Long-Term Trends in Adult Socioeconomic Resemblance between Former Schoolmates and Neighbouring Children

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Published in *European Sociological Review*, 2020, 36(3): 366-380.

Abstract

Schools and residential neighbourhoods constitute key contexts of development beyond the family of origin. Yet, few prior studies address whether the overall impact of these childhood contexts on adult life chances has changed over time. In this paper, we investigate changes in socioeconomic resemblance between former schoolmates and neighbouring children using Norwegian registry data covering three decades. We use cross-classified multilevel models to decompose the variance in children's educational attainment and adult earnings into the contributions found within and between their school and neighbourhood contexts in adolescence. We find that unadjusted school and neighbourhood correlations in educational attainment are relatively modest and declining over time. These trends largely reflect declining socioeconomic segregation between schools and neighbourhoods over time. After adjusting for sorting by family background, schools account for 2% or less of the total variation in completed years of education in the more recent cohorts and neighbourhoods even less. For adult earnings, the adjusted school correlations are very low, accounting for around 1% of the total variance, while the contribution of neighbourhoods is close to zero. Our findings suggest that adolescent school and neighbourhood contexts are not major determinants of children's later-life socioeconomic attainments in the Norwegian welfare state setting.

Key words

Neighbourhood; school; education; earnings; intraclass correlations; cross-classified multilevel models; Norway

Acknowledgements

This research was supported by the Research Council of Norway [grant numbers 236793 and 238050]. The administrative data were made available by Statistics Norway. Please direct correspondence to Are Skeie Hermansen, Department of Sociology and Human Geography, University of Oslo, PO Box 1096, Blindern, N-0317 Oslo, Norway. E-mail: a.s.hermansen@sosgeo.uio.no.

Developmental theories describe children and youth as embedded within a series of social contexts, where schools and neighbourhoods often constitute the key settings of learning and socialization beyond the family of origin (Bronfenbrenner, 1979). Ever since the Coleman et al. (1966) report, a longstanding focus has been to identify the impact of these contexts on children's future life chances. Recent studies provide strong evidence of a causal influence of childhood neighbourhood environments on later educational and socioeconomic outcomes (Wodtke, Harding and Elwert, 2011; Chetty and Hendren, 2018). Further, various school-level characteristics, such as peer composition, class size, the presence of skilled teachers, and the effectiveness of local school administrations, has also been shown to be important for children's education and later-life socioeconomic well-being (Scheerens and Bosker, 1997, Fredriksson, Öckert and Oosterbeek, 2013, Chetty, Friedman and Rockoff, 2014). Yet, studies identifying the partial effects of specific characteristics of schools and neighbourhoods are less informative on the overall influence of these contexts. Further, prior studies assessing the overall influence of adolescent contexts on later-life outcomes often report relatively modest effect sizes (e.g., Solon, Page and Duncan, 2000, Duncan, Boisjoly, and Harris, 2001, Altonji and Mansfield, 2011).

To address questions regarding the overall contribution of these contexts for children's life chances, we assess the resemblance in adult socioeconomic outcomes between former schoolmates and neighbouring children, i.e., so-called school and neighbourhood correlations (Jencks and Brown, 1975, Bryk and Raudenbush, 1988, Solon, Page and Duncan, 2000), after adjusting for sorting by observed family background.[1] Inquiries into such peer-level correlations are, given some assumptions, informative for the scope of interventions aimed to equalize children's opportunities at the level of schools and neighbourhoods. The existing literature is very limited, however, particularly when it comes to the issue of whether the importance of these contexts for children's later-life outcomes has changed over time (Raaum, et al., 2006, Altonji and Mansfield, 2011).

[1] In a related literature, correlations between siblings in later-life socioeconomic attainments provide a method of estimating the total influence family background (Corcoran, Jencks and Olneck, 1976) and sibling correlations are often used to assess changes in the importance of family background over time (for recent studies from Norway, see Pekkarinen, Salvanes and Sarvimäki, 2017, Wiborg and Hansen, 2018).

In this study, we present new evidence on long-run trends in adult socioeconomic resemblance between former schoolmates and neighbouring children using Norwegian administrative data covering three decades. Instead of focusing on particular characteristics of schools and neighbourhoods, we use multilevel models that exploit the clustering of children within these contexts to decompose the variance in educational attainment (years of completed education) and earnings rank in adulthood into their within and between context components. The school or neighbourhood correlations (more technically, the intraclass correlation coefficient, ICC) is then given by the proportion of the total variance that is found between each of these contexts with or without taking observed characteristics of children's family background into account. By estimating school and neighbourhood correlations separately across many birth cohorts, we are able to address whether there has been any change in these contextual influences on children's adult attainments across a period of three decades. Beyond estimating school and neighbourhood correlations across several decades, we contribute to the existing literature by using cross-classified multilevel models that take into account the complexity of how schools and neighbourhoods correlations are intertwined with each other.

Later-life resemblance between children who attended the same school or grew up in the same neighbourhood is not necessarily indicative of school or neighbourhood effects, as it might also reflect systematic sorting of children and their families across these contexts (Duncan and Raudenbush, 1999, Sobel, 2006). Given variation in economic constraints between households, differences in the desirability of local schools and their surrounding residential catchment areas are likely to result in a clustering of children that resemble each other according to parental socioeconomic resources and various unobserved traits. While we are able to control for several relevant and well-measured family background traits, remaining unobserved sorting may lead to an overstatement of the importance of school and neighbourhood contexts for children's later-life outcomes. Consequently, our variance-decomposition approach provides an upper-bound estimate of the long-term causal influence of these contexts (Jencks and Brown, 1975, Solon, et al., 2000).[2]

[2] The upper-bound interpretation of school correlations relies on some assumptions. The most important one is probably that potential sorting on unobserved characteristics contributes to greater and not to smaller outcome differences between schools. This will not be the case if there is in fact an *inverse* sorting with strong students attending poor schools and weak students attending good schools. In principle, such a scenario could arise under

Our results reveal low adjusted school and neighbourhood correlations in adult socioeconomic attainments and this pattern is relatively stable across the birth cohorts we focus on. To the extent that former schoolmates and neighbouring children resemble each other in terms of education and earnings as adults, this mostly reflects sorting across childhood context by observed family background. Overall, we find that the variation in adult socioeconomic attainments between children who attended the same school or grew up in the same neighbourhood is far larger than the variation across these contexts. Before moving to the empirical part, we briefly discuss the theoretical background, previous research, and the Norwegian setting.

Background and previous literature

There are several reasons to expect school and neighbourhood contexts to matter for life chances. Influential theories argue that neighbourhood contexts matter for adolescent development through processes such as peer interactions in local friendship networks, the role model functioning of adult community members, variation in the quality of local institutions, and the broader social organization of neighbourhood life (Jencks and Mayer, 1990, Sampson, Morenoff and Gannon-Rowley, 2002, Sharkey and Faber, 2014). Schools are key arenas structuring peer interaction among adolescents, but they also matter for children's later-life outcomes because of the didactic inputs they provide to their students, such as teacher quality, school curricula, student-teacher ratios, and access to high-quality learning facilities and other financial resources (Scheerens and Bosker, 1997, Hanushek, 2006, Sørensen and Morgan, 2006). If there is considerable spatial variation in the socioeconomic characteristics of neighbourhoods and the quality of local schools, we expect that the school and neighbourhood contexts that individuals are exposed to while growing up would contribute to substantial variation in their adult outcomes. By contrast, if there is less contextual variation across schools and neighbourhoods, or if these contexts just matter less for adolescent development than often assumed, we would expect lower levels of adult socioeconomic resemblance between former schoolmates and neighbouring children.

strong public policies of resource redistribution in favour of schools with weak students. Similar reasoning applies to the upper-bound interpretation when applied to neighbourhood correlations.

Importantly, the influence of adolescent school and neighbourhood contexts on adult attainments may change across historical periods. To begin with, increased spatial segregation over time may lead to more variation in children's social contexts, such as access to high-quality schools, exposure to skilled teachers, and classmate composition, or the type of adult supervision or role models children encounter in their local neighbourhood communities (Bischoff and Owens, 2019). In this regard, many industrialized countries have experienced a marked increase in economic inequality starting around 1980 (Roine and Waldenström, 2015), after a preceding period of decline in inequality throughout most of the earlier part of the 20th century. Norway is no exception, as the Gini coefficient of gross family income increased from a low of .40 in 1980 to a level of about .46 in the early 2000s (Aaberge, Atkinson and Modalsli, 2016). As a consequence, overall inequality trends may translate into increased segregation of children by parental socioeconomic resources across schools and neighbourhoods (Reardon and Bischoff, 2011, Owens, 2016, Owens, Reardon and Jencks, 2016). A key mechanism that may link rising economic inequalities to increased segregation is changes in housing prices and spatial variation in affordability across residential areas (Matlack and Vigdor, 2008; Dewilde and Lancee, 2013). Overall, increased socioeconomic segregation would likely lead to both more variation between the schools and neighbourhoods children are exposed to and increased later-life inequalities between children from different contexts beyond sorting by family background.

Further, quality differences among schools are likely to depend on the degree to which schools are funded by local (municipality) taxes, and on the amount of school autonomy. Changes in educational policies may therefore affect the variation in children's adult outcomes across schools contexts. Cross-national research have found that between-school variation and socioeconomic inequalities in student outcomes often are smaller in countries with less differentiation between schools (e.g., absence of between-school tracking) and higher levels of standardization (e.g., less school autonomy and more standardized curricula) in their educational systems (Van de Werfhorst and Mijs, 2010, OECD, 2016). To the extent that educational policies and the related distribution of resources across schools change over time, this could lead to changes in the role of attending given schools for student outcomes.

Prior studies on school and neighbourhood correlations in children's socioeconomic attainments

Given the above considerations, our aim is to examine how school and neighbourhood correlations have developed across three decades drawing on Norwegian administrative data. In the educational literature, variance decomposition methods (i.e., school correlations) are frequently used to examine the extent to which between-pupils variation in achievement can be attributed to differences between schools (e.g., Marks 2006; Jennings et al. 2015).[3] However, few studies apply the variance decomposition methods to study educational attainment or earnings in adulthood, and the number of studies of the importance of neighbourhoods for such outcomes is particularly small.

An early and influential study from the United States found that the neighbourhood correlation for educational attainment was in the .15-.19 range and the .06-.10 range, respectively, before and after taking parental resources into account (Solon, et al., 2000), while a companion study found a neighbourhood correlation of .16 in adult earnings between neighbouring children in adolescence after adjusting for family background (Page and Solon, 2003). A lower neighbourhood correlation of .05 was found in a Canadian study (Oreopoulos, 2003). With regard to school correlations in adult outcomes, Altonji and Mansfield (2011) found that school correlations in enrolment in four-year college between former high school students in 1972 and 2002 had increased from .14 to .22 and .11 to .15 before and after taking student background characteristics into account. During this period, the socioeconomic segregation of students between schools had also increased. Adult earnings was only observed for the 1972 cohort, where the corresponding school correlations before and after taking student sorting into account was .16 and .11, respectively (Altonji and Mansfield, 2011, figures 16.3 and 16.4).

