and the number of siblings. Parental education was measured when the children were 15 years old, separately for both parents. Low education means basic or vocational upper secondary education (*ammattikoulu*) and high education refers to general upper secondary (*ylioppilas*), post-secondary non-higher education (*opistokoulutus* or similar), bachelor-level higher education, or higher education in either polytechnics or universities (*ammattikorkeakoulu* or *yliopisto*).

Parental EGP class was used to measure a high or a low level of parental occupation. A high level of parental occupation includes higher and lower service occupations (EGP class I and II) and self-employed with employees (IVa). A low level of parental occupation includes all other occupational categories. Parental occupation was measured around age 20 of all children. More precisely, it was measured in 1995 for cohorts born between 1974 and 1977

(age 18 to 21) and in 2000 for cohorts born between 1978 and 1980 (age 20 to 22). This was due to occupations were only measured every five years during this period.

Number of siblings refers to all biological siblings from the mother's side. Siblings born after 1990 were not included. This results in minor underestimations of the number of siblings in the family although most siblings are born within short intervals.

Germany. For Germany, data from version 31.1 (DOI: 10.5684/soep.v31.1) of the German Socio-Economic Panel Study (SOEP) is used. There are two different samples constructed, one to analyze sibling similarity in cognitive skills and the other to estimate sibling correlations in educational attainment.

Cognitive skills are measured based on a test measuring cognitive potential conducted as part of the survey when respondents were age 16 to 17. Educational attainment is a variable reporting the years of education needed to obtain a certain degree.

Parental background variables are based on parental education and occupation. Occupational information refers to the EGP class schema. A high level of maternal or paternal occupation is an occupation in EGP class I and II (professional and managerial occupations) or IVa (employers with employees), a low level all other occupations. A high level of maternal or paternal education is assigned if the mother or father holds the highest school-leaving certificate (*Abitur*) or an equivalent qualification, a low level for all qualifications below *Abitur* level. In addition to separate results for maternal and paternal occupation and education, we also report results for parental occupation and education. These models use the highest occupation or level of education obtained by one of the parents.

Norway. The Norwegian data comes from several different administrative registers, such as censuses, employer-employee registers, and the Norwegian educational data bases (NUDB).

Individual-level anonymized data files are delivered by Statistics Norway. The Norwegian results are obtained using two distinct extracts from the register system. The first set of data, covers all Norwegians born after 1954. It is used to analyze the highest educational attainment among 30 year olds born between 1970 and 1980; and school grades for 16 year olds in the period 2001–2008. This second data set is used to analyze cognitive outcomes and covers the Norwegian birth cohorts 1967–1976.

Each outcome is analyzed on a specific sample. Our measure for cognitive ability comes from the Norwegian military conscription register. It is only available for men, and our sample is further limited to the members of the 1967–1976 Norwegian birth cohorts. Over 98% of conscripted individuals took the conscription test between the ages of 17 and 20, and so we exclude individuals who took the tests outside of these ages to keep the sample age homogenous. The cognitive ability test consists of several subtests that measured logical, spatial, verbal, and technical abilities. Each of these sub-tests is first evaluated on a normalized 9-point (stanine) scale. The subtest scores are summed to obtain an overall score and transformed onto a stanine scale with a mean of 5 and a standard deviation of 2. The cognitive test includes three subtests of arithmetic, word similarities, and figures. A general cognitive ability score is the combined measure of the performance on the three tests seen together, obtained by transforming the raw scores in a standardization sample into normally distributed F scores (M=50, SD=20). The F scores are added and subsequently transformed into stanine scores (with a mean of 5 and a standard deviation of 2).

Our two next dependent measures are not restricted by gender. Our measure of school grades is the sum of grade scores from compulsory-level school at the age of 16. These scores are standardized. Information on these scores is available in the period 2001–2008. Consequently, the analyses of this outcome are restricted to those who received a grade at compulsory school level in the given time period; individuals born between 1985 and 1992.

Educational attainment is measured as the number of years of education that correspond to a specific educational level achieved by the age of 30. In the analyses of educational attainment, we use birth cohorts born between 1970 and 1980.

All individuals have information on demographic and family background variables. The following variables are used to obtain estimates of sibling similarity within subsamples: number of siblings, immigrant background, father and mother's education when the individuals were age 16, the mother and father's occupation. High parental education is defined if one of the parents obtained a university degree. High parental occupation is based on if one of the parents is a professional or manager. There are small differences in measurement between the two data sets. Parental occupation is measured in register data covering 2003–2008 in the first data set, while it is taken from the 1980 Census in the second data set (which cover an older population). The analysis of cognitive skills includes no migrants in the sample.

Sweden. In Sweden each individual has a unique personal identification number (PIN). This PIN makes it possible to link the records of an individual across the various administrative registers. This study draws heavily upon the Swedish multi-generational register. The multi-generational register contains information on the PIN of each individual and of that individual's parents. This allows us to identify the biological mother and father of each individual, and, in turn, to identify any other biological kin relations. The main family members of interest in this study are the mother, father, and siblings. We use information on the biological mother and father to identify the sibling group.

The data on GPA is taken from grades from the final year of *grundskolan* (*Årskurs 9*), which is the ninth year of compulsory education. Students are typically 16 years old in ninth grade. The system for assigning grades in the Swedish high school system has changed

several times over the past decades, and so we limit our analyses to a period, 1998 to 2007, where the grade system stayed constant. This means studying cohorts born 1982 to 1991, who were aged 16 between 1998 and 2007. During this period in the Swedish compulsory school system, grades could range from pass with special distinction, to pass with distinction, pass, or fail. To construct an overall score, each of these grades was assigned a numerical score, where pass with special distinction was equal to 20, pass with distinction equal to 15, pass equal to 10, and fail equal to 0. The overall GPA was calculated by summing the values for the 16 best grades achieved by any given pupil, and the overall range was therefore 0 to 320.[1]

To examine educational attainment we use data on cohorts born 1960 to 1982, and look at the number of years of educational attainment achieved by age 30. This measure is based upon the number of years of education that correspond to the specific level of education achieved by age 30, and may not in all cases reflect the actual number of years that an individual spent in the educational system.

Our measure for cognitive ability comes from the Swedish military conscription register but is only available for men as women were not required to take conscription tests in Sweden. Nevertheless, in our analyses of cognitive ability the measure of family size is based upon the full sibling group, including male and female siblings. In these analyses we use men born between 1965 and 1977. Over 98% of conscripted individuals took the conscription test between the ages of 17 and 20. We exclude individuals who took the tests outside of these ages to keep the sample age homogenous. The cognitive ability test consisted of subtests that measured logical, spatial, verbal, and technical abilities. Each of these sub-tests was first evaluated on a normalized 9-point (stanine) scale. The subtest scores were summed to obtain an overall score and transformed onto a stanine scale with a mean of 5 and a standard deviation of 2.

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[1] Skolverket. 2010. "Facts and Figures about Pre-school Activities, School-age Childcare, Schools and Adult Education in Sweden 2010". Stockholm: Swedish National Agency for Education.

United Kingdom. For the United Kingdom, we use data from the 8th edition of "Understanding Society" (DOI: 10.5255/UKDA-SN-6614-9), the United Kingdom Household Longitudinal Study (UKHLS). Siblings refer to children born to the same mother.

Years of education are obtained as the answer to the questions how old respondents were you when they left school, or, if applicable, further education.

Parental education is based on the ISCED classification of parents' self-reported educational degrees with "low" education denoting degrees in the ISCED categories 0–4 and "high" in the categories 5 and 6. Parental occupation is based on the National Statistics Socio-economic Classification (NS-SEC), with the "low" category comprising intermediate or routine and manual occupations and the "high" category managerial and professional occupations. Occupations were classified based on parents' self-reported occupations. If parents reported different occupations or educational degrees in different survey waves, we used the highest one reported. Migrant background refers to the situation that one or both of the parents were not born in the UK.

