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Working paper

25/05

Intergenerational mobility in socio-economic skills

Economic and Social Research Council

Intergenerational Mobility in Socio-emotional Skills*

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February 11, 2025

Abstract

This paper investigates the intergenerational transmission of socio-emotional skills during childhood, using data from the 1970 British Cohort Study (BCS70) in the United Kingdom. This dataset enables us to measure two dimensions of socio-emotional development: internalising and externalising skills. More importantly, we can use multiple measures of parents' skills collected during both their childhood and their adulthood. Whereas parent-child skills are strongly related when both are measured contemporaneously, they remain correlated when both are measured in childhood, with a stronger transmission observed from mothers to their children. The BCS70 data finally enable us to estimate the correlation between the grandmother's internalising skill and the grandchildren's skills, after accounting for parental skills.

JEL codes: J62, D63, I21, J24

Keywords: Intergenerational Mobility, Inequality, Socio-emotional Skills, Spectral gap mobility index.

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1 Introduction

It is now widely accepted that human development has many dimensions that jointly determine life course outcomes, ranging from labour market earnings and criminal activities, to subjective well-being and health (Currie and Almond, 2011; Almlund et al., 2011; Almond et al., 2018). These different dimensions include cognitive and socio-emotional skills, with the former including the ability to complete simple and complex tasks as well as the ability to learn, pay attention and solve problems, while the latter refers to psychological and preference traits, such as sociability, emotional stability, locus of control and self-esteem, and personality (e.g. conscientiousness, risk aversion and time preferences).

It is also well established that parental skill endowments and parental investment play an important role in determining their children's development. These influences are particularly visible in the early years of life, because of the brain's rapid development and malleability and the fact that parents are typically the main source of interaction for very young children (Cunha and Heckman, 2007; Cunha, Heckman, and Schennach, 2010). It is therefore likely that different types of skills are transmitted across generations and that this transmission plays an important, although not exclusive, role in the intergenerational transmission of inequality. The economic literature has examined extensively the intergenerational transmission of inequality, focusing on income and education. Nevertheless, the evidence on the intergenerational transmission of different types of skills and, in particular, of socio-emotional skills is still scarce, despite the fact that these skills are now accepted to be important in determining different dimensions of well-being (Currie and Almond, 2011; Almlund et al., 2011; Almond et al., 2018).[1]

In this paper, we study different aspects of the evolution of socio-emotional skills across generations. We do so by exploiting some of the unique longitudinal dimensions of the 1970 British Cohort Study (BCS70), who are followed from birth onwards. A first feature of the BCS70 is that in 2004, when the cohort members were 34, measures of socio-emotional development of their offspring, if any, were collected. This feature allows us to assess the correlation between comparable measures of socio-emotional skills across two generations. As the cohort members are of both genders, we can study the possibility that socio-emotional skills are transmitted differently (if at all) by *fathers and mothers*. Additionally, when characterising the relation between socio-emotional skills of the cohort members and their offspring, we can use skills measured *before adulthood*, rather than skills observed *at the same calendar time*. Finally, the BCS70 contains information about the cohort members' parents. We can therefore observe three connected generations and analyse the transmission of skills across them.

To study the dynamics of socio-emotional skills and cognition across generations, we need

[1] An excellent review paper on intergenerational mobility is Black and Devereux (2011). Some prominent studies on mobility include, for example, Chetty et al. (2014), that map the geography of intergenerational mobility in the United States. Card et al. (2022) study the intergenerational transmission of human capital for children born in the 1920s in the United States. Alesina et al. (2021) map the intergenerational mobility in educational attainment in Africa. Guell et al. (2015) propose an alternative approach to measure mobility by using cross-sectional data on income and the surname of the individual. There is also a growing interest in intergenerational mobility in other outcomes, such as in wealth (Charles and Hurst, 2003) and health (Halliday et al., 2020).

to define what they are and how they are measured. Following the literature (see e.g. Heckman and Zhou (2022)), we use factor analysis to measure cognitive skills and two dimensions of socio-emotional skills, which we label 'internalising' and 'externalising'. The first dimension of socio-emotional skills captures children's ability to focus their drive and determination, while the second one captures their ability to relate to others (Achenbach, 1966; Achenbach et al., 2016; Attanasio et al., 2020). In addition, since we analyse socio-emotional skills measured at slightly different ages and for different generations, we pay attention to the comparability of these measures across generations (Wu and Estabrook, 2016).

We make three contributions to the understanding of the development of socio-emotional skills. First, we study the intergenerational transmission of skills looking at the socio-emotional skills of cohort members and their offspring. We do this by assessing separately the role played by fathers and mothers in the intergenerational transmission of socio-emotional skills. On the other hand, the literature estimating the intergenerational transmission of income has mostly focused on the intergenerational correlation between fathers and sons, due to the lower likelihood of maternal participation in the labor force (see for example Blanden (2013) and Black and Devereux (2011)).[2] Our data from the age-34 wave implies that for some children we have information on their mothers; and for others, on their fathers. The evidence we uncover is suggestive that mothers play a predominant role in the intergenerational transmission of socio-emotional skills.

Second, we investigate to what extent the cohort members' skills measured *during childhood* are associated with their children's socio-emotional skills *during childhood*, roughly 20 years apart. A possible issue with most of the existing work on the intergenerational transmission of socio-emotional skills is the use of measurements for parents' and children's skills obtained *at one point in time*, typically in adulthood for the parents and in adolescence for the children. At these development stages, skills and attitudes are likely to have developed and changed for other reasons, such as schooling and peer effects. On the other hand, socio-emotional skills during childhood are not fully developed and may still be quite malleable (Almlund et al., 2011). Furthermore, while the main direction of intergenerational transmission is presumably from parents to children, it is also possible that children influence their parents' values and skills. A high (low) correlation between parents and children's socio-emotional skills and attitudes could, therefore, be found because of a convergence (or divergence) in skills and attitudes during adulthood when the children can also affect parents' personality and attitudes.[3]

We show that, when using contemporaneously measured skills (i.e., with parental skills measured in adulthood), which are also available in the BCS70, we find estimates that are larger than those we obtain using age-compatible measures. Whereas correlations in contemporaneous mea-

[2] An earlier study examining the intergenerational transmission of income for daughters in the United States is Chadwick and Solon (2002), though its findings do not distinguish by the parent's gender. A recent study by Hu and Qian (2023) shows that father-child associations in educational status have become weaker, while mother-child associations have become stronger around the world since 1960 (see also Chadwick and Solon (2002)). Similar evidence is also emerging for the intergenererational transmission of income (Brandén et al., 2024; Ahrsjö et al., 2023).

[3] Dohmen et al. (2011) try to tackle reverse causality due to contemporaneous measurements by using religion as an instrumental variable for the child's attitude, but the first stage indicates a weak instrumental variable problem even if one accepts its validity.

surements may themselves be of interest, it is important to highlight how estimates are sensitive to different measurement timings. The 'life-cycle bias' connected with the measurement of certain variables over different intervals of the life cycle is somewhat similar to the one encountered when studying income mobility using earnings data at only one point in time that do not correspond to lifetime earnings (see, for example, Nybom and Stuhler (2017)). Whether a specific measure has a 'bias' or not depends on what concept one ultimately is after. However, it is important to know how and why different estimates may vary depending on the timing of measurements.

Finally, for our third contribution, the data we use allow us to estimate the association of grandparents' socio-emotional skills with their grandchildren's socio-emotional skills, even after controlling for parents' skills. Information on grandmothers' and grandchildren's socio-emotional skills is *not* often found in datasets. The BSC70 is an exception because the cohort members' mothers were asked to complete the Malaise Inventory (Rutter et al., 1970) in the 1975, 1980 and 1986 waves.[4] We show that the association of socio-emotional skills might be relevant across more than one generation (Adermon et al., 2021). We do however note that, in contrast with the preceding analysis where parents' and children's measurements are taken at similar ages and thus not contemporaneously, grandmothers' and parents' measurements here are contemporaneously taken. Additionally, we acknowledge that the grandparent effect may arise because of a direct grandparent effect but also spuriously via measurement error and group-level effects (see Solon (2018) and Ferrie et al. (2021)).

Our study is not the first to look at the intergenerational correlation of skills. Noteworthy contributions to this literature in economics are Dohmen et al. (2011), Anger (2012), Grönqvist et al. (2017) and Alan et al. (2017). The first two papers use data from the German Socio-Economic Panel Study (SOEP) to study respectively the transmission of attitudes and skills from parents to children *during adulthood*. Grönqvist et al. (2017) study the intergenerational transmission of skills in Sweden, using data only on 18-year-old men's cognitive and socio-emotional skills from military enlistment records. Alan et al. (2017) study the transmission of risk attitudes from mothers to children through elicitation of risk aversion in an incentivised experiment in Turkey.

The psychology literature has also studied the intergenerational correlation of socio-emotional skills. For example, Duncan et al. (2005) use the data from the National Longitudinal Survey of Youth (NLSY) to study personal traits and behaviours measured during adolescence. Loehlin (2005) and Groves (2005) review the psychology literature and conclude that the correlation in socio-emotional skills ranges between 0.10 to 0.30 for children during young adulthood. Unfortunately, these psychology studies are based on a small number of observations and may lack representativeness.

The rest of the paper is organised as follows. In Section 2, we introduce the 1970 British Cohort Study data used in the analysis. Sections 3 and 4 present respectively the derivation of

[4]Our analysis is complementary to the literature examining multi-generational mobility in mental health. For example, Johnson et al. (2013), Hancock et al. (2013) and Bütikofer et al. (2024) study multi-generational mobility in mental health across three generations respectively in the United Kingdom, Australia and Norway. We discuss their approach to study multi-generational mobility in mental health when we measure multi-generational in socio-emotional skills. We notice that they focus only on one dimension of mental health, while socio-emotional skills are multi-dimensional and often divided into internalising and externalising skills.

the three dimensions of skills we analyse and the measures of intergenerational mobility in socio-emotional skills and cognition. In Section 5, we present estimates of intergenerational mobility in socio-emotional and cognitive skills. Section 6 investigates the multi-generational persistence in socio-emotional skills by examining the correlation between grandmothers' and grandchildren's skills. Section 7 summarizes the results and concludes.

2 Data sources and available measures

We make use of a unique longitudinal database, the 1970 British Cohort Study (BCS70), which follows the lives of people born in England, Scotland and Wales in a single week (April, 5-11) of 1970 and is publicly available at the UK Data Service. Cohort members have been contacted nine times, resulting in information at ages 5, 10, 16, 26, 30, 34, 38, 42, 46 and 51.[5]

The age-34 wave provides substantial information on the offspring of the cohort members, including a number of tests aimed at measuring their socio-emotional skills. We concentrate on the sample of cohort members linked to their children and present descriptive statistics on the sample of BCS70 with children in Appendix Table E1. An important limitation of this data structure is that the children of the BCS70 cohort, if present when the age-34 wave was collected, have, inevitably, different ages. This makes the comparison of several dimensions of their development difficult, as different tests are used. This is particularly salient for cognitive skills. For this reason, we limit our analysis to the children of the BCS cohort aged between 3 and 16 at the age-34 wave and consider only their socio-emotional skills, for which we can identify a common metric as discussed in Section 3.

The BCS70 sample's socio-emotional skills were measured using the Rutter A questionnaire for the cohort members at ages 5, 10 and 16, and Strengths and Difficulties Questionnaire (SDQ) for the children of the cohort members aged between 3 and 16 at the age-34 wave. In Table 1, we present the questions from these tests (Rutter et al., 1970; Goodman, 1994). The Rutter A and SDQ are behavioural screening scales, where mothers are asked whether their children exhibit a series of behaviours. The SDQ scale was developed to consider advances in child psychopathology and includes positive as well as undesirable traits. Items take one of three values: 'Does not apply', 'Somewhat applies', and 'Certainly applies'. For the questions about behaviours indicating low skills, we recode all of them in reverse for the ease of interpretation, with higher values associated with better socio-emotional skills. We augment the Rutter Scale with four additional parent-reported questions from the parental questionnaire, items A, B, C and D in Table 1. These are rated on 4 levels: 'Never in the last 12 months', 'less than once a month', 'at least once a month', and 'at least once a week'.[6]

[5] While the British Cohort Study (BCS) provides invaluable longitudinal data, it is worth noting that the cohort consists of individuals born in a single week of the year. As birth timing is not entirely random (Buckles and Hungerman, 2013), this selection may have implications for the representativeness of the sample, although the bias should be similar for males and females.

[6] We recode these into binary indicators, with 'Never' and 'Less than once a month' to 1 and zero otherwise. At the age 10 wave, the Rutter A scale is continuous from 0 to 100, where 0 means 'Does not apply' and 100 means 'Certainly applies'. We recode it in reverse. In order to make it comparable to the Rutter A scale in the other waves, we recode the

Table 1: Rutter A and Strengths and Difficulties Questionnaire Scales

Rutter A scale administered to parents when they were 5, 10 and 16 years old	
1. Very restless. Often running about or jumping up and down. Hardly ever still.*	2. Is squirmy or fidgety.*
3. Often destroys own or others' belongings.	4. Frequently fights other children.*
5. Not much liked by other children.	6. Often worried, worries about many things.*
7. Tends to do things on his/her own, is rather solitary.*	8. Irritable. Is quick to fly off the handle.
9. Often appears miserable, unhappy, tearful or distressed.*	10. Sometimes takes things belonging to others.
11. Has twitches, mannerisms or tics of the face or body.	12. Frequently sucks thumb or finger.
13. Frequently bites nails or fingers.	14. Is often disobedient.*
15. Cannot settle to anything for more than a few moments.*	16. Tends to be fearful or afraid of new things or new situations.*
17. Is over fussy or over particular.	18. Often tells lies.
19. Bullies other children.*	A. Complains of headaches.*
B. Complains of stomach-ache or has vomited.*	C. Complains of biliousness
D. Has temper tantrums (that is, complete loss of temper with shouting, angry movements, etc.).*	

Strengths and Difficulties Questionnaire scale administered to children when they were between the age 3-16	
1. Considerate of other people's feelings^{+}	2. Restless, overactive and not able to sit still for long*
3. Often complaining of headaches, stomach-aches or sickness*	4. Sharing readily with other children (treats, toys, pencils etc.)$^{+}$
5. Has often had temper tantrums or hot tempers*	6. Rather solitary, tending to play alone*
7. Generally obedient, usually doing what adults requested* $^{+}$	8. Many worries, often seeming worried*
9. Helpful if someone was hurt, upset or feeling ill^{+}	10. Constantly fidgeting and squirming*
11. Has had at least one good friend $^{+}$	12. Has often had fights with other children or bullies them*
13. Often unhappy, downhearted or tearful*	14. Generally liked by other children $^{+}$
15. Easily distracted, concentration wandered*	16. Nervous or clingy in new situations, easily loses confidence*
17. Kind to younger children $^{+}$	18. Often lied or cheated†
19. Picked on or bullied by other children	20. Has often volunteered to help others (parents, teachers, other children)$^{+}$
21. Able to think things out before acting† $^{+}$	22. Stole from home, school or elsewhere†
23. Getting on better with adults than with other children	24. Many fears, easily scared
25. Has seen tasks through to the end, good attention span $^{+}$	

Note. The Rutter and Strengths and Difficulties Questionnaire items are rated on three levels: 'Does not apply', 'Somewhat applies', 'Certainly applies'. For the questions about behaviours indicating lower skills, we recode all of them in reverse, i.e. 'Certainly applies' = 0, 'Somewhat applies' = 1, 'Does not apply' = 2. The question of the Rutter items in the BCS70 administered when parents were 16 years old refers to the teenager. Items denoted by $^{+}$ are positively coded in the original scale and we do not reverse the order for those items. Items denoted by * are comparable (similarly-worded) questions in the Rutter and Strengths and Difficulties Questionnaire shown in Table 3. Items denoted by † are asked only to the children aged 6-16.

Appendix Tables E2 and E3, respectively, report sample sizes at the age-34 wave and response rates for the socio-emotional questions retained in the analysis at the age-5, 10, 16 and 34 waves. While survey non-response is low for the cohort member's children, it occurs at the age-16 wave because of a teacher strike (Appendix Table E3). In Appendix Table E4, we show that survey non-response is not predicted by the cohort members' cognitive or socio-emotional skills. We further discuss these issues in Section 5.1 and show that our results do not depend on the children's age selection.