While there are few comparable studies from Europe, there are some from Scandinavian countries. Using Swedish data on early 1950's cohorts in Stockholm, Lindahl (2011) found that unadjusted neighbourhood and school correlations in completed education were of a similar magnitude at about .08 for men and .05 for women, but declined to.02 and .01, respectively, after taking parental

[3] We limit our attention to previous research that has attempted to estimate the overall importance of schools or neighbourhoods and do not include literature on specific school or neighbourhood variables (such as their ethnic or socio-economic composition).

education and earnings into account. For earnings, the neighbour and schoolmate correlations were similar for both genders and very small both before (.02 or less) and after (.01 or less) adjusting for family background. In Norway, prior research has found declining neighbourhood correlations in socioeconomic outcomes for children born in the first two decades after World War II. Comparing adolescent neighbours observed in the censuses from 1960 and 1970, Raaum, Salvanes and Sørensen (2006; see also Raaum, Salvanes and Sørensen, 2003) found that unadjusted correlations in education decreased from about .10 to .06. The same reduction after adjusting for parental characteristics was from about .04 to .02. For adult earnings, the unadjusted neighbour correlation declined from .06 to .03 for men and from .03 to .02 for women. With adjustment for parental education and family structure, the corresponding reduction was from .05 to .02 for men and from .02 to .01 for women. Thus, for both outcomes the overall trend is moving from moderate effects in the oldest cohorts to very low levels in the younger cohorts.

None of the abovementioned studies on neighbourhood or school correlations in children's educational attainment or adult earnings has used methods that take nesting into both of these contexts into account simultaneously. However, several studies of other outcomes such as educational achievement (e.g., test scores or grades) have found very small neighbourhood correlations in cross-classified multilevel models which also take the school into account (Brännström, 2008, Leckie, 2009, Rasbash *et al.*, 2010, Sykes and Musterd, 2011). Brännström (2008), for instance, found that the adjusted correlations in grade point averages between grademates in upper-secondary schools (.07) was considerably higher than between those growing up in the same neighbourhoods (.01) in Swedish metropolitan areas.

The Norwegian setting

Norway, alongside the other countries in the Nordic region, is characterised by redistributive welfare state institutions, low income inequality, and high rates of intergenerational mobility (OECD, 2015, UNICEF, 2016). High-quality basic services, such as health care, are offered to all residents. Norway also has a relatively egalitarian educational system, with publicly financed education at all levels and no tuition fees (Van de Werfhorst and Mijs, 2010).

The Norwegian comprehensive education system is mandatory and publicly funded. For the cohorts covered in this study, compulsory education consisted of nine years of schooling starting at age seven, and was split into primary schools (grades 1–6) and lower-secondary schools (grades 7–9). Students generally graduate from compulsory education at age 16 and there is no formal tracking by student ability during these grades. Municipalities run comprehensive public schools, school attendance is based on place of residence, and rules specifying that students attend the school in their local catchment area are strictly enforced. Importantly, there are minimum standards for schools set by the central government. There is also a high degree of resource redistribution from relatively rich to relatively poor municipalities, and in particular there is considerable resource compensation towards schools serving disadvantaged student bodies (Hægeland, Raaum and Salvanes, 2005, Hægeland, Kirkebøen and Raaum, 2009).

Studies of educational achievement such as PISA also suggest that the between-school variation is small in Norway, although the cohorts covered by these studies overlap only with the very latest cohorts in our data. Analyses of OECD's PISA 2000 data on eighth-graders indicate, for instance, that the between-school part of the total variation in test scores was less than ten percent in Iceland, Finland, Sweden and Norway, whereas the average for all 30 countries included was 33 percent (Marks 2006: Table 6).[4] More recent PISA results largely confirm this, as do analyses of PIRLS and TIMSS data on both eighth-graders and fourth-graders (Martin *et al.*, 2011, Caponera and Losito, 2016).

Although the basic features of Norwegian compulsory education have been quite stable in the period we study, some developments may nevertheless be mentioned. During the first decades after World War II, schools were subject to very detailed national (state) control (Telhaug, Mediås and Aasen, 2004, 2006). From the 1970s, Norwegian educational policy was strongly influenced by progressive, pupil-centred and anti-authoritarian pedagogical ideas. As a result, central government control over curriculum content, teaching methods, and other aspects of education was reduced. Special schools for children with disabilities or other special needs were abolished, and these children

[4] The reported percentages refer to the unadjusted school correlations and are based on averaging across the reading, mathematics and science tests.

were to be included in ordinary schools. By the end of the 1980s, the influence of radical pedagogy had waned. During the 1990s, the aims of the school were redefined with a greater focus on subject matter and learning. The amount of monitoring of schools was increased and detailed standardized curricula for all schools were implemented (Telhaug, et al., 2006: 273-274). The process culminated with an educational reform in 1997, in which the school starting age was also changed from seven to six years and the duration of compulsory school extended from nine to ten years.

In comparative terms, levels of residential segregation by economic status in metropolitan areas are generally quite low in Norway (Musterd 2005; Musterd et al. 2017). In spite of increasing income inequality, Wessel (2000) found that that the level of segregation in Oslo, Norway's capital city, remained stable, or declined slightly, in the period from 1970 to the 1990s. During the 2000s, however, economic segregation in both Oslo and Norway as a whole has increased quite markedly and this seems largely to reflect recent immigration (Wessel, 2016; Markussen and Røed, 2018). Despite immigration-related increases in segregation, recent studies indicate very modest effects of exposure to immigrant-origin peers in school on student outcomes once sorting is adequately addressed (Hermansen and Birkelund, 2015; Hardoy, Mastekaasa, and Schøne, 2018).

Data and methods

We use matched panel data on children and their schools and residential neighbourhoods during adolescence emanating from population-wide Norwegian administrative registries. Information on socio-demographic characteristics of children and their parents, as well as unique identifiers of each child's residential location in adolescence and their school of graduation observed at the end of compulsory lower-secondary education, were matched across several registries using unique personal identifiers. For the current purposes, we follow children in 29 entire birth cohorts (born 1959–1989) from adolescence into adulthood. We exclude all foreign-born individuals who immigrated after school-starting age at seven. With these restrictions, our final sample for the analysis consists of 1,671,784 children. The average number of children per cohort is about 59,000, who graduate from

about 1,000 different schools and reside in about 10,500 different neighbourhoods (cf. Appendix Table A1). Table 1 provides summary statistics for the variables used in the empirical analysis.[5]

<Table 1 about here>

Measurement of school and neighbourhood contexts

To measure children's adolescent contexts, we use information on their school of graduation at the end of lower-secondary education and their neighbourhood of residence while growing up. Unique school identifiers are available for all graduating cohorts from 1975 and onwards and are used to identify schoolmates.[6] For the early cohorts, there were about 900 schools with an average of about 65 graduating students in each cohort, while the corresponding figures are 1,150 schools and 50 students per cohort towards the end of our period (Appendix Table A1). A school typically recruits students from a large number of neighbourhoods (on average fifteen for the earliest cohorts and twelve for the latest, see Appendix Table A2). Children from the same neighbourhood often go to the same school, but a substantial number of neighbourhoods are split between two or more schools (nearly 50 percent of the neighbourhoods in the earliest cohorts and about 25 percent in the latest, see Appendix Table A3)

Neighbourhoods are measured using detailed information on children's residential location in the year of graduation from lower secondary school. For most of our cohorts, these neighbourhood units are defined in terms of Statistics Norway's detailed 'Basic Statistical Unit (BSU)' classification (i.e., '*grunnkretser*'). There are about 13,700 such units with on average about 350 individuals in each unit, which are designed to resemble genuine neighbourhoods and are relatively homogeneous with respect to location and type of housing (Statistics Norway, 1999). For each cohort in our sample, there are about 10,500 neighbourhoods with on average 5-6 students from the same birth cohort in each

[5] Note that the earnings variables are given in raw form (Norwegian NOK) in Table 1, but they are transformed to percentile ranks within each child's birth cohort in the analyses.

[6] School of graduation is missing for all students who graduated in 1990, who are (mostly) born in 1974. Some data on schools are also missing in 1992. We exclude all children from these two graduation cohorts.

neighbourhood (cf. Appendix Table A1). The basic statistical unit is available only for cohorts born 1964 and forward. For the 1959-1964 cohorts, we use census tracts from the 1970 and 1980 Census, which are slightly fewer (about 7,200) and larger (cf. Appendix Table A1).

As stated above, information on residential neighbourhood location is available in the 1970 and 1980 Census and, then, annually from 1990 and onwards. For children born 1975-1989, we measure neighbourhood location when graduating from compulsory education (age 16). For children born in 1959-1974 we use information on neighbourhood location in the 1970 Census (1959-1963 birth cohorts) and 1980 Census (1964-1974 birth cohorts). For these birth cohorts, neighbourhood context is measured between ages 7 and 11 (i.e., born 1959-1963) or between ages 6 and 16 (i.e., born 1964-1974).

Children's later-life socioeconomic outcomes and family background characteristics

To capture the socio-economic status of children and their parents, we use information on educational attainment and annual earnings. Child education refers to the highest level of educational attainment reached by age 25 using the Norwegian Standard Classification of Education (NUS2000). We recode this educational attainment level into years of completed education. We measure the father's and the mother's education separately, based on their level of education attained when the child was 16 years old using the same classification. For the father's and the mother's education, we include each of these as continuous variables and their squared terms.

Child earnings refer to pre-tax annual income from gainful employment (including self-employment); capital income and social welfare transfers are not included. This information is taken from tax files that include annual gross income subject to taxation in various forms and is captured with high accuracy. We measure children's average earnings between ages 32 and 34. Following recent contributions in the literature on intergenerational income mobility, we then rank children in percentiles based on their earnings relative to other children in the same birth cohort, irrespective of gender and including those with zero earnings (Dahl and DeLeire, 2008; Mastekaasa, 2011). This

yields a symmetric variable that captures earnings ranks measured as the cohort-specific percentile in the earnings distribution, which ranges from zero (lowest) to 100 (highest).

Parental earnings are also measured in terms of pre-tax annual wages income from gainful employment. We average the father's and the mother's annual earnings over the years the child was aged 11-15 years and then rank each parent's earnings position relative to other fathers or mothers with children in their child's birth cohort (i.e., percentile rank), irrespective of the child's gender and including parents with zero earnings. Father's and mother's earnings rank are entered as continuous variables in our models (with squared terms), but we also include dummy variables indicating whether the mother or the father had earnings equal to zero throughout the whole time period.

We also include additional sociodemographic background characteristics. This includes information on children's gender, immigrant background (i.e., dummy variables for first generation and second generation), number of siblings (with squared term), birth order (with squared term), and mother's age at the child's birth (with squared term).

Empirical approach

Since schoolmates often live in the same neighbourhoods, there are good reasons to estimate school correlations while also taking neighbourhood clustering into account, and vice versa. In line with several of the more recent studies in the field, we therefore supplement separate two-level neighbourhood and school models with cross-classified models in which individuals are treated as clustered within both schools and neighbourhoods (Brännström, 2008, Dundas, Leyland and Macintyre, 2014, Rasbash, et al., 2010, Sykes and Musterd, 2011).