United States. For calculating sibling correlations in educational attainment for the U.S., we used the main dataset of the Panel Study of Income Dynamics (PSID). The PSID is a longitudinal, statistically representative survey which was collected annually from 1968 to 1997 and biennially thereafter up to the present. Because we wish to capture educational attainment during adulthood while also linking to parents' attributes in the main dataset, we focus on individuals who were either "heads" (in practice, usually the husband or adult male "breadwinner" of the household) or "wives" (in practice, usually adult women who married into or otherwise formed their own households) who were 25 years or older in any wave from 1983 to 2011. We iteratively obtained the earliest possible measures for education for the

eligible heads and wives and their parents. We use 1968 as a baseline for obtaining information on parental education. The cut-off point for "high" and "low" levels of education was more than 15 years of attainment (corresponding to a bachelor's degree in the U.S.) and less than 16 years (high school graduate). With respect to final educational attainment, we do not stratify results based on father's and mother's occupational status because of the older cohorts included in our educational attainment data were largely dominated by single-earner households. For the PSID results stratified by occupational status, we offer estimates based on the occupation of the head of household (and 'wife' when stratifying in the newer modules), which in practice signifies the father (and mother) in the great majority of cases. (Occupational status is only available at the family unit level, so unlike education we cannot link individual data on children to their mothers and fathers, but only to the 'heads/wives' of their households.)

For measuring cognitive skills, we partly rely on the Child Development Supplement (CDS) of the PSID, which consists of children who were 0–12 at the first wave in 1997. Information was subsequently collected from children and their families in 2002 and 2007, unless they transitioned into adulthood (in that case becoming part of a more limited supplement, the Transition to Adulthood [TA] module). For our purposes, because children younger than three years old were not tested, our sample consists of children who were approximately 3–12 in 1997, 5–18 in 2002, and 10–18 in 2007. Our measures of interest are an age-standardized overall score averaging percentile scores in applied problems (math) and broad reading (verbal). We averaged the cognitive scores over waves for children with multiple observations (i.e. a 4-year-old in 1997 who was retested at ages 9 and 14 in 2002 and 2007 waves, respectively). Our cognitive measures from the CDS consist specifically of Woodcock-Johnson tests of cognitive abilities. The scores (already age-standardized) are then standardized to the sample of children, such that estimates are obtained for intra-family z-

score correlations. Restricting the sample to older ages, which are more closely resembling the age restrictions in the other countries, results in sibling correlations at the population level of .52 (95% CI: .47, .57; age 14–18; N=1,183) and .48 (95% CI: .38, 58; age 16–18; N=585). Hence, the estimates of the smaller age groups are smaller but not statistically significantly different to those obtained using ages 3–18. Therefore, these estimates would lead to even smaller variation across countries. Nevertheless we decided to use the larger age group in order to have larger sample sizes for the comparisons by family socioeconomic background.

We also used Add Health Picture Vocabulary Test (AHPVT) scores for measuring cognition, which is an abridged, age-standardized version of the Peabody Picture Vocabulary Test. Add Health (or the National Longitudinal Study of Adolescent to Adult Health) is a longitudinal study of adolescents which has started in 1994–1995 and includes follow-up waves in 1996, 2001–2002, 2008, and a planned fifth wave in 2016–2018. Our sample consists of Wave I respondents, who were enrolled in 7th to 12th grade in the 1994/1995 school year. Because unique family identifiers (which are necessary for obtaining intra-family correlations) are only available on restricted contract, we use protected data to connect siblings to one another. Again, we tested how restricting the age at which cognitive scores are observed affected the estimates: we obtained sibling correlations at the population level of .55 (95% CI: .51, 58; age 14–18; N=1,537) and .53 (95% CI: .46, .60; age 16–18; N=838). These estimates are again lower but not statistically significantly different for those obtained using ages 11–18.

For Grade Point Average (GPA), we again use Add Health data, but restrict our sample to 14 to 18 year olds in an effort to standardize grades by confining them to the years of secondary education in the United States, rather than, for example, comparing middle schoolers to their older siblings. GPA is measured on a conventional four-point scale rendered from the Wave I dataset, and, then, standardized to the sample by obtaining z-

scores. Restricting the sample to those for which we observe grades at ages 16–18 (N=944) leads to an estimated sibling similarity at the population level of .41 (95% CI: .33, .49). This estimate is nearly identical to the estimate using ages 14–18.

Appendix B. Tables S1 to S12

Tables S1-3. Sibling Similarity in Cognitive Skills, School Grades, and Educational Attainment, Full Tables of Results

Table S1. Sibling Correlations in Cognitive Skills

	Germany	Norway	Sweden	United States	
				PSID Read-Math	**Add Health**
N Individuals	2,006	284,110	652,940	2,265	2,269
N Families	1,441	230,896	536,224	1,567	1,072
Overall	.46	.45*	.48*	.57*	.55*
	(.03)	(.00)	(.00)	(.02)	(.02)
	[.39, .52]	[.44, .46]	[.48, .49]	[.52, .62]	[.51, .59]
Highest education of either parent					
Low	.43	.40	.42	.51	.55
	(.04)	(.00)	(.00)	(.03)	(.04)
	[.35, .52]	[.39, .41]	[.42, .43]	[.44, .58]	[.48, .63]
High	.35	.41	.45	.52	.53
	(.06)	(.01)	(.00)	(.05)	(.04)
	[.25, .47]	[.40, .42]	[.45, .46]	[.42, .62]	[.45, .60]
Difference	.08*	−.01*	−.03*	−.01	.02
Father's education					
Low	.40	.41	.43	.53	.56
	(.04)	(.00)	(.00)	(.03)	(.03)
	[.32, .49]	[.40, .42]	[.43, .44]	[.47, .59]	[.49, .62]
High	.40	.41	.46	.53	.48
	(.06)	(.01)	(.00)	(.06)	(.05)
	[.29, .53]	[.40, .42]	[.45, .46]	[.42, .64]	[.38, .58]
Difference	.00	.00	−.03*	.00	.08*
Mother's education					
Low	.44	.41	.44	.51	.57

	(.04)	(.00)	(.00)	(.03)	(.03)
	[.37, .52]	[.40, .42]	[.43, .45]	[.45, .57]	[.52, .62]
High	.33	.36	.44	.54	.55
	(.07)	(.01)	(.00)	(.06)	(.05)
	[.21, .48]	[.34, .37]	[.43, .45]	[.42, .66]	[.46, .63]
Difference	.11*	.05*	.00	−.03	.02

Highest parental occupation

Low	.50	.42	.47	.53	.56
	(.05)	(.00)	(.00)	(.04)	(.03)
	[.41, .59]	[.41, .43]	[.47, .47]	[.46, .61]	[.50, .63]
High	.30	.41	.36	.53	.41
	(.05)	(.01)	(.01)	(.06)	(.06)
	[.21, .41]	[.39, .42]	[.34, .38]	[.42, .64]	[.30, .54]
Difference	.20*	.01	.11*	.00	.15*

Father's occupation

Low	.49	.43	.47	.55	.51
	(.05)	(.00)	(.00)	(.03)	(.03)
	[.41, .58]	[.42, .43]	[.47, .48]	[.49, .60]	[.46, .57]
High	.29	.41	.35	.56	.38
	(.06)	(.01)	(.01)	(.07)	(.07)
	[.20, .41]	[.40, .42]	[.33, .37]	[.42, .69]	[.24, .53]
Difference	.20*	.02*	.12*	−.01	.13*

