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Kieron Barclay | barclay@demogr.mpg.de
Torkild Lyngstad
Dalton Conley

This working paper has been approved for release by: Mikko Myrskylä (sekmyrskylä@demogr.mpg.de), Head of the Laboratory of Population Health, the Laboratory of Fertility and Well-Being, and the Research Group Labor Demography.

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THE PRODUCTION OF INEQUALITIES WITHIN FAMILIES AND ACROSS GENERATIONS: THE INTERGENERATIONAL EFFECTS OF BIRTH ORDER AND FAMILY SIZE ON EDUCATIONAL ATTAINMENT

KIERON BARCLAY^{1,2,3}, TORKILD LYNGSTAD⁴ AND DALTON CONLEY^{5,6}

ABSTRACT. There has long been interest in the extent to which effects of social stratification extend and persist across generations. We take a novel approach to this question by asking whether birth order and sibling group size in the parental generation influences the educational attainment of their children. To address this question we use Swedish population data on cohorts born 1960-1982. To study the effects of parental birth order and family size we apply a cousin fixed effects design and exploit information on twin births in the parents generation. Relative to having a first-born mother, having a second-born or fifth-born mother is associated with educational attainment at age 30 being 4% and 8% of a standard deviation lower, respectively. After adjusting for attained parental education and social class, the parental birth order effect is heavily attenuated. Nevertheless, we do find that children who share the same birth order and gender as their parents attain slightly more education, and this is particularly pronounced when the parents have higher levels of education themselves. We do not find clear or consistent evidence for parental sibling group size effects. Overall our results suggest that birth order and family size effects operate through a Markovian process of transmission.

¹Max Planck Institute for Demographic Research

²Department of Social Policy, London School of Economics and Political Science

³Department of Sociology, Stockholm University

⁴Department of Sociology and Human Geography, University of Oslo

⁵Department of Sociology, Princeton University

⁶National Bureau of Economic Research

INTRODUCTION

Research on the intergenerational transmission of status has a long history in the social sciences, and studies have consistently documented the importance of the family of origin for socioeconomic attainment (e.g. Sorokin, 1927; Blau and Duncan, 1967; Erikson and Goldthorpe, 1992; Ermisch, Jantti, and Smeeding, 2012). In recent years there has been a growing interest in the influence that grandparental socioeconomic status (SES) has on the attainment of grandchildren. A majority of studies have suggested that grandparental wealth and SES does influence the outcomes of grandchildren, even net of parental characteristics (Anderson, Sheppard, and Monden, 2018). Typically, these studies have pursued one of two strategies. Some research has regressed individuals' social statuses (education, occupation or income) on their grandparent(s)' SES, holding their parents' values on these measures constant. A residual effect of grandparental characteristics on grand-offspring holding the intervening generation constant is seen as evidence of a non-Markovian process of status transmission (e.g. see Warren and Hauser, 1997; Zeng and Xie, 2014; Hällsten and Pfeffer, 2017). Another approach decomposes variance in SES measures into a nuclear family component (sibling correlation) and an extended family component (cousin correlation). In this model, grandparents' characteristics need not be measured, and the interpretation of the cousin correlation is that it captures the omnibus effect of grandparents net of unmeasured, immediate family effects (Jæger, 2012; Hällsten, 2014).

This literature on stratification and social mobility suggests that there are indeed multigenerational processes of status transmission over and above a two-generational Markovian process. However, recent work suggests that grandparental effects may be an artifact of measurement error (Lundberg, 2018), particularly at the parental level (Ferrie, Massey, and Rothbaum, 2016). After such attenuation-inducing error is corrected, evidence of a multigenerational transmission of status disappears, and stratification seems to follow a two-generation Markovian model (Ferrie et al., 2016). Within this literature the multigenerational impact of *demographic factors* within the family has received much less attention than the multigenerational impact of socioeconomic conditions (Mare, 2011). This is unfortunate, as within-family sociodemographic factors such as birth order or

sibling group size are measured with much less error than, say, education, occupational prestige, or income. As a consequence, research on the multigenerational impact of birth order or family size would be much less vulnerable to bias from measurement error, and would therefore shine a clear light on whether intergenerational transmission processes follow a Markovian model or not. Furthermore, to date research on the multigenerational transmission of advantage has focused largely, if not exclusively, on differences across families rather than within families. Although parental socioeconomic status and household income are powerful predictors of offspring attainment, sibling correlations on high school grades, educational attainment, and earnings in adulthood demonstrate that there are substantial differences in outcomes even amongst children who share the same parents (Conley, 2004; Björklund and Jäntti, 2012; Grätz et al., 2016). These differences in sibling outcomes suggest that there are important inequality generating processes operating even within families, and that processes of cumulative advantage based upon differences in relative access to resources within the household can lead to substantial differences in outcomes in the long-run, and potentially even over subsequent generations.

For these reasons, in the present study we seek to go beyond previous research examining whether grandparental SES influences grandchildren to ask whether grandparental fertility affects grandchild outcomes. In doing so we also attempt to address a broader question, which is: do inequality generating processes within families, such as differences in parental investment, have effects on the attainment of the subsequent generation? We address these questions by examining whether birth order and sibling group size in the parental generation are associated with the educational attainment of their children. We consider parental birth order and sibling group size a grandparental variable and its putative effect a three-generational effect because it is the grandparents' fertility that determines the parents' birth order and sibling group size, which may in turn affect their offspring's attainment, net of the grandchildren's own birth order and sibling group size. When sibling group size is held constant in an OLS model, or a family fixed effects analysis, birth order can be considered randomly assigned. Therefore, examining the multigenerational impact of birth order allows us to approximate the notion of a 'treatment' to the parental generation. The same applies to sibling group size in the parental generation if we use a twin birth at the

grandparental generation as an exogenous shock to family size. If there are intergenerational birth order and family size effects in this context (net of each generation's fertility and ego's birth order and sibling group size), then it is reasonable to assume that three-generational effects are real (at least for birth order and family size). Furthermore, if there are no net effects once parental characteristics known to be influenced by birth order are controlled, then the random assignment nature of birth order within families offers the potential to consider parental birth order as an instrumental variable for parental education – an important background variable in the stratification literature for which there have been few, if any, instruments (Angrist and Krueger, 1991; Bound, Jaeger, and Baker, 1995; Lleras-Muney, 2005).