The two-level models can be written as:

$$y_{ij} = \beta_0 + u_j + e_{ij} \qquad (1a)$$

$$y_{ik} = \beta_0 + v_k + e_{ik} \qquad (1b)$$

In equation (1a), y_{ij} is the educational level (or earnings) of individual i from school j, β_0 is mean

education (or earnings) across all schools and neighborhoods, u_j is the effect of school j and e_{ij} is an individual level error term. The school effect and the individual level error term are assumed to be independent of each other. In equation (1b), a similar model for neighbourhood variation is obtained by replacing u_j with v_k, where the latter is the effect associated with neighbourhood k.[7] The variance across schools (neighbourhoods) is denoted as σ_u^2 (σ_v^2), and the variance within schools (neighbourhoods) as σ_e^2. Then, the intraclass correlation coefficients for schools (ICC_u) and neighborhoods (ICC_v) are:

$$ICC_u = \frac{\sigma_u^2}{\sigma_u^2+\sigma_e^2} \qquad (2a)$$

$$ICC_v = \frac{\sigma_v^2}{\sigma_v^2+\sigma_e^2} \qquad (2b)$$

The cross-classified model can be written as:

$$y_{ijk} = \beta_0 + v_k + u_j + e_{ijk} \qquad (3)$$

In this equation, y_{ijk} is the educational level (or earnings) of individual *i* from neighbourhood k and school j, β_0 is mean education (or earnings) across all schools and neighborhoods, v_k is the effect associated with neighbourhood k and u_j is the effect of school j. The random effects v_k and u_j and the individual error term e_{ijk} are all assumed to be independent of each other.[8] Then the ICCs for schools (ICC_u) and neighborhoods (ICC_v) are:

[7] For simplicity we reuse terms across equations (e.g., β_0) although the parameters and variables thus denoted are of course not expected to be identical in the various equations.

[8] As in ordinary regression, correlated error terms will lead to bias in the coefficient estimates. There is a large literature on selection effects leading to, e.g., correlation between the individual error term and the school (or neighbourhood) effect and resulting bias in the latter (e.g., Sørensen & Morgan 2000). We are not aware of any discussion of correlations of the group level random effects in hierarchical or cross-classified multilevel models, but parallel problems arise there.

$$ICC_u = \frac{\sigma_u^2}{\sigma_u^2+\sigma_v^2+\sigma_e^2} \qquad (4a)$$

$$ICC_v = \frac{\sigma_v^2}{\sigma_u^2+\sigma_v^2+\sigma_e^2} \qquad (4b)$$

The intra-school correlation coefficient (ICC_u) is interpreted as the correlation in education (or earnings) between two randomly selected students who attend the same school but live in different neighbourhoods, or, equivalently, as the proportion of variance accounted for by school affiliation. The intra-neighbourhood correlation coefficient (ICC_v) is interpreted as the correlation between two students who attend different schools but live in the same neighbourhood (Dunn, Richmond, Milliren and Subramanian, 2015, Leckie, 2013).

While we focus mainly on the ICC's in our presentation, it should be noted the variances, or rather the standard deviations of the random effects, σ_u and σ_v, are also of interest in their own right, as they indicate how much variation in the absolute level of earnings and educational attainment there is among the schools and the neighbourhoods.[9] With *y* measured, e.g., in terms of years of education, a σ_u of 1.5 means that students from a school one standard deviation higher than another in the distribution of school effects can expect to attain 1.5 years more of education.

The two-level and the cross-classified models described above contain no explanatory variables other than school and neighbourhood. In addition to these unadjusted multilevel models, we estimate adjusted models. We expand on the models described in equation 1a, 1b, and 3 by including parental education, parental earnings, gender, immigrant background, number of siblings, birth order, and mother's age at children's birth. We estimate all models separately for each birth cohort, using Markov Chain Monte Carlo (MCMC) estimation as implemented in the MLwiN program (both for cross-classified and two-level models).[10]

[9] The standard deviation of the random effects can be found by taking the square root of the variance of the random effects.
[10] We used a burn-in of 1000 and a chain of 100,000.

Results

The degree to which socioeconomic origin, as captured by parents' earnings and education, contribute to school and neighbourhood level variation in children's adult outcomes depends, among other things, on the extent to which such parental characteristics are themselves unequally distributed across schools and neighbourhoods. Before moving to the main analyses, we therefore present results from two-level models with parents' level of schooling and earnings as outcome variables using Equations 1a and 1b.

Figure 1 shows how school and neighbourhood correlations in parents' education and earnings (i.e., segregation by socioeconomic background) have developed over the 1959 to 1989 birth cohorts. With regard to parental education, a steady downward trend is found in both correlations for cohorts until about 1980, followed by stability over cohorts born during the 1980s. With regard to parents' earnings, the development over time is also very similar for the school and the neighbourhood correlations, but there is no monotonic trend over time. There was an increase for the 1959 to 1966 cohorts, followed by a decline, and then stability for those born in 1980 or later. Both with regard to parents' earnings and education, neighbourhoods are more uneven than schools.

Figure 1: Intraclass correlations (ICC) in schools and neighbourhoods for parental education and earnings with 95% confidence intervals

***** Figure 1 here *****

Educational attainment

Figure 2 presents the school and neighbourhood correlations for years of completed education;[11] the ICC estimates as well as the variance of the random effects (σ_u^2 and σ_v^2) and the variance of the within-subject residual (σ_e^2) are reported in the Online Appendix Tables A4 to A9. We start with the unadjusted ICC's for schools and neighbourhoods (i.e., without controls for child and parental background characteristics); results from the two-level models are in Panel A and from the cross-

[11] In Appendix Figure A1 in the Online Appendix, we report very similar results for year of completed education measured at age 30, but for a shorter time series (i.e., birth cohorts 1959 to 1984).

classified model in Panel B. The school correlations are very similar in the two models, declining from about .05 for the earliest cohorts to about .03 among those born in the mid 1970's and with no clear trend after that. The neighbourhood correlations, on the other hand, are considerably lower in the cross-classified model than in the two-level model. Similar to the school correlations, the neighbourhood correlations also decline over cohorts, but less clearly in the cross-classified model than in the two-level model, as the correlations there are much lower even in the earliest cohorts. In the cross-classified model, the neighbourhood correlations are in the .03 and .04 interval for the pre-1973 cohorts and in the .02 to .03 interval thereafter.

The adjusted school and neighbourhood correlations (i.e., with controls for child and parental background characteristics) are shown in Panels C (two-level models) and D (cross-classified model). As far as the adjusted school correlations are concerned, the results from the two-level models (Panel C) and the cross-classified model (Panel D) are extremely similar. The correlations increase from slightly above .01 in the earliest cohorts to .03 for cohorts from about 1970, but return to about .01 for those born in the late 1980's. In the two-level model, the neighbourhood correlations display a somewhat similar pattern over time, but this similarity disappears in the cross-classified model. In this model, the adjusted neighbourhood correlations are generally low in all cohorts, mostly below .01. The finding that the neighbourhood correlations (both unadjusted and adjusted) are much lower in the cross-classified than in the two-level models is consistent with the idea that neighbourhood effects to a considerable extent operate through the school context.[12]

Apart from the unadjusted correlations in the earlier cohorts, the general impression from the analyses of educational attainment is that both the school and the neighbourhood correlations are small and in some cases almost negligible. This is also evident if we examine the standard deviations of the

[12] The fact that the school correlation is little affected by whether a cross-classified or a two-level model was estimated, whereas the neighbourhood correlation was considerably higher in the two-level model compared to the cross-classified model, is in line with Luo and Kwok (2009). According to their results, the omission of a cross-classified factor *j* (e.g., schools) means that most of the variance associated with that factor is transferred to the remaining factor *k* (e.g., neighbourhoods), if *k* is to a great extent nested within *j*, which is the case for neighbourhoods within schools in our data. The omission of *k*, however, has little impact on the estimated variance component for *j* (maintaining the assumption that *k* is largely nested within *j*). This also makes intuitive sense, as the between-school variance is also to a great extent between-neighbourhood variance and will add to that if the school factor is removed. By contrast, the between-neighbourhood variance comprises variation both within and between schools, and adds to both between-school and individual-level variance if the neighbourhood factor is dropped (cf. Moerbeek 2004, for similar results in a standard hierarchical multilevel model).

random effects. Averaging over the five latest cohorts, the standard deviation of the random school effects (σ_u) is .24. As mentioned earlier, this number can be interpreted as the difference in expected years of completed education between students attending schools one standard deviation apart in the school effects distribution. The corresponding five-cohort average standard deviation for the neighbourhood effects (σ_v) is even lower, namely .15.

Figure 2: Intraclass correlations (ICC) in schools and neighbourhoods for education with 95% confidence intervals

***** Figure 2 here *****

Note: The adjusted models control for mother's and father's level of education and earnings (including dummy variables for zero earnings), mother's age at child's birth, child's gender, immigrant background, number of siblings, and birth order.

Adult earnings

The results for earnings rank are shown in Figure 3, which, as for education, presents estimates from both two-level (panels A and C) and cross-classified (panels B and D) models both before and after the inclusion of controls for the observed parental and child background characteristics. The variance of the random effects (σ_u^2 and σ_v^2) and the variance of the within-subject residual (σ_e^2) are reported in the Online Appendix Tables A10 to A15.

The most striking feature of the results for earnings is that the correlations are generally low across all the cohorts studied and without any evidence of trends.[13] As far as the school correlations are concerned, the results for the two-level models and the cross-classified models are very similar. This parallels the results for educational attainment above. Also similar to the educational attainment results, the neighbourhood correlations are clearly lower in the cross-classified models. In the two-level model, the unadjusted neighbourhood correlations fluctuate mainly between .015 and .020 (panel A), while the adjusted neighbourhood correlations are mostly lower than .01 (panel C). In the cross-

[13] Since earnings are measured in the age interval 32-34, the latest cohort covered is those born in 1982.

classified models, the unadjusted school correlations are mainly in the .010 to .015 interval (panel B) and the adjusted correlations in the .005 to .010 interval (panel D).

Overall, these school and neighbourhood correlations suggest that these adolescent contexts have a very limited long-term influence on individuals' adult earnings in Norway. This is also evident if we look at standard deviations of the school and neighbourhood random effects. For the five most recent cohorts, a move of one standard deviation in the distribution of school effects (σ_u) amounts to about 2.5 percentile earnings ranks. The corresponding number for the neighbourhood effects (σ_v) is 1.5 percentile earnings ranks.

Figure 3: Intraclass correlations (ICC) in schools and neighbourhoods for adult earnings with 95% confidence intervals

***** Figure 3 here *****

Note: The adjusted models control for mother's and father's level of education and earnings (including dummy variables for zero earnings), mother's age at child's birth, child's gender, immigrant background, number of siblings, and birth order.

Discussion and conclusions

This study has explored trends in the adult socioeconomic resemblance between children who graduated from the same school or who lived in the same residential neighbourhood during adolescence across three decades in Norway. We have used intraclass correlations from two-level and cross-classified multilevel models to assess change over time in the contribution of school and neighbourhood contexts for children's later-life outcomes before and after taking observed family background into account. For educational attainment, our results revealed a clear decline in the unadjusted school and neighbourhood correlations over birth cohorts born between 1959 and the late 1970s, followed by a relatively stable pattern of low correlations across the younger cohorts. After taking into account sorting by observed family background, we did not find a corresponding decline in school and neighbourhood correlations but instead stable and low correlations. In line with this, we found a declining trend in the school and neighbourhood level clustering by parental socioeconomic

characteristics that ran more or less parallel with the decline in the unadjusted school and neighbourhood correlations. Thus, declining segregation by parental socioeconomic background seems to be the key driver for the developments in the unadjusted correlations in children's educational attainment.