Mother's occupation

Low	.46	.44	.47	.56	.57
	(.05)	(.00)	(.00)	(.03)	(.02)
	[.36, .55]	[.43, .44]	[.47, .48]	[.50, .62]	[.52, .62]
High	.32	.39	.37	.46	.55
	(.06)	(.01)	(.02)	(.07)	(.08)
	[.22, .44]	[.37, .41]	[.35, .40]	[.34, .59]	[.38, .70]
Difference	.24*	.05*	.10*	.10*	.02

Migration Background

No migrant background	.40	n/a	.47	.57	.46
	(.04)		(.00)	(.03)	(.03)
	[.32, .48]		[.47, .48]	[.52, .62]	[.40, .53]
Migrant background	.47	n/a	.52	.58	.59
	(.07)		(.01)	(.07)	(.04)
	[.34, .60]		[.51, .53]	[.43, .71]	[.50, .66]
Difference	.07	n/a	−.05*	.01	−.13*

Family Size

3 children and less	.47	.44	.47	n/a	n/a
	(.03)	(.00)	(.00)		
	[.41, .54]	[.43, .45]	[.46, .47]		
More than 3 children	.31	.47	.55	n/a	n/a
	(.14)	(.01)	(.00)		
	[.11 .63]	[.46, .48]	[.54,.55]		
Difference	.16	−.03*	−.08*	n/a	n/a

Maternal Age at Birth

25 or younger	.55	.44	.46	.57	.56
	(.06)	(.01)	(.00)	(.04)	(.03)
	[.43, .66]	[.43, .45]	[.45, .47]	[.49, .65]	[.50, .62]
26 or older	.42	.47	.50	.54	.54
	(.04)	(.01)	(.00)	(.04)	(.04)
	[.33, .51]	[.46, .49]	[.49, .50]	[.47, .61]	[.46, .62]
Difference	.13*	−.03*	−.04*	.03	.02

Note: Standard errors in parentheses and 95% confidence intervals in square brackets.

* indicates (a) if attached to the population-level estimate: that the sibling correlation in a country is statistically significantly different from the weighted average sibling correlation of all other countries at the 5% level; (b) if attached to the difference between social groups: that the conditional sibling correlations at the group level are statistically significantly different from each other within the same country at the 5% level. All differences are calculated using the unrounded sibling correlations.

Sources: Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United States: Panel Study of Income Dynamics (PSID) and National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

Table S2. Sibling Correlations in School Grades

	Norway	Sweden	United States
N Individuals	403,661	1,026,673	1,620
N Families	271,162	683,546	1,040
Overall	.48*	.52*	.42*
	(.00)	(.00)	(.03)
	[.47, .48]	[.52, .52]	[.36, .49]
Highest education of either parent			
Low	.42	.44	.30
	(.00)	(.00)	(.06)
	[.41, .42]	[.44, .45]	[.20, .44]
High	.39	.50	.51
	(.00)	(.00)	(.06)
	[.39, .40]	[.50, .50]	[.40, .62]
Difference	.02*	−.06*	−.21*
Father's education			
Low	.43	.46	.32
	(.00)	(.00)	(.06)
	[.43, .44]	[.46, .47]	[.22, .44]
High	.39	.51	.56
	(.00)	(.00)	(.07)
	[.38,. 40]	[.50, .51]	[.43, .69]
Difference	.04*	−.05*	−.24*
Mother's education			
Low	.43	.46	.35
	(.00)	(.00)	(.05)
	[.43, .44]	[.45, .46]	[.27, .45]
High	.38	.50	.50
	(.00)	(.00)	(.07)
	[.37, .39]	[.50, .50]	[.37, .63]
Difference	.06*	−.04*	−.15*

Highest parental occupation

Low	.45	.50	.41
	(.00)	(.00)	(.05)
	[.44, .45]	[.50, .50]	[.31, .52]
High	.41	.47	.42
	(.00)	(.00)	(.09)
	[.40, .42]	[.47, .48]	[.27, .59]
Difference	.04*	.03*	−.01

Father's occupation

Low	.45	.51	.40
	(.00)	(.00)	(.05)
	[.44, .45]	[.50, .51]	[.31, .49]
High	.41	.48	.47
	(.00)	(.00)	(.10)
	[.41, .42]	[.47, .49]	[.28, .66]
Difference	.04*	.03*	−.07

Mother's occupation

Low	.45	.51	.44
	(.00)	(.00)	(.04)
	[.45, .46]	[.51, .51]	[.36, .52]
High	.40	.48	.38
	(.00)	(.01)	(.15)
	[.39, .41]	[.47, .50]	[.16, .69]
Difference	.05*	.03*	.06

Migration Background

No migrant background	.47	.51	.42
	(.00)	(.00)	(.05)
	[.47, .48]	[.50, .52]	[.33, .51]
Migrant background	.52	.51	.49
	(.01)	(.00)	(.07)
	[.50, .54]	[.51, .52]	[.36, .62]

Difference	−.05*	.00	−.07
Family Size			
3 children and less	.48	.52	n/a
	(.00)	(.00)	
	[.47, .48]	[.52, .52]	
More than 3 children	.50	.53	n/a
	(.01)	(.00)	
	[.49, .51]	[.52, .53]	
Difference	−.02*	−.01*	n/a
Maternal Age at Birth			
25 or younger	.45	.47	.44
	(.00)	(.00)	(.05)
	[.44, .45]	[.46, .47]	[.34, .54]
26 or older	.48	.52	.46
	(.00)	(.00)	(.07)
	[.48, .49]	[.52, .53]	[.33, .59]
Difference	−.04*	−.05*	−.02

Note: Standard errors and 95% confidence intervals in square brackets.

* indicates (a) if attached to the population-level estimate: that the sibling correlation in a country is statistically significantly different from the weighted average sibling correlation of all other countries at the 5% level; (b) if attached to the difference between social groups: that the conditional sibling correlations at the group level are statistically significantly different from each other within the same country at the 5% level. All differences are calculated using the unrounded sibling correlations.

Sources: Norway: Registers. Sweden: Registers. United States: National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

Table S3. Sibling Correlations in Final Educational Attainment (Years of Education)

	Finland	Germany	Norway	Sweden	United Kingdom	United States
N Individuals	79,467	1,034	643,701	2,302,256	5,017	5,578
N Families	60,766	815	412,328	1,371,369	4,131	2,866
Overall	.36*	.51*	.41*	.44*	.42	.51*
	(.01)	(.05)	(.00)	(.00)	(.03)	(.01)
	[.35, .37]	[.43, .60]	[.40, .41]	[.44, .45]	[.36, .48]	[.48, .54]
Highest education of either parent						
Low	.31	.46	.33	.33	.18	.39
	(.01)	(.06)	(.00)	(.00)	(.05)	(.02)
	[.29, .33]	[.34, .58]	[.33, .34]	[.33, .34]	[.09, .31]	[.35, .43]
High	.28	.35	.29	.43	.32	.51
	(.01)	(.09)	(.00)	(.00)	(.06)	(.03)
	[.26, .30]	[.21, .53]	[.28, .29]	[.43, .43]	[.21, .45]	[.45, .57]
Difference	.03*	.11	.04*	−.10*	−.14*	−.12*
Father's education						
Low	.31	.46	.35	.36	.24	.41
	(.01)	(.06)	(.00)	(.00)	(.05)	(.02)
	[.30, .33]	[.34, .59]	[.34, .35]	[.36, .37]	[.16, .34]	[.37, .45]
High	.27	.29	.29	.44	.21	.50
	(.01)	(.10)	(.00)	(.00)	(.08)	(.03)
	[.25, .29]	[.14, .51]	[.28, .29]	[.43, .44]	[.09, .42]	[.43, .57]
Difference	.04*	.17*	.06*	−.08*	.03	−.09*
Mother's education						
Low	.33	.50	.36	.37	.36	.45
	(.01)	(.05)	(.00)	(.00)	(.04)	(.02)
	[.31, .34]	[.40, .60]	[.36, .36]	[.37, .37]	[.29, .44]	[.41, .48]
High	.27	.36	.28	.41	.37	.46
	(.01)	(.12)	(.00)	(.00)	(.06)	(.05)
	[.24, .29]	[.17, .60]	[.27, .29]	[.40, .41]	[.26, .49]	[.36, .56]