Our study is predicated on several points. First, in line with previous research, we assume that relative differences in childhood investment lead to potentially large differences in later attainment due to processes of cumulative advantage (Merton, 1968; DiPrete and Eirich, 2006; Heckman, 2006), that these relative differences in resources are consequential even when the absolute level of resources is high (Marmot, 2004), and that differences in parental attainment can affect offspring attainment (Holmlund, Lindahl, and Plug, 2011). Second, as we will argue, birth order can be used as a valuable indicator for relative levels of parental investment and access to resources within the family, and particularly indexes access to resources in the crucial early years of life. Thus, our interest in birth order is primarily driven by how this factor marks access to resources and parental investment during childhood. Research on birth order has been criticized on the grounds that it lacks policy relevance. However, the fact that birth order is essentially random and not amenable to policy intervention is also a strength when it is considered as a random assignment to relative advantage in terms of resource access and parental investment during childhood. We also use sibling group size, instrumented using twin births as an exogenous shock on family size, as a second indicator of resource dilution in the family, following the classic quantity-quality trade-off assumption (e.g. see Becker and Lewis, 1973; Becker and Tomes, 1976). Finally, we argue that the microcosm of the family is uniquely suited for studying how inequality generating processes related to relative access to resources and cumulative advantage produce differences in attainment,

as the family context allows us to study the influence of these factors net of shared genetics, and the shared contextual environment.

Another motivating factor for the present research is the idea that parental birth order may act as a moderator for ego's birth order. A handful of existing studies indicate differential inheritance of parental characteristics by birth parity. For example, Black, Devereux, and Salvanes (2009) examined the IQ scores of Norwegian military conscripts and found that the natural logarithm of ability is more weakly inherited by first-born sons than by later-borns. It should be added that this effect was barely significant despite almost 25,000 cases, and disappeared when ability was not logged. Conversely, Lindahl (2008) reported that the strength of transmission of labor market earnings decreased with increasing parity in Sweden; she also reported that transmission was weaker in larger family sizes. One intuition behind birth order effects, at least as articulated by Lindahl (2008), is that later-borns may feel less attachment to their parents, they may be more influenced by older siblings (and thus less so by parents) and they may experience father absence more frequently and for longer durations. It may also be the case that there are higher order interactions at work; namely, it could be that transmission is stronger when fathers identify with particular offspring in terms of birth order. In other words, a last-born father may identify more strongly with his last-born son (and vice versa) resulting in a higher correlation than with earlier-born sons. Or, alternatively, there could be a magnified effect of dissociation from the family such that later-born offspring to later-born fathers resemble each other the least. In such a model, birth order would be a relational variable of parent-offspring identification and investment. That is, there may be heterogeneous effects of birth order contingent on parental birth order (and/or gender) that are averaged out by only looking at a single generation's parity.

Within-Family Inequality Generating Processes. The vast majority of research on how family background influences socioeconomic attainment focuses on differences across families. This literature examines how factors such as social class, education, and race and ethnicity influence opportunity structures and predict differences in the production of and transmission of skills and resources to children. Although differences between families are enormously important for the

production and reproduction of patterns of social stratification in society, variation in how children are raised within the family may also play an important role in explaining individual differences in human capital formation and educational attainment. That is, the concept of a non-shared environment also has relevance within the family, particularly when one considers time-varying circumstances. Differences in how children within the same family are raised may be a consequence of numerous factors, including changes to family structure, such as parental divorce or changes in family size, differences in how parents treat their children, such as by gender or birth order, as well as within-family differences in parent-child relationships (Conley, 2004; Plomin and Daniels, 1987; Sutor et al., 2008). Parents are typically reluctant to report that they treat their children differently, but children do perceive substantial differences. Studies show that parental self-reports on how they treat each of their children are much more highly correlated than how children perceive they are treated (Daniels et al., 1985; Reiss et al., 2009). Furthermore, it is the childrens' perceptions that are corroborated by independent observers (Reiss et al., 2009).

Although full siblings share the same parents and kin network, live in the same house and neighbourhood, and often attend the same schools, there are substantial sibling differences in socioeconomic attainment. Sibling correlations on cognitive ability and educational and socioeconomic outcomes in Sweden have been estimated at 0.51 for high school GPA (Björklund, Lindahl, and Sund, 2003), 0.39 for educational attainment, 0.47 for IQ, and 0.22 for long-run earnings (Björklund and Jäntti, 2012). These correlations reflect the influence of both shared genetics and shared environment, and indicate that while there are substantial similarities amongst siblings in attainment, non-shared environment is important for explaining differences in sibling outcomes (Plomin and Daniels, 1987). One factor that consistently captures systematic sources of advantage in the sibling group is birth order. Research suggests that first- and earlier-born siblings are advantaged over later-born siblings on many dimensions. Studies show that parents differentially invest time, care, and resources in first-born and earlier-born siblings relative to later-borns, both during pregnancy and during childhood. Mothers are more likely to seek prenatal care for first-born children (Buckles and Kolka, 2014), they are more likely to breast feed first-borns (Buckles and Kolka, 2014),

and they take longer periods of parental leave to spend with first-borns (Sundström and Duvander, 2002). Research in the United States indicates that parents regulate the television watching and monitor the school performance of first-borns to a greater extent than they do for later-born children (Hotz and Pantano, 2015). Studies also indicate that, particularly in middle class families, younger children can be hostages to the activities and schedules of older children, whose cultivation is prioritised by the parents over that of the younger children (Lareau, 2011).