The cognitive skill measure we use comes from combining information from three tests administered at the age of 5 (Copy Designs, Human Figure Drawing, English Picture Vocabulary Test) and four tests administered at the age of 10 (Shortened Edinburgh Reading Test, Friendly Math Test, Spelling Dictation Task and Pictorial Language Comprehension Test). More specifically, the age-5 cognitive tests are the following: the copy design (the child is asked to copy simple designs

items as follows: if the response is below 40, we code the answer as 0; if the response is between 40 and 70, we code the answer as 1; if the response is between 70 and 100, we code the answer as 2.

adjacently), the human figure drawing (the child draws an entire human figure), the English picture vocabulary test (the child identifies the picture referring to a word among four pictures). The Pictorial Language comprehension test at the age of 10 was based on the English Picture Vocabulary Test administered at the age of 5, where the child identifies the picture referring to a word among four pictures.

Finally, teachers to the cohort members were also asked to answer socio-emotional questions similar to the ones asked to the cohort member's mothers in the Rutter A questionnaire at the age-10 wave. In Appendix C.4, we use these data to address possible concerns about misreporting bias and obtain similar estimates.

3 The dimensions of skills and their measurement

Skills in childhood are intrinsically difficult to measure. As discussed in the previous section, a wide range of measures are available, typically behavioural screening scales, where parents or teachers are asked to evaluate a number of items on the child's behaviour, and cognitive tests. To extract efficiently estimates of socio-emotional and cognitive skills from these measures, the use of factor models has become common.

We follow much of the literature and focus on one single cognitive factor and two factors for socio-emotional skills reflected in the available measures (Achenbach, 1966; Achenbach et al., 2016). We first use exploratory factor analysis to identify which measures are relevant for which factor and test the hypothesis that a dedicated system, where a single factor loads on each of the available measures, represents the data well. Using this evidence, we then proceed to the estimation of the factor models we use in our analysis of intergenerational mobility. Cunha, Heckman, and Schennach (2010) provide a framework to allow researchers to express assumptions through a measurement system on how the available observable questionnaire responses are mapped into the latent constructs of interest. The measurement system provides an effective way to summarize the information available from the questionnaire and obtain an efficient measure of the latent factors (Kamata and Bauer, 2008).

3.1 Exploratory analysis

In what follows, we analyse the intergenerational transmissions of socio-emotional skills. We follow the previous literature, which has identified two dimensions of socio-emotional skills and has labeled them as 'externalising' and 'internalising' socio-emotional skills (Attanasio et al., 2020; Moroni et al., 2019). These two constructs have also been used extensively in the psychology literature (Achenbach, 1966; Achenbach et al., 2016). The first factor captures the ability of children to relate to others and the second one their ability to focus, their drive and determination.

To establish which measures are related to each of the two factors, we perform an exploratory factor analysis (EFA) and concentrate on the 11 items from the Rutter A and Strengths and Difficulties Questionnaire (SDQ) scale that are common across the cohort members and their children,

listed in Table 2, as in Attanasio et al. (2020). The EFA is based on decomposing the polychoric correlation matrix of the items and using maximum likelihood estimation (Olsson, 1979).[7]

Table 3 presents the estimates of the EFA of the division proposed in Table 2. We consider a factor to be significant if the loading is at least 0.40 in EFA, following the guidelines provided by Costello and Osborne (2019), Fidell (2001), Thompson (2004), and Heckman et al. (2013) (see also the review by Taherdoost et al. (2014)). Additionally, the factor loadings in this table show a clear separation between items. We highlight that the factor loadings have a similar magnitudes across groups, pointing out that there is a similar association between the item and the factor across groups.

Table 2: Subscale of comparable items

Itm.	Factor	Cat.	Title	Rutter Wording (Parents during childhood)	SDQ Wording (Children aged 3-16)
1	EXT	3	*Restless*	Very restless. Often running about or jumping up and down. Hardly ever still	Restless, overactive and not able to sit still for long
2	EXT	3	*Squirmy/fidgety*	Is squirmy or fidgety.	Constantly fidgeting and squirming
3	EXT	3	*Fights/bullies*	Frequently fights other children	Has often had fights with other children or bullied them
4	EXT	3	*Distracted*	Cannot settle to anything for more than a few moments.	Easily distracted, concentration wandered
5	EXT	2/3	*Tantrums*	Has temper tantrums (complete loss of temper with shouting, angry movements, etc.)	Has often had temper tantrums or hot tempers
6	EXT	3	*Disobedient*	Is often disobedient	(+) Generally obedient, usually doing what adults requested
7	INT	3	*Worried*	Often worried, worries about many things	Many worries, often seeming worried
8	INT	3	*Fearful*	Tends to be fearful or afraid of new things or new situations	Nervous or clingy in new situations, easily loses confidence
9	INT	3	*Solitary*	Tends to do things on his/her own, is rather solitary	Rather solitary, tending to play alone
10	INT	3	*Unhappy*	Often appears miserable, unhappy, tearful or distressed	Often unhappy, downhearted or tearful
11	INT	2/3	*Aches*	Complains of headaches + stomach-ache or has vomited	Often complaining of headaches, stomach-aches or sickness

Note. Itm. is item number. Factor is the latent construct to which the item loads - EXT is externalising skills, INT is internalising skills. Cat. is the number of categories in which the item is coded - 2 denotes a binary item (applies/does not apply) and 3 denotes a 3-category item. Title is a short label for the item. Wording columns show the actual wording in the scales used in each of the cohort studies. Since they are all behaviours indicating lower skills, we recode all of them in reverse, i.e. 'Certainly applies' = 0, 'Somewhat applies' = 1, 'Does not apply' = 2. Items denoted by (+) are positively coded in the original scale.

[7]The polychoric correlation is an estimate for the correlation between two normally distributed continuous random variables observed as ordinal variables. The solution is rescaled using oblique factor rotation obtained via the PROMAX protocol outlined in Hendrickson and White (1964) (with $k = 3$). Since we use a dedicated factor structure based on the oblique factor rotation matrix suggested above, our factor scores (i.e., skills) are *not* orthogonal. Their estimated correlation is presented in Table E5.

Table 3: Loadings from exploratory factor analysis

Item	Title	Parents at age 5 EXT	Parents at age 5 INT	Parents at age 10 EXT	Parents at age 10 INT	Parents at age 16 EXT	Parents at age 16 INT	Children aged 3-16 EXT	Children aged 3-16 INT
1	*Restless*	**0.8648**	-0.1281	**0.8108**	-0.1640	**0.8000**	-0.1228	**0.6040**	0.0785
2	*Squirmy/fidgety*	**0.7816**	0.0100	**0.6919**	0.0263	**0.7286**	0.0103	**0.6166**	0.1066
3	*Fights/bullies*	**0.4830**	0.2039	**0.4955**	0.0021	**0.6111**	0.0058	**0.6875**	-0.0050
4	*Distracted*	**0.6431**	0.0556	**0.5927**	0.0705	**0.6493**	0.0709	**0.7113**	0.0553
5	*Tantrums*	**0.5466**	0.1570	**0.4892**	0.1756	**0.4998**	0.1262	**0.7244**	-0.0164
6	*Disobedient*	**0.5732**	-0.0575	**0.6684**	0.0288	**0.6890**	-0.0016	**0.8162**	-0.1781
7	*Worried*	-0.1092	**0.7993**	-0.0981	**0.7030**	-0.0055	**0.7953**	-0.0701	**0.7747**
8	*Fearful*	0.0657	**0.4692**	-0.0921	**0.5659**	-0.1245	**0.7277**	-0.0798	**0.6837**
9	*Solitary*	-0.0391	**0.4794**	0.0989	**0.2828**	0.0463	**0.3125**	0.1060	**0.4432**
10	*Unhappy*	0.0492	**0.7948**	0.2346	**0.5117**	0.2664	**0.5016**	0.3889	**0.4102**
11	*Aches*	-0.0078	**0.5367**	-0.0492	**0.4103**	-0.0360	**0.3897**	0.1322	**0.1758**

Note. The table displays the factors loadings obtained from exploratory factor analysis (EFA) by sample. The EFA is based on the decomposition of the polychoric correlation matrix, and uses PROMAX rotation. Since they are all behaviours indicating lower skills, we recode all of them in reverse, i.e. 'Certainly applies' = 0, 'Somewhat applies' = 1, 'Does not apply' = 2.

3.2 Factor model

We specify a factor model to estimate the relationship between internalising and externalising skills and the available measures, the Rutter and SDQ items, based on the results of the exploratory analysis described in section 3.1. For most of our analysis, we consider two groups of individuals $c \in \{C_1, C_2\}$, corresponding respectively to the children of the cohort members and the cohort members. In Figure 3, we examine instead four groups of individuals $c \in \{C_1, C_2, C_3, C_4\}$, corresponding respectively to the children of the cohort members and the cohort members at the age of 5, 10 and 16.

Each individual is denoted by $i = 1, ..., N_c$. For each individual and group, we observe categorical item responses Z_{ijc}, corresponding to the common Rutter/SDQ questions (Table 2) where j indexes the 11 available items. We follow the literature and assume a latent bi-dimensional vector of externalising and internalising socio-emotional skills $Y_{ic} = (Y_{ic}^{EXT}, Y_{ic}^{INT})$.

The relationship between the latent factors Y_{ic} and the available measures Z_{ijc} is characterised by item- and group-specific intercepts v_{jc} and loadings λ_{jc} and is affected by an independent measurement error term u_{ijc}. The measures are defined in terms of the following variable:

$$Z_{ijc}^{*} = v_{jc} + \lambda_{jc}^{\top} Y_{ic} + u_{ijc}. \tag{1}$$

We consider a dedicated factor structure, where each item loads only on one latent dimension, and follow the structure found in the exploratory factor analysis (Heckman et al., 2013). We estimate a baseline model which is characterized by the bare minimum number of assumptions with the parameterisation defined below (Wu and Estabrook, 2016).

The available behavioural scales yield measures Z_{ijc} that are discrete taking one of an ordered number of values. To allow for such measures, we introduce item- and group-specific threshold parameters τ_{jc} as follows:

$$Z_{ijc} = s \quad \text{if} \quad \tau_{s,jc} \geq Z^*_{ijc} \geq \tau_{s+1,jc} \quad \text{for} \quad s = 0, 1, 2, \tag{2}$$

with $\tau_{0,jc} = -\infty$ and $\tau_{3,jc} = \infty$. The values taken by Z_{ijc}, $s = 0, 1, 2$, correspond to those in our data ('Certainly applies' = 0, 'Somewhat applies' = 1, 'Does not apply' = 2).

Following the literature, we assume that the latent factors and the measurement error terms are normally distributed:[8]

$$Y_{ic} \sim \mathcal{N}(\kappa_c, \sigma^2_{Y_c}) \quad \text{and} \quad u_{ijc} \sim \mathcal{N}(0, \sigma^2_c). \tag{3}$$

Finally, we make the normalization assumption needed to deal with factor indeterminacy by setting the mean κ_c and the variance $\sigma^2_{Y_c}$ of the factor equal to 0 and 1 respectively. In addition, the intercepts v_{jc} are equal to zero and the error variance σ^2_c to 1, while the loadings λ_{jc} and threshold τ_{jc} are free to vary. In Appendix A, we follow Attanasio et al. (2020) and test for measurement invariance since any comparison between socio-emotional skills across different generations requires that the socio-emotional measures we derive have the same relationship with the latent constructs (Vandenberg and Lance, 2000; Putnick and Bornstein, 2016). We fail to reject measurement invariance, so that the latent factors measured for the different groups are comparable.

While the focus of the analysis is on the intergenerational transmission of socio-emotional skills, in what follows we want to check whether the links we identify are robust to controlling for parental cognitive skills, for which we have a variety of markers. To measure parental cognitive skills during childhood, we consider a factor model with continuous items. The continuous items are the raw scores from the Copy Designs, Human Figure Drawing, English Picture Vocabulary Test, Shortened Edinburgh Reading Test, Friendly Math Test, Spelling Dictation Task and Pictorial Language Comprehension Test. Appendix Figure E1 shows the distributions of the latent factors: internalising, externalising and cognitive skills.

4 Measuring intergenerational mobility

We perform the analysis of intergenerational persistence of skills in one step, estimating the measurement system and the regression jointly. In particular, we analyse how different dimensions of parents' development observed during childhood relate to the children's socio-emotional development (internalising and externalising) in 2004, when the parents were 34 years old.[9]

To perform this analysis, we estimate jointly a measurement system and the relationship among the factors following the procedure in Muthen (1984) to estimate parameters of interest jointly, avoiding biases that would arise from a two-step procedure. We describe the estimation

[8] In our analysis of the intergenerational (IG) correlation, this assumption can be weakened to the requirement that the latent variables Z^* obey a multivariate normal distribution conditional on observed covariates, following Muthen (1984) as described in Appendix B.

[9] We do not consider the children's cognitive development, as they were of different ages, posing comparability problems with those measures.

methodology in Appendix B.

Intergenerational mobility equation To study how socio-emotional and cognitive skills can be transmitted across generations, we relate outcomes observed in the children to outcomes observed in their parents *prior to their adulthood*.

In particular, for each BCS member - referred to as parent - we identify a child in the household, if present in 2004 and included in the study, and estimate:

$$Y_i^C = \phi + \gamma^\top Y_i^P + \rho^\top \mathbf{X}_i + \epsilon_i, \tag{4}$$

where Y_i^C is the child i's socio-emotional skill score and γ is a vector of parameters measuring intergenerational mobility in skills (i.e. internalising, externalising and cognitive skills). Higher values of the coefficient γ correspond to lower mobility.

The vector Y_i^P represents the socio-emotional and cognitive skills of child i's parent, as measured during the parent's childhood. As these skills are observed when the parent (cohort member) is 5, 10 and 16, two possible approaches can be pursued to measure Y_i^P and deal with possible measurement error.

Here, we mainly report results estimating Y_i^P from a factor model, combining the measures for the parents available at ages 5, 10 and 16. Two alternative strategies are also possible. The first alternative would be to use a factor model to obtain estimates of the parent's skills at ages 5, 10 and 16 and use the age-5 and 10 measures as instruments for the age 16, under the assumption that these are all error-ridden measurements for the same underlying skill with independent measurement errors (see, for example, Madansky (1964), Pudney (1982), Cunha and Heckman (2008), and Bollen (2012) for a discussion). The second alternative would be to construct three separate factors for each age and then combine them into a higher-order factor (this is also known as hierarchical model). We discuss the estimates for these alternative approaches in Section 5 and show that indeed they are very similar to the approach used throughout the paper in Appendix C.

Therefore, parents' internalising and externalising skills during childhood are measured by estimating a factor model combining the Rutter A questionnaires administered at the age-5, 10 and 16 waves. Parents' cognitive skills during childhood are measured by estimating a factor model combining the cognitive tests administered at age-5 and 10 waves.[10]

In our specifications, we control for a vector $\mathbf{X}_i$ of individual characteristics, which include the parent's region of birth, the parent's gender, the child's gender and age, the number of children in the cohort member and child's household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. We include these controls to accommodate some other possible channels that might relate to skills. For example, the employment variables are here to proxy for

[10]We do not include the cognitive tests administered at age 16 because of a teacher-led industrial strike, disrupting the dissemination of the questionnaire. The strike led to administer only 2 cognitive tests (spelling test and vocabulary test) – out of 4 tests proposed – only to a small subset of the cohort members.

other channels like income that might explain skills. Region of birth fixed effects can account for the fact that parents were born in different geographical areas. We also include controls for family characteristics to consider the fact that the family composition can influence skills.

As mentioned in the introduction, the nature of the data allows us to study separately the role played by mothers and fathers in the intergenerational transmission of skills. To do this, we can estimate equation (4) separately for male and female cohort members.

We compute standard errors by bootstrap. More specifically, we first generate 200 samples by block sampling with replacement from the original sample (i.e. we randomly draw the entire history of the parent-child link with replacement from the original sample). Then, for each bootstrap sample, we estimate the measurement system and the regression equation jointly.