Difference	.06*	.14*	.08*	−.04*	−.01	−.01
Highest parental occupation						
Low	.33	.46	.37	.42	.46	.48
	(.01)	(.08)	(.00)	(.00)	(.08)	(.02)
	[.31, .34]	[.32, .61]	[.36, .37]	[.42, .42]	[.31, .61]	[.45, .51]
High	.29	.43	.35	.29	.35	.38
	(.01)	(.07)	(.00)	(.00)	(.06)	(.06)
	[.27, .32]	[.30, .57]	[.34, .35]	[.29, .30]	[.24, .49]	[.28, .50]
Difference	.03*	.03	.02*	.13*	.11*	.10*
Father's occupation						
Low	.32	.42	.37	.43	.27	n/a
	(.01)	(.08)	(.00)	(.00)	(.05)	
	[.31, .34]	[.28, .57]	[.37, .38]	[.43, .43]	[.18, .38]	
High	.29	.46	.35	.30	.28	n/a
	(.01)	(.07)	(.00)	(.00)	(.07)	
	[.27, .32]	[.32, .60]	[.34, .36]	[.29, .31]	[.16, .45]	
Difference	.03*	−.04	.02*	.13*	−.01	n/a
Mother's occupation						
Low	.34	.60	.38	.44	.42	n/a
	(.01)	(.06)	(.00)	(.00)	(.05)	
	[.32, .35]	[.49, .71]	[.38, .38]	[.43, .44]	[.34, .51]	
High	.30	.35	.33	.26	.32	n/a
	(.01)	(.10)	(.01)	(.01)	(.06)	
	[.27, .33]	[.18, .57]	[.32, .34]	[.25, .27]	[.22, .45]	
Difference	.04*	.25*	.05*	.18*	.10*	n/a
Migration Background						
No migrant background	n/a	.45	.40	.44	.38	n/a
		(.05)	(.00)	(.00)	(.06)	

	Finland	Germany	Norway	Sweden	United Kingdom	United States
		[.35, .56]	[.40, .41]	[.44, .45]	[.28, .50]	
Migrant background	n/a	.70	.43	.43	.23	n/a
		(.07)	(.01)	(.00)	(.06)	
		[.56, .82]	[.41, .45]	[.43, .44]	[.14 .36]	
Difference	n/a	−.25*	−.02*	.01*	.15*	n/a
Family Size						
3 children and less	.35	.50	.39	.44	.48	.51
	(.01)	(.05)	(.00)	(.00)	(.03)	(.03)
	[.34, .37]	[.41, .59]	[.38, .39]	[.43, .44]	[.42, .54]	[.47, .55]
More than 3 children	.37	.54	.42	.45	.13	.47
	(.01)	(.22)	(.00)	(.00)	(.06)	(.02)
	[.35, .39]	[.17, .87]	[.41, .42]	[.45, .45]	[.05, .30]	[.42, .52]
Difference	.02	.04	.03*	.01*	−.35*	.04
Maternal Age at Birth						
25 or younger	.34	.43	.39	.42	.45	.47
	(.01)	(.10)	(.00)	(.00)	(.04)	(.02)
	[.32, .36]	[.24, .63]	[.38, .39]	[.41, .42]	[.37, .54]	[.43, .52]
26 or older	.35	.53	.41	.46	.37	.55
	(.01)	(.07)	(.00)	(.00)	(.05)	(.02)
	[.34, .37]	[.40, .65]	[.40, .41]	[.46, .46]	[.28, .46]	[.51, .60]
Difference	.01	.10*	.02*	.04*	−.08*	.08*

Tables S4-6. Sibling Similarity in Cognitive Skills, School Grades, and Educational Attainment, Robustness Check Using Only Siblings

Table S4. Sibling Correlations in Cognitive Skills

	Germany	Norway	Sweden	United States	
				PSID Read-Math	Add Health
N Individuals	1,036	101,220	223,159	1,396	2,231
N Families	471	48,006	106,443	698	1,034
Overall	.44	.45*	.49*	.57*	.54*
	(.03)	(.00)	(.00)	(.03)	(.02)
	[.38, .51]	[.45, .46]	[.49, .50]	[.52, .62]	[.50, .58]
Highest education of either parent					
Low	.42	.40	.42	.51	.54
	(.05)	(.00)	(.00)	(.04)	(.04)
	[.33, .51]	[.39, .40]	[.42, .43]	[.44, .58]	[.46, .62]
High	.35	.41	.45	.46	.53
	(.06)	(.01)	(.00)	(.06)	(.04)
	[.25, .47]	[.40, .42]	[.45, .46]	[.36, .57]	[.45, .60]
Difference	.07	−.01*	−.03*	.05	.01
Father's education					
Low	.39	.41	.43	.53	.55
	(.04)	(.00)	(.00)	(.03)	(.03)
	[.31 .48]	[.40, .42]	[.43, .44]	[.47, .60]	[.48, .61]
High	.39	.42	.46	.47	.47
	(.06)	(.01)	(.00)	(.06)	(.05)
	[.28, .52]	[.41, .43]	[.45, .47]	[.35, .59]	[.38, .57]
Difference	.00	−.01*	−.03*	.06	.08*
Mother's education					
Low	.43	.41	.44	.51	.56
	(.04)	(.00)	(.00)	(.03)	(.03)
	[.36, .51]	[.40, .42]	[.44, .45]	[.45, .57]	[.51, .62]

High	.32	.35	.44	.46	.54
	(.07)	(.01)	(.00)	(.07)	(.05)
	[.20, .47]	[.34, .37]	[.43, .45]	[.34, .59]	[.45, .63]
Difference	.11	.06*	.00	.05	.02
Highest parental occupation					
Low	.49	.42	.48	.54	.56
	(.05)	(.00)	(.00)	(.04)	(.03)
	[.39, .58]	[.41, .43]	[.47, .48]	[.46, .61]	[.50, .63]
High	.29	.41	.36	.49	.41
	(.05)	(.00)	(.01)	(.06)	(.06)
	[.20, .41]	[.40, .41]	[.34, .38]	[.37, .60]	[.30, .54]
Difference	.20*	.01	.12*	.05	.15*
Father's occupation					
Low	.48	.42	.48	.55	.51
	(.05)	(.00)	(.00)	(.03)	(.03)
	[.39, .58]	[.42, .43]	[.48, .48]	[.49, .61]	[.45, .57]
High	.29	.41	.35	.47	.38
	(.06)	(.01)	(.01)	(.08)	(.08)
	[.19, .41]	[.40, .43]	[.33, .37]	[.33, .62]	[.24, .53]
Difference	.27*	.01	.13*	.08	.13*
Mother's occupation					
Low	.43	.44	.48	.55	.57
	(.05)	(.00)	(.00)	(.03)	(.02)
	[.33, .53]	[.43, .45]	[.48, .49]	[.48, .62]	[.52, .62]
High	.32	.39	.37	.47	.55
	(.06)	(.01)	(.02)	(.07)	(.08)
	[.22, .44]	[.37, .41]	[.34, .41]	[.34, .61]	[.38, .70]
Difference	.11*	.05*	.11*	.08	.02
Migration background					
No migrant background	.38	n/a	.48	.56	.46
	(.04)		(.00)	(.03)	(.02)
	[.31, .46]		[.47, .48]	[.51, .62]	[.42, .51]