Parents also spend more time with first-borns than later-borns, with some estimates suggesting that parents spend 20-30 minutes more quality time per day with first-borns than second-borns of the same age (Price, 2008). An important factor explaining this difference in quality time is structural change in the sibling group attributable to changes in family size, which leads to the dilution of parental resources (Blake, 1989). By definition parents have relatively more time for their first-born child during the early years of life than they have for later-born children, as parental time is finite, and family size is a time-varying factor during the life course. According to the resource dilution hypothesis, first-borns will typically be the most advantaged amongst a group of siblings precisely because they spend a period of time with exclusive access to parental attention and various other parental resources. Studies indicate that these early years can be crucial for child development. Although this has been shown most dramatically by examining severely deprived children (Rutter, 1998), it is also clear that early life investment has an important impact on reading ability and numeracy even amongst children who are not deprived (Stanovich, 1986; Bast and Reitsma, 1998; Sénéchal and LeFevre, 2002; Cheadle, 2008).

A second theory concerned with structural changes to the sibling group is the confluence hypothesis (Zajonc and Markus, 1975; Zajonc, 1976). The confluence hypothesis also posits that earlier-born siblings should be advantaged over later-born siblings, but argues that this is due to the average degree of intellectual stimulation in the household. First-borns interact exclusively with their parents, which is highly cognitively stimulating, until the birth of any later siblings. This is presumed to be beneficial for cognitive development. Later-borns, however, interact not only with the parents, but will also spend much time interacting with their other infant siblings, who offer much less cognitive stimulation. This in turn may have negative long-term consequences.

Indeed, studies show that later-born children have lower cognitive ability and educational attainment than first-borns (Black, Devereux, and Salvanes, 2005a; Bjerkedal, Kristensen, Skjeret, and Brevik, 2007; Barclay, 2015b).

As this body of theoretical and empirical research would suggest, there are also consistent birth order differences in academic achievement. Studies that have compared siblings within the same family have consistently shown that later-borns have a lower GPA than first- and earlier-born siblings (Kalmijn and Kraaykamp, 2005), are less likely to graduate from high school (Härkönen, 2014), or to go to university (Barclay, 2018), and have lower completed educational attainment (Black, Devereux, and Salvanes, 2005a). In Sweden second-borns, third-borns and fourth-borns typically achieve around 30%, 40%, and 50% of a year less education than first-borns by age 30, respectively (Barclay, 2015a). Past work strongly suggests that these birth order differences in attainment are attributable to differences in how children are raised rather than any biological differences between siblings or differences in the *in utero* environment by parity. Studies on sibling groups where social and biological birth order differ, such as sibling groups where a child has died, or sibling groups of adopted children, show that it is social birth order that explains differences in attainment rather than biological order (Kristensen and Bjerkedal, 2007; Barclay, 2015a). Furthermore, it is worth noting that biomedical factors actually predict worse long-term outcomes for first-born children, who are more likely to be born with low birth weight (Kramer, 1987), and to be born pre-term (Astolfi and Zonta, 1999), both of which typically lead to worse long-term socioeconomic outcomes (Conley and Bennett, 2000; Black, Devereux, and Salvanes, 2007). Studies on birth order and academic attainment therefore not only suggests that the first-born and earlier-born advantage is attributable to differences in how children are raised, but also that these differences in nurture are sufficiently great to overcome physiological disadvantages amongst first-borns at the time of birth.

Family size is also assumed to have a negative effect on attainment, with each additional child leading to further dilution of resources and the attendant tradeoff between number of children and how much attention and resources parents can devote to each one (Becker and Lewis, 1973; Becker and Tomes, 1976; Blake, 1981). Indeed, most research correlating completed family size with the

attainment of children has shown that growing up in a larger family is negatively correlated with educational and labor market success (Blake, 1989; Steelman et al., 2002). However, although the effect of family size on attainment has been an object of substantial research attention, completed family size is a rather poor way of capturing resource dilution within the family, because it assumes that each child in a family of a given size has access to a similar pool of resources. Family size is rather experienced as a time-varying factor, increasing as more children are born, decreasing as others leave the home. Birth order captures this time-varying nature of resource dilution within the family, though it does so most effectively for the first years of life, which is when parental investment is likely to matter the most (Stanovich, 1986; Bast and Reitsma, 1998; Sénéchal and LeFevre, 2002; Cheadle, 2008). Nevertheless, contemporary studies that have used a twin birth as an exogenous shock on family size are still able to capture the importance of the introduction of an additional, unexpected, sibling on resource dilution for those children that are born before the twin birth (Rosenzweig and Wolpin, 1980).

Past research on birth order and educational attainment not only accounts for why later-born children should achieve lower educational attainment than first- and earlier-born siblings, but also suggests that a child's later-born parents should have lower educational attainment than their first- and earlier-born aunts and uncles. If parental educational attainment has an effect on the attainment of their children, then we would expect that the birth order of the index person's parents should matter for educational attainment even net of the index person's own birth order. For example, the first-born child of a first-born mother should achieve higher levels of educational attainment than the first-born child of a third-born mother. We would also expect that a larger family size in the parental generation should have a negative effect on parental attainment, which should in turn have a negative effect on the attainment of their own children. Given that we expect that the effect of parental birth order on offspring educational attainment is driven by later-born parents having lower educational and occupational attainment, we expect that after we adjust for parental attained education and social class the effect of parental birth order on offspring educational attainment will be substantially or completely attenuated. If this is indeed the case, this would suggest that the effect of parental birth order follows a two-generation Markovian process.