Intergenerational rank transitions Another common measure of intergenerational mobility is to study the children's outcomes (R_i^C) from parents (R_i^P) at a given quintile of the distribution (Chetty et al., 2014). For example, a measure which is often reported is the probability of going from the lowest to the highest quintile of the skill distribution (Corak and Heisz, 1999):

$$LH = Pr(R_i^C \geq 80 | R_i^P < 20). \tag{5}$$

We thus produce matrices of transition probabilities across quintiles of the skill distribution. We do this for the internalizing, externalizing and cognitive skills of parents during childhood to document how mobility may differ at different points of the skill distribution.[11]

To facilitate comparison across the several matrices, we propose a summary measure to compare the different transition matrices and order them in terms of mobility. Our measure is based on the difference between the largest and the second largest eigenvalues in the transition matrix. This difference is usually referred to as the 'spectral gap', and is bounded between 0 and 2 as the eigenvalues of a Markov chain's transition matrix lie within the interval between -1 and 1 (inclusive). (This can be seen, for instance, using Gergorin's Circle Theorem.) We thus call this measure the *'spectral gap mobility index'*. This measure is useful to understand how far the intergenerational transition matrices are from an identity matrix, which corresponds to a table with no mobility across quintiles: all its eigenvalues are equal to one and the spectral gap is zero. The discrepancy between one and the second largest could be seen as a departure from zero mobility, where higher numbers of the *'spectral gap mobility index'* corresponds to higher mobility.[12]

5 Intergenerational correlations of socio-emotional skills

In this section, we present evidence on the relationship between children's internalising and externalising socio-emotional skills and their parents' skills in different domains. As mentioned in

[11] To perform this exercise, we do not use the regression in equation 4. Instead we estimate seperately the factor models for parents and children.

[12] In the sociology literature, Sommers and Conlisk (1979) also note the use of the second largest eigenvalue as a measure of immobility.

the introduction, we distinguish this type of intergenerational correlation by parent's gender. We also look at the correlation between children's socio-emotional skills and various dimensions of their parents' skills, including socio-emotional skills measured at different points in the parents' life cycle. We then look at how the ranking of the children's skills is affected by the ranking of their parents, by estimating transition matrices.

For this purpose, we use data from the wave that contains information on the children of the 1970 cohort, which was collected when the cohort members were about 34 years old. In what follows, we refer to the cohort members as parents.

5.1 Intergenerational mobility: average and gender specific

In Table 4, we report the results we obtain estimating equation (4) for the whole sample. We estimate jointly the intergenerational mobility equation and the latent variables, extracted from the available measures using the factor model discussed above.

The different specifications we report are informative about how parental internalising, externalising and cognitive skills, as measured during childhood, relate to their children's socio-emotional skills during childhood, even after including a large set of controls.[13] In particular, parents' skills combine information on the skills measured at ages 5, 10 and 16 and we interpret the coefficients on these variables as measuring intergenerational mobility. In Panel A, we present intergenerational mobility estimates for the child's internalising skill, while in Panel B we present the child's externalising skill.

As noted in Section 4, estimating a factor model, combining measures of parents' skills taken at ages 5, 10 and 16, yields similar results to those obtained using an instrumental variable strategy, where we use measures of the parents' skills at earlier ages as instruments for their observed skills at later ages (Madansky, 1964; Pudney, 1982; Cunha and Heckman, 2008; Bollen, 2012), and a hierarchical model. Appendix Table C2 presents similar estimates from these methods, designed to deal in different ways with measurement error, using multiple measures with independent errors.

A clear pattern emerges: the child's internalising skill is highly correlated with the parent's internalising and cognitive skills, while it is not associated with the other dimension of the parent's socio-emotional skills (i.e., the externalising skill). Analogously, the child's externalising skill is correlated with the parent's cognition and externalising skills, but not with the parent's internalising skill.

Differently from previous studies, in Table 5, we examine whether intergenerational mobility in socio-emotional skills differs by the parent's gender. The BCS70 allows us to perform this analysis as both genders are represented in the survey and both have their children tested. The most striking result in Table 5 is the fact that most of the skill correlation between parents and children is between mother and child rather than father and child. If we take as the null hypothesis that the coefficient for the mother-child regression is less than that for the father-child regression, we

[13] Appendix Table C1 presents the main estimates of the intergenerational transmission of socio-emotional skills, incorporating one control variable at a time. The inclusion of these controls does not significantly alter the intergenerational transmission correlations.

Table 4: Intergenerational mobility in socio-emotional skills

Panel A:				
Dependent variable:	**Child's Internalising (INT) Skill**			
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.168***	0.165***	0.153***	0.192***
	(0.050)	(0.047)	(0.052)	(0.067)
Parent's EXT (during childhood)				-0.082
				(0.071)
Parent's COG (during childhood)			0.141***	0.157**
			(0.047)	(0.052)
Observations	1035	1035	1035	1035
R^2	0.027	0.114	0.131	0.135
Region of birth FE (BCS70 5y)	No	Yes	Yes	Yes
Child's age FE	No	Yes	Yes	Yes
Other controls	No	Yes	Yes	Yes
Panel B:				
Dependent variable:	**Child's Externalising (EXT) Skill**			
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)				-0.040
				(0.057)
Parent's EXT (during childhood)	0.259***	0.256***	0.222***	0.243***
	(0.047)	(0.048)	(0.048)	(0.054)
Parent's COG (during childhood)			0.154***	0.153***
			(0.042)	(0.041)
Observations	1035	1035	1035	1035
R^2	0.063	0.146	0.164	0.165
Region of birth FE (BCS70 5y)	No	Yes	Yes	Yes
Child's age FE	No	Yes	Yes	Yes
Other controls	No	Yes	Yes	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills (child's socio-emotional skills on parent's skills *during childhood*). The measurement system and the intergenerational mobility equation are estimated jointly. Other controls include the parent's gender, the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

fail to reject the null at the 5% level for both externalizing and internalizing skills. These results indicate that most of the transmission occurs through the mother, as the mother-child estimates are both larger in magnitude and more precisely estimated than the father-child estimates. This evidence is consistent with Hu and Qian (2023), showing that father-child educational mobility have become weaker, while mother-child educational mobility have become stronger around the world since 1960 (see also Chadwick and Solon (2002)). Similar evidence is also emerging for the intergenererational transmission of income (Brandén et al., 2024; Ahrsjö et al., 2023).

We also undertake an exploratory analysis to investigate whether child-care sharing arrangements between father and mother may be related to those findings (see, for example, Craig and Mullan (2011)). Although the British Cohort Study (BCS) lacks detailed data on broader parent-child interactions, the age-34 wave has some information on the division of child-care responsibilities between mothers and fathers and the frequency with which parents read to the child.

Table 5: Intergenerational mobility in socio-emotional skills by the parent's gender

Panel A: Mother-child				
Dependent variable:	**Child's Internalising (INT) Skill**		**Child's Externalising (EXT) Skill**	
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.219***	0.221***		-0.065
	(0.062)	(0.081)		(0.074)
Parent's EXT (during childhood)		-0.096	0.300***	0.288***
		(0.079)	(0.054)	(0.072)
Parent's COG (during childhood)		0.173**		0.190***
		(0.063)		(0.058)
Observations	752	752	752	752
R^2	0.046	0.159	0.083	0.182
Region of birth FE (BCS70 5y)	No	Yes	No	Yes
Child's age FE	No	Yes	No	Yes
Other controls	No	Yes	No	Yes
Panel B: Father-child				
Dependent variable:	**Child's Internalising (INT) Skill**		**Child's Externalising (EXT) Skill**	
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	-0.011	0.152		0.070
	(0.109)	(0.158)		(0.171)
Parent's EXT (during childhood)		-0.099	0.094	0.045
		(0.150)	(0.104)	(0.159)
Parent's COG (during childhood)		0.164		0.114
		(0.145)		(0.114)
Observations	283	283	283	283
R^2	0.000	0.165	0.009	0.174
Region of birth FE (BCS70 5y)	No	Yes	No	Yes
Child's age FE	No	Yes	No	Yes
Other controls	No	Yes	No	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills by parent's gender (child's socio-emotional skills on parent's skills *during childhood*). The measurement system and the intergenerational mobility equation are estimated jointly. Other controls include the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

First, Appendix Figure C1 helps contextualize the role of each parent in child-rearing responsibilities which underscore the importance of recognizing maternal involvement, though joint parenting remains significant. For example, in most cases (over 60%), mothers take the primary responsibility for looking after children when they are ill, with about 25% of respondents stating that both parents share this role. This disparity in caregiving roles could potentially explain some of the heterogeneity in the transmission of socio-emotional skills, as mothers may be more engaged in certain nurturing activities. Second, we notice that the transmission of socio-emotional skill is stronger when parents are reading to the child everyday (Appendix Table C3). We also observe that mothers are 18 percentage points more likely to read everyday to the child than fathers (35% of fathers report reading to the child everyday). We however urge caution in interpreting these findings because the transmission of socio-emotional skills is conditioned on an endogenous outcome (reading to the child).

We perform several robustness checks for Tables 4 and 5. First, a potential criticism of these

results is that they are estimated on the sample of children of the 1970 cohort, when the cohort members are 34. Cohort members with no children at 34, therefore, cannot be included in the analysis. It is not surprising, for instance, that a larger number of females than males is present in this sample. Selection into this sample is unlikely to be random and this selection process can bias our results.

To address these issues, we re-estimate the specification in Column 4 of Table 4 by using a Heckman selection model to account for the potential selection bias induced by fertility decisions (Appendix Table C4). In the selection equation for the fertility decision at age 34, we explore marital status and grandmother's age at the parent's birth as excluded variables, alongside with other cohort members' covariates (Appendix Table C5). Appendix Table C6 explores three specifications: (i) using both marital status and grandmother's age at the parent's birth as excluded variables (Columns 1 and 4 of Appendix Table C6), (ii) using only marital status as an excluded variable, while controlling for the grandmother's age at the parent's birth (Columns 2 and 5 of Appendix Table C6), and (iii) using only the grandmother's age at the parent's birth as an excluded variable, while controlling for marital status (Columns 2 and 5 of Appendix Table C6). Appendix Table C6 documents that the estimates of intergenerational transmission of internalising and externalising skills are similar to ones presented in Table 4 and the results do not depend crucially on the exogenous source of variation that we exploit.

Second, cohort members have children at different ages. As a consequence, their children's socio-emotional skills are measured at different ages, which can raise concerns about the stability of the measures across ages. Appendix Table C7 shows that we obtain results that are quantitatively very similar to those in Table 4 if we control for the child's age in our regressions. Not only cohort members of different genders have, on average, children at different ages, but at age 34, female cohort members are much more likely to have children than male cohort members. As noted previously, we do control for the child's age in all our regressions, which may be particularly relevant in this case. Additionally, we control for selection into the sample for the intergenerational mobility estimates by gender in Table 5 and obtain similar results (Appendix Table C8).[14]

Third, Appendix Table C11 reproduces Table 4 by estimating Tobit regressions for censored data as some measures of socio-emotional skills may suffer from ceiling effects (McBee, 2010). The inability to characterize adequately skills in the upper end of the distribution may understate the intergenerational correlations in skills. However, we find that estimates in Appendix Table C11 are quantitatively very similar to Table 4.

Fourth, we investigate whether the differences in results for mothers relative to fathers in Table 5 could be attributed to the larger sample size available for the former. To address this, we re-estimate Columns 1 and 3 of Panel B (Table 5) by randomly selecting a subsample of mothers and children, ensuring that it matches the size as well as the children's age distribution of the sample of fathers and children. Appendix Figure C2 presents the distribution of 200 resamples,

[14] We also explore heterogeneity in skill transmission by the child's age, dividing the sample at age 6, when children typically enter formal education. The effect is slightly larger for the externalizing skill of younger children but not for the internalizing skill (Appendix Tables C9 and C10). Ideally, we would analyze this heterogeneity by each individual age; however, small sample sizes limit the reliability of such estimates.

addressing concerns about the randomness of a single resample. In these smaller, randomly-selected subsamples, we observe a consistent transmission of internalising and externalising skills from mothers to children, with average estimates aligning closely with those reported in Columns 1 and 3 of Panel B (Table 5). This suggests that the estimates for the father-child sample are not driven by a smaller sample size. Additionally, Appendix Tables C12 and C13 present some additional specifications of the estimates presented in Table 5.

Fifth, as a robustness check on the results in Tables 4 and 5, we also use the data collected on the cohort members at the age-10 wave from Rutter A questionnaire administered to their teachers. We can exploit these data to address possible concerns about misreporting bias and estimate intergenerational mobility in socio-emotional skills by using the questions answered by the teachers, instead of the cohort members' mothers. Appendix Tables C14 and C15 reproduce Tables 4 and 5, using this information.

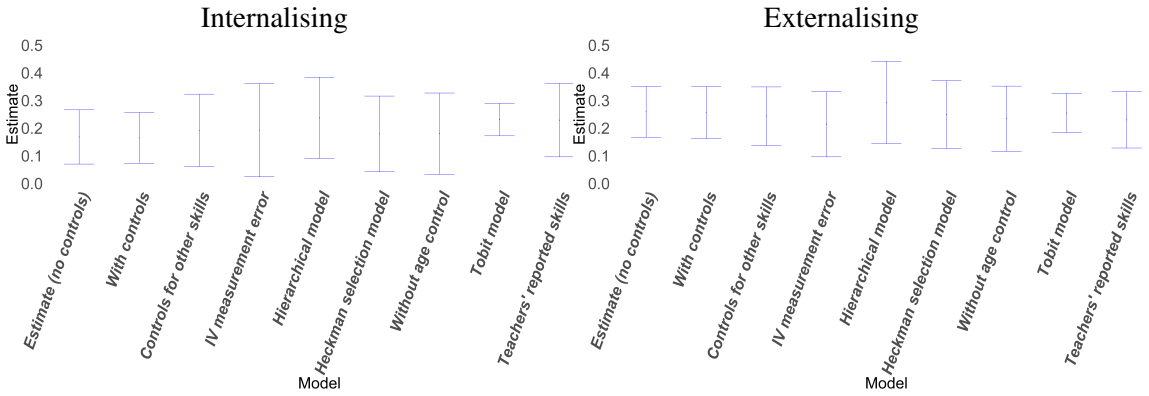
The evidence, using the questions answered by the teachers, mitigates the concern that mothers may report their daughters as more similar to themselves and their sons as more dissimilar. Such behaviour would create contemporaneous correlations between mother-child pairs, driven mostly by mother-girl pairs. We therefore compute the correlations between mother-daughter (internalising skill: 0.320 (SE 0.081); externalising skill: 0.279 (SE 0.075)) and mother-son (internalising skill: 0.099 (SE 0.100); externalising skill: 0.335 (SE 0.080)). The non-statistically difference in the correlations by mother-daughter and mother-son hints that the mother-child correlation is not driven by a specific gender-combination.

Furthermore, as we have some evidence on the socio-emotional skills of the mothers of the cohort members, we can estimate with a larger number of observations the correlations in these skills separately for male and female cohort members. We find that these correlations are higher than the correlations between female cohort members and their sons and daughters and are statistically different from zero for both male and female cohort members. In particular, we find that the correlation between grandmothers' internalising skills and the female cohort members' internalising and externalising skills are respectively 0.628 (SE 0.038) and 0.444 (SE 0.028). The same quantities for males cohort members are 0.484 (SE 0.031) and 0.479 (SE 0.030).

Finally, we report the main estimates and the robustness checks we describe above in Figure 1 and notice that the magnitudes of our estimates are similar to, though somewhat smaller than, the ones in the UK for intergenerational mobility in occupation (Bell et al., 2023), and income (Gregg et al., 2017; Rohenkohl, 2023). This is shown in the bar chart (Figure 2), which compares the mobility estimates from the studies mentioned above with the mobility estimates in socio-emotional skills for each skill separately without controls (Appendix Figure C3).[15] We however urge caution in comparing our results to the findings in intergenerational mobility in income and/or occupation because of different datasets, variables and model specifications.

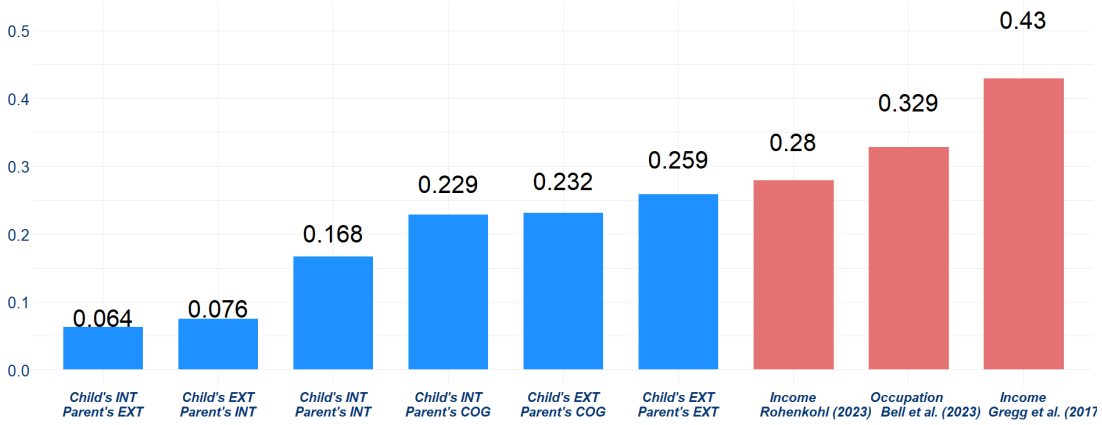
[15] Appendix F contextualizes our estimates on intergenerational mobility in skills during childhood by estimating the relationship between skills during childhood and log pay at age 42 in Appendix Table F1, providing evidence that skills during childhood are predictive of log pay. A similar result is also presented in Papageorge et al. (2019).