Migrant background	.44	n/a	.54	.59	.57
	(.07)		(.01)	(.08)	(.04)
	[.30, .58]		[.52, .55]	[.43, .73]	[.49, .65]
Difference	−.06	n/a	−.06*	−.03	−.11
Family Size					
3 children and less	.46	.44	.47	n/a	n/a
	(.04)	(.00)	(.00)		
	[.39, .53]	[.43, .45]	[.47, .48]		
More than 3 children	.25	.47	.56	n/a	n/a
	(.13)	(.01)	(.00)		
	[.08, .56]	[.46, .49]	[.55, .56]		
Difference	.21*	−.03*	.09*	n/a	n/a
Maternal Age at Birth					
25 or younger	.53	.44	.47	.58	.57
	(.06)	(.01)	(.00)	(.04)	(.03)
	[.41, .65]	[.43, .45]	[.46, .48]	[.49, .66]	[.50, .63]
26 or older	.41	.48	.51	.52	.54
	(.05)	(.01)	(.00)	(.04)	(.04)
	[.32, .50]	[.46, .49]	[.50, .51]	[.45, .60]	[.46, .62]
Difference	.12*	−.04*	−.04*	.06	.03

Note: Standard errors in parentheses and 95% confidence intervals in square brackets.

* indicates (a) if attached to the population-level estimate: that the sibling correlation in a country is statistically significantly different from the weighted average sibling correlation of all other countries at the 5% level; (b) if attached to the difference between social groups: that the conditional sibling correlations at the group level are statistically significantly different from each other within the same country at the 5% level. All differences are calculated using the unrounded sibling correlations.

Sources: Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United States: Panel Study of Income Dynamics (PSID) and National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

Table S5. Sibling Correlations in School Grades

	Norway	Sweden	United States
N Individuals	246,600	625,421	1,112
N Families	114,101	282,294	532
Overall	.47*	.51*	.42
	(.00)	(.00)	(.03)
	[.47, .47]	[.50, .51]	[.36, .49]
Highest education of either parent			
Low	.41	.43	.30
	(.00)	(.00)	(.06)
	[.40, .41]	[.43, .44]	[.19, .43]
High	.38*	.49	.50
	(.00)	(.00)	(.06)
	[.37, .39]	[.48, .49]	[.38, .62]
Difference	.03*	−.06*	−.20*
Father's education			
Low	.43	.45	.32
	(.00)	(.00)	(.06)
	[.42, .43]	[.45, .45]	[.22, .44]
High	.38	.50	.55
	(.00)	(.00)	(.07)
	[.37, .39]	[.49, .50]	[.40, .68]
Difference	.04*	−.05*	−.23*
Mother's education			
Low	.43	.45	.35
	(.00)	(.00)	(.05)
	[.42, .43]	[.45, .45]	[.27, .45]
High	.36	.49	.50
	(.00)	(.00)	(.07)
	[.35, .37]	[.49, .49]	[.37, .64]
Difference	.06*	−.04*	−.15*

Highest parental occupation

Low	.44	.49	.42
	(.00)	(.00)	(.06)
	[.44, .45]	[.49, .49]	[.31, .53]
High	.40	.47	.41
	(.00)	(.00)	(.09)
	[.39, .41]	[.46, .48]	[.26, .59]
Difference	.04*	.02*	.01

Father's occupation

Low	.44	.49	.40
	(.00)	(.00)	(.05)
	[.44, .45]	[.49, .50]	[.31, .49]
High	.40	.47	.46
	(.00)	(.00)	(.10)
	[.39, .41]	[.46, .48]	[.28, .66]
Difference	.04*	.02*	−.06

Mother's occupation

Low	.45	.50	.44
	(.00)	(.00)	(.04)
	[.44, .45]	[.50, .50]	[.36, .52]
High	.39	.48	.37
	(.01)	(.01)	(.15)
	[.38, .40]	[.46, .49]	[.14, .67]
Difference	.05*	.02*	.07

Migration background

No migrant background	.46	.50	.41
	(.00)	(.00)	(.05)
	[.46, .47]	[.50, .50]	[.32, .50]
Migrant background	.51	.51	.49
	(.01)	(.00)	(.07)
	[.49, .53]	[.50, .52]	[.36, .63]

Difference	−.05*	−.01*	−.08
Family size			
3 children and less	.45	.50	n/a
	(.00)	(.00)	
	[.44, .45]	[.50, .50]	
More than 3 children	.49	.53	n/a
	(.00)	(.00)	
	[.49, .50]	[.52, .53]	
Difference	−.05*	−.03*	n/a
Maternal age at birth			
25 or younger	.43	.46	.44
	(.00)	(.00)	(.05)
	[.42, .44]	[.45, .46]	[.34, .54]
26 or older	.46	.52	.45
	(.00)	(.00)	(.07)
	[.45, .47]	[.51, .52]	[.32, .59]
Difference	−.03*	−.06*	−.01

Note: Standard errors in parentheses and 95% confidence intervals in square brackets.
* indicates (a) if attached to the population-level estimate: that the sibling correlation in a country is statistically significantly different from the weighted average sibling correlation of all other countries at the 5% level; (b) if attached to the difference between social groups: that the conditional sibling correlations at the group level are statistically significantly different from each other within the same country at the 5% level. All differences are calculated using the unrounded sibling correlations.
Sources: Norway: Registers. Sweden: Registers. United States: National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

Table S6. Sibling Correlations in Final Educational Attainment (Years of Education)

	Finland	Germany	Norway	Sweden	United Kingdom	United States
N Individuals	35,740	411	421,692	1,646,003	2,363	4,320
N Families	17,039	192	190,319	715,116	1,491	1,608
Overall	.36*	.53*	.40*	.44*	.32*	.50*
	(.01)	(.05)	(.00)	(.00)	(.03)	(.02)
	[.35, .38]	[.44, .63]	[.40, .41]	[.44, .45]	[.26, .38]	[.47, .53]
Highest education of either parent						
Low	.31	.48	.33	.33	.16	.39
	(.01)	(.07)	(.00)	(.00)	(.05)	(.02)
	[.29, .32]	[.35, .62]	[.33, .33]	[.33, .33]	[.09, .28]	[.35, .43]
High	.28	.38	.28	.42	.28	.51
	(.01)	(.09)	(.00)	(.00)	(.06)	(.03)
	[.26, .30]	[.22, .57]	[.27, .29]	[.42, .42]	[.18, .42]	[.44, .57]
Difference	.03*	.10	.05*	−.09*	.12*	−.12*
Father's education						
Low	.31	.47	.34	.36	.21	.41
	(.01)	(.07)	(.00)	(.00)	(.04)	(.02)
	[.30, .33]	[.34, .60]	[.34, .35]	[.36, .36]	[.14, .31]	[.37, .45]
High	.27	.31	.28	.43	.12	.50
	(.01)	(.10)	(.00)	(.00)	(.08)	(.04)
	[.25, .30]	[.15, .54]	[.27, .29]	[.43, .43]	[.09, .40]	[.43, .57]
Difference	.04*	.16	.07*	−.07*	−.09	−.09*
Mother's education						
Low	.33	.53	.36	.37	.28	.44
	(.01)	(.06)	(.00)	(.00)	(.03)	(.02)
	[.31, .34]	[.42, .64]	[.35, .36]	[.37, .37]	[.21, .35]	[.41, .48]
High	.27	.39	.27	.40	.36	.44
	(.01)	(.13)	(.00)	(.00)	(.06)	(.05)
	[.24, .29]	[.18, .65]	[.26, .28]	[.39, .40]	[.25, .48]	[.35, .54]