DATA AND METHODS

Data. In this study we use Swedish population register data with multigenerational linkages to examine how birth order and sibling group size in the parental generation is related to educational attainment amongst their children at age 30. We examine educational attainment amongst Swedish men and women born between 1960 and 1982, whose parents were born between 1938 and 1969. In our analyses we focus on families where both the parents and children were born in Sweden. In Sweden each individual has a personal identity number (PIN) that enables records to be linked across a variety of administrative registers. The Swedish multigenerational register also contains information on the PIN of the mother and father of any given individual. Information on the PIN of the mother and father allows any given individual to be linked to any biological kin, including siblings, cousins, and grandparents.

To examine the relationship between the birth order of parents and the educational attainment of their offspring, it is essential to have three generations of data. Information on the identity of the grandmother and grandfather (Generation 1 [G1]) is needed to identify the birth order of the parents (G2), while information on the fertility of the parents (G2) is needed to identify the birth order of the grandchildren (G3). We classify a sibling group (G2 and G3) as a set of individuals who share a biological mother and father. A cousin group (G3) is based upon sharing a biological grandmother and grandfather. Figure 1 provides a graphical illustration of our data structure. Although we describe this in greater detail below, in the ‘Statistical Analyses’ section, a key dimension of our study is the use of a cousin fixed effects design, which has implications for our sample selection. We compare cousins in order to reduce confounding from factors shared amongst parents, aunts, and uncles. These factors include grandparental socioeconomic status, which might affect both fertility behaviour as well as the educational attainment of the parental generation (G2), and which are unmeasured because of the early time period. This means that we exclude ‘only cousins’ from our analysis. An ‘only cousin’ might have multiple siblings, but not have any cousins within their own generation, either because their parents were only children, or because their aunts and uncles did not have any children of their own. In our analyses focusing upon birth order we also exclude

sibling groups at the G2 and G3 level which experienced a multiple birth such as twins, as this confuses the measurement of birth order. However, in our analyses of how sibling group size in the parental generation (G2) affects offspring (G3) attainment, we utilize those sibling groups to take advantage of the exogenous increase in family size stemming from a twin birth.

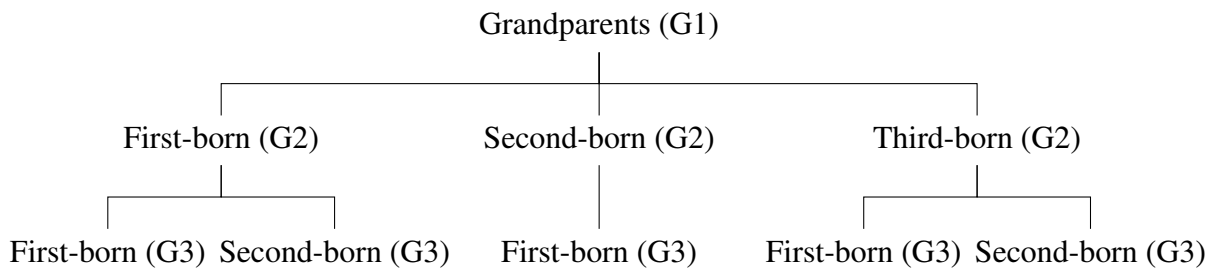


FIGURE 1. Multigenerational Data Structure

The Swedish Educational Context. Education in Sweden is state funded at all levels, and tertiary education is free for Swedish citizens (Halldén, 2008; Högskoleverket, 2012). In Sweden family resources are therefore less important for the transition to tertiary education than in other contexts, such as the United States. The Swedish education system is divided into three sections: (1) 9 years of compulsory schooling (*grundskolan*); (2) three additional years of secondary school (*gymnasium*); and, (3) the tertiary section (Halldén, 2008). Tertiary education in Sweden today consists of two parts. The first is a traditional university education, with degrees at the Bachelors (*kandidatexamen*), Magister (*magisterexamen*), Masters, Licentiate, and Doctoral levels. The second part is a vocational tertiary education (*högre yrkesutbildning/högskolor*) (Halldén, 2008). Students in tertiary education are eligible for financial support from the Swedish state for living costs in the form of study grants and student loans with low interest rates (Högskoleverket, 2012), minimising the need for reliance on family resources for maintenance. In 2012 approximately 33% of the Swedish population had undergone post-secondary education, which was slightly higher than the OECD average (Högskoleverket, 2012).

Outcome Variable. The primary outcome variable in this study is educational attainment in years, measured in the year that the index person turned 30. This measure is based upon the number

of years that correspond to the specific level of education achieved by age 30, and may not in all cases reflect that actual number of years that an individual spent in the educational system. We also conduct a number of additional analyses, using high school grade point average (GPA) and inflation-adjusted (CPI) logged earnings averaged between ages 29 to 31. The detailed results from those analyses are included in the supplementary section of our paper, but we also describe the results briefly in the results section below.

TABLE 1. Variables included in statistical models

Variable Category	Variables			
	Model 1	Models 2, 5, 8	Models 3, 6, 9	Models 4, 7, 10
Explanatory	Maternal birth order	Maternal birth order	Maternal birth order	Maternal birth order
Explanatory	Paternal birth order	Paternal birth order	Paternal birth order	Paternal birth order
G2 Control		(Maternal sibling group size)	(Maternal sibling group size)	(Maternal sibling group size)
G2 Control		(Paternal sibling group size)	(Paternal sibling group size)	(Paternal sibling group size)
G2 Control		Maternal grandmother age	Maternal grandmother age	Maternal grandmother age
G2 Control		Paternal grandmother age	Paternal grandmother age	Paternal grandmother age
G2 Control		Maternal birth year	Maternal birth year	Maternal birth year
G2 Control		Paternal birth year	Paternal birth year	Paternal birth year
G3 Mediator			Index birth order	Index birth order
G3 Mediator			Sex	Sex
G3 Mediator			Sibling group size	Sibling group size
G3 Mediator			Birth year	Birth year
G3 Mediator			Maternal age	Maternal age
G3 Mediator			Paternal age	Paternal age
G2 SES Mediator				Maternal educational attainment
G2 SES Mediator				Maternal social class (EGP)
G2 SES Mediator				Paternal educational attainment
G2 SES Mediator				Paternal social class (EGP)