Further, the school-level correlations in educational attainment were very similar in two-level and cross-classified multilevel models. This indicates that school correlations are not strongly biased even if neighbourhood clustering is not taken into account. However, the neighbourhood correlations dropped to about half when we simultaneously took nesting within schools into account. Thus, neighbourhood effects appear to be mediated by schools to a considerable extent. Overall, our results suggest that the upper-bound contribution of the school contexts, net of observed family background, is very small, only slightly above one percent of the total variation in completed years of education in the more recent cohorts. The contribution of the neighbourhood is even smaller. The relatively low importance of the contextual variation is also evident if we look at the standard deviations of the random effects, which on average are .24 for schools and .15 for neighbourhoods in recent cohorts.

Turning to adult earnings, we found that both neighbourhood and school correlations are very small. We found no downward trend in the resemblance between former schoolmates and neighbouring children similar to the one found for educational attainment. Instead, the unadjusted school and neighbourhood correlations were low throughout the period. As for education, we found that the school correlations from the ordinary two-level and the cross-classified multilevel models were quite similar, whereas the neighbourhood correlations were considerably lower in the latter. The unadjusted intraclass correlations show that the upper-bound contribution of school and neighbourhood contexts to the total variation in children's percentile earnings rank is not much higher than one percent across these birth cohorts. Moreover, this estimate was further reduced after accounting for family background characteristics, for the neighbourhood effects to the point where it was hardly distinguishable from zero.

In summary, we arrive at two main conclusions. First, the consistently low levels of the correlations between former schoolmates and neighbouring children, after taking sorting into account, suggest that these adolescent contexts are not important sources of later-life socioeconomic

inequalities between children growing up in contemporary Norway. Both before and after adjusting for observed family background, there is far more variation in educational attainment and adult earnings within schools and neighbourhoods than between these contexts. Second, we find that adjusted school and neighbourhood correlations in education and earnings are relatively stable across birth cohorts. This suggests that the overall influence of childhood conditions that vary between different schools and neighbourhoods has not exhibited considerable change during the three last decades in Norway.

Some limitations in our study should be noted. To begin, we measure school and neighbourhood context at one occasion during adolescence, which might underestimate the overall cumulative effects of these contexts on children's outcomes. Previous studies have found stronger effects of neighbourhood context once cumulative effects of sustained exposure to given neighbourhood contexts are taken into account (Wodtke, et al., 2011, Chetty and Hendren, 2018), although others argue that cross-sectional measures are reliable as children often do not experience high levels of variation in their local surroundings over time (Jackson and Mare, 2007). Further, measurement errors in lifetime earnings due to yearly fluctuations and a relatively short observation period might contribute to a downward bias in the estimated school and neighbourhood correlations for this outcome. The age at which earnings are measured is also a potential issue, but our approach here is in line with recommendations in studies of life-cycle variation in earnings (Bhuller, Mogstad & Salvanes, 2017). Finally, since we are not able to measure all factors at the family level that may both influence families' school and neighbourhood selection and children's later-life outcomes it is evident that remaining (unobserved) non-random sorting will result in some degree of omitted variable bias. Consequently, we may overstate the importance of school and neighbourhood factors due to unobserved variation in children's family characteristics across different contexts and, as such, our estimates likely represent upper-bound estimates of these effects.

Nonetheless, the relatively stable and low influence of school and neighbourhood contexts that we show for children born during the 1960s, 1970s, and 1980s is interesting when compared to previous Norwegian studies (Raaum et al., 2003, 2006), which have shown a clear decline in the importance of local childhood context for those born in early post-WWII decades. While the early post-war period was characterized by extensive educational reforms and expansion of the welfare

state, we focus on a period when Norwegian welfare-state institutions were well developed. Interestingly, our estimates are comparable to those found in egalitarian Sweden (Lindahl 2011) while studies from the high-inequality context in USA report considerably higher neighbourhood and school correlations (Solon et al. 2000; Page and Solon 2003; Altonji and Mansfield 2011). As far as school correlations are concerned, there is also no sign of a decline over time in the US studies. To the contrary, Altonji and Mansfield (2011) report an increase from .11 to .15 when comparing adjusted school correlations for four-year college enrolment among high school students in 1972 and 2002.

Interestingly, the pattern of increasing school-level correlations in educational attainment in this period coincides with a stark increase in economic inequality in US society, which has led to increased segregation by family income across children's schools and neighbourhood contexts (Reardon and Bischoff, 2011, Owens, 2016, Owens, et al., 2016). Norway, like most Western societies, has also experienced growing economic inequalities since the late 1970s (Aaberge, et al., 2016), but our results show that the trend towards increased inequalities so far has not been translated into larger between school or between neighbourhood inequality in children's outcomes. For the birth cohorts covered in the current study, changes in income inequality have not been accompanied by increased school or neighbourhood segregation with regard to parental income (cf. Figure 1), suggesting that inequality mainly increased within neighbourhoods and school catchment areas. This pattern is in line with a recent Norwegian study, which also found stable or slightly declining neighbourhood segregation throughout the 1990s (Markussen and Røed 2018). Importantly, however, Markussen and Røed (2018) document a reversal in this trend, leading to increased levels of residential segregation by income towards the end of the 2000s. Further, this reversal is largely explained by increased immigration and less so by overall changes in income inequality. To assess whether increased school and neighbourhood segregation in recent years has accentuated the influence of these contexts on adolescents' life chances should be a key task for future research.

In conclusion, one interpretation of the stable and low adjusted school and neighbourhood correlations in our data is that the Norwegian educational system and broader welfare-state institutions have been able to limit the importance of contextual variation in children's socioeconomic opportunities in life. As long time series of administrative data are becoming available in a growing

number of countries, a fruitful avenue for future research would be to provide comparative cross-national evidence using variance decomposition methods to assess variation in the upper-bound importance of school and neighbourhood contexts for children's socioeconomic attainments in different institutional settings and over extended periods of time.

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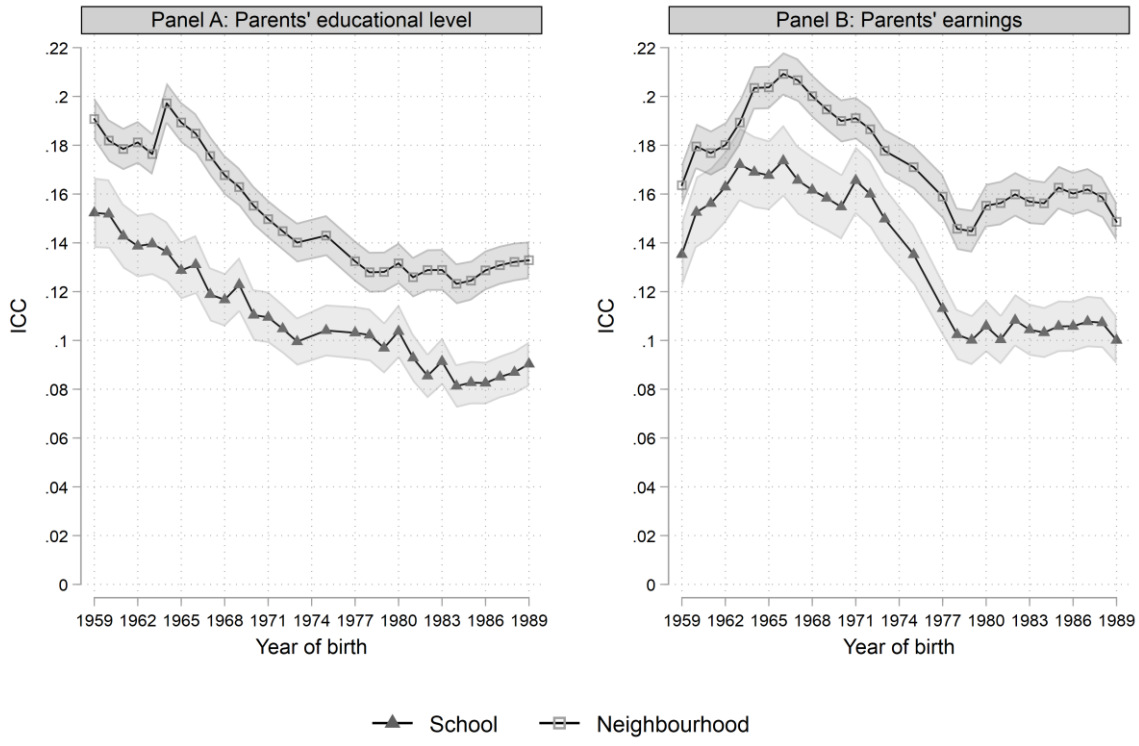

Figure 1: Intraclass correlations (ICC) in schools and neighbourhoods for parental education and earnings with 95% confidence intervals

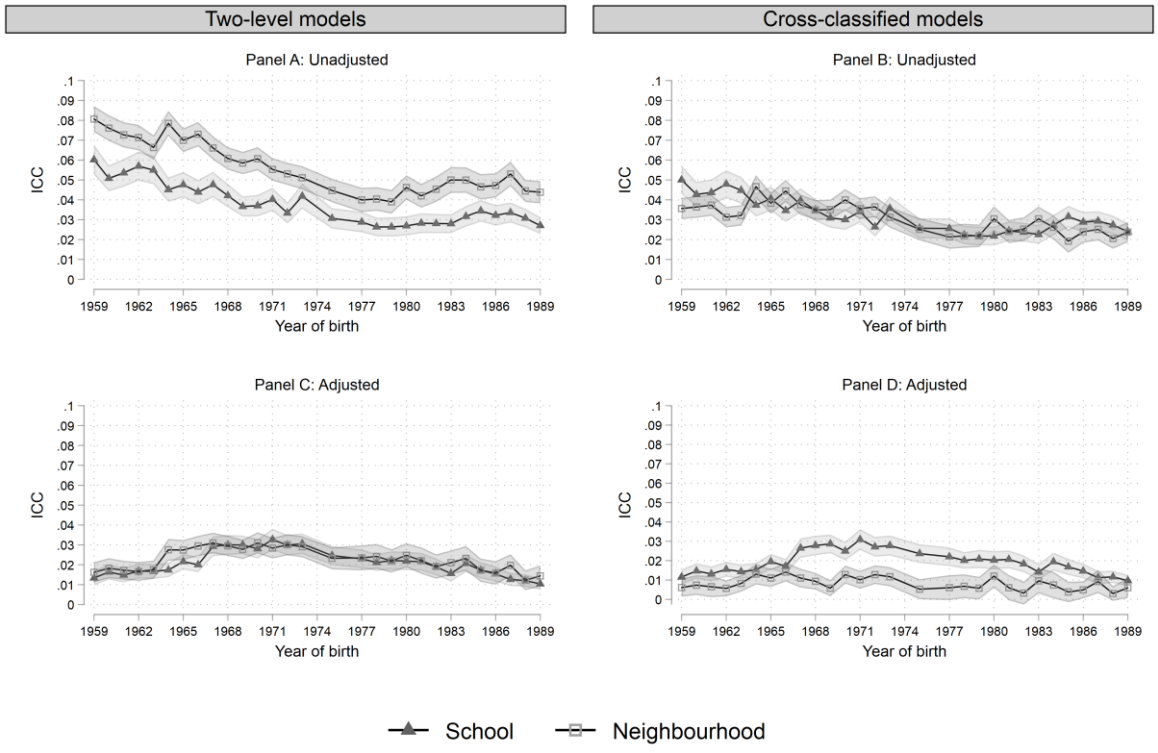

Figure 2: Intraclass correlations (ICC) in schools and neighbourhoods for education with 95% confidence intervals