Difference	.06*	.14	.09*	−.03*	.08	.00
Highest parental occupation						
Low	.33 (.01) [.31, .34]	.48 (.08) [.33, .64]	.36 (.00) [.36, .37]	.42 (.00) [.42, .42]	.39 (.08) [.26, .55]	.48 (.02) [.44, .51]
High	.29 (.01) [.27, .32]	.43 (.07) [.30, .58]	.34 (.00) [.34, .35]	.29 (.01) [.28, .30]	.30 (.06) [.20, .43]	.37 (.06) [.27, .49]
Difference	.03*	.05	.02*	.13*	−.09	.11*
Father's occupation						
Low	.32 (.01) [.30, .34]	.44 (.09) [.28, .61]	.37 (.00) [.36, .37]	.43 (.00) [.43, .43]	.24 (.05) [.16, .35]	n/a
High	.29 (.01) [.27, .32]	.45 (.08) [.31, .60]	.35 (.00) [.34, .36]	.29 (.00) [.28, .30]	.25 (.07) [.14, .41]	n/a
Difference	.03*	−.01	.02*	.14*	−.01	n/a
Mother's occupation						
Low	.34 (.01) [.32, .35]	.62 (.06) [.49, .73]	.38 (.00) [.37, .38]	.44 (.00) [.43, .44]	.35 (.06) [.27, .44]	n/a
High	.29 (.02) [.26, .33]	.36 (.11) [.18, .58]	.33 (.01) [.31, .34]	.25 (.01) [.24, .27]	.29 (.05) [.19, .41]	n/a
Difference	.04*	.26*	.05*	.19*	.06	n/a
Migration background						
No migrant background	n/a	.47 (.06) [.36, .58]	.40 (.00) [.40, .41]	.44 (.00) [.44, .45]	.30 (.05) [.21, .41]	n/a

	Finland	Germany	Norway	Sweden	United Kingdom	United States
Migrant background	n/a	.72	.42	.43	.22	n/a
		(.08)	(.01)	(.00)	(.03)	
		[.54, .84]	[.39, .44]	[.43, .44]	[.13, .35]	
Difference	n/a	−.25*	−.01*	.01*	.08	n/a
Family size						
3 children and less	.36	.52	.39	.43	.37	.50
	(.01)	(.05)	(.00)	(.00)	(.03)	(.02)
	[.34, .37]	[.42, .62]	[.38, .39]	[.43, .44]	[.31, .43]	[.47, .54]
More than 3 children	.37	.54	.42	.45	.13	.45
	(.01)	(.22)	(.00)	(.00)	(.06)	(.03)
	[.34, .39]	[.17, .87]	[.41, .43]	[.45, .46]	[.05, .30]	[.39, .51]
Difference	−.01	−.02	−.03*	−.02*	.24*	.05
Maternal age at birth						
25 or younger	.34	.44	.39	.42	.32	.46
	(.01)	(.11)	(.00)	(.00)	(.04)	(.02)
	[.32, .37]	[.25, .65]	[.38,.39]	[.41, .42]	[.25, .40]	[.41, .51]
26 or older	.36	.55	.40	.45	.30	.55
	(.01)	(.07)	(.00)	(.00)	(.04)	(.02)
	[.34, .38]	[.41, .68]	[.40, .41]	[.45, .46]	[.22, .62]	[.51, .60]
Difference	−.01	−.11	−.02*	−.03*	.02	−.09

Note: Standard errors in parentheses and 95% confidence intervals in square brackets.
* indicates (a) if attached to the population-level estimate: that the sibling correlation in a country is statistically significantly different from the weighted average sibling correlation of all other countries at the 5% level; (b) if attached to the difference between social groups: that the conditional sibling correlations at the group level are statistically significantly different from each other within the same country at the 5% level. All differences are calculated using the unrounded sibling correlations.

Sources: Finland: Registers. Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United Kingdom: UK Household Longitudinal Study (Understanding Society), 8th edition (DOI: 10.5255/UKDA-SN-6614-9). United States: Panel Study of Income Dynamics (PSID).

Tables S7-9. Sibling Similarity in Cognitive Skills, School Grades, and Educational Attainment, Normal-Based Confidence Intervals

Table S7. Sibling Correlations in Cognitive Skills

	Germany	Norway	Sweden	United States	
				PSID Read-Math	Add Health
N Individuals	2,006	284,110	652,940	2,265	2,269
N Families	1,441	230,896	536,224	1,567	1,072
Overall	.46	.45	.48	.57	.55
	[.39, .52]	[.45, .46]	[.48, .49]	[.54, .60]	[.51, .59]
Highest education of either parent					
Low	.43	.40	.42	.51	.55
	[.34, .52]	[.39, .40]	[.42, .43]	[.47, .56]	[.48, .63]
High	.35	.41	.45	.52	.53
	[.24, .46]	[.40, .42]	[.45, .46]	[.42, .62]	[.45, .60]
Father's education					
Low	.40	.41	.43	.53	.56
	[.32, .49]	[.40, .42]	[.43, .44]	[.47, .59]	[.49, .62]
High	.40	.41	.46	.53	.48
	[.28, .53]	[.40, .42]	[.45, .46]	[.42, .65]	[.38, .58]
Mother's education					
Low	.44	.41	.44	.51	.57
	[.37, .52]	[.40, .42]	[.43, .45]	[.45, .57]	[.52 .62]
High	.33	.36	.44	.54	.55
	[.19, .47]	[.34, .37]	[.43, .45]	[.42, .66]	[.46, .64]
Highest parental occupation					
Low	.50	.42	.47	.53	.56
	[.41, .59]	[.41, .43]	[.47, .47]	[.46, .61]	[.50, .63]
High	.30	.41	.36	.53	.41
	[.19, .40]	[.39, .42]	[.34, .38]	[.42, .64]	[.30, .53]
Father's occupation					
Low	.49	.43	.47	.55	.51
	[.41, .58]	[.42, .43]	[.47, .48]	[.49, .60]	[.45, .57]
High	.29	.41	.35	.56	.38

	[.19, .40]	[.40, .42]	[.33, .37]	[.42, .70]	[.23, .52]
Mother's occupation					
Low	.46	.44	.47	.56	.57
	[.36, .55]	[.43, .44]	[.47, .48]	[.49, .62]	[.52, .62]
High	.32	.39	.37	.46	.55
	[.21, .43]	[.37, .41]	[.34, .41]	[.33, .59]	[.38, .71]
Migration background					
No migrant background	.40	n/a	.47	.57	.46
	[.32, .48]		[.47, .48]	[.52, .62]	[.40, .53]
Migrant background	.47	n/a	.52	.58	.59
	[.33, .60]		[.51, .53]	[.43, .72]	[.50, .67]
Family size					
3 children and less	.47	.44	.47	n/a	n/a
	[.41, .54]	[.43, .45]	[.46, .47]		
More than 3 children	.31	.47	.55	n/a	n/a
	[.03 .59]	[.46, .48]	[.54,.55]		
Maternal age at birth					
25 or younger	.55	.44	.46	.57	.56
	[.43, .67]	[.43, .45]	[.45, .47]	[.50, .65]	[.50, .63]
26 or older	.42	.47	.50	.54	.54
	[.33, .50]	[.46, .49]	[.49, .50]	[.47, .61]	[.47, .62]

Note: 95% confidence intervals in square brackets.