Control Variables. In our analyses focusing on the effects of parental birth order we adjust for a number of different factors that may be linked to both parental (G2) and offspring (G3) birth order, and educational attainment. We adjust our analyses for maternal sibling group size (G2), paternal sibling group size (G2), grandmaternal age at the time of birth of the mother (G2), grandmaternal age at the time of birth of the father (G2), and maternal and paternal birth year (G2). These variables capture conditions at the time of birth, with the exception of parental sibling group size, which may be not settle until later childhood. We adjust for the completed sibling group size of the parents as there is a correlation between sibling group size and educational attainment (Black et al., 2005a), and higher birth order siblings will be drawn from larger sibling groups. We adjust for grandparental age at the time of birth as later-born siblings are typically born to older mother

and fathers, and advanced parental age may be associated with educational outcomes (Barclay and Myrskylä, 2016). We control for birth year in order to adjust for educational expansion over time (Breen et al., 2009; Breen, 2010), which is likely to benefit later-born siblings and cousins (Barclay, 2018).

Mediator Variables. We consider two groups of variables that mediate the relationship between parental birth order and offspring educational attainment. The first group of mediating variables refers to sociodemographic characteristics of the grandchild generation (G3), including the birth order of the index person (G3), the sex of the index person (G3), the sibling group size of the index person (G3), the birth year of the index person (G3), and maternal and paternal age at the time of the birth of the index person (G3). These factors may well be influenced by parental birth order, and are also known to influence educational attainment. Most important amongst these is the birth year of the index person (G3), as being born in a later calendar year during a period of rapid educational expansion is known to be associated with a higher average educational attainment (Breen et al., 2009; Breen, 2010).

Our second group of mediator variables pertain to educational and socioeconomic attainment of the parents. Our expectation is that the association between parental birth order and offspring educational attainment operates entirely through the educational and socioeconomic attainment of the parents. We evaluate this mechanism by adjusting for the attained education and social class of the mother and father (G2). Maternal and paternal educational attainment is based upon the highest attained level of educational attainment. Highest maternal and paternal educational attainment is grouped into eight categories, which are: primary (<9 years); primary (9 years); secondary (10-11 years); secondary (12 years); tertiary (13-15 years); tertiary (15+ years); graduate school; and, missing. Maternal and paternal social class is based upon the Erikson, Goldthorpe and Portocarero occupational class scheme (EGP) (Erikson et al., 1979), measured between ages 30 and 40 using information on occupation from the Swedish censuses in 1960, 1970, 1980, and 1990.

Table 2: Descriptive statistics for birth order and educational attainment at age 30 for generation 3 (G3), Swedish men and women born 1960-1982.