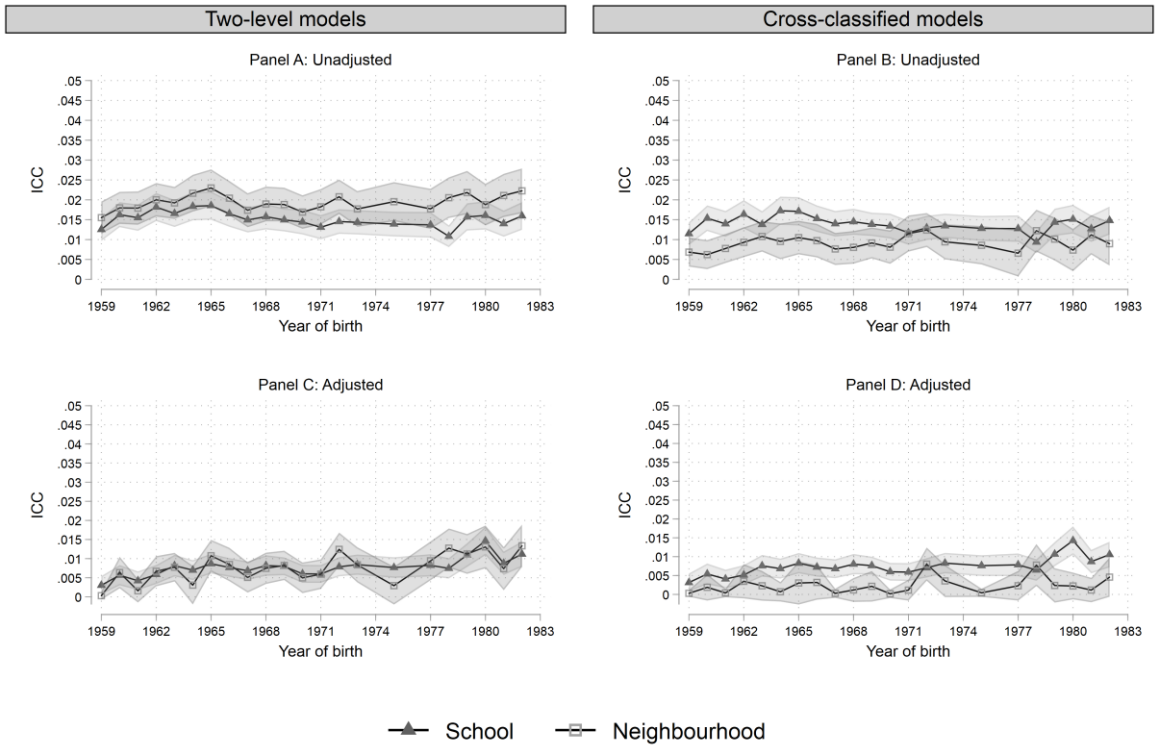

Figure 3: Intraclass correlations (ICC) in schools and neighbourhoods for adult earnings with 95% confidence intervals

Table 1: Descriptive statistics by birth cohorts.

	1959-1968		1969-1978		1979-1988	
	Mean	SD	Mean	SD	Mean	SD
Educational attainment (years)	12.475	2.108	13.169	2.121	13.381	2.263
Earnings (NOK)	214,554	155,681	276,830	166,030	323,816	185,750
Father's education (years)	11.225	2.970	12.101	2.999	12.951	2.873
Mother's education (years)	10.441	2.295	11.416	2.498	12.574	2.726
Father's earnings (NOK)	237,652	102,161	255,424	125,961	299,683	220,262
Mother's earnings (NOK)	74,323	64,314	102,900	75,972	149,672	98,845
Father zero earnings	0.010	0.098	0.012	0.109	0.020	0.142
Mother zero earnings	0.060	0.238	0.072	0.259	0.054	0.226
Gender	0.490	0.500	0.488	0.500	0.488	0.500
First-generation immigrants	0.001	0.028	0.003	0.052	0.011	0.106
Second-generation immigrants	0.002	0.039	0.003	0.053	0.013	0.111
Birth order	2.170	1.225	1.986	1.131	1.871	0.983
Number of siblings	2.224	1.350	1.943	1.250	1.981	1.241
Mothers' age	27.331	6.037	26.162	5.211	27.151	4.980

Note: For all variables but earnings, the numbers of observations for the birth cohorts 1959-1668, 1969-1978, and 1979-1988 are 486,633, 417,911, and 447,034, respectively. For earnings, the numbers observations are 470,812, 408,943, and 174,096.

Online Appendix Figures and Tables

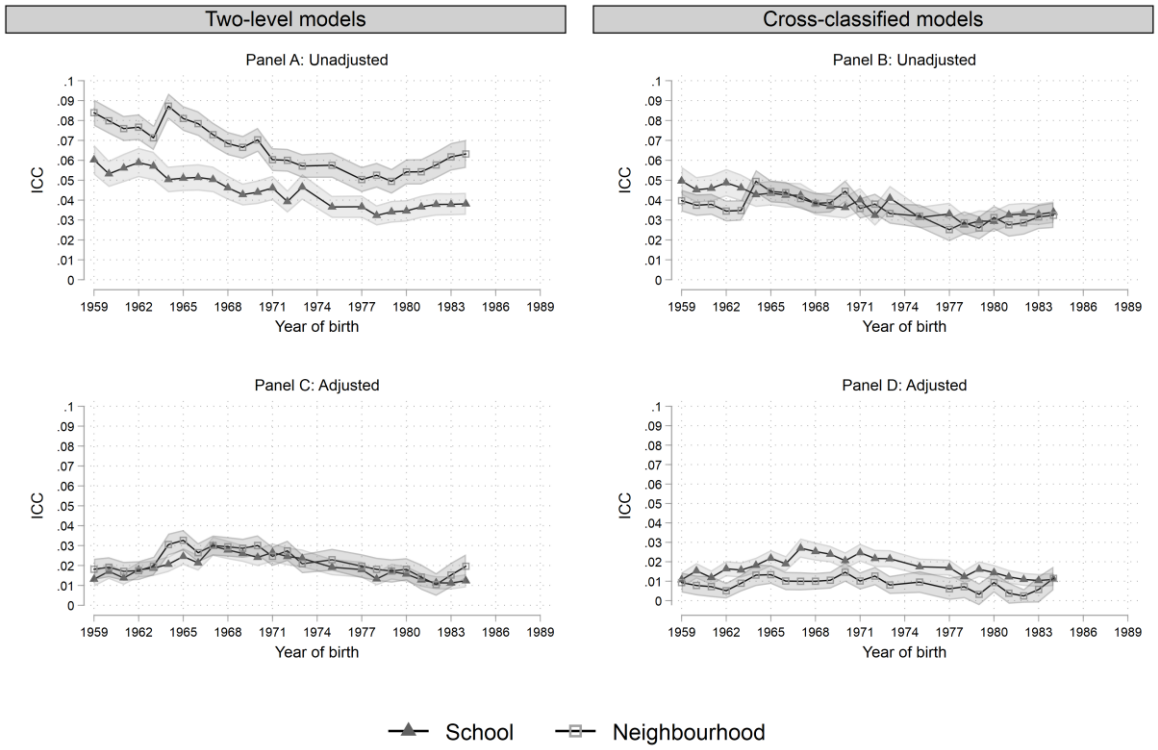

Figure A1: Intraclass correlations (ICC) in schools and neighbourhoods for education at age 30 with 95% confidence intervals

Note: The adjusted models control for mother's and father's level of education and earnings (including dummy variables for zero earnings), mother's age at child's birth, child's gender, immigrant background, number of siblings, and birth order.

Table A1: Number of schools and neighbourhoods (groups) and average number of students in the groups in the analysis sample, by year of birth.

Year of birth	Schools		Neighbourhoods	
	Groups	Students	Groups	Students
1959	837	70.6	7,168	8.3
1960	859	67.9	7,261	8.0
1961	946	62.0	7,277	8.1
1962	1,000	58.6	7,247	8.1
1963	1,028	58.9	7,245	8.4
1964	1,061	58.8	10,460	6.0
1965	1,088	58.8	10,531	6.1
1966	1,118	57.8	10,523	6.1
1967	1,134	56.7	10,461	6.2
1968	1,157	56.8	10,481	6.3
1969	1,171	56.6	10,437	6.4
1970	1,191	53.2	10,419	6.1
1971	1,210	53.3	10,406	6.2
1972	1,195	52.6	10,340	6.1
1973	1,201	50.2	10,211	5.9
1975	1,192	46.1	10,294	5.3
1977	1,180	42.7	10,048	5.0
1978	1,194	42.8	10,091	5.1
1979	1,196	42.5	10,106	5.0
1980	1,187	42.6	10,114	5.0
1981	1,180	42.7	10,106	5.0
1982	1,147	44.0	10,152	5.0
1983	1,148	43.1	10,143	4.9
1984	1,130	44.2	10,203	4.9
1985	1,164	43.5	10,243	4.9
1986	1,189	44.4	10,358	5.1
1987	1,133	46.9	10,313	5.2
1988	1,159	49.2	10,393	5.5
1989	1,160	50.2	10,464	5.6

Note: There is one observation for each group (i.e., results not weighted by group size).

Table A2: Distribution of neighbourhoods and students across neighbourhoods for students in the same school, by year of birth.

Year of birth	Number of schools	Share of students living in largest neighbourhood	Average number of neighbourhoods	Share of schools with one neighbourhood
1959	837	.363	15.065	.027
1960	859	.364	15.766	.031
1961	946	.376	15.496	.043
1962	1,000	.389	15.705	.055
1963	1,028	.383	16.679	.046
1964	1,061	.347	13.414	.066
1965	1,088	.356	12.575	.073
1966	1,118	.364	12.680	.070
1967	1,134	.370	13.082	.077
1968	1,157	.368	13.743	.075
1969	1,171	.370	14.606	.067
1970	1,191	.368	15.141	.077
1971	1,210	.362	15.871	.077
1972	1,195	.351	17.185	.058
1973	1,201	.344	17.789	.054
1975	1,192	.387	11.064	.077
1977	1,180	.398	10.681	.092
1978	1,194	.399	10.678	.094
1979	1,196	.396	10.643	.099
1980	1,187	.393	10.757	.092
1981	1,180	.384	10.829	.086
1982	1,147	.374	11.051	.071
1983	1,148	.379	11.131	.078
1984	1,130	.384	11.200	.088
1985	1,164	.375	11.241	.073
1986	1,189	.380	11.394	.095
1987	1,133	.369	11.807	.066
1988	1,159	.370	12.110	.079
1989	1,160	.368	12.172	.072

Note: There is one observation for each school (i.e., results not weighted by group size).

Table A3: Distribution of schools and students across schools for students in the same neighbourhood, by year of birth.