Figure 1: Summary of the robustness checks: Intergenerational mobility in socio-emotional skills



Note. The figures present the summary of the robustness checks of the intergenerational mobility in socio-emotional skills with the 95% confidence intervals. The estimate (no control), with controls and controlling for other skills are presented and discussed in Table 4. Using IV for measurement error and hierarchical model are presented in Appendix Table C2. Heckman selection is presented in Appendix Table C6. Without age control is presented in Appendix Table C7. Tobit model is presented in Appendix Table C11. Using teachers' reported skills is presented in Appendix Table C14.

Figure 2: Comparison of the mobility measures



Note. The bar chart presents a comparison of the mobility measures in socio-emotional skills from the non-instrumented regressions without controls (equation 4 with no controls) to the mobility measures (i.e., coefficients from the OLS regressions) in other economic domains. The measurement system and the mobility equation are estimated jointly with no controls. Bell et al. (2023) and Rohenkohl (2023) study an older cohort born respectively in 1974-83 and 1973-1991. Gregg et al. (2017) study mobility in income for the BCS70. Higher values of the OLS coefficient correspond to lower mobility.

5.2 The timing of parental measures

In Table 4, we characterise intergenerational mobility estimates using parental internalising, externalising and cognitive skills *during childhood* combining measurements obtained at different ages. To complement the evidence in Table 4 and offer a graphic representation of the mobility results, we first project each predicted skill on the control variables in Table 4 and obtain the residualised skill. Second, we plot the child's residualised skill against the parent's residualised skill in Figure 3.[16] To produce the slopes with the respective standard errors in the notes of the figures, we

[16]The residualisation emulates the Frisch-Waugh-Lovell Theorem, which establishes that the multiple regression coefficient of a specific variable can also be obtained by first netting out the effect of other variable(s) in the regression

estimate the measurement system and the mobility equation jointly and report the standard errors in parentheses using 200 bootstrap repetitions.

The slope coefficients in plots (A), (B) and (E) from Figure 3 are broadly comparable to the coefficient estimates in Panel A from Table 4, while plots (C), (D) and (F) are comparable to Panel B from Table 4. Although the patterns that emerge from the plots are similar to the evidence in Table 4, the slopes are stronger when considering parents' skills measured at older ages (10 or 16 years). This highlights the role of the age of measurement. Specifically, it reiterates the point in the Introduction that stronger correlations may be observed when parents and children are measured at older ages in childhood. This aligns with the literature on life cycle bias when measuring the intergenerational mobility in income (Nybom and Stuhler, 2017).

An important difference between the results we present and most evidence in the literature on intergenerational mobility in skills is that in the latter children's and parents' skills or attitudes were measured *contemporaneously*, implying that parental skills are measured in adulthood. On the other hand, we measure children's and parents' skills during the *childhood* of both generations, which are roughly 20 years apart. To investigate the importance of this difference, Table 6 presents estimates for intergenerational mobility, both using measures of the parent's internalising skills measured during their childhood (as in Table 4) and measured at the same time as those of their children (see for example, Dohmen et al. (2011) and Anger (2012)).[17]

Table 6: Intergenerational mobility estimates (childhood and adult measures of parental skills)

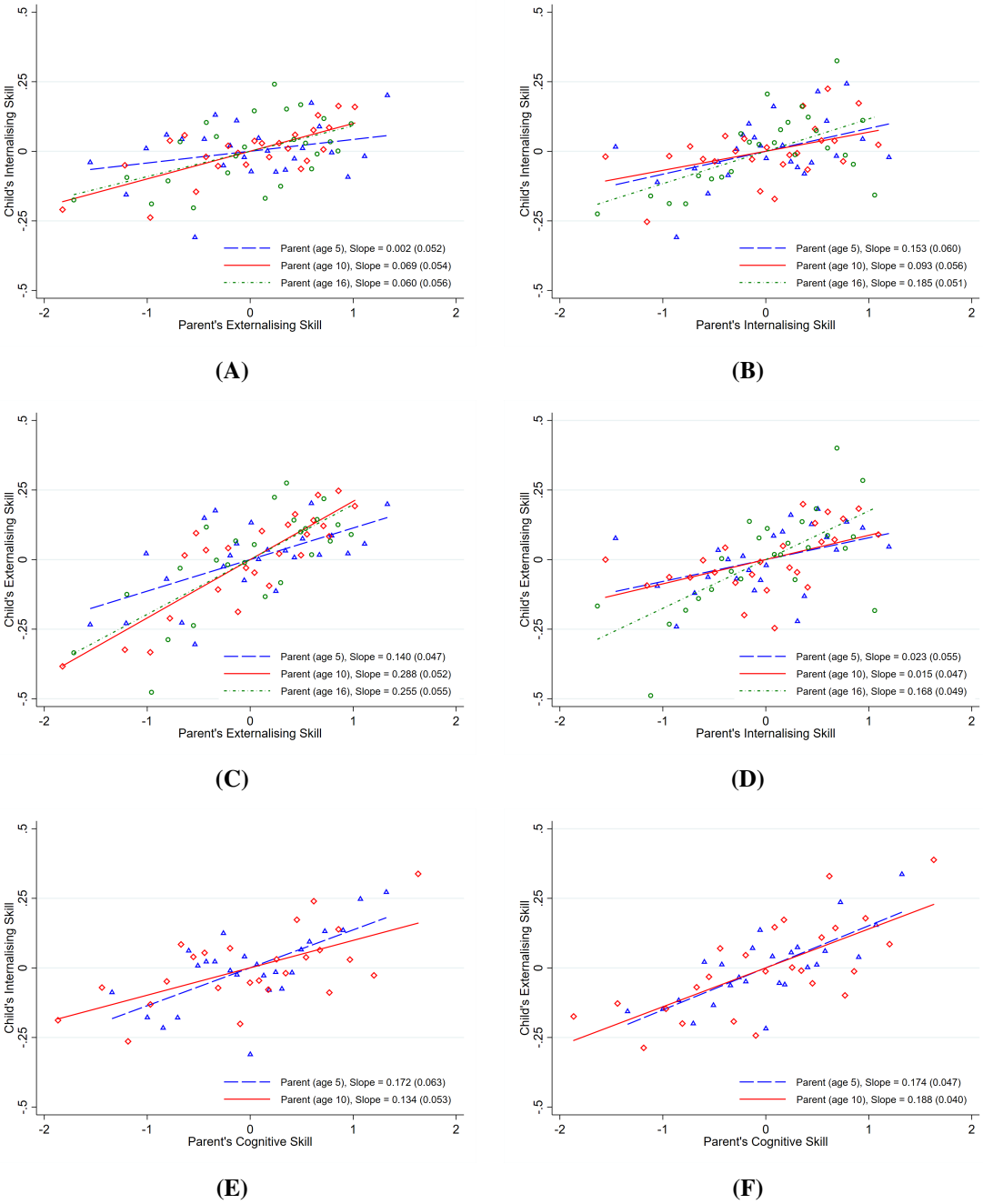
Dependent variable:	**Internalising (INT) Skill**		
	Child	Child	Child
	(1)	(2)	(3)
Parent's INT (during childhood)	0.208***		0.137*
	(0.067)		(0.078)
Parent's INT (contemporaneous - age 34)		0.426***	0.393***
		(0.077)	(0.090)
Observations	919	919	919
R^2	0.093	0.198	0.208
Region of birth FE (BCS70 5y)	Yes	Yes	Yes
Child's age FE	Yes	Yes	Yes
Other controls	Yes	Yes	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in socio-emotional skills. The measurement system and the intergenerational mobility equation are estimated jointly. The internalising skill is derived by a factor model that considers 3 items (unhappy, worried and fearful) common across the 4 different sweeps to assure comparability/measurement invariance across measures (the age-34 measure comes from the Malaise questionnaire). Other controls include the parent's gender, the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education on 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

model from both the dependent and independent variable of interest and performing a simple regression using those residuals.

[17] We focus on internalising skill to assure comparability/measurement invariance of skills across different ages as internalising skill can be measured with similarly-worded questionnaire items (i.e., unhappy, worried and fearful) for children and parents during childhood and adulthood (the age-34 measure comes from the Malaise questionnaire). Interestingly, our estimates of intergenerational mobility do not change even if we use fewer items to measure socio-emotional skills. We notice that the estimates of mobility in Column 2 in Panel A of Table 4 are robust and similar to the ones in column 1 in Table 6.

Figure 3: Association between the children's residualised socio-emotional skills and the parents' residualised skills at different ages.



Note. The figures present binned scatter plots of the relationship between the children's and the parent's residualised skills. Each panel plots the mean child skill within each parent skill bin. To construct each series, we group parents into 25 equally sized (4 percentile points) bins and plot the mean child's skill versus the mean parent's skill within each bin. To obtain the residualised skills, we first project each predicted skill on the control variables in Table 4 and obtain the residualised skill. Second, we plot the child's residualised skill against the parent's residualised skill. The slopes are obtained by estimating the measurement system and the mobility equation jointly. All standard errors in parentheses are obtained using 200 bootstrap repetitions.

When we use contemporaneously measured internalising skills for parents and children, the estimated coefficient on the parent's internalising skill (column 2, Table 6) is twice as large as the one we estimate when using measures of socio-emotional skills collected in different waves during childhood both for parents and children (column 1, Table 6). Moreover, as is apparent from comparing the R^2 of the different columns, parental skills measured contemporaneously are better predictors of children skills.

The larger role played by skills measured during adulthood could occur for several reasons. The transmission of skills may appear more persistent due to contemporaneous environmental factors or reverse causality, leading to greater correlation between parents' and children's skills. Instead, skills measured during childhood may not have fully developed yet, which could explain the smaller coefficient estimate. The estimated coefficient at age 34 is even higher when one instruments the contemporaneously measured parental internalising skill with parental internalising skill measured at age 26. This pattern is also observed in Dohmen et al. (2011), when contemporaneously measured parental trust and risk attitudes are instrumented (see Tables 1 and 5 in their paper). This indicates that, even when instrumented, estimates using contemporaneously measured parental skills are much higher than those measured in childhood.

To better understand this phenomenon, in Column 3 of Table 6 we relate children's skills with parental skills as measured both during childhood and adulthood. Interestingly, both skills are important predictors, underscoring the sensitivity of the estimates to the timing of skill measurement. The coefficient on parental skill measured during adulthood, however, is estimated to be almost three times larger than that on skills measured during childhood.

5.3 Intergenerational rank transitions

We now turn to a different measure of mobility, relating the position in the skill distribution of the 1970 cohort with the position of their children. We do so in Table 7, which reports the transition matrices from the quintile of a skill distribution a parent belongs to, to the quintile of a skill their child belongs to. For the parents we consider internalising, externalising and cognitive skills during childhood, while for the child we consider externalising and internalising skills.

In particular, the transition probabilities report measures of directional mobility, highlighting how mobility may change at different quintiles of the skill distribution. One advantage of reporting transition matrices is to gain a better understanding on whether intergenerational persistence in socio-emotional skills arises from what happens in the tails. For each matrix, we also present the *'spectral gap mobility index'* introduced earlier to facilitate comparison across matrices.[18]

Interestingly, children of very low- or very high-skill parents mostly stay in the same quintile as their parents, while children of parents in the middle of the skills distribution often end up in a different quintile from their parents. We also notice that there are large variations in the percentage of children staying in the same quintile of their parents as well as those moving up or down across different skills and ages. The probability of moving from the lowest to the highest quintile ranges from 13.1 to 17.7, highlighting the importance of distinguishing between skills.

[18] Bootstrap standard errors of the *'spectral gap mobility index'* from 200 repetitions are presented in parentheses.

Table 7: Intergenerational transition matrix

Child's EXT - Parent's EXT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	33.5	15.9	19.3	14.9	12.5
	2	21.3	21.7	21.7	17.8	19.9
	3	18.3	21.3	22.2	18.3	19
	4	12.7	21.3	13.5	24	26.9
	5	14.2	19.8	23.2	25	21.8

Spectral gap mobility index: 0.800 (0.038)

Child's INT - Parent's EXT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	25.4	13.5	18.8	15.4	22.2
	2	26.9	21.7	21.3	17.8	13.9
	3	18.8	19.8	17.4	22.6	21.3
	4	15.2	21.3	20.8	23.1	21.8
	5	13.7	23.7	21.7	21.2	20.8

Spectral gap mobility index: 0.913 (0.025)

Child's EXT - Parent's INT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	17.2	21.4	18.8	20.3	17.5
	2	24.2	21.4	15.5	24.6	17.1
	3	18.7	19.4	20.3	17.4	23
	4	22.2	19.4	23.2	18.8	15.7
	5	17.7	18.4	22.2	18.8	26.7

Spectral gap mobility index: 0.898 (0.031)

Child's INT - Parent's INT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	22.7	20.4	18.8	16.9	16.6
	2	21.2	25.7	17.4	19.8	17.1
	3	22.2	18.4	24.2	18.8	16.6
	4	18.7	18.4	20.3	21.7	23
	5	15.2	17	19.3	22.7	26.7

Spectral gap mobility index: 0.885 (0.034)

Child's EXT - Parent's COG (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	26.3	22.8	17.3	20.3	9.3
	2	23.2	19.9	21.6	19.3	18.5
	3	19.7	24.3	14.9	21.3	19
	4	15.7	17	23.1	15.5	27.3
	5	15.2	16	23.1	23.7	25.9

Spectral gap mobility index: 0.844 (0.035)

Child's INT - Parent's COG (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	25.8	20.4	17.8	18.4	13.4
	2	25.8	22.3	20.2	20.3	13
	3	16.2	22.8	19.7	20.3	20.8
	4	19.2	15	18.8	23.2	25.9
	5	13.1	19.4	23.6	17.9	26.9

Spectral gap mobility index: 0.862 (0.038)

Note. The tables present the percent frequency with which a child is in certain skill quintile (row) when parent is in a certain skill quintile (column). The spectral gap mobility index is computed by taking the difference between one and the second largest eigenvalues of the transition matrices. The transition matrices are stochastic matrices; therefore, their largest eigenvalue is always one. The discrepancy between one and the second largest could be seen as a departure from zero mobility, which corresponds to an identity matrix. Higher numbers of the spectral gap mobility index corresponds to higher mobility. All standard errors of the spectral gap mobility index in parentheses are obtained using 200 bootstrap repetition, taking into account the factor estimation stage that precedes the estimation of the transition matrix and its respective eigenvalues.

The *'spectral gap mobility index'* indicates that the intergenerational transition matrix with higher mobility is the one relating the child's internalising skill to the parent's externalising skill during childhood, while the one with lower mobility is the one relating the child's externalising skill to the parent's externalising skill during childhood. The correlation between the *'spectral gap mobility index'* and the intergenerational mobility coefficients without any controls is -0.898 (the correlation is negative because a higher coefficient implies lower mobility, while a high spectral gap mobility index implies higher mobility).

As we did with our previous estimates of intergenerational mobility, we also consider the transition matrices reported in Table 7 for the mother-child and father-child pairs, which we report in Appendix Tables C16 and C17. Examining the transition probabilities by gender directly unveils heterogeneities not readily apparent when focusing solely on the spectral gap mobility index. To highlight these patterns, Table 8 presents the difference between the mother-child and father-child transition matrices.

On average, we observe lower mobility in the mother-child transition matrices. Namely, there

tends to be a higher probability for the child to stay in same quintile as the mother compared to a father in the same quintile and a lower relative probability of moving to another quintile. This can be observed when comparing the diagonals, which indicate the probability of the child staying in the same quintile as the mother minus the probability of staying in the same quintile as the father, as reported in Table 8.