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
N		515,405	308,554	72,293	9,709	1,947	434,579	276,745	116,856	45,989	33,739	446,386	277,305	112,833	42,479	28,905
Years of Education	Mean	12.9	13.0	12.9	12.6	12.3	12.9	13.0	12.9	12.7	12.6	12.9	13.0	12.9	12.7	12.6
	SD	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2
Mother Birth Order	Mean	1.9	1.9	1.9	2.0	2.0	1.0	2.0	3.0	4.0	5.8	1.8	1.9	2.0	2.0	2.1
	SD	1.2	1.2	1.2	1.3	1.3	0.0	0.0	0.0	0.0	1.2	1.1	1.2	1.2	1.3	1.4
Father Birth Order	Mean	1.8	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	2.1	1.0	2.0	3.0	4.0	5.7
	SD	1.1	1.1	1.1	1.2	1.2	1.1	1.1	1.2	1.2	1.3	0.0	0.0	0.0	0.0	1.1
Index Birth Order	Mean	1.0	2.0	3.0	4.0	5.4	1.5	1.5	1.6	1.6	1.6	1.5	1.5	1.6	1.6	1.6
	SD	0.0	0.0	0.0	0.0	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Index Sibling Group Size	Mean	2.0	2.4	3.3	4.4	6.1	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.5
	SD	0.9	0.7	0.7	0.9	1.6	0.9	0.9	0.9	1.0	1.0	0.9	0.9	1.0	1.0	1.1
Index Birth Year	Mean	1973.1	1974.6	1975.9	1976.5	1977.1	1973.7	1974.0	1974.1	1974.2	1974.4	1973.6	1974.0	1974.3	1974.5	1975.0
	SD	5.6	5.0	4.6	4.5	4.4	5.5	5.4	5.3	5.3	5.1	5.5	5.4	5.3	5.3	4.9
Index Mother Age	Mean	23.8	26.6	29.2	30.9	32.4	25.5	25.3	25.0	24.7	24.3	25.4	25.3	25.0	24.7	24.2
	SD	4.1	3.8	3.8	4.0	4.1	4.4	4.4	4.4	4.3	4.2	4.4	4.4	4.4	4.4	4.2
Index Father Age	Mean	26.0	28.7	31.3	33.0	34.5	27.4	27.5	27.4	27.2	27.0	27.6	27.4	27.1	26.9	26.5
	SD	4.2	3.8	3.8	3.9	4.2	4.4	4.4	4.4	4.4	4.4	4.5	4.4	4.4	4.4	4.2
Mother Sibling Group Size	Mean	2.8	2.9	3.1	3.3	3.6	2.2	2.8	3.8	4.9	6.9	2.8	2.9	3.0	3.1	3.2
	SD	1.6	1.6	1.7	1.9	2.2	1.2	1.1	1.2	1.2	1.8	1.6	1.6	1.7	1.8	1.9
Father Sibling Group Size	Mean	2.8	2.9	3.1	3.3	3.6	2.8	2.9	2.9	3.0	3.2	2.2	2.8	3.9	5.0	6.9
	SD	1.6	1.6	1.7	1.9	2.1	1.6	1.6	1.7	1.7	1.9	1.2	1.2	1.2	1.4	1.8
Mother Birth Year	Mean	1949.3	1948.0	1946.7	1945.6	1944.6	1948.2	1948.7	1949.2	1949.5	1950.1	1948.1	1948.7	1949.3	1949.8	1950.8
	SD	5.4	4.8	4.3	4.0	3.7	5.3	5.1	5.1	5.1	4.8	5.2	5.2	5.1	5.1	4.9
Father Birth Year	Mean	1947.1	1945.9	1944.6	1943.5	1942.6	1946.2	1946.5	1946.8	1947.0	1947.4	1946.0	1946.6	1947.1	1947.6	1948.6
	SD	5.3	4.6	4.1	3.8	3.6	5.1	5.0	5.0	5.0	4.8	5.0	5.0	5.0	4.9	4.6
Maternal Grandmother Age at Birth	Mean	28.2	28.4	28.5	28.4	28.2	25.9	29.0	31.4	33.0	35.1	28.3	28.3	28.2	28.2	28.1
	SD	6.1	6.1	6.1	6.2	6.4	5.7	5.4	5.3	5.2	4.9	6.1	6.1	6.2	6.2	6.3
Paternal Grandmother Age at Birth	Mean	28.3	28.6	28.7	28.8	28.3	28.5	28.4	28.5	28.4	28.4	26.3	29.3	31.4	33.0	34.9
	SD	6.1	6.0	6.1	6.2	6.3	6.0	6.0	6.1	6.2	6.2	5.7	5.4	5.3	5.1	4.8
Mother Education (%)	Primary (<9 years)	9.4	10.7	14.5	21.0	31.5	9.2	10.5	12.1	14.0	15.3	10.5	10.2	10.5	11.2	10.3
	Primary (9 years)	12.0	11.2	10.5	10.9	10.8	11.0	11.6	12.4	13.3	15.2	11.3	11.4	12.2	13.1	14.4
	Secondary (10-11 years)	41.1	40.6	40.0	38.8	35.9	39.8	40.8	42.1	44.0	45.8	39.9	40.8	42.0	44.3	46.6
	Secondary (12 years)	9.5	9.1	7.7	6.2	5.4	9.8	9.0	8.3	7.8	7.1	9.3	9.1	9.2	8.6	9.3
	Tertiary (13-15 years)	12.6	12.5	11.3	9.3	7.3	13.1	12.6	11.5	10.1	8.8	12.7	12.7	11.9	10.5	9.6
	Tertiary (15+ years)	14.8	15.3	15.5	13.4	8.4	16.6	15.0	13.0	10.3	7.6	15.8	15.2	13.8	12.0	9.6
	Graduate school	0.5	0.5	0.5	0.4	0.3	0.5	0.5	0.4	0.3	0.1	0.5	0.5	0.4	0.3	0.2
Missing	0.1	0.1	0.1	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

Continued on next page

Table 2 – Continued from previous page

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
Mother EGP (%)	I	1.0	0.8	0.7	0.6	0.7	1.0	0.9	0.8	0.7	0.5	1.0	1.0	0.8	0.7	0.5
	II	35.4	38.7	36.7	31.5	25.1	39.4	36.7	32.5	28.4	24.2	39.4	36.3	32.1	28.4	23.3
	III	9.8	7.8	5.8	5.4	5.7	8.5	8.8	9.2	9.4	8.7	8.5	8.9	9.2	9.2	9.0
	IV	2.5	3.0	4.5	6.3	6.8	2.7	3.0	3.3	2.9	2.9	2.7	3.0	3.2	3.3	3.0
	VI-VII	27.5	26.0	28.0	34.0	42.8	25.4	26.9	29.4	32.6	35.6	25.7	26.9	29.8	31.9	34.2
	Unknown	23.8	23.7	24.3	22.3	18.9	23.0	23.6	24.9	25.9	28.1	22.7	24.0	25.0	26.5	30.0
Father Education (%)	Primary (<9 years)	18.1	20.3	25.2	31.9	38.8	18.8	19.3	20.7	22.6	24.6	17.6	19.8	22.5	26.5	27.7
	Primary (9 years)	12.4	10.5	8.6	7.4	7.5	11.0	11.3	12.0	12.8	13.7	10.5	11.4	12.8	13.7	16.4
	Secondary (10-11 years)	29.1	26.8	25.6	26.6	28.2	27.2	27.9	29.3	30.6	32.4	27.1	28.0	29.4	30.7	32.6
	Secondary (12 years)	16.3	17.4	16.0	12.7	10.1	17.2	16.7	15.7	14.9	13.8	18.0	16.6	14.3	12.4	10.3
	Tertiary (13-15 years)	10.5	10.5	9.0	6.9	4.5	10.6	10.4	9.9	9.0	8.2	11.0	10.3	9.3	7.9	7.2
	Tertiary (15+ years)	12.1	12.9	13.4	12.1	8.9	13.5	12.7	11.0	8.9	6.6	13.8	12.5	10.4	8.0	5.1
	Graduate school	1.3	1.5	2.0	2.2	1.8	1.6	1.4	1.2	0.9	0.5	1.7	1.3	1.1	0.7	0.5
Missing	0.3	0.2	0.1	0.2	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	
Father EGP (%)	I	1.8	1.5	1.1	0.8	0.9	1.7	1.7	1.5	1.2	1.1	1.7	1.7	1.4	1.2	1.0
	II	21.3	23.7	22.7	18.9	15.3	23.6	22.4	20.1	17.9	15.3	24.9	21.9	18.1	14.5	10.9
	III	3.1	2.2	1.3	1.0	1.1	2.6	2.7	2.7	2.5	2.5	2.5	2.7	2.7	2.8	2.6
	IV	5.2	5.4	6.7	8.5	7.6	5.2	5.4	6.0	5.9	6.2	4.9	5.6	6.2	6.6	6.4
	VI-VII	47.4	46.3	47.2	50.5	55.0	45.3	46.4	49.5	52.9	57.7	44.0	47.1	51.7	56.3	61.8
	Unknown	21.3	21.0	21.1	20.3	20.2	21.7	21.5	20.2	19.6	17.2	22.0	21.0	20.0	18.7	17.3