Year of birth	Number of neighbourhoods	Share of students at largest school	Average number of schools	Share of neighbourhoods with one school
1959	7,168	.894	1.885	.589
1960	7,261	.901	1.847	.624
1961	7,277	.886	1.997	.590
1962	7,247	.864	2.217	.545
1963	7,245	.851	2.385	.513
1964	10,460	.937	1.364	.753
1965	10,531	.949	1.295	.792
1966	10,523	.944	1.338	.764
1967	10,461	.935	1.410	.734
1968	10,481	.925	1.510	.696
1969	10,437	.915	1.628	.663
1970	10,419	.899	1.723	.629
1971	10,406	.860	1.991	.535
1972	10,340	.869	1.972	.572
1973	10,211	.849	2.079	.540
1975	10,294	.947	1.281	.795
1977	10,048	.949	1.253	.811
1978	10,091	.948	1.272	.805
1979	10,106	.949	1.259	.810
1980	10,114	.948	1.263	.808
1981	10,106	.945	1.278	.792
1982	10,152	.947	1.262	.800
1983	10,143	.946	1.266	.803
1984	10,203	.943	1.278	.791
1985	10,243	.942	1.285	.781
1986	10,358	.931	1.357	.745
1987	10,313	.940	1.311	.770
1988	10,393	.935	1.357	.749
1989	10,464	.936	1.351	.753

Note: There is one observation for each neighbourhood (i.e., results not weighted by group size).

Table A4: Unadjusted two-level school random intercepts and intraclass correlation (ICC) for education (Panel A, Figure 2).

Year of birth	School		Individual		School	
	Variance	SE	Variance	SE	ICC	SE
1959	0.2749	0.0185	4.2939	0.0253	0.0602	0.0038
1960	0.2294	0.0158	4.2860	0.0251	0.0508	0.0033
1961	0.2361	0.0165	4.1685	0.0243	0.0536	0.0036
1962	0.2463	0.0170	4.0768	0.0240	0.0570	0.0037
1963	0.2403	0.0167	4.1304	0.0238	0.0550	0.0036
1964	0.1965	0.0142	4.1592	0.0237	0.0451	0.0031
1965	0.2077	0.0148	4.1554	0.0233	0.0476	0.0033
1966	0.1917	0.0141	4.1765	0.0234	0.0439	0.0031
1967	0.2088	0.0150	4.1743	0.0233	0.0476	0.0033
1968	0.1898	0.0140	4.3154	0.0239	0.0421	0.0030
1969	0.1672	0.0122	4.3943	0.0242	0.0367	0.0026
1970	0.1671	0.0128	4.3431	0.0246	0.0371	0.0028
1971	0.1857	0.0142	4.4306	0.0253	0.0402	0.0030
1972	0.1512	0.0126	4.3799	0.0249	0.0334	0.0027
1973	0.1855	0.0149	4.2441	0.0247	0.0419	0.0032
1975	0.1324	0.0116	4.1821	0.0255	0.0307	0.0026
1977	0.1276	0.0118	4.2976	0.0274	0.0288	0.0026
1978	0.1254	0.0115	4.6259	0.0292	0.0264	0.0024
1979	0.1308	0.0125	4.8284	0.0305	0.0264	0.0025
1980	0.1282	0.0120	4.6392	0.0296	0.0269	0.0025
1981	0.1350	0.0124	4.6452	0.0296	0.0283	0.0025
1982	0.1371	0.0122	4.7457	0.0301	0.0281	0.0024
1983	0.1392	0.0123	4.8297	0.0311	0.0280	0.0024
1984	0.1626	0.0138	4.9684	0.0320	0.0317	0.0026
1985	0.1807	0.0151	5.0631	0.0321	0.0345	0.0028
1986	0.1767	0.0149	5.3075	0.0331	0.0322	0.0026
1987	0.1888	0.0148	5.4305	0.0336	0.0336	0.0026
1988	0.1758	0.0139	5.5298	0.0328	0.0308	0.0024
1989	0.1507	0.0123	5.4191	0.0319	0.0271	0.0022

Table A5: Unadjusted two-level neighbourhood random intercepts and intraclass correlation (ICC) for education (Panel A, Figure 2).

Year of birth	Neighbourhood		Individual		Neighbourhood	
	Variance	SE	Variance	SE	ICC	SE
1959	0.3673	0.0161	4.1873	0.0253	0.0806	0.0033
1960	0.3439	0.0157	4.1775	0.0254	0.0761	0.0033
1961	0.3189	0.0149	4.0690	0.0247	0.0727	0.0032
1962	0.3073	0.0148	4.0044	0.0243	0.0713	0.0033
1963	0.2881	0.0142	4.0556	0.0243	0.0663	0.0031
1964	0.3408	0.0145	4.0023	0.0241	0.0785	0.0032
1965	0.3033	0.0137	4.0327	0.0239	0.0699	0.0031
1966	0.3169	0.0141	4.0253	0.0239	0.0730	0.0031
1967	0.2874	0.0135	4.0598	0.0240	0.0661	0.0030
1968	0.2724	0.0134	4.2074	0.0247	0.0608	0.0029
1969	0.2662	0.0134	4.2826	0.0249	0.0585	0.0029
1970	0.2724	0.0138	4.2173	0.0251	0.0607	0.0030
1971	0.2521	0.0135	4.3057	0.0255	0.0553	0.0029
1972	0.2391	0.0131	4.2667	0.0256	0.0531	0.0028
1973	0.2243	0.0133	4.1659	0.0256	0.0511	0.0030
1975	0.1921	0.0132	4.1060	0.0264	0.0447	0.0030
1977	0.1763	0.0139	4.2366	0.0287	0.0400	0.0031
1978	0.1914	0.0146	4.5453	0.0304	0.0404	0.0030
1979	0.1928	0.0151	4.7495	0.0318	0.0390	0.0030
1980	0.2196	0.0151	4.5327	0.0304	0.0462	0.0031
1981	0.2000	0.0148	4.5578	0.0306	0.0420	0.0031
1982	0.2203	0.0160	4.6393	0.0314	0.0453	0.0032
1983	0.2479	0.0168	4.7098	0.0323	0.0500	0.0033
1984	0.2561	0.0171	4.8710	0.0330	0.0499	0.0033
1985	0.2438	0.0175	4.9932	0.0337	0.0466	0.0033
1986	0.2590	0.0174	5.2247	0.0343	0.0472	0.0031
1987	0.2977	0.0181	5.3188	0.0349	0.0530	0.0032
1988	0.2536	0.0165	5.4482	0.0342	0.0445	0.0028
1989	0.2442	0.0162	5.3245	0.0331	0.0438	0.0029

Table A6: Unadjusted cross-classified school and neighbourhood random intercepts and intraclass correlations (ICCs) for education (Panel B, Figure 2).

Year of	School		Neighbourhood		Individual		School		Neighbourhood	
birth	Variance	SE	Variance	SE	Variance	SE	ICC	SE	ICC	SE
1959	0.2276	0.0173	0.1622	0.0125	4.1614	0.0255	0.0500	0.0036	0.0356	0.0027
1960	0.1928	0.0150	0.1642	0.0128	4.1529	0.0254	0.0427	0.0032	0.0364	0.0028
1961	0.1919	0.0153	0.1638	0.0121	4.0344	0.0245	0.0437	0.0034	0.0373	0.0027
1962	0.2064	0.0159	0.1348	0.0115	3.9649	0.0242	0.0479	0.0035	0.0313	0.0026
1963	0.1946	0.0154	0.1397	0.0115	4.0126	0.0241	0.0448	0.0034	0.0321	0.0026
1964	0.1625	0.0133	0.2028	0.0130	3.9819	0.0241	0.0374	0.0030	0.0466	0.0029
1965	0.1767	0.0140	0.1666	0.0119	4.0088	0.0238	0.0406	0.0031	0.0383	0.0027
1966	0.1508	0.0130	0.1935	0.0126	4.0095	0.0238	0.0346	0.0029	0.0445	0.0029
1967	0.1734	0.0141	0.1640	0.0116	4.0311	0.0238	0.0397	0.0031	0.0375	0.0026
1968	0.1565	0.0131	0.1568	0.0116	4.1793	0.0244	0.0348	0.0028	0.0349	0.0026
1969	0.1407	0.0117	0.1599	0.0117	4.2521	0.0247	0.0309	0.0025	0.0351	0.0025
1970	0.1351	0.0119	0.1798	0.0126	4.1835	0.0251	0.0300	0.0026	0.0400	0.0028
1971	0.1571	0.0136	0.1637	0.0125	4.2820	0.0258	0.0341	0.0029	0.0356	0.0027
1972	0.1192	0.0115	0.1648	0.0123	4.2319	0.0254	0.0264	0.0025	0.0365	0.0027
1973	0.1578	0.0141	0.1379	0.0118	4.1179	0.0253	0.0358	0.0031	0.0312	0.0026
1975	0.1108	0.0112	0.1085	0.0122	4.0896	0.0264	0.0257	0.0026	0.0252	0.0028
1977	0.1133	0.0116	0.0944	0.0135	4.2161	0.0286	0.0256	0.0026	0.0213	0.0030
1978	0.1059	0.0114	0.1041	0.0147	4.5348	0.0305	0.0223	0.0024	0.0219	0.0031
1979	0.1081	0.0120	0.1085	0.0143	4.7356	0.0318	0.0218	0.0024	0.0219	0.0029
1980	0.1038	0.0117	0.1450	0.0154	4.5131	0.0307	0.0218	0.0024	0.0305	0.0032
1981	0.1161	0.0122	0.1149	0.0142	4.5470	0.0307	0.0243	0.0025	0.0240	0.0029
1982	0.1156	0.0120	0.1232	0.0148	4.6376	0.0314	0.0237	0.0024	0.0253	0.0030
1983	0.1119	0.0120	0.1510	0.0157	4.6987	0.0321	0.0226	0.0024	0.0304	0.0031
1984	0.1401	0.0135	0.1342	0.0159	4.8522	0.0333	0.0273	0.0026	0.0262	0.0031
1985	0.1654	0.0149	0.1008	0.0157	4.9759	0.0338	0.0315	0.0028	0.0192	0.0030
1986	0.1579	0.0145	0.1311	0.0156	5.1917	0.0345	0.0288	0.0026	0.0239	0.0028
1987	0.1647	0.0146	0.1412	0.0160	5.3082	0.0349	0.0293	0.0025	0.0252	0.0028
1988	0.1560	0.0138	0.1170	0.0150	5.4277	0.0342	0.0274	0.0024	0.0205	0.0026
1989	0.1334	0.0122	0.1323	0.0145	5.3025	0.0328	0.0240	0.0022	0.0238	0.0026

Table A7: Adjusted two-level school random intercepts and intraclass correlation (ICC) for education (Panel C, Figure 2).