Furthermore, there is less mobility at the lower end for mother-child pairs compared to father-child pairs. Specifically, the probability of children ending up in the first quintile is consistently higher when the mother is in the first quintile, indicating a more challenging escape from the bottom of the distribution for children, whose mothers have lower skills. This contrasts with the situation at the top of the distribution, where the pattern is reversed. Notably, children with fathers at the top are more likely to remain at the top quintile than those with mothers at the top.

Table 8: Difference in intergenerational transition matrix between mother-child and father-child

Child's EXT - Parent's EXT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	**8.5**	-0.3	-10.8	5.2	-3.0
	2	5.1	**0.5**	4.2	-7.4	-2.4
	3	1.7	3.2	**-8.8**	1.3	3.4
	4	-9.5	-13.3	7.8	**3.4**	9.0
	5	-6.0	9.9	7.5	-2.4	**-6.9**

Δ Spectral gap mobility index: -0.057

Child's INT - Parent's EXT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	**8.5**	2.6	-6.1	-1.9	-3.1
	2	-3.7	**6.9**	-8.1	-5.7	9.0
	3	-3.7	-6.6	**4.0**	6.7	1.9
	4	0.1	-2.6	1.5	**2.8**	1.1
	5	-1.1	-0.3	8.8	-1.9	**-8.8**

Δ Spectral gap mobility index: 0.018

Child's EXT - Parent's INT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	**6.0**	-0.4	13.8	-13	-6.1
	2	-3.3	**1.4**	7.8	-13.8	7.2
	3	-9.7	-4.4	**-3.1**	8.4	8.7
	4	6.0	-2.4	-9.2	**6.0**	-2.3
	5	0.9	5.8	-9.3	12.4	**-7.6**

Δ Spectral gap mobility index: 0.075

Child's INT - Parent's INT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	**18.1**	-6.0	13.1	-18.6	-5.7
	2	-10.0	**2.5**	4.6	5.3	-4.2
	3	-14.8	-2.3	**11.2**	1.4	6.4
	4	5.1	6.2	-16.9	**3.4**	5.2
	5	1.6	-0.4	-12.0	8.7	**-1.6**

Δ Spectral gap mobility index: 0.045

Child's EXT - Parent's COG (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	**13.0**	3.2	-9.6	-5.8	-0.6
	2	-5.2	**5.0**	-1.5	-4.6	5.5
	3	-0.1	5.4	**0.5**	0.5	-5.2
	4	-2.7	-10.4	12.7	**-1.3**	-0.3
	5	-5.0	-3.2	-2.0	11.0	**0.7**

Δ Spectral gap mobility index: -0.093

Child's INT - Parent's COG (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	**6.5**	3.4	-7.6	-2.2	-0.2
	2	-1.4	**8.3**	-2.9	-11.0	5.3
	3	-1.3	-0.9	**3.3**	-7.4	8.5
	4	-1.7	-5.4	8.0	**13.7**	-11.2
	5	-2.0	-5.4	-0.9	6.9	**-2.5**

Δ Spectral gap mobility index: -0.050

Note. The table presents the difference in intergenerational transition matrix between mother-child and father-child (i.e., the mother-child transition matrix minus the father-child transition matrix). The Δ spectral gap mobility index is the difference in the spectral gap mobility index between mother-child and father-child one.

6 Multi-generational persistence in socio-emotional skills

During the 1975, 1980 and 1986 waves, the mothers of the subjects (i.e., grandmothers to the children of the 1970 cohort) were also asked some socio-emotional related questions. We exploit

these data to study multi-generational persistence in socio-emotional skills, that is, the relationship between the grandmother and grandchild's socio-emotional skills.

The data on the grandmother's socio-emotional skill in adulthood come from the cohort members' mothers who have completed the Malaise Inventory (Rutter et al., 1970) in the 1975, 1980 and 1986 waves. Appendix Table D1 presents the set of 24 'yes-no' self-completion questions asked to the grandmothers to measure their levels of psychological distress, or depression.[19] These scales have been used extensively and have been shown to have internal consistency, hold in different socioeconomic groups and differentiate moderately well between individuals with and without psychiatric disorders (Rutter et al., 1970; Rodgers et al., 1999). As done in Section 3, we focus on comparable questionnaire items between grandmothers, cohort members and grandchildren, shown in Appendix Table D2, to measure their 'internalising skill'. Subsequently, we estimate the measurement system and the multi-generational mobility equation jointly.

Table 9 presents the estimates of multi-generational mobility. Panel A presents the estimates for the internalising skill, while Panel B for the externalising skill. Column 1 of both panels presents the intergenerational mobility estimates when we correlate the grandmother's internalising skill to the parent's internalising (Panel A) and externalising (Panel B) skills. In this instance, the measures of skills for the mothers (aged around 25 years old in 1975) and the cohort members are contemporaneous. These results hint at the bias that we highlight in Section 5 when we estimate intergenerational mobility in socio-emotional skills using contemporaneous measures. The intergenerational mobility coefficients obtained from using contemporaneous measures of socio-emotional skills are larger than the ones in Section 5 when we use parents' socio-emotional skills *before they reached adulthood*

Columns (2)-(4) present the estimates for multi-generational persistence in the internalising and externalising skills in Panels A and B. The estimates show that the grandmother's internalising skill in adulthood is predictive of the grandchild's internalising and externalising skills during childhood. This finding is in line with Adermon et al. (2021), who study long-run intergenerational persistence in human capital, using information on outcomes for the extended family in Sweden. As noted by Adermon et al. (2021), we find that part of the grandparent effect on the grandchild is mediated through the parents. We also recognize that the observed grandparent effect may stem from a direct influence of grandparents, or arise spuriously due to measurement error or group-level effects (see Solon (2018), Güell et al. (2018), and Ferrie et al. (2021)).

These findings also complement the literature investigating multi-generational mobility in mental health, which is related to a certain extent to socio-emotional skills. For example, Johnson et al. (2013) and Hancock et al. (2013) study multi-generational mobility in mental health in the UK and Australia respectively. Their approach to study multi-generational mobility, however, does not consider the multi-dimensionality of children's skills and may suffer from some of the problems, which we have mentioned in the introduction and discussed in Section 5. For example,

[19]The 1975-wave scale is binary, the 1980-wave scale is continuous from 0 to 100 and the-1986 wave scale has 3 categories. We convert them to binary. The continuous scale between 0 and 100 (where 100 means "seldom or never") is recoded 'no behavioural problem' (dummy equal to 1) if the answer is below 70. We have tried different cutoffs and the results are robust.

Table 9: Multi-generational mobility in socio-emotional skills

Panel A: grandchild's INT skill				
Dependent variable:	**Parent's Internalising Skill**	**Grandchild's Internalising Skill**		
	(1)	(2)	(3)	(4)
Grandmother's INT	0.708***	0.138***	0.055	0.074
	(0.071)	(0.053)	(0.071)	(0.075)
Parent's COG (during childhood)			0.165***	0.184***
			(0.054)	(0.049)
Parent's EXT (during childhood)				-0.094
				(0.063)
Parent's INT (during childhood)			0.114*	0.145*
			(0.063)	(0.075)
Observations	994	994	994	994
R^2	0.350	0.078	0.110	0.115
Region of birth FE (BCS70 5y)	Yes	Yes	Yes	Yes
Child's age FE	No	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Panel B: grandchild's EXT skill				
Dependent variable:	**Parent's Externalising Skill**	**Grandchild's Externalising Skill**		
	(1)	(2)	(3)	(4)
Grandmother's INT	0.478***	0.159***	0.058	0.108*
	(0.048)	(0.043)	(0.051)	(0.057)
Parent's COG (during childhood)			0.196***	0.191***
			(0.046)	(0.044)
Parent's EXT (during childhood)			0.191***	0.221***
			(0.058)	(0.051)
Parent's INT (during childhood)				-0.106*
				(0.062)
Observations	994	994	994	994
R^2	0.207	0.063	0.135	0.141
Region of birth FE (BCS70 5y)	Yes	Yes	Yes	Yes
Child's age FE	No	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes

Note. The table presents the estimates for the multi-generational mobility in socio-emotional skills. The measurement system and the mobility equation are estimated jointly. Other controls include the cohort member's gender, the age of the cohort member's mother at birth, the grandchild's gender. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

they use contemporaneous measures of parents' and children's mental health, which could lead to reverse causality if the disruptive child affects the parents' mental health. Their measure of grandchildren's mental health may not be directly comparable to grandmothers and parents' one because they use questionnaires, containing different items, and obtain their measure by averaging the responses, instead of estimating a factor model.

7 Conclusion

This study investigates intergenerational mobility in skills during childhood in the United Kingdom, using unique data from the 1970 British Cohort Study. We document that parental skills

during childhood are predictive of their children's socio-emotional skills *during childhood*. These results contribute to the literature by tackling some of the concerns from previous estimates of intergenerational skill transmission.

First, we estimate heterogeneity in the transmission process *by mother and father* and move beyond estimating the intergenerational transmission by correlating parents and children. We find that most of the transmission occurs from mothers to children.

Second, we incorporate multiple assessments of parental socio-emotional skills gathered throughout *both childhood and adulthood*. This is in contrast to the prior literature, that primarily focuses on measuring contemporaneously parents' and children's skills during adulthood. Using multiple measures over the life cycle enables us to show that the transmission of skills from parents to children becomes increasingly persistent when parental skills are measured later in life. Additionally, it enables us to reasonably infer that the primary direction of intergenerational transmission is from parents to children, thereby ruling out the possibility of children influencing their parents' skills, which can be more salient when using contemporaneous measures.

Finally, multi-generational mobility in socio-emotional skills is investigated, presenting evidence that the transmission of socio-emotional skills remains persistent. The grandmother's socio-emotional skill predicts her own grandchild's socio-emotional skills.

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Appendices to "Intergenerational Mobility in Socio-emotional Skills"

A Measurement invariance

As in Attanasio et al. (2020), we test for measurement invariance. Any comparison between socio-emotional skills across different generations requires that the socio-emotional measures have the same relationship with the latent constructs (Vandenberg and Lance, 2000; Putnick and Bornstein, 2016). Specifically, the items in the age-5, 10 and 16 waves for the cohort members and the child-wave must measure internalising and externalising in the same way.

This is a formally testable property following the assumptions introduced by Wu and Estabrook (2016). Intuitively, this is done by comparing the baseline model, namely the minimal identifiable model, with a series of models with stronger restrictions on the item- and cohort-specific intercepts v_{ic} and loadings λ_{ic}, requiring them to be the same across groups. Their fit is compared to see if the models with stronger restrictions have a worse fit. If this is not the case, invariance is achieved.

We estimate three models with additional restrictions that we can compare with the baseline model and assess their relative fit. First, we estimate the threshold invariant model which is observationally equivalent to the baseline model when each item is a categorical variable with three categories (Wu and Estabrook, 2016). We highlight that the number of parameters and fit are indeed the same for the baseline and threshold invariant model.

Second, we estimate the loading- and threshold-invariant model, which imposes stronger restrictions (also known as metric invariance). Namely, we impose that the factor loadings λ_{ic} and the threshold on the parameters must be the same between parents and children. This means that the items in the Rutter/SDQ scale from the children and parents have the same relationship with the latent skill because the factor loadings are the same across groups. If the fit of the model is similar to the baseline one, then socio-emotional skills can be placed on the same scale and we can compare second moments.

Third, we estimate a loading-, threshold-, and intercept-invariant model (also known as scalar invariance). Namely, we impose that the factor loadings λ_{jc}, the intercepts v_{jc} and the threshold be the same between parents and children. If the fit of the model does not worsen compared to the baseline model, we can also compare the means of the socio-emotional skills between the two groups.

Appendix Table A1 presents a range of fit indices for a comprehensive assessment of measurement invariance. First, we compute the χ^2 statistic, the root mean squared error of approximation (RMSEA), standardised root mean square residual (RMSR), the comparative fit index (CFI), and the Tucker-Lewis index (TLI).[2] Second, we discuss commonly-used rules of thumbs for the com-

[2]The RMSEA is defined as $\sqrt{(\chi^2 - df)/df(N-1)}$, where df are the degrees of freedom and N is the sample size. Lower values imply a better fit and MacCallum et al. (1996) suggest measures between 0.05 and 0.08 to be fair. On the other hand, CFI and TLI determine how far our model is from the model where the variables have no correlation across them). The CFI is defined as $(\epsilon_{\text{Null Model}} - \epsilon_{\text{Alternative Model}})/\epsilon_{\text{Null Model}}$, where $\epsilon = \chi^2 - df$, whereas the TLI is defined as $(\epsilon_{\text{Null Model}} - \epsilon_{\text{Alternative Model}})/(\epsilon_{\text{Null Model}} - 1)$, where now $\epsilon = \chi^2/df$. Both indices are between 0 and 1 and a

parison of fits. For example, Chen (2007) suggests the following thresholds for *rejecting* measurement invariance: ΔRMSEA>0.015, ΔCFI<-0.010, and ΔRMSR>0.010. Chen (2007) computes these rules of thumb from simulations with continuous measures that may not adjust well to the categorical case as suggested by Lubke and Muthén (2004). We follow Rutkowski and Svetina (2017) who find that a ΔRMSEA threshold of 0.010 is appropriate for testing equality of slopes and thresholds (see also Svetina et al. (2020)).

According to Rutkowski and Svetina (2017), when ΔRMSEA exceeds this threshold (as in Appendix Table A1), it indicates a lack of scalar invariance but acceptable metric invariance. For an intergenerational mobility regression, metric invariance suffices for a valid measure of relative mobility as in our cases, as we are interested in the second moments (i.e., how children's skills change as a function of parents' skills) rather than first moments. This is consistent with Attanasio et al. (2020) who indeed showed that comparability at the level of inequality, or variance (metric invariance), was more viable than comparability at the mean level (scalar invariance).

Table A1: Comparison of models' fit for measurement invariance

			Absolute fit			
	N of Parameters	χ^2	RMSEA	RMSR	CFI	TLI
Baseline model/ Threshold Invariance	136	1876.094	0.060	0.071	0.959	0.948
Threshold and loading invariance	108	2803.019	0.069	0.078	0.938	0.932
Threshold, loading, and intercept invariance	81	6457.661	0.100	0.080	0.851	0.856
		Relative Fit to the Baseline model/Threshold Invariance				
		P-value	Δ RMSEA	Δ RMSR	Δ CFI	Δ TLI
Threshold and loading invariance		0.000	0.009	0.007	-0.021	-0.016
Threshold, loading, and intercept invariance		0.000	0.040	0.009	-0.108	-0.092

Note. RMSEA stands for the root mean squared error of approximation, SRMR for the standardised root mean square residual, CFI for the comparative fit index, and TLI for the Tucker-Lewis index.

B Joint estimation of regressions and factor model

We outline here the minimum-distance estimation method developed by Muthen (1984) in the psychometric literature to estimate structural equation models (SEM) with categorical items.[3] We adopt this approach to estimate each of the regressions proposed in Section 4 jointly with the factor model introduced in Section 3.2. Since social-emotional skills correspond to the factors in the model presented in Section 3.2, an intuitive estimation strategy would proceed in two steps. First, the factor model is estimated. Second, the predicted factors from the factor model are used in the regression. Because the estimation error in the first step would emulate a measurement error, this might lead to concerns about measurement error bias. The joint estimation of the regression of interest and factor model addresses this potential concern.

We briefly describe here the strategy proposed by Muthen (1984) to estimate the measurement system and the regression jointly. The estimation protocol first estimates the parameters for the "reduced form" implied by the factor model and regression of interest. Under the assumption that

higher value corresponds to a better fit for the alternative model.

[3] Goldberger (1971) is an excellent review of the common themes between econometrics and psychometrics.

the latent variables Z^*_{jc} follow a multivariate normal distribution given covariates, this reduced form is a categorical model for the observed item responses Z_{ijc} as functions of the observable covariates $\mathbf{X}_i$ in the regression of interest. Notice that these distributional assumptions are not imposed separately on latent factors or other unobservables in equations (1) or (4). These reduced form parameters comprise the thresholds τ_{jc} and intercept, slope and covariance parameters that are functions of the "structural" parameters in the factor model and regression of interest. Letting σ denote the reduced form parameters (as in Muthen (1984)) and θ denote the structural parameters, we thus have that $\sigma = g(\theta)$ for a known function $g(\cdot)$. Given the normality assumption on u_{ijc}, the reduced form parameters collected in σ can be estimated by maximum likelihood methods. Let $\hat{\sigma}$ denote the estimates obtained in this initial stage.