The EGP variable used in this study is divided into the following categories: upper service class, including self-employed professionals (EGP=I); lower service class (EGP=II); routine non-manual (EGP=III); self-employed non-professionals, farmers, and fishermen (EGP=IV); skilled and unskilled workers (EGP=VI-VII); and, unknown/other.

Statistical Analyses.

Parental Birth Order. To examine the relationship between birth order and educational attainment at age 30 we use linear regression with and without the application of fixed effects. We first estimate the association between parental birth order and offspring educational attainment using the full sample, without implementing fixed effects:

$$(1) \quad y = \beta_0 + \beta_l BO_l + \varepsilon$$

$$(2) \quad y = \beta_0 + \beta_l BO_l + \beta_m G2\text{-Controls}_m + \varepsilon$$

$$(3) \quad y = \beta_0 + \beta_l BO_l + \beta_m G2\text{-Controls}_m + \beta_n G3\text{-Mediators}_n + \varepsilon$$

$$(4) \quad y = \beta_0 + \beta_l BO_l + \beta_m G2\text{-Controls}_m + \beta_n G3\text{-Mediators}_n + \beta_o G2\text{-Mediators}_o + \varepsilon$$

where y refers to years of educational attainment at age 30, BO refers to a vector of the birth order of the mother (G2) and father (G2), $G3\text{-Controls}$ refers to a vector of the control variables at the level of the third-generation, $G2\text{-Controls}$ refers to a vector of the control variables at the level of the second-generation, and $G2\text{-Mediators}$ refers to a vector of the G2 mediating variables, i.e. attained socioeconomic status and educational attainment of the parents. Model 1 estimates the total effect of maternal and paternal birth order on offspring educational attainment. Model 2 adjusts for confounding factors measured at the time of the parents birth, and Models 3 and 4 successively introduce control variables for mediating variables at the G3 and G2 level, respectively. Models 1, 2, 3, and 4 are OLS models that use the full population. Descriptive statistics for the population used to estimate Models 1, 2, 3, and 4 are shown in Table 2.

Our fixed effects analyses are based upon a shared grandparental ID, meaning that we compare full biological cousins. Since an individual can have two sets of cousins, we have two analytical samples: maternal cousin groups, and paternal cousin groups. Our cousin fixed effects analyses are therefore based upon the following six models:

$$(5) \quad y_{ij} = \beta_0 + \beta_l BO_{l,ij} + \beta_m G2\text{-Controls}_{m,ij} + \alpha_j + \varepsilon_{ij}$$

$$(6) \quad y_{ij} = \beta_0 + \beta_l BO_{l,ij} + \beta_m G2\text{-Controls}_{m,ij} + \beta_n G3\text{-Mediators}_{n,ij} + \alpha_j + \varepsilon_{ij}$$

$$(7) \quad y_{ij} = \beta_0 + \beta_l BO_{l,ij} + \beta_m G2\text{-Controls}_{m,ij} + \beta_n G3\text{-Mediators}_{n,ij} + \beta_o G2\text{-Mediators}_{o,ij} + \alpha_j + \varepsilon_{ij}$$

$$(8) \quad y_{ik} = \beta_0 + \beta_l BO_{l,ik} + \beta_m G2\text{-Controls}_{m,ik} + \delta_k + \varepsilon_{ik}$$

$$(9) \quad y_{ik} = \beta_0 + \beta_l BO_{l,ik} + \beta_m G2\text{-Controls}_{m,ik} + \beta_n G3\text{-Mediators}_{n,ik} + \delta_k + \varepsilon_{ik}$$

$$(10) \quad y_{ik} = \beta_0 + \beta_l BO_{l,ik} + \beta_m G2\text{-Controls}_{m,ik} + \beta_n G3\text{-Mediators}_{n,ik} + \beta_o G2\text{-Mediators}_{o,ik} + \delta_k + \varepsilon_{ik}$$

where y refers to years of educational attainment at age 30, the indexes i , j , and k refer to individual i in maternal cousin group j , and paternal cousin group k , α is the fixed effect for maternal cousin group j , δ is the fixed effect for paternal cousin group k , and ε is the residual. Models 5, 6, and 7 are linear regressions estimated on the maternal cousin analytical sample, implementing cousin fixed effects. Models 8, 9, and 10 are linear regressions estimated on the paternal cousin analytical sample, implementing cousin fixed effects. As with the OLS models without cousin fixed effects (Models 1 to 4), we control for confounding variables measured at the time of the parents birth in Models 5 and 8, and introduce control variables for mediating variables at the G3 and G2 level, respectively in Models 6, 7, 9, and 10. Further descriptive statistics for the maternal cousin and paternal cousin group samples are shown in the Supplementary Information, in Tables S1 and S2.