Sources: German: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United States: Panel Study of Income Dynamics (PSID) and National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

Table S8. Sibling Correlations in School Grades

	Norway	Sweden	United States
N Individuals	403,661	1,026,673	1,620
N Families	271,162	683,546	1,040
Overall	.48	.52	.42
	[.47, .48]	[.52, .52]	[.36, .49]
Highest education of either parent			
Low	.42	.44	.30
	[.41, .42]	[.44, .45]	[.18, .43]
High	.39	.50	.51
	[.39, .40]	[.50, .50]	[.40, .62]
Father's education			
Low	.43	.46	.32
	[.43, .44]	[.46, .47]	[.21, .43]
High	.39	.51	.56
	[.38, .40]	[.50, .51]	[.43, .70]
Mother's education			
Low	.43	.46	.35
	[.43, .44]	[.45, .46]	[.26, .44]
High	.38	.50	.50
	[.37, .39]	[.50, .50]	[.37, .63]
Highest parental occupation			
Low	.45	.50	.41
	[.44, .45]	[.50, .50]	[.30, .52]
High	.41	.47	.42
	[.40, .42]	[.47, .48]	[.26, .59]
Father's occupation			
Low	.45	.51	.40
	[.44, .45]	[.50, .51]	[.31, .49]
High	.41	.48	.47
	[.41, .42]	[.47, .49]	[.27, .67]
Mother's occupation			
Low	.45	.51	.44

	[.45, .46]	[.51, .51]	[.36, .52]
High	.40	.48	.38
	[.39, .41]	[.47, .50]	[.10, .67]
Migration background			
No migrant background	.47	.51	.42
	[.47, .48]	[.50, .52]	[.33, .51]
Migrant background	.52	.51	.49
	[.50, .54]	[.51, .52]	[.35, .62]
Family size			
3 children and less	.48	.52	n/a
	[.47, .48]	[.52, .52]	
More than 3 children	.50	.53	n/a
	[.49, .51]	[.52, .53]	
Maternal age at birth			
25 or younger	.45	.47	.44
	[.44, .45]	[.46, .47]	[.34, .54]
26 or older	.48	.52	.46
	[.48, .49]	[.52, .53]	[.33, .59]

Note: 95% confidence intervals in square brackets.
Sources: Norway: Registers. Sweden: Registers. United States: National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

Table S9. Sibling Correlations in Final Educational Attainment (Years of Education)

	Finland	Germany	Norway	Sweden	United Kingdom	United States
N Individuals	79,467	1,034	643,701	2,302,256	5,017	5,578
N Families	60,766	815	412,328	1,371,369	4,131	2,866
Overall	.36	.51	.41	.44	.42	.51
	[.35, .37]	[.42, .60]	[.40, .41]	[.44, .45]	[.36, .48]	[.48, .54]
Highest education of either parent						
Low	.31	.46	.33	.33	.18	.39
	[.29, .33]	[.33, .58]	[.33, .34]	[.33, .34]	[.07, .24]	[.35, .43]
High	.28	.35	.29	.43	.32	.51
	[.26, .30]	[.19, .52]	[.28, .29]	[.43, .43]	[.19, .44]	[.45, .57]
Father's education						
Low	.31	.46	.35	.36	.24	.41
	[.30, .33]	[.34, .59]	[.34, .35]	[.36, .37]	[.14, .33]	[.37, .45]
High	.27	.29	.29	.44	.21	.50
	[.25, .29]	[.10, .48]	[.28, .29]	[.43, .44]	[.05, .38]	[.43, .57]
Mother's education						
Low	.33	.50	.36	.37	.36	.45
	[.31, .34]	[.40, .60]	[.36,. 36]	[.37, .37]	[.28, .44]	[.41, .48]
High	.27	.36	.28	.41	.37	.46
	[.24, .29]	[.13, .59]	[.27, .29]	[.40, .41]	[.26, .49]	[.36, .56]
Highest parental occupation						
Low	.33	.46	.37	.42	.46	.48
	[.31, .34]	[.31, .61]	[.36, .37]	[.42, .42]	[.31, .61]	[.45, .51]
High	.29	.43	.35	.29	.35	.38
	[.27, .32]	[.29, .57]	[.34, .35]	[.29, .30]	[.23, .48]	[.27, .50]
Father's occupation						
Low	.32	.42	.37	.43	.27	n/a
	[.31, .34]	[.26, .57]	[.37, .38]	[.43, .43]	[.17, .37]	
High	.29	.46	.35	.30	.28	n/a
	[.27, .32]	[.31, .60]	[.34, .36]	[.29, .31]	[.14, .43]	
Mother's occupation						
Low	.34	.60	.38	.44	.42	n/a

	Finland	Germany	Norway	Sweden	UK	US
	[.32, .35]	[.49, .72]	[.38, .38]	[.43, .44]	[.34, .51]	
High	.30	.35	.33	.26	.32	n/a
	[.27, .33]	[.15, .56]	[.32, .34]	[.25, .27]	[.21, .44]	
Migration background						
No migrant background	n/a	.45	.40	.44	.38	n/a
		[.34, .55]	[.40, .41]	[.44, .45]	[.27, .49]	
Migrant background	n/a	.70	.43	.43	.23	n/a
		[.57, .84]	[.41, .45]	[.43, .44]	[.12, .34]	
Family size						
3 children and less	.35	.50	.39	.44	.48	.51
	[.34, .37]	[.41, .59]	[.38, .39]	[.43, .44]	[.41, .54]	[.47, .55]
More than 3 children	.37	.54	.42	.45	.13	.47
	[.34, .39]	[.11, .97]	[.41, .42]	[.45, .45]	[.01, .25]	[.42, .52]
Maternal age at birth						
25 or younger	.34	.43	.39	.42	.45	.47
	[.32, .36]	[.22, .63]	[.38, .39]	[.41, .42]	[.37, .54]	[.43, .52]
26 or older	.35	.53	.41	.46	.37	.55
	[.34, .37]	[.40, .66]	[.40, .41]	[.46, .46]	[.28, .46]	[.51, .59]

Note: 95% confidence intervals in square brackets.

Sources: Finland: Registers. Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United Kingdom: UK Household Longitudinal Study (Understanding Society), 8th edition (DOI: 10.5255/UKDA-SN-6614-9). United States: Panel Study of Income Dynamics (PSID).

Tables S10-12. Sibling Similarity in Cognitive Skills, School Grades, and Educational Attainment, Normal-Based Confidence Intervals, Robustness Check Using Only Siblings

Table S10. Sibling Correlations in Cognitive Skills

	Germany	Norway	Sweden	United States	
				PSID Read-Math	Add Health
N Individuals	1,036	101,220	223,159	1,396	2,231
N Families	471	48,006	106,443	698	1,034
Overall	.44	.45	.49	.57	.54
	[.37, .51]	[.45, .46]	[.49, .50]	[.52, .62]	[.50, .58]
Highest education of either parent					
Low	.42	.40	.42	.51	.54
	[.33, .51]	[.39, .40]	[.42, .43]	[.44, .58]	[.46, .62]
High	.35	.41	.45	.46	.53
	[.24, .46]	[.40, .42]	[.45, .46]	[.35, .57]	[.45, .60]
Father's education					
Low	.39	.41	.43	.53	.55
	[.31 .48]	[.40, .42]	[.43, .44]	[.47, .60]	[.48, .61]
High	.39	.42	.46	.47	.47
	[.27, .52]	[.41, .43]	[.45, .47]	[.35, .59]	[.37, .57]
Mother's education					
Low	.43	.41	.44	.51	.56
	[.35, .51]	[.40, .42]	[.44, .45]	[.45, .57]	[.51, .62]
High	.32	.35	.44	.46	.54
	[.18, .46]	[.34, .37]	[.43, .45]	[.34, .59]	[.45, .63]
Highest parental occupation					
Low	.49	.42	.48	.54	.56
	[.39, .58]	[.41, .43]	[.47, .48]	[.46, .62]	[.50, .63]
High	.29	.41	.36	.49	.41
	[.19, .40]	[.40, .42]	[.34, .38]	[.37, .60]	[.30, .53]
Father's occupation					
Low	.48	.42	.48	.55	.51
	[.39, .58]	[.42, .43]	[.48, .48]	[.49, .61]	[.45, .57]
High	.29	.41	.35	.47	.38