Once the estimates $\hat{\sigma}$ are obtained, the procedure fits the structural parameters using a minimum distance estimator based on the following objective function:

$$F_W(\theta) = (g(\theta) - \hat{\sigma})^\top \mathbf{W}^{-1} (g(\theta) - \hat{\sigma}), \tag{6}$$

for a weight matrix $\mathbf{W}$, to be minimised with respect to θ. Muthen (1984) suggests using as $\mathbf{W}$ a consistent estimator for asymptotic covariance matrix of $\hat{\sigma}$. The corresponding estimator for θ is referred to in the psychometrics literature as the Weighted Least Squares (WLS) estimator. Alternative weight matrices, computationally more tractable and often better performing statistically in small samples, are instead: (1) the diagonal of $\mathbf{W}$ (Diagonally Weighted Least Squares, DWLS) or the (2) the identity matrix (Unweighted Least Squares, ULS). We adopt the DWLS weight matrix in the estimation. The estimation is carried out through the R Lavaan package version 0.6-8 (Rosseel, 2012).

C Mobility in socio-emotional skills

Table C1: Intergenerational mobility in socio-emotional skills (adding controls)

Panel A: Dependent variable:	**Child's Internalising (INT) Skill**											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Parent's INT (during childhood)	0.168***	0.168***	0.168***	0.171***	0.166***	0.166***	0.168***	0.168***	0.160***	0.165***	0.168***	0.166***
	(0.050)	(0.052)	(0.050)	(0.049)	(0.051)	(0.050)	(0.051)	(0.053)	(0.057)	(0.050)	(0.054)	(0.053)
Observations	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035
Controls												
Parent's gender	No	***Yes***	No	No	No	No	No	No	No	No	No	No
Mother's age at the parent's birth	No	No	***Yes***	No	No	No	No	No	No	No	No	No
Parent is the first born	No	No	No	***Yes***	No	No	No	No	No	No	No	No
Region of birth FE (BCS70 5y)	No	No	No	No	***Yes***	No	No	No	No	No	No	No
Grandmother's education in 1975	No	No	No	No	No	***Yes***	No	No	No	No	No	No
Grandmother's employment status	No	No	No	No	No	No	***Yes***	No	No	No	No	No
Number of parent's siblings (BCS70 5y)	No	No	No	No	No	No	No	***Yes***	No	No	No	No
Parent's employment status at the age of 34	No	No	No	No	No	No	No	No	***Yes***	No	No	No
Child's age FE	No	No	No	No	No	No	No	No	No	***Yes***	No	No
Child's gender	No	No	No	No	No	No	No	No	No	No	***Yes***	No
Number of children in HH	No	No	No	No	No	No	No	No	No	No	No	***Yes***

Panel B: Dependent variable:	**Child's Externalising (EXT) Skill**											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Parent's EXT (during childhood)	0.259***	0.252***	0.255***	0.261***	0.260***	0.251***	0.260***	0.256***	0.268***	0.267***	0.266***	0.261***
	(0.047)	(0.048)	(0.046)	(0.048)	(0.044)	(0.042)	(0.045)	(0.045)	(0.043)	(0.049)	(0.049)	(0.046)
Observations	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035
Controls												
Parent's gender	No	***Yes***	No	No	No	No	No	No	No	No	No	No
Mother's age at the parent's birth	No	No	***Yes***	No	No	No	No	No	No	No	No	No
Parent is the first born	No	No	No	***Yes***	No	No	No	No	No	No	No	No
Region of birth FE (BCS70 5y)	No	No	No	No	***Yes***	No	No	No	No	No	No	No
Grandmother's education in 1975	No	No	No	No	No	***Yes***	No	No	No	No	No	No
Grandmother's employment status	No	No	No	No	No	No	***Yes***	No	No	No	No	No
Number of parent's siblings (BCS70 5y)	No	No	No	No	No	No	No	***Yes***	No	No	No	No
Parent's employment status at the age of 34	No	No	No	No	No	No	No	No	***Yes***	No	No	No
Child's age FE	No	No	No	No	No	No	No	No	No	***Yes***	No	No
Child's gender	No	No	No	No	No	No	No	No	No	No	***Yes***	No
Number of children in HH	No	No	No	No	No	No	No	No	No	No	No	***Yes***

Note. The table presents estimates for equation 4 on the intergenerational mobility in skills (child's socio-emotional skills on parent's skills *during childhood*). The measurement system and the intergenerational mobility equation are estimated jointly. Other controls include the parent's gender, the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

C.1 Factor models to address measurement error

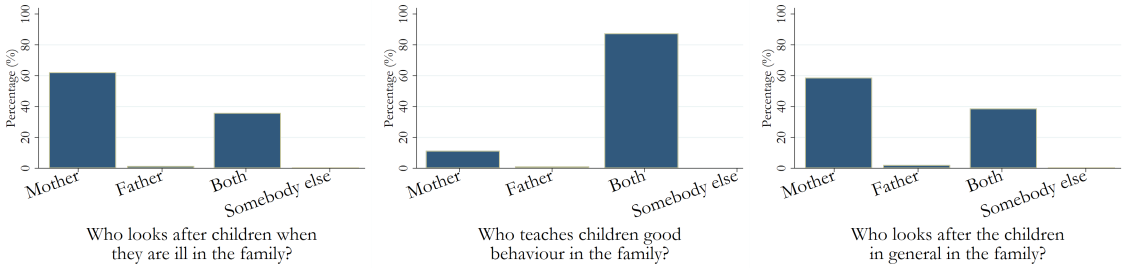
Table C2: Factor models. Instrumental variables and hierarchical models: Intergenerational mobility in socio-emotional skills

Dependent variable:	**Child's Internalising (INT) Skill**			**Child's Externalising (EXT) Skill**		
	Factor	**IV**	**Hierarchical**	**Factor**	**IV**	**Hierarchical**
	(1)	(2)	(3)	(4)	(5)	(6)
Parent's INT	0.192***	0.193**	0.237***	-0.040	-0.136	-0.081
	(0.067)	(0.086)	(0.075)	(0.057)	(0.078)	(0.071)
Parent's EXT	-0.082	-0.071	-0.126	0.243***	0.214***	0.293***
	(0.071)	(0.061)	(0.081)	(0.054)	(0.060)	(0.076)
Parent's COG	0.157**	0.128**	0.177***	0.153***	0.141***	0.156***
	(0.052)	(0.056)	(0.052)	(0.041)	(0.052)	(0.046)
Observations	1035	1035	1035	1035	1035	1035
Region of birth FE (BCS70 5y)	Yes	Yes	Yes	Yes	Yes	Yes
Child's age FE	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills (child's socio-emotional skills on parent's skills *during childhood*). The measurement system and the intergenerational mobility equation are estimated jointly. Columns 1 and 4 present the estimates from a factor model, combining the measures for the cohort members (the parents) available at ages 5, 10 and 16. Columns 2 and 5 employ a factor model to obtain estimates of the parent's skills at ages 5, 10 and 16 and use the age-5 and 10 measures as instruments for the age 16. Columns 3 and 6 present the estimates from a hierarchical factor model, estimating a factor model for the cohort members at ages 5, 10, and 16, and then combining these factors into a higher-order factor. Other controls include the parent's gender, the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

C.2 Exploratory analysis

Figure C1: Child-care arrangements between father and mother



Note. The figures present the role of each parent in child-rearing responsibilities at the age-34 sweep.

Table C3: Intergenerational mobility in socio-emotional skills by frequency of reading to the child

Dependent variable:	**Child's Internalising (INT) Skill**			**Child's Externalising (EXT) Skill**		
Read to the child everyday	Total	Yes	No	Total	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
Parent's INT (during childhood)	0.129**	0.185**	0.067			
	(0.065)	(0.092)	(0.091)			
Parent's EXT (during childhood)				0.338***	0.544***	0.195**
				(0.059)	(0.094)	(0.080)
Observations	770	361	409	770	361	409

Note. The table presents the estimates for the intergenerational mobility in skills by the frequency of reading to the child at age 34. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

C.3 Robustness: other tables

Table C4: Relationship between cohort member's skills during childhood and probability of having a child and being married

Dependent variable:	**Fertility**	**Married**
	(1)	(2)
Cohort member's INT (during childhood)	0.023**	0.035***
	(0.009)	(0.010)
Cohort member's EXT (during childhood)	-0.010	-0.001
	(0.010)	(0.009)
Cohort member's COG (during childhood)	-0.023***	0.019**
	(0.008)	(0.008)
Observations	3355	3355
Region of birth FE (BCS70 5y)	Yes	Yes
Other controls	Yes	Yes

Note. The table presents the estimates of the relationship between cohort member's skills during childhood and probability of having a child and being married. The measurement system and the outcome equation are estimated jointly. Other controls include the cohort member's gender, the mother's age at the cohort member's birth, a dummy equal to 1 if the cohort member is the first born, the cohort member's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the cohort member's household when the cohort member is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

Table C5: Heckman selection equations

Dependent variable:	**Fertility**	
	(1)	(2)
Grandmother's age	-0.032***	-0.033***
	(0.005)	(0.006)
Marital status		-1.418***
		(0.060)
Observations	3355	3355
Other controls	Yes	Yes

Note. The table presents theestimates for selection equation with the excluded instruments. The measurement system and the outcome equation are estimated jointly. Other controls include the cohort member's gender, the mother's age at the cohort member's birth, a dummy equal to 1 if the cohort member is the first born, the cohort member's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the cohort member's household when the cohort member is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

Table C6: Heckman selection: Intergenerational mobility in socio-emotional skills

Dependent variable:	**Child's Internalising (INT) Skill**			**Child's Externalising (EXT) Skill**		
	(1)	(2)	(3)	(4)		
Parent's INT (during childhood)	0.179**	0.182**	0.177***	-0.052	-0.057	-0.049
	(0.070)	(0.065)	(0.063)	(0.058)	(0.053)	(0.053)
Parent's EXT (during childhood)	-0.086	-0.081	-0.063	0.249***	0.243***	0.240***
	(0.083)	(0.073)	(0.070)	(0.063)	(0.059)	(0.056)
Parent's COG (during childhood)	0.161**	0.162**	0.163***	0.181***	0.174***	0.150***
	(0.066)	(0.054)	(0.059)	(0.045)	(0.044)	(0.045)
Inverse Mills ratio	-0.216	-0.208	0.334	-0.156	-0.260	1.673***
	(0.187)	(0.198)	(0.497)	(0.185)	(0.201)	(0.531)
Grandmother's age		-0.003			0.029**	
		(0.010)			(0.011)	
Marital status			-0.452			-1.542***
			(0.395)			(0.416)
Observations	1035	1035	1035	1035	1035	1035
Heckman selection	Yes	Yes	Yes	Yes	Yes	Yes
Region of birth FE (BCS70 5y)	Yes	Yes	Yes	Yes	Yes	Yes
Child's age FE	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills (child's socio-emotional skills on parent's skills *during childhood*). Even columns present the estimates for the Heckman selection model. In the Heckman selection model for the fertility decision at age 34, we add marital status and the mother's age at the parent's birth alongside other cohort member covariates in the selection equation. The measurement system and the intergenerational mobility equation are estimated jointly. For computational tractability, we incorporate the inverse Mills ratio in the set of controls. Other controls include the parent's gender, the child's gender, the number of children in the household, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

Table C7: Intergenerational mobility in socio-emotional skills with and without child's age control

Dependent variable:	**Child's Internalising (INT) Skill**		**Child's Externalising (EXT) Skill**	
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.192***	0.180**	-0.040	-0.034
	(0.067)	(0.075)	(0.057)	(0.059)
Parent's EXT (during childhood)	-0.082	-0.072	0.243***	0.234***
	(0.071)	(0.068)	(0.054)	(0.060)
Parent's COG (during childhood)	0.157**	0.198***	0.153***	0.141***
	(0.052)	(0.064)	(0.041)	(0.042)
Observations	1035	1035	1035	1035
R^2	0.135	0.092	0.165	0.155
Controlling for child's age	Yes	No	Yes	No
Region of birth FE (BCS70 5y)	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills (child's socio-emotional skills on parent's skills *during childhood*). Even columns present the estimates when *not* controlling for the age of the child. The measurement system and the intergenerational mobility equation are estimated jointly. Other controls include the parent's gender, the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

Table C8: Heckman selection: Intergenerational mobility in socio-emotional skills by the parent's gender

Dependent variable:	**Child's Internalising (INT) Skill**		**Child's Externalising (EXT) Skill**	
	Mother-child	**Father-child**	**Mother-child**	**Father-child**
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.200***	0.141	-0.088	0.076
	(0.077)	(0.179)	(0.071)	(0.142)
Parent's EXT (during childhood)	-0.086	-0.113	0.295***	0.064
	(0.117)	(0.242)	(0.076)	(0.169)
Parent's COG (during childhood)	0.154*	0.145	0.227***	0.113
	(0.083)	(0.217)	(0.057)	(0.111)
Inverse Mills ratio	-0.339	0.577	-0.221	0.255
	(0.223)	(0.545)	(0.190)	(0.391)
Observations	752	283	752	283
R^2	0.157	0.171	0.190	0.170
Heckman selection	Yes	Yes	Yes	Yes
Region of birth FE (BCS70 5y)	Yes	Yes	Yes	Yes
Child's age FE	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes

Note. The table presents the estimates for the Heckman selection model for equation 4 on the intergenerational mobility in skills by the parent's gender (child's socio-emotional skills on parent's skills *during childhood*). In the Heckman selection model for the fertility decision at age 34, we add marital status and the mother's age at the parent's birth alongside other cohort member covariates in the selection equation. The measurement system and the intergenerational mobility equation are estimated jointly. For computational tractability, we incorporate the inverse Mills ratio in the set of controls. Other controls include the child's gender, the number of children in the household, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

Table C9: Intergenerational mobility in socio-emotional skills by the child's age

Dependent variable:	**Child's Internalising (INT) Skill**		**Child's Externalising (EXT) Skill**	
Age	<6	≥6	<6	≥6
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.150	0.174**		
	(0.098)	(0.059)		
Parent's EXT (during childhood)			0.379***	0.214***
			(0.079)	(0.069)
Observations	378	657	378	657
R^2	0.109	0.095	0.236	0.138
Region of birth FE (BCS70 5y)	Yes	Yes	Yes	Yes
Child's age FE	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills by the child's age (regression of child's socio-emotional skills on parent's skills *during childhood*). The measurement system and the intergenerational mobility equation are estimated jointly. Other controls include the parent's gender, the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

Table C10: Intergenerational mobility in socio-emotional skills by the child's age (mother-child and father-child samples)

Dependent variable:	**Child's Internalising (INT) Skill**		**Child's Externalising (EXT) Skill**	
Age	<6	≥6	<6	≥6
Panel A: Mother-child:				
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.223	0.232***		
	(0.142)	(0.075)		
Parent's EXT (during childhood)			0.445***	0.268***
			(0.033)	(0.017)
Observations	254	498	254	498
Panel B: Father-child:				
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.037	0.155		
	(0.307)	(0.241)		
Parent's EXT (during childhood)			0.193	0.056
			(0.162)	(0.106)
Observations	124	159	124	159

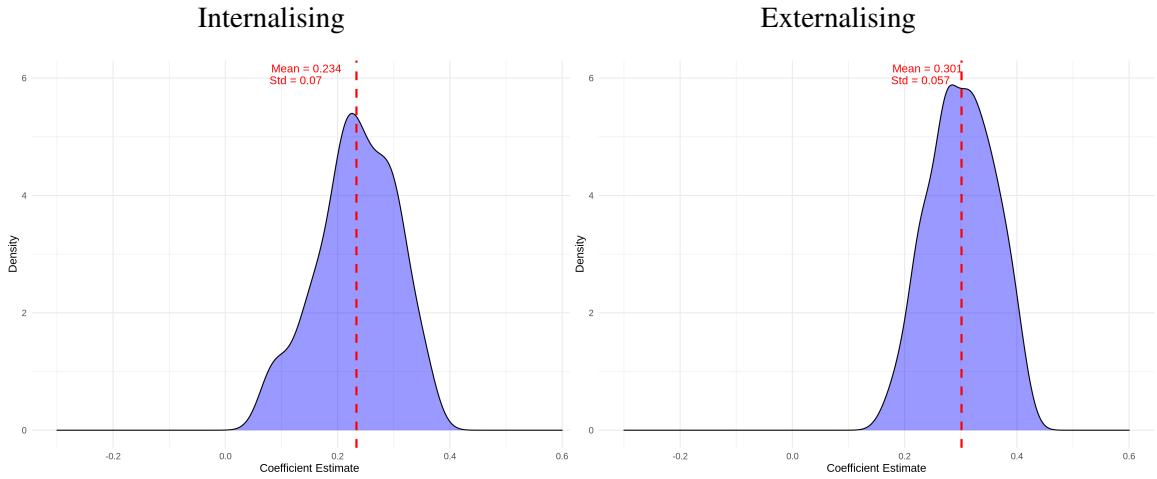
Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills for mother-child sample by the child's age (regression of child's socio-emotional skills on parent's skills *during childhood*). The measurement system and the intergenerational mobility equation are estimated jointly. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

Table C11: Intergenerational mobility in socio-emotional skills - Tobit model for ceiling effects

Dependent variable:	**Child's Internalising (INT) Skill**		**Child's Externalising (EXT) Skill**	
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.192***	0.231***	-0.040	-0.042
	(0.067)	(0.030)	(0.057)	(0.037)
Parent's EXT (during childhood)	-0.082	-0.118***	0.243***	0.255***
	(0.071)	(0.034)	(0.054)	(0.036)
Parent's COG (during childhood)	0.157**	0.203***	0.153***	0.156***
	(0.052)	(0.025)	(0.041)	(0.025)
Observations	1035	1035	1035	1035
Tobit model	No	Yes	No	Yes
Region of birth FE (BCS70 5y)	Yes	Yes	Yes	Yes
Child's age FE	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes

Note. The table presents estimates for equation 4 on the intergenerational mobility in skills (child's socio-emotional skills on parent's skills *during childhood*). Even columns present the estimates when estimating a Tobit model where the censoring is the largest value in socio-emotional skills in the upper end of the distribution which may suffer from ceiling effects (McBee, 2010). For computational tractability, we use the predicted factors to estimate the Tobit model to consider the ceiling effect. Other controls include the parent's gender, the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

Figure C2: Mother-child transmission of socio-emotional skills (multiple resamples to match father-child sample by age distribution)



Note. The figures present the distribution of coefficients based on 200 resamples of the mother-child sample matching the the size as well as the children's age distribution of the father-child sample. The top and bottom 5% of draws are excluded from the analysis. The resampling procedure addresses concerns regarding the potential influence of a single random sample by conducting multiple resamples.