Year of birth	School		Individual		School	
	Variance	SE	Variance	SE	ICC	SE
1959	0.0482	0.0070	3.5580	0.0268	0.0134	0.0019
1960	0.0587	0.0071	3.5255	0.0255	0.0164	0.0020
1961	0.0520	0.0066	3.4617	0.0242	0.0148	0.0018
1962	0.0577	0.0066	3.3657	0.0230	0.0169	0.0019
1963	0.0581	0.0067	3.4262	0.0227	0.0167	0.0019
1964	0.0610	0.0065	3.4528	0.0220	0.0174	0.0018
1965	0.0761	0.0072	3.4480	0.0207	0.0216	0.0020
1966	0.0702	0.0069	3.4355	0.0205	0.0200	0.0019
1967	0.1046	0.0092	3.4713	0.0209	0.0293	0.0025
1968	0.1103	0.0096	3.5672	0.0212	0.0300	0.0025
1969	0.1108	0.0091	3.5840	0.0210	0.0300	0.0024
1970	0.1035	0.0093	3.5869	0.0217	0.0280	0.0025
1971	0.1220	0.0104	3.6104	0.0221	0.0327	0.0027
1972	0.1102	0.0099	3.5759	0.0219	0.0299	0.0026
1973	0.1103	0.0098	3.4938	0.0218	0.0306	0.0027
1975	0.0891	0.0089	3.5259	0.0229	0.0246	0.0024
1977	0.0860	0.0091	3.6570	0.0248	0.0230	0.0024
1978	0.0852	0.0088	3.9409	0.0266	0.0212	0.0021
1979	0.0930	0.0100	4.1111	0.0278	0.0221	0.0024
1980	0.0878	0.0096	3.9287	0.0268	0.0219	0.0024
1981	0.0860	0.0092	3.9107	0.0267	0.0215	0.0023
1982	0.0761	0.0088	3.9492	0.0271	0.0189	0.0022
1983	0.0639	0.0084	4.0272	0.0280	0.0156	0.0020
1984	0.0877	0.0096	4.1507	0.0287	0.0207	0.0022
1985	0.0744	0.0090	4.2338	0.0291	0.0173	0.0021
1986	0.0686	0.0088	4.3893	0.0296	0.0154	0.0019
1987	0.0580	0.0077	4.5366	0.0303	0.0126	0.0017
1988	0.0562	0.0075	4.6133	0.0297	0.0120	0.0016
1989	0.0475	0.0069	4.5290	0.0289	0.0104	0.0015

Table A8: Adjusted two-level neighbourhood random intercepts and intraclass correlation (ICC) for education (Panel C, Figure 2).

Year of birth	Neighbourhood		Individual		Neighbourhood	
	Variance	SE	Variance	SE	ICC	SE
1959	0.0589	0.0095	3.5775	0.0275	0.0162	0.0026
1960	0.0655	0.0092	3.5155	0.0263	0.0183	0.0026
1961	0.0606	0.0086	3.4503	0.0248	0.0173	0.0024
1962	0.0569	0.0083	3.3653	0.0236	0.0166	0.0024
1963	0.0609	0.0082	3.4144	0.0232	0.0175	0.0024
1964	0.0966	0.0099	3.4147	0.0231	0.0275	0.0028
1965	0.0964	0.0090	3.4187	0.0217	0.0274	0.0025
1966	0.1030	0.0092	3.3948	0.0213	0.0294	0.0026
1967	0.1100	0.0095	3.4479	0.0218	0.0309	0.0026
1968	0.1081	0.0096	3.5526	0.0222	0.0295	0.0026
1969	0.1022	0.0092	3.5815	0.0221	0.0277	0.0025
1970	0.1140	0.0101	3.5617	0.0226	0.0310	0.0027
1971	0.1050	0.0099	3.5965	0.0228	0.0284	0.0027
1972	0.1102	0.0101	3.5543	0.0230	0.0301	0.0027
1973	0.1042	0.0098	3.4795	0.0227	0.0291	0.0027
1975	0.0837	0.0102	3.5191	0.0241	0.0232	0.0028
1977	0.0876	0.0120	3.6473	0.0264	0.0235	0.0032
1978	0.0973	0.0129	3.9239	0.0283	0.0242	0.0032
1979	0.0919	0.0126	4.1006	0.0293	0.0219	0.0030
1980	0.0993	0.0124	3.9073	0.0284	0.0248	0.0031
1981	0.0880	0.0135	3.8953	0.0287	0.0221	0.0034
1982	0.0767	0.0126	3.9355	0.0288	0.0191	0.0031
1983	0.0861	0.0128	3.9983	0.0296	0.0211	0.0031
1984	0.0982	0.0135	4.1359	0.0302	0.0232	0.0032
1985	0.0743	0.0129	4.2323	0.0310	0.0173	0.0030
1986	0.0710	0.0135	4.3895	0.0316	0.0159	0.0030
1987	0.0905	0.0131	4.5022	0.0318	0.0197	0.0028
1988	0.0571	0.0119	4.6126	0.0314	0.0122	0.0025
1989	0.0658	0.0124	4.5102	0.0306	0.0144	0.0027

Table A9: Adjusted cross-classified school and neighbourhood random intercepts and intraclass correlations (ICCs) for education (Panel D, Figure 2).

Year of	School		Neighbourhood		Individual		School		Neighbourhood	
birth	Variance	SE	Variance	SE	Variance	SE	ICC	SE	ICC	SE
1959	0.0417	0.0070	0.0220	0.0087	3.5398	0.0274	0.0116	0.0019	0.0061	0.0024
1960	0.0527	0.0073	0.0264	0.0094	3.5028	0.0263	0.0147	0.0020	0.0074	0.0026
1961	0.0462	0.0069	0.0230	0.0097	3.4430	0.0251	0.0132	0.0020	0.0065	0.0028
1962	0.0531	0.0067	0.0195	0.0072	3.3485	0.0234	0.0155	0.0020	0.0057	0.0021
1963	0.0498	0.0067	0.0287	0.0076	3.4034	0.0233	0.0143	0.0019	0.0082	0.0022
1964	0.0536	0.0066	0.0458	0.0096	3.4134	0.0230	0.0153	0.0019	0.0130	0.0027
1965	0.0687	0.0071	0.0390	0.0083	3.4128	0.0215	0.0195	0.0020	0.0111	0.0024
1966	0.0600	0.0068	0.0495	0.0088	3.3921	0.0214	0.0171	0.0019	0.0141	0.0025
1967	0.0946	0.0093	0.0393	0.0089	3.4367	0.0219	0.0265	0.0026	0.0110	0.0025
1968	0.1023	0.0096	0.0344	0.0081	3.5375	0.0220	0.0278	0.0026	0.0094	0.0022
1969	0.1059	0.0092	0.0214	0.0079	3.5653	0.0219	0.0287	0.0024	0.0058	0.0021
1970	0.0920	0.0092	0.0472	0.0088	3.5456	0.0224	0.0250	0.0024	0.0128	0.0024
1971	0.1152	0.0104	0.0378	0.0088	3.5734	0.0230	0.0309	0.0027	0.0101	0.0024
1972	0.0999	0.0098	0.0470	0.0090	3.5309	0.0228	0.0272	0.0026	0.0128	0.0025
1973	0.1000	0.0097	0.0421	0.0091	3.4545	0.0226	0.0278	0.0026	0.0117	0.0025
1975	0.0855	0.0091	0.0192	0.0096	3.5091	0.0240	0.0237	0.0025	0.0053	0.0027
1977	0.0824	0.0093	0.0227	0.0122	3.6380	0.0267	0.0220	0.0024	0.0061	0.0033
1978	0.0811	0.0088	0.0273	0.0126	3.9157	0.0284	0.0201	0.0022	0.0068	0.0031
1979	0.0876	0.0102	0.0243	0.0126	4.0901	0.0297	0.0209	0.0024	0.0058	0.0030
1980	0.0815	0.0097	0.0483	0.0121	3.8850	0.0282	0.0203	0.0024	0.0120	0.0030
1981	0.0826	0.0094	0.0242	0.0133	3.8891	0.0290	0.0207	0.0023	0.0060	0.0033
1982	0.0739	0.0090	0.0131	0.0121	3.9375	0.0288	0.0184	0.0022	0.0033	0.0030
1983	0.0579	0.0086	0.0392	0.0135	3.9926	0.0298	0.0142	0.0021	0.0096	0.0033
1984	0.0826	0.0100	0.0315	0.0149	4.1228	0.0309	0.0195	0.0023	0.0074	0.0035
1985	0.0724	0.0092	0.0165	0.0116	4.2192	0.0306	0.0168	0.0021	0.0038	0.0027
1986	0.0653	0.0087	0.0220	0.0100	4.3696	0.0307	0.0147	0.0019	0.0049	0.0022
1987	0.0516	0.0079	0.0426	0.0141	4.4989	0.0322	0.0112	0.0017	0.0093	0.0031
1988	0.0543	0.0076	0.0142	0.0090	4.6008	0.0306	0.0116	0.0016	0.0030	0.0019
1989	0.0443	0.0070	0.0276	0.0123	4.5048	0.0308	0.0097	0.0015	0.0060	0.0027

Table A10: Unadjusted two-level school random intercepts and intraclass correlation (ICC) for adult earnings (Panel A, Figure 3).

Year of birth	School		Individual		School	
	Variance	SE	Variance	SE	ICC	SE
1959	10.1703	1.1914	801.3614	4.8258	0.0125	0.0015
1960	13.1336	1.3080	794.3647	4.7376	0.0163	0.0016
1961	12.6261	1.3852	801.0439	4.7778	0.0155	0.0017
1962	14.8764	1.4897	803.5446	4.7962	0.0182	0.0018
1963	13.5783	1.4372	805.5859	4.7480	0.0166	0.0017
1964	14.9991	1.4927	801.1642	4.6355	0.0184	0.0018
1965	15.2037	1.5077	804.3345	4.5815	0.0186	0.0018
1966	13.5390	1.3931	806.0762	4.5901	0.0165	0.0017
1967	12.2391	1.3310	805.9759	4.5939	0.0150	0.0016
1968	12.9648	1.3576	809.4387	4.5574	0.0158	0.0016
1969	12.2317	1.2214	805.6670	4.4960	0.0150	0.0015
1970	11.8001	1.3132	806.5606	4.6244	0.0144	0.0016
1971	10.7198	1.2750	807.0589	4.6559	0.0131	0.0015
1972	11.8993	1.3024	805.9584	4.6356	0.0145	0.0016
1973	11.7377	1.2821	806.4017	4.7185	0.0143	0.0016
1975	11.3666	1.3082	805.6525	4.9477	0.0139	0.0016
1977	11.1903	1.3518	804.8167	5.1423	0.0137	0.0016
1978	8.8269	1.1412	805.3641	5.1247	0.0108	0.0014
1979	12.8095	1.4365	802.7614	5.1086	0.0157	0.0017
1980	13.1936	1.5018	807.0549	5.1653	0.0161	0.0018
1981	11.4159	1.3770	803.3116	5.1307	0.0140	0.0017
1982	12.9696	1.4568	799.9078	5.1297	0.0160	0.0018

Table A11: Unadjusted two-level neighbourhood random intercepts and intraclass correlation (ICC) for adult earnings (Panel A, Figure 3).