	[.18, .40]	[.40, .43]	[.33, .37]	[.32, .62]	[.23, .52]
Mother's occupation					
Low	.43	.44	.48	.55	.57
	[.33, .53]	[.43, .45]	[.48, .49]	[.48, .62]	[.52, .62]
High	.32	.39	.37	.47	.55
	[.21, .43]	[.37, .41]	[.34, .40]	[.34, .61]	[.38, .71]
Migration background					
No migrant background	.38	n/a	.48	.56	.46
	[.30, .46]		[.47, .48]	[.51, .62]	[.40, .53]
Migrant background	.44	n/a	.54	.59	.57
	[.29, .58]		[.52, .55]	[.44, .74]	[.49, .65]
Family size					
3 children and less	.46	.44	.47	n/a	n/a
	[.39, .53]	[.43, .45]	[.47, .48]		
More than 3 children	.25	.47	.56	n/a	n/a
	[-.00, .50]	[.46, .49]	[.55, .56]		
Maternal age at birth					
25 or younger	.53	.44	.47	.58	.57
	[.41, .66]	[.43, .45]	[.46, .48]	[.49, .66]	[.50, .63]
26 or older	.41	.48	.51	.52	.54
	[.31, .50]	[.46, .49]	[.50, .51]	[.45, .60]	[.46, .62]

Note: 95% confidence intervals in square brackets.

Sources: Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United States: Panel Study of Income Dynamics (PSID) and National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

Table S11. Sibling Correlations in School Grades

	Norway	Sweden	United States
N Individuals	246,600	625,421	1,112
N Families	114,101	282,294	532
Overall	.47	.51	.42
	[.47, .47]	[.50, .51]	[.36, .49]
Highest education of either parent			
Low	.41	.43	.30
	[.40, .41]	[.43, .44]	[.17, .42]
High	.38	.49	.50
	[.37, .39]	[.48, .49]	[.38, .62]
Father's education			
Low	.43	.45	.32
	[.42, .43]	[.45, .45]	[.23, .41]
High	.38	.50	.55
	[.37, .39]	[.49, .50]	[.40, .69]
Mother's education			
Low	.43	.45	.35
	[.42, .43]	[.45, .45]	[.26, .45]
High	.36	.49	.50
	[.35, .37]	[.49, .49]	[.36, .64]
Highest parental occupation			
Low	.44	.49	.42
	[.44, .45]	[.49, .49]	[.31, .53]
High	.40	.47	.41
	[.39, .41]	[.46, .48]	[.24, .58]
Father's occupation			
Low	.44	.49	.40
	[.44, .45]	[.49, .50]	[.30, .49]
High	.40	.47	.46
	[.39, .41]	[.46, .48]	[.26, .67]
Mother's occupation			
Low	.45	.50	.44

	[.44, .45]	[.50, .50]	[.36, .52]
High	.39	.48	.37
	[.38, .40]	[.46, .49]	[.08, .66]
Migration background			
No migrant background	.46	.50	.41
	[.46, .47]	[.50, .50]	[.32, .50]
Migrant background	.51	.51	.49
	[.49, .53]	[.50, .52]	[.35, .63]
Family size			
2-3 children	.45	.50	n/a
	[.44,. 45]	[.50, .50]	
More than 3 children	.49	.53	n/a
	[.49, .50]	[.52, .53]	
Maternal age at birth			
25 or younger	.43	.46	.44
	[.42, .44]	[.45, .46]	[.33, .54]
26 or older	.46	.52	.45
	[.45, .47]	[.51, .52]	[.32, .59]

Note: 95% confidence intervals in square brackets.

Sources: Norway: Registers. Sweden: Registers. United States: National Longitudinal Study of Adolescent to Adult Health (Add Health), Carolina Population Center, University of North Carolina.

Table S12. Sibling Correlations in Final Educational Attainment (Years of Education)

	Finland	Germany	Norway	Sweden	United Kingdom	United States
N Individuals	35,740	411	421,692	1,646,003	2,363	4,320
N Families	17,039	192	190,319	715,116	1,491	1,608
Overall	.36	.53	.40	.44	.32	.50
	[.35, .38]	[.44, .63]	[.40, .41]	[.44, .45]	[.26, .37]	[.48, .53]
Highest education of either parent						
Low	.31	.48	.33	.33	.16	.39
	[.29, .32]	[.34, .62]	[.33, .33]	[.33, .33]	[.06, .26]	[.35, .43]
High	.28	.38	.28	.42	.28	.51
	[.26, .30]	[.20, .56]	[.27, .29]	[.42, .42]	[.16, .40]	[.44, .57]
Father's education						
Low	.31	.47	.34	.36	.21	.41
	[.30, .33]	[.33, .60]	[.34, .35]	[.36, .36]	[.13, .30]	[.37, .45]
High	.27	.31	.28	.43	.21	.50
	[.25, .29]	[.11, .51]	[.27, .29]	[.43, .43]	[.05, .36]	[.43, .57]
Mother's education						
Low	.33	.53	.36	.37	.28	.44
	[.31, .34]	[.42, .64]	[.35, .36]	[.37, .37]	[.21, .34]	[.41, .48]
High	.27	.39	.27	.40	.36	.44
	[.24, .29]	[.14, .64]	[.26, .28]	[.39, .40]	[.24, .47]	[.35, .54]
Highest parental occupation						
Low	.33	.48	.36	.42	.39	.48
	[.31, .34]	[.32, .65]	[.36, .37]	[.42, .42]	[.24, .54]	[.44, .51]
High	.29	.43	.34	.29	.30	.37
	[.27, .32]	[.29, .58]	[.34, .35]	[.28, .30]	[.18, .42]	[.26, .48]
Father's occupation						
Low	.32	.44	.37	.43	.24	n/a
	[.30, .34]	[.27, .61]	[.36, .37]	[.43, .43]	[.15, .34]	
High	.29	.45	.35	.29	.25	n/a
	[.27, .32]	[.31, .60]	[.34, .36]	[.28, .30]	[.11, .38]	
Mother's occupation						
Low	.34	.62	.38	.44	.35	n/a

	Finland	Germany	Norway	Sweden	United Kingdom	United States
	[.32, .35]	[.49, .75]	[.37, .38]	[.43, .44]	[.26, .43]	
High	.29	.36	.33	.25	.29	n/a
	[.26, .32]	[.14, .57]	[.31, .34]	[.24, .28]	[.18, .40]	
Migration background						
No migrant background	n/a	.47	.40	.44	.30	n/a
		[.35, .58]	[.40, .41]	[.44, .45]	[.20, .40]	
Migrant background	n/a	.72	.42	.43	.22	n/a
		[.56, .87]	[.39, .44]	[.43, .44]	[.11, .33]	
Family size						
3 children and less	.36	.52	.39	.43	.37	.50
	[.34, .37]	[.42, .62]	[.38, .39]	[.43, .44]	[.31, .43]	[.47, .54]
More than 3 children	.37	.54	.42	.45	.13	.45
	[.34, .39]	[.11, .97]	[.41, .43]	[.45, .46]	[.01, .25]	[.39, .51]
Maternal age at birth						
25 or younger	.34	.44	.39	.42	.32	.46
	[32, .37]	[.23, .65]	[.38, .39]	[.41, .42]	[.25, .40]	[.42, .51]
26 or older	.36	.55	.40	.45	.30	.55
	[.34, .37]	[.41, .69]	[.40, .41]	[.45, .46]	[.22, .39]	[.51, .60]

Note: 95% confidence intervals in square brackets.

Sources: Finland: Registers. Germany: Socio-Economic Panel Study (SOEP), v31.1 (DOI: 10.5684/soep.v31.1). Norway: Registers. Sweden: Registers. United Kingdom: UK Household Longitudinal Study (Understanding Society), 8th edition (DOI: 10.5255/UKDA-SN-6614-9). United States: Panel Study of Income Dynamics (PSID).