Table C12: Intergenerational mobility in internalising skill by the parent's gender

Panel A: Child-mother						
Dependent variable:	**Child's Internalising (INT) Skill**					
	(1)	(2)	(3)	(4)	(5)	(6)
Parent's INT (during childhood)	0.219***	0.195***		0.173***		0.221***
	(0.062)	(0.059)		(0.055)		(0.081)
Parent's EXT (during childhood)			0.060		0.010	-0.096
			(0.061)		(0.073)	(0.079)
Parent's COG (during childhood)				0.153***	0.174**	0.173**
				(0.057)	(0.089)	(0.063)
Observations	752	752	752	752	752	752
R^2	0.046	0.136	0.105	0.153	0.126	0.159
Region of birth FE (BCS70 5y)	No	Yes	Yes	Yes	Yes	Yes
Child's age FE	No	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	Yes	Yes	Yes	Yes

Panel B: Child-father						
Dependent variable:	**Child's Internalising (INT) Skill**					
	(1)	(2)	(3)	(4)	(5)	(6)
Parent's INT (during childhood)	-0.011	0.090		0.087		0.152
	(0.109)	(0.113)		(0.107)		(0.158)
Parent's EXT (during childhood)			-0.006		0.023	-0.099
			(0.107)		(0.123)	(0.150)
Parent's COG (during childhood)				0.148*	0.155	0.164
				(0.090)	(0.096)	(0.145)
Observations	283	283	283	283	283	283
R^2	0.000	0.144	0.138	0.163	0.158	0.165
Region of birth FE (BCS70 5y)	No	Yes	Yes	Yes	Yes	Yes
Child's age FE	No	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	Yes	Yes	Yes	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills (child's socio-emotional skills on parent's skills *during childhood*). The measurement system and the intergenerational mobility equation are estimated jointly. Other controls include the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

Table C13: Intergenerational mobility in externalising skills by the parent's gender

Panel A: Child-mother						
Dependent variable:	**Child's Externalising (EXT) Skill**					
	(1)	(2)	(3)	(4)	(5)	(6)
Parent's INT (during childhood)			0.097**		0.063	-0.065
			(0.048)		(0.050)	(0.074)
Parent's EXT (during childhood)	0.300***	0.303***		0.253***		0.288***
	(0.054)	(0.057)		(0.060)		(0.072)
Parent's COG (during childhood)				0.190***	0.245***	0.190***
				(0.054)	(0.047)	(0.058)
Observations	752	752	752	752	752	752
R^2	0.083	0.152	0.082	0.179	0.133	0.182
Region of birth FE (BCS70 5y)	No	Yes	Yes	Yes	Yes	Yes
Child's age FE	No	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	Yes	Yes	Yes	Yes

Panel B: Child-father						
Dependent variable:	**Child's Externalising (EXT) Skill**					
	(1)	(2)	(3)	(4)	(5)	(6)
Parent's INT (during childhood)			0.075		0.071	0.070
			(0.105)		(0.116)	(0.171)
Parent's EXT (during childhood)	0.094	0.093		0.081		0.045
	(0.104)	(0.099)		(0.091)		(0.159)
Parent's COG (during childhood)				0.113	0.119	0.114
				(0.096)	(0.115)	(0.114)
Observations	283	283	283	283	283	283
R^2	0.009	0.161	0.159	0.171	0.170	0.174
Region of birth FE (BCS70 5y)	No	Yes	Yes	Yes	Yes	Yes
Child's age FE	No	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	Yes	Yes	Yes	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills (child's socio-emotional skills on parent's skills *during childhood*). The measurement system and the intergenerational mobility equation are estimated jointly. Other controls include the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

C.4 Robustness: mobility estimates with items from questionnaire administered to teachers at the age-10 wave

To address any concerns about misreporting bias, we present Appendix Table C14 which shows the estimates for equation (4) on the intergenerational mobility in socio-emotional skills during childhood, where socio-emotional skills at the age-10 wave are derived from questionnaire administered to the teachers to the cohort members (i.e., parents) - instead of their parents directly. The estimates are indeed similar to the ones obtained in Section 5 when we use the data from the Rutter A questionnaire administered to the parents. We notice that we have missing data on 5 child-parent pairs when estimating intergenerational mobility using the teachers' data.

Similarly, Appendix Table C15 reproduces Table 5. In the father-child estimates when using the teachers' data, the model has encountered problems to converge. We have experimented with different starting values, such as setting all parameter values to zero, except the factor loadings and (residual) variances, which are set to one. Alternatively, it is also possible to set them as follows: the starting values for the factor loadings are estimated by using a two-stage least squares estimator, the residual variances of observed variables are set to half the observed variance, and all other (residual) variances are set to 0.05. The remaining parameters (regression coefficients, covariances) are set to zero. We have used the second set of starting values which leads to a lower objective function than alternative starting values.

Table C14: Intergenerational mobility regression of child's socio-emotional skills on parent's skills - Socio-emotional skills at the age-10 sweep derived from questionnaire administered to teachers to the cohort members (i.e., parents).

Dependent variable:	**Internalising (INT) Skill**			**Externalising (EXT) Skill**		
	(1)	(2)	(3)	(4)	(5)	(6)
Parent's INT (during childhood)	0.208***		0.229***	0.115**		0.037
	(0.056)		(0.068)	(0.049)		(0.052)
Parent's EXT (during childhood)		0.032	-0.050		0.243***	0.230***
		(0.059)	(0.059)		(0.046)	(0.052)
Parent's COG (during childhood)	0.116**	0.140**	0.127**	0.196***	0.149***	0.146***
	(0.052)	(0.057)	(0.056)	(0.045)	(0.048)	(0.044)
Observations	1030	1030	1030	1030	1030	1030
R^2	0.120	0.087	0.124	0.139	0.173	0.174
Region of birth FE (BCS70 5y)	Yes	Yes	Yes	Yes	Yes	Yes
Child's age FE	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in socio-emotional skills. Socio-emotional skill at the age-10 sweep derived from the questionnaire administered to teachers. The measurement system and the intergenerational mobility equation are estimated jointly. We do not include items for disobedient and aches because teachers were not administered such questions. Other controls include the parent's gender, the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

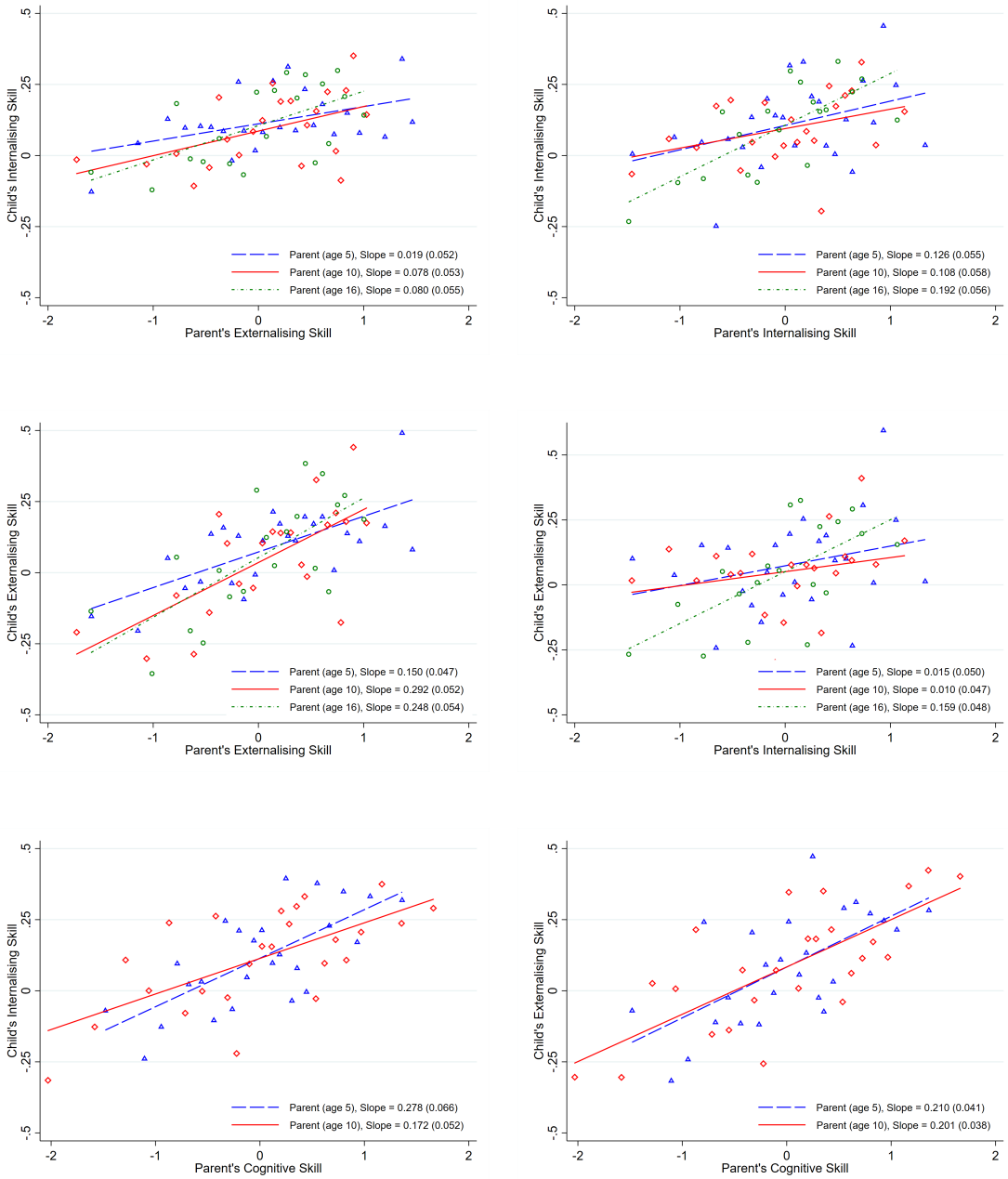
Table C15: Intergenerational mobility in socio-emotional skills by the parent's gender (age-10 sweep questionnaire administered to teachers)

Panel A: Mother-child				
Dependent variable:	**Child's Internalising (INT) Skill**		**Child's Externalising (EXT) Skill**	
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.347***	0.259***		0.025
	(0.069)	(0.070)		(0.067)
Parent's EXT (during childhood)		-0.008	0.328***	0.270***
		(0.074)	(0.056)	(0.072)
Parent's COG (during childhood)		0.112*		0.174***
		(0.061)		(0.058)
Observations	751	751	751	751
R^2	0.108	0.278	0.097	0.444
Region of birth FE (BCS70 5y)	No	Yes	No	Yes
Child's age FE	No	Yes	No	Yes
Other controls	No	Yes	No	Yes
Panel B: Father-child				
Dependent variable:	**Child's Internalising (INT) Skill**		**Child's Externalising (EXT) Skill**	
	(1)	(2)	(3)	(4)
Parent's INT (during childhood)	0.023	0.213		0.149
	(0.188)	(0.190)		(0.173)
Parent's EXT (during childhood)		0.249*	0.222**	0.135
		(0.156)	(0.108)	(0.120)
Parent's COG (during childhood)		0.232*		0.107
		(0.127)		(0.102)
Observations	279	279	279	279
R^2	0.001	0.413	0.047	0.389
Region of birth FE (BCS70 5y)	No	Yes	No	Yes
Child's age FE	No	Yes	No	Yes
Other controls	No	Yes	No	Yes

Note. The table presents the estimates for equation 4 on the intergenerational mobility in skills by parent's gender (child's socio-emotional skills on parent's skills *during childhood*), using the age-10 sweep questionnaire administered to teachers. The measurement system and the intergenerational mobility equation are estimated jointly. Other controls include the child's gender, the number of children in the household, the mother's age at the parent's birth, a dummy equal to 1 if the parent is the first born, the parent's employment status at the age of 34, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).

C.5 Association between the children's and parents' socio-emotional skills at different ages

Figure C3: Association between the children's (non-residualised) socio-emotional skills and the parents' (non-residualised) skills at different ages.



Note. The figures present non-parametric binned scatter plots of the relationship between the children's and the parent's skills when we do not include any controls. Each panel plots the mean child socio-emotional skill within each parent skill bin. To construct each series, we group parents into 25 equally sized (4 percentile points) bins and plot the mean child's skill versus the mean parent's skill within each bin. The slopes are obtained by estimating the measurement system and the mobility equation jointly. All standard errors in parentheses are obtained using 200 bootstrap repetitions.

C.6 Intergenerational rank transitions by sex

Table C16: Intergenerational transition matrix (mother-child)

Child's EXT - Parent's EXT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	34	15.8	14.2	13.7	18.1
	2	21.5	23.7	20.3	16.3	18.7
	3	18.1	21.1	21.6	21.6	17.4
	4	16	17.1	20.3	20.3	26.5
	5	10.4	22.4	23.6	28.1	19.4

Spectral gap mobility index: 0.823 (0.051)

Child's INT - Parent's EXT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	28.5	15.1	13.5	15	23.2
	2	23.6	23	16.9	16.3	21.3
	3	18.1	18.4	23.6	20.3	19.4
	4	14.6	22.4	17.6	24.8	23.9
	5	15.3	21.1	28.4	23.5	12.3

Spectral gap mobility index: 0.921 (0.035)

Child's EXT - Parent's INT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	20.8	20.7	24.5	13.3	15.9
	2	20.8	20.7	18.5	21.3	19.1
	3	18.1	16.7	21.9	20.7	22.3
	4	20.8	18.7	21.2	20	19.7
	5	19.4	23.3	13.9	24.7	22.9

Spectral gap mobility index: 0.938 (0.030)

Child's INT - Parent's INT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	29.2	13.3	23.8	14.7	14.6
	2	21.5	20	22.5	19.3	17.8
	3	16.7	24	21.9	20.7	16.6
	4	18.1	22	15.2	22.7	25.5
	5	14.6	20.7	16.6	22.7	25.5

Spectral gap mobility index: 0.859 (0.037)

Child's EXT - Parent's COG (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	31.5	22.5	17.2	15.3	9.6
	2	18.9	22.5	19.9	20	19.1
	3	20.3	21.2	16.6	23.3	18.5
	4	14	15.9	25.2	18	26.8
	5	15.4	17.9	21.2	23.3	26.1

Spectral gap mobility index: 0.814 (0.044)

Child's INT - Parent's COG (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	28.7	19.2	19.2	15.3	13.4
	2	24.5	25.8	18.5	15.3	17.2
	3	15.4	21.9	21.2	20.7	20.4
	4	16.8	13.9	20.5	26	26.1
	5	14.7	19.2	20.5	22.7	22.9

Spectral gap mobility index: 0.824 (0.047)

Note. The tables present the percent frequency with which a child is in certain skill quintile (row) when parent is in a certain skill quintile (column) for the mother-child pairs. The spectral gap mobility index is computed by taking the difference between one and the second largest eigenvalues of the transition matrices. The transition matrices are stochastic matrices; therefore, their largest eigenvalue is always one. The discrepancy between one and the second largest could be seen as a departure from zero mobility, which corresponds to an identity matrix. Higher numbers of the spectral gap mobility index corresponds to higher mobility. All standard errors of the spectral gap mobility index in parentheses are obtained using 200 bootstrap repetition, taking into account the factor estimation stage that precedes the estimation of the transition matrix and its respective eigenvalues.