Year of birth	Neighbourhood		Individual		Neighbourhood	
	Variance	SE	Variance	SE	ICC	SE
1959	12.6153	1.6876	799.9748	4.8968	0.0155	0.0021
1960	14.5023	1.6666	792.0659	4.8848	0.0180	0.0021
1961	14.5696	1.7457	798.1000	4.8777	0.0179	0.0021
1962	16.3434	1.7667	800.2332	4.9048	0.0200	0.0021
1963	15.7529	1.6931	803.2431	4.8444	0.0192	0.0021
1964	17.6694	1.9298	797.7267	4.8566	0.0217	0.0024
1965	18.8083	1.9572	799.2014	4.8118	0.0230	0.0024
1966	16.7126	1.8188	801.5720	4.7754	0.0204	0.0022
1967	14.2053	1.7866	802.8436	4.7875	0.0174	0.0022
1968	15.5674	1.8406	805.5804	4.7461	0.0190	0.0022
1969	15.3738	1.7683	801.0782	4.6791	0.0188	0.0022
1970	13.8176	1.7599	802.6079	4.8239	0.0169	0.0021
1971	14.9557	1.8788	804.8751	4.7995	0.0182	0.0023
1972	16.9522	1.8100	799.2539	4.8102	0.0208	0.0022
1973	14.4505	1.8769	801.3452	4.9158	0.0177	0.0023
1975	15.9652	2.0549	801.0873	5.1754	0.0195	0.0025
1977	14.4678	2.1058	801.1530	5.4203	0.0177	0.0026
1978	16.7078	2.1320	796.8263	5.3296	0.0205	0.0026
1979	17.7948	2.2713	797.3741	5.3638	0.0218	0.0028
1980	15.4042	2.1985	804.0026	5.4097	0.0188	0.0027
1981	17.1801	2.2671	796.9921	5.3822	0.0211	0.0028
1982	18.0752	2.3372	793.6573	5.4194	0.0223	0.0029

Table A12: Unadjusted cross-classified school and neighbourhood random intercepts and intraclass correlation (ICC) for adult earnings (Panel B, Figure 3).

Year of birth	School		Neighourhood		Individual		School		Neighbourhood	
	Variance	SE	Variance	SE	Variance	SE	ICC	SE	ICC	SE
1959	9.3221	1.1865	5.5603	1.5100	796.2039	4.9369	0.0115	0.0015	0.0069	0.0019
1960	12.4093	1.3369	5.0120	1.5061	789.2399	4.8579	0.0154	0.0016	0.0062	0.0019
1961	11.3522	1.3545	6.3138	1.5118	795.3467	4.8634	0.0140	0.0017	0.0078	0.0019
1962	13.3836	1.5000	7.6282	1.5634	796.5737	4.9097	0.0164	0.0018	0.0093	0.0019
1963	11.2879	1.4062	8.8243	1.5914	797.7205	4.8493	0.0138	0.0017	0.0108	0.0019
1964	14.0807	1.4901	7.7894	1.8725	793.9024	4.8494	0.0173	0.0018	0.0095	0.0023
1965	14.0162	1.5059	8.6103	1.7642	796.6260	4.7735	0.0171	0.0018	0.0105	0.0022
1966	12.5075	1.4011	7.9729	1.7619	798.6749	4.7771	0.0153	0.0017	0.0097	0.0021
1967	11.4412	1.3496	6.2525	1.6818	800.3090	4.7622	0.0140	0.0016	0.0076	0.0021
1968	11.9176	1.3844	6.6160	1.7217	803.5691	4.7332	0.0145	0.0017	0.0080	0.0021
1969	11.3118	1.2310	7.4833	1.6150	798.2486	4.6576	0.0138	0.0015	0.0092	0.0020
1970	10.9696	1.3128	6.6258	1.7516	800.1122	4.8201	0.0134	0.0016	0.0081	0.0021
1971	9.5842	1.2673	9.4076	1.8970	798.1473	4.8710	0.0117	0.0015	0.0115	0.0023
1972	10.5702	1.2770	10.1261	1.7829	795.8242	4.8161	0.0129	0.0016	0.0124	0.0022
1973	10.9881	1.2800	7.7043	1.8404	797.7418	4.9338	0.0135	0.0016	0.0094	0.0023
1975	10.4719	1.3148	7.0089	2.0126	799.4615	5.1623	0.0128	0.0016	0.0086	0.0025
1977	10.4139	1.3916	5.3723	2.4455	800.0457	5.5347	0.0128	0.0017	0.0066	0.0030
1978	7.6370	1.1665	9.9573	2.1966	796.3609	5.3829	0.0094	0.0014	0.0122	0.0027
1979	11.7091	1.4348	8.2598	2.2411	795.5065	5.3875	0.0144	0.0017	0.0101	0.0027
1980	12.4117	1.5220	6.0387	2.2311	801.6075	5.4412	0.0151	0.0018	0.0074	0.0027
1981	10.3937	1.3892	9.1259	2.0581	795.1964	5.3518	0.0128	0.0017	0.0112	0.0025
1982	12.0312	1.4630	7.2873	2.2752	793.3994	5.4518	0.0148	0.0018	0.0090	0.0028

Table A13: Adjusted two-level school random intercepts and intraclass correlation (ICC) for adult earnings (Panel B, Figure 3).

Year of birth	School		Individual		School	
	Variance	SE	Variance	SE	ICC	SE
1959	1.7878	0.7191	586.2018	4.4987	0.0030	0.0012
1960	3.3749	0.8050	592.0485	4.3580	0.0057	0.0013
1961	2.5508	0.7515	601.3327	4.2552	0.0042	0.0012
1962	3.5577	0.7697	604.0378	4.1805	0.0059	0.0013
1963	4.9829	0.8827	604.9898	4.0841	0.0082	0.0014
1964	4.2309	0.8003	600.6800	3.8854	0.0070	0.0013
1965	5.2771	0.8028	603.1965	3.6756	0.0087	0.0013
1966	4.7008	0.7629	607.2439	3.6828	0.0077	0.0012
1967	4.2331	0.7674	614.2349	3.7617	0.0068	0.0012
1968	5.0962	0.8506	616.2490	3.7066	0.0082	0.0014
1969	4.9658	0.7380	616.2465	3.6586	0.0080	0.0012
1970	3.8147	0.7616	628.5300	3.8425	0.0060	0.0012
1971	3.8762	0.7696	642.6696	3.9538	0.0060	0.0012
1972	5.1248	0.8346	645.3387	3.9794	0.0079	0.0013
1973	5.4648	0.8730	642.5316	4.0225	0.0084	0.0013
1975	5.0658	0.9073	654.7748	4.2773	0.0077	0.0014
1977	5.6087	1.0084	673.7787	4.5892	0.0083	0.0015
1978	5.0827	0.9240	676.1785	4.6052	0.0075	0.0014
1979	7.5520	1.0957	682.9855	4.6489	0.0109	0.0016
1980	10.2428	1.3443	688.2597	4.7262	0.0147	0.0019
1981	6.1140	1.0870	689.9940	4.7489	0.0088	0.0016
1982	7.8606	1.1997	695.5587	4.8284	0.0112	0.0017

Table A14: Adjusted two-level neighbourhood random intercepts and intraclass correlation (ICC) for adult earnings (Panel B, Figure 3).

Year of birth	Neighbourhood		Individual		Neighbourhood	
	Variance	SE	Variance	SE	ICC	SE
1959	0.1876	0.3159	590.7623	4.4590	0.0003	0.0005
1960	3.7857	1.2531	591.3574	4.4712	0.0064	0.0021
1961	0.9596	0.9425	602.5278	4.3284	0.0016	0.0016
1962	4.0704	1.2235	603.3115	4.2561	0.0067	0.0020
1963	4.7480	1.1687	606.5910	4.1605	0.0078	0.0019
1964	1.8595	1.5574	602.9781	4.1568	0.0031	0.0026
1965	6.5354	1.2923	601.4454	3.8150	0.0107	0.0021
1966	5.1843	1.3634	606.6169	3.8644	0.0085	0.0022
1967	3.1466	1.2505	614.8650	3.9365	0.0051	0.0020
1968	4.6359	1.2953	615.8720	3.8762	0.0075	0.0021
1969	5.1075	1.2147	615.1052	3.8059	0.0082	0.0020
1970	3.1424	1.2911	627.9417	4.0001	0.0050	0.0020
1971	3.8709	1.2857	648.3836	4.0863	0.0059	0.0020
1972	8.0623	1.4537	640.9483	4.1602	0.0124	0.0022
1973	5.4093	1.5179	640.7924	4.2102	0.0084	0.0023
1975	1.9393	1.6654	658.0296	4.5362	0.0029	0.0025
1977	6.3984	1.7589	672.6366	4.8607	0.0094	0.0026
1978	8.6796	1.7902	672.5169	4.8256	0.0127	0.0026
1979	7.7486	1.8367	682.5764	4.8810	0.0112	0.0027
1980	9.1161	1.9953	688.5923	5.0133	0.0131	0.0029
1981	5.1353	2.0085	690.8520	5.0607	0.0074	0.0029
1982	9.3774	1.9895	693.0218	5.0827	0.0134	0.0028

Table A15: Adjusted cross-classified school and neighbourhood random intercepts and intraclass correlation (ICC) for adult earnings (Panel D, Figure 3).

Year of birth	School Variance	SE	Neighourhood Variance	SE	Individual Variance	SE	School ICC	SE	Neighbourhood ICC	SE
1959	1.8525	0.7163	0.1744	0.2761	586.2561	4.5128	0.0031	0.0012	0.0003	0.0005
1960	3.2352	0.8361	1.1201	1.0655	590.8054	4.4290	0.0054	0.0014	0.0019	0.0018
1961	2.4758	0.7511	0.2424	0.3571	600.8497	4.2740	0.0041	0.0012	0.0004	0.0006
1962	3.1342	0.8067	2.1135	1.4069	601.9772	4.3051	0.0052	0.0013	0.0035	0.0023
1963	4.6239	0.8949	1.3940	1.2271	603.5726	4.1807	0.0076	0.0015	0.0023	0.0020
1964	4.1372	0.8147	0.4264	0.7955	600.0845	3.9520	0.0068	0.0013	0.0007	0.0013
1965	5.0348	0.8344	1.8429	1.7732	601.4352	3.9828	0.0083	0.0014	0.0030	0.0029
1966	4.4333	0.7918	1.9437	1.4277	605.5329	3.8816	0.0072	0.0013	0.0032	0.0023
1967	4.2061	0.7879	0.1804	0.3826	613.7407	3.7874	0.0068	0.0013	0.0003	0.0006
1968	4.9792	0.8566	0.7325	1.0035	615.3693	3.7967	0.0080	0.0014	0.0012	0.0016
1969	4.7395	0.7467	1.3299	1.2783	614.3396	3.8216	0.0076	0.0012	0.0021	0.0021
1970	3.7923	0.7571	0.1094	0.3649	627.7297	3.8364	0.0060	0.0012	0.0002	0.0006
1971	3.8231	0.7806	0.7388	0.9152	641.5332	4.0528	0.0059	0.0012	0.0011	0.0014
1972	4.5759	0.8493	5.2089	1.4571	639.1854	4.1484	0.0071	0.0013	0.0080	0.0022
1973	5.3617	0.8941	2.3103	1.4148	638.7977	4.1959	0.0083	0.0014	0.0036	0.0022
1975	5.0341	0.9287	0.2820	0.3631	654.4579	4.2962	0.0076	0.0014	0.0004	0.0006
1977	5.3322	1.0430	1.5597	1.3602	672.3383	4.7318	0.0079	0.0015	0.0023	0.0020
1978	4.4017	0.9897	5.2942	1.9307	671.2762	4.8248	0.0065	0.0015	0.0078	0.0028
1979	7.3772	1.1296	1.6444	1.6022	681.6145	4.8289	0.0107	0.0016	0.0024	0.0023
1980	9.9725	1.3450	1.5641	1.2648	686.7935	4.8649	0.0143	0.0019	0.0022	0.0018
1981	6.0541	1.1037	0.8042	1.1499	689.2783	4.8707	0.0087	0.0016	0.0012	0.0017
1982	7.4272	1.2233	3.2222	1.8696	692.6880	5.0633	0.0106	0.0017	0.0046	0.0027