Table C17: Intergenerational transition matrix (father-child)

Child's EXT - Parent's EXT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	25.5	16.1	25	8.5	21.1
	2	16.4	23.2	16.1	23.7	21.1
	3	16.4	17.9	30.4	20.3	14
	4	25.5	30.4	12.5	16.9	17.5
	5	16.4	12.5	16.1	30.5	26.3

Spectral gap mobility index: 0.880 (0.053)

Child's INT - Parent's EXT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	20	12.5	19.6	16.9	26.3
	2	27.3	16.1	25	22	12.3
	3	21.8	25	19.6	13.6	17.5
	4	14.5	25	16.1	22	22.8
	5	16.4	21.4	19.6	25.4	21.1

Spectral gap mobility index: 0.903 (0.050)

Child's EXT - Parent's INT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	14.8	21.1	10.7	26.3	22
	2	24.1	19.3	10.7	35.1	11.9
	3	27.8	21.1	25	12.3	13.6
	4	14.8	21.1	30.4	14	22
	5	18.5	17.5	23.2	12.3	30.5

Spectral gap mobility index: 0.863 (0.047)

Child's INT - Parent's INT (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	11.1	19.3	10.7	33.3	20.3
	2	31.5	17.5	17.9	14	22
	3	31.5	26.3	10.7	19.3	10.2
	4	13	15.8	32.1	19.3	20.3
	5	13	21.1	28.6	14	27.1

Spectral gap mobility index: 0.814 (0.046)

Child's EXT - Parent's COG (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	18.5	19.3	26.8	21.1	10.2
	2	24.1	17.5	21.4	24.6	13.6
	3	20.4	15.8	16.1	22.8	23.7
	4	16.7	26.3	12.5	19.3	27.1
	5	20.4	21.1	23.2	12.3	25.4

Spectral gap mobility index: 0.907 (0..051)

Child's INT - Parent's COG (during childhood)

		Parent quintile				
		1	2	3	4	5
Child quintile	1	22.2	15.8	26.8	17.5	13.6
	2	25.9	17.5	21.4	26.3	11.9
	3	16.7	22.8	17.9	28.1	11.9
	4	18.5	19.3	12.5	12.3	37.3
	5	16.7	24.6	21.4	15.8	25.4

Spectral gap mobility index: 0.874 (0.052)

Note. The tables present the percent frequency with which a child is in certain skill quintile (row) when parent is in a certain skill quintile (column) for the father-child pairs. The spectral gap mobility index is computed by taking the difference between one and the second largest eigenvalues of the transition matrices. The transition matrices are stochastic matrices; therefore, their largest eigenvalue is always one. The discrepancy between one and the second largest could be seen as a departure from zero mobility, which corresponds to an identity matrix. Higher numbers of the spectral gap mobility index corresponds to higher mobility. All standard errors of the spectral gap mobility index in parentheses are obtained using 200 bootstrap repetition, taking into account the factor estimation stage that precedes the estimation of the transition matrix and its respective eigenvalues.

D Mother malaise questionnaire

Table D1: Malaise Inventory Questions

Cohort members' mothers (i.e. grandmothers to the children of the 1970 cohort) answered the following questions	
1. Tired Most of Time	13. Easily Upset or Irritated
2. Often Feel Depressed	14. Frightened of Going Out
3. Often Have Bad Headaches	15. Constantly Keyed Up, Jittery
4. Often Get Worried	16. Suffer From Indigestion
5. Sleeping Difficulty	17. Suffer From Upset Stomach
6. Waking Unnecessarily Early	18. Is Appetite Poor
7. Worn Out Worrying About Health	19. Everything Gets on Nerves
8. Often Get Into Violent Rage	20. Does Heart Race
9. Do People Annoy and Irritate	21. Often Have Bad Pains in Eyes
10. Had Twitching of Face,Head	22. Rheumatism, Fibrositis
11. Scared for No Good Reason	23. Had Nervous Breakdown
12. Scared to be Alone	24. Other Health Problems

Note. The table reports the Malaise inventory questions. Cohort members' mothers (i.e. grandmothers to the children of the 1970 cohort) answered them at the age-5 sweep. The Malaise inventory questions are a set of self-completion questions which combine to measure levels of psychological distress, or depression. The 24 items of the inventory are 'yes-no' questions.

Table D2: Subscale of comparable items between grandmother and grandchild

Itm.	Factor	Cat.	Title	Mother's malaise (grandmother)	Rutter Wording (Children aged 3-16)
1	INT	2	*Worried*	Often get worried	Many worries, often seeming worried
2	INT	2	*Fearful*	Scared for no good reason	Nervous or clingy in new situations,
3	INT	2	*Unhappy*	Often feel depressed	Often unhappy, downhearted or tearful
4	INT	2	*Aches*	Suffer from upset stomach stomach-ache or has vomited	Often complaining of headaches, stomach-aches or sickness
5	INT	2	*Solitary*	Scared to be alone	Rather solitary, tending to play alone

Note. Itm. is item number. Factor is the latent construct to which the item loads - EXT is externalizing skills, INT is internalizing skills. Cat. is the number of categories in which the item is coded - 2 denotes a binary item (applies/does not apply). For the Rutter Wording (Children aged 3-16), 3-category item is converted to be binary (Does not apply is 1). Title is a short label for the item. Wording columns show the actual wording in the scales used in each of the cohort studies.

E Descriptive statistics

Appendix Table E1 reports the descriptive statistics for the sample of parent and children linked. Appendix Table E2 presents the number of responses in the BCS70 at the age-34 wave. Appendix Table E3 reports the response rates for the questionnaire items used in the main analysis. Appendix Table E5 reports the correlation matrix of internalising and externalising skills at different ages.

Table E1: Descriptive statistics

	Household characteristics		
	Mean	St.Dev.	N
	(1)	(2)	(3)
Grandparents at age-5 sweep			
Grandmother's age	25	4.87	1035
Grandmother has higher education degree (%)	5.89	23.56	1035
Grandmother is not employed (%)	57.29	49.49	1035
Parents (BCS70 cohort members)			
Number other children in HH (5y)	1.54	1.03	1035
First born (%)	40.58	49.13	1035
Male (%)	27.34	44.59	1035
Employed at age 34 (%)	74.78	43.45	1035
Region of birth			
North (%)	19.90	39.95	1035
Yorksh. + Humbers. (%)	10.72	30.96	1035
East Midlands (%)	7.15	25.78	1035
West Midlands (%)	11.50	31.91	1035
South West (%)	7.63	26.57	1035
East + SE (%)	29.95	45.83	1035
Wales (%)	5.41	22.63	1035
Scotland (%)	7.73	26.72	1035
Children at age-34 sweep			
Total number of children	2	0.89	1035
Child's age	7	3.35	1035
Child's sex (%)	51.90	49.02	1035

Note. The mean is reported in column 1, the standard deviation in column 2, and the number of observations of parent-children link in column 3.

Table E2: Number of responses in British Cohort Study (BCS70) at the age-34 sweep

	Number of observations
BCS70 cohort members:	
Core interviews	9,665
Parent and Child Survey:	
Children aged 0-11 months	414
Children aged 1-2 years	825
Children aged 3-5 years	1,259
Children aged 6-16 years	2,285

Note. The table presents the sample sizes of the age-34 sweep. It contains the number of completed interviews by cohort members with or without children. "Core interviews" refers to cohort members with or without children. For the cohort members with children, the sample sizes are also divided by children's age for the parents. The socio-emotional skill questions were administered only to the parents who have children between the age of 3 and 16.

Table E3: Item response rates for children and parents at age-5, 10, 16 and 34 sweeps

Itm.	Title	Children	Parents (age 5)	Parents (age 10)	Parents (age 16)
1	*Restless*	0.997	0.804	0.852	0.619
2	*Squirmy/fidgety*	0.997	0.801	0.850	0.620
3	*Fights/bullies*	0.998	0.810	0.850	0.617
4	*Distracted*	0.998	0.809	0.851	0.618
5	*Tantrums*	0.998	0.775	0.813	0.625
6	*Disobedient*	0.998	0.808	0.848	0.620
7	*Worried*	0.997	0.808	0.850	0.615
8	*Fearful*	0.998	0.809	0.851	0.622
9	*Solitary*	0.997	0.807	0.852	0.619
10	*Unhappy*	0.999	0.809	0.850	0.620
11	*Aches*	0.997	0.795	0.849	0.625

Note. Itm. is item number. Title is a short label for the item. Columns 3-6 report the item response rates. The response rate is lower at the age 16 sweep because of a teacher-led industrial strike disrupting the dissemination of the questionnaire.

Table E4: Survey non-response (Rutter A questionnare age-16 sweep)

Dependent variable:	**Survey non-response (age-16 sweep)**
	(1)
Cohort member's INT (age 5)	-0.009
	(0.015)
Cohort member's EXT (age 5)	-0.011
	(0.014)
Cohort member's EXT (age 5)	-0.012
	(0.013)
Observations	283
Region of birth FE (BCS70 5y)	Yes
Other controls	Yes

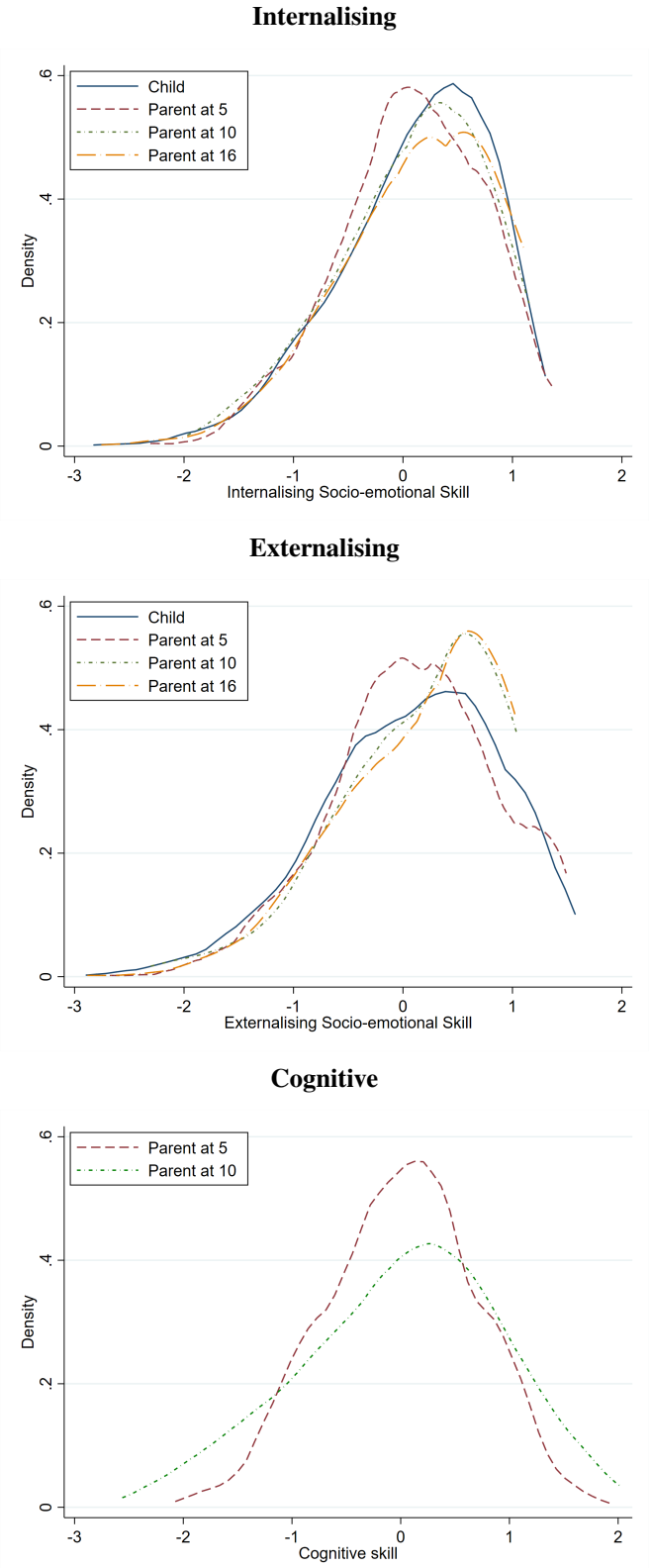
Note. The table presents estimates for survey non-response on cohort members' skills. The measurement system and the outcome equation are estimated jointly. Other controls include the mother's age at the parent's birth, a dummy equal to 1 if the cohort member is the first born, the grandmother's employment status and education in 1975 and the number of children in the parent's household when the parent is 5 years old. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Table E5: Correlation matrix of internalizing and externalizing skills at different ages

	INT (age 5)	INT (age 10)	INT (age 16)	EXT (age 5)	EXT (age 10)	EXT (age 16)
INT (age 5)	1					
INT (age 10)	0.44	1				
INT (age 16)	0.43	0.41	1			
EXT (age 5)	0.66	0.32	0.33	1		
EXT (age 10)	0.31	0.66	0.35	0.46	1	
EXT (age 16)	0.40	0.37	0.82	0.45	0.48	1

Note. The table reports the Pearson correlation of the internalizing and externalizing factor scores at different ages.

Figure E1: Distribution of Factor Scores



Note. The figures present the distributions of the internalising and externalising socio-emotional skills for the children and parents respectively at age 5, 10, and 16 and parents' cognitive skills at age 5 and 10. Higher scores correspond to better skills. The distribution is estimated nonparametrically, using an Epanechnikov kernel. The scale of the Rutter/SDQ items at the age-5, age-16 and child-questionnaire wave is categorical. The scale of the Rutter items at the age-10 wave is converted to a categorical variable. The scale of the cognitive test items is continuous.

F Relationship between skills during childhood and log pay during adulthood

Appendix Table F1 presents estimates for the regression of BCS70 parents' skills (during childhood) on economic outcomes at age 42.

Table F1: Log pay at age 42

Dependent variable:	**Log Pay (age 42)**				
	(1)	(2)	(3)	(4)	(5)
Internalizing skill (during childhood)	0.129***			0.135***	0.126**
	(0.048)			(0.052)	(0.054)
Externalizing skill (during childhood)		0.058		-0.003	-0.076
		(0.049)		(0.054)	(0.057)
Cognitive skill (during childhood)			0.217***		0.225***
			(0.033)		(0.038)
Observations	719	719	719	719	719
R^2	0.021	0.004	0.059	0.022	0.078
Controls	No	No	No	No	No

Note. The table presents the estimates for the regression of BCS70 parents' skills (during childhood) on economic outcomes at age 42 (BCS70 sample). The measurement system and the equation are estimated jointly. Gross weekly pay is weekly pre-tax pay from the respondent's main activity, conditional on being a paid employee or self-employed. The mean of weekly pre-tax log pay is 5.821. The employment rate in the sample is 85%. The cognitive skill measure comes from a factor model where three tests administered at the age of 5 and 10 are combined: Copy Designs (child is asked to copy simple designs adjacently), Human Figure Drawing (child draws an entire human figure), English Picture Vocabulary Test (child identifies the picture referring to a word among four pictures), Shortened Edinburgh Reading Test, Friendly Math Test, Spelling Dictation Task and Pictorial Language Comprehension Test. All standard errors in parentheses are obtained using 200 bootstrap repetitions (*** p<0.01, ** p<0.05, * p<0.1).