We also run a number of additional analyses to examine the extent to which parental and child birth order (and gender) moderate each other (i.e. interact) in predicting the educational attainment of the children. For example, we examine whether sharing the same birth order has any effect on educational attainment above and beyond the main effects of parent and child birth order. We operationalise birth order three ways to examine these interactions. We first examine whether

the parents and child share the same ordinal birth order, we then examine whether they share a similarity in being a first-, middle-, or last-born child, and finally we examine whether they are similar in being either the first- or a later-born child. In further analyses we also examine whether parent-child birth order and gender homophily interacts with the educational level of the parent to influence educational attainment, and so examine whether this homophily is particularly important when the parents have greater human capital at their disposal.

Parental Sibling Group Size. Another objective of our study is to examine how resource dilution in the parental generation, related to family size, affects the attainment of the subsequent generation. Since family size is endogenous, we study twin births as an exogenous shock on family size (as first proposed by Rosenzweig and Wolpin, 1980), to examine the relationship between parental sibling group size and educational attainment amongst their children. The Swedish Multigenerational Register allows us to identify twins, and the parity at which the twin birth occurs. Although our focus is on the educational attainment of the grandchild generation (G3), who are born 1960-1982, we study how fertility and twinning in the grandparental generation (G1) affects the family size of the parental generation (G2). As the parental generation were born between the 1930s and early 1970s, this is before the first *in vitro* fertilisation (IVF) assisted birth took place in Sweden in 1982; consequently, twin births are a valid exogenous instrument for family size for the cohorts that we study.

To estimate these models we use a two-stage least squares (2SLS) estimation strategy (Angrist and Pischke, 2008, Chapter 4). We estimate the following equations:

$$(11) \quad FAMILYSIZE_{G2} = \alpha_0 + \alpha_1 TWIN_{G2} + \alpha_2 X + \nu$$

$$(12) \quad EDU_{G3} = \beta_0 + \beta_1 FAMILYSIZE_{G2} + \beta_2 X + \varepsilon$$

where $FAMILYSIZE_{G2}$ is the final family size of the mother or father, $TWIN$ is a binary indicator for a twin birth in the family, X is a vector of control variables, and EDU_{G3} is the educational attainment of the offspring (G3) at age 30. Equation 11 is the first-stage estimation, and equation

12 the second-stage. We estimate these 2SLS models separately for the mother and father. We control for the birth year of the mother or father, as well as the age of the grandmother (G1) at the time of birth, as maternal age at birth is related to the probability of twinning. To estimate these models we use what has been called the ‘twin-first’ approach (Black et al., 2009). The $TWIN_{G2}$ variable is a binary indicator denoting whether the n th birth was a twin or not, estimated on the population of children born before the n th birth in families with at least n births. For example, we estimate these models on the population of first-born children in families with at least two children, whose mother may or may not have had a twin birth at parity 2. We estimate these models for mothers and father separately, for values of n between 2 and 4. To be clear, twins themselves are not included in the analysis, and the key variable pertains to whether or not an individual was exposed to a twin birth, implying exposure to a larger family size than would otherwise have been expected, as well as the potential consequences such as further resource dilution amongst siblings.

RESULTS

Parental Birth Order. We begin by presenting the results from our analyses of the relationship between parental birth order and the educational attainment of their children at age 30. Figure 2 shows the results from models using the full population of individuals for whom it was possible to link three generations using the Swedish register data. The results shown in Figure 2 do not implement the cousin fixed effects approach. Figure 2 consists of four panels, successively displaying the results from Models 1 to 4. These model numbers correspond to the equations detailed in the ‘Statistical Analyses’ section above. Full results tables for these models can be seen in the Supplementary Information, in Table S3.

Models 1 to 4 in Figure 2 show the correlation between maternal and paternal birth order and offspring educational attainment at age 30. The results from Model 1 are the total effects of parental birth order, capturing all intermediary mediating processes between parental birth and offspring educational attainment. The results from Model 1 show that, relative to having a mother who was first-born, having a mother who was third-born is associated with 0.07 less years of education by age 30, and having a mother who was fifth-born is associated with 0.33 less years of education at age 30. Likewise, having a father who was third-born is associated with 0.03 less

years of education by age 30, and having a father who was fifth-born is associated with 0.27 less years of education at age 30. Introducing additional controls for parental (G2) characteristics in Model 2 actually increases the size of the point estimates. We see that, relative to having a first-born mother or father, having a mother or father who is second-born is associated with having approximately 0.20 years less education by age 30, and having a mother or father who is fifth-born or later is associated with having over 0.40 years less education by age 30. This change in the estimates between Models 1 and 2 is related to the fact that later-born parents were on average born into a later birth year, and as a consequence of educational expansion in Sweden they had more educational opportunities, with consequent benefits for their own educational achievement and subsequently the educational achievement of their children. By controlling for parental birth cohort in Model 2 we partially adjust for those period changes in educational opportunities.

In Models 3 and 4 we introduce additional covariates in order to control for mediating variables at the grandchild level and the parental level. Model 3 focuses on mediating variables at the grandchild level. The results from Model 3 are relatively similar to those from Model 2, and we see that, relative to having a mother who was first-born, having a mother who was second-born is associated with 0.14 less years of education by age 30, and having a mother who was fifth-born is associated with 0.33 less years of education at age 30. Likewise, having a father who was second-born is associated with 0.13 less years of education by age 30, and having a father who was fifth-born is associated with 0.30 less years of education at age 30. Thus, even net of the index person's own birth order and birth year, amongst other factors, having a later-born parent is associated with lower educational attainment at age 30. In relation to the summary statistics for this population, 0.30 years of education by age 30 is equivalent to 13% of a standard deviation, which is far from a trivial association.

As we discuss earlier in this manuscript, we not only want to examine the association between parental birth order and offspring educational attainment, but also to examine the pathway by which that association operates. One possibility is that the effects of grandparental fertility outcomes (the determinant of parental birth order) are fully channeled through parental socioeconomic attainment, corresponding to a memoryless Markov process. The second possibility is that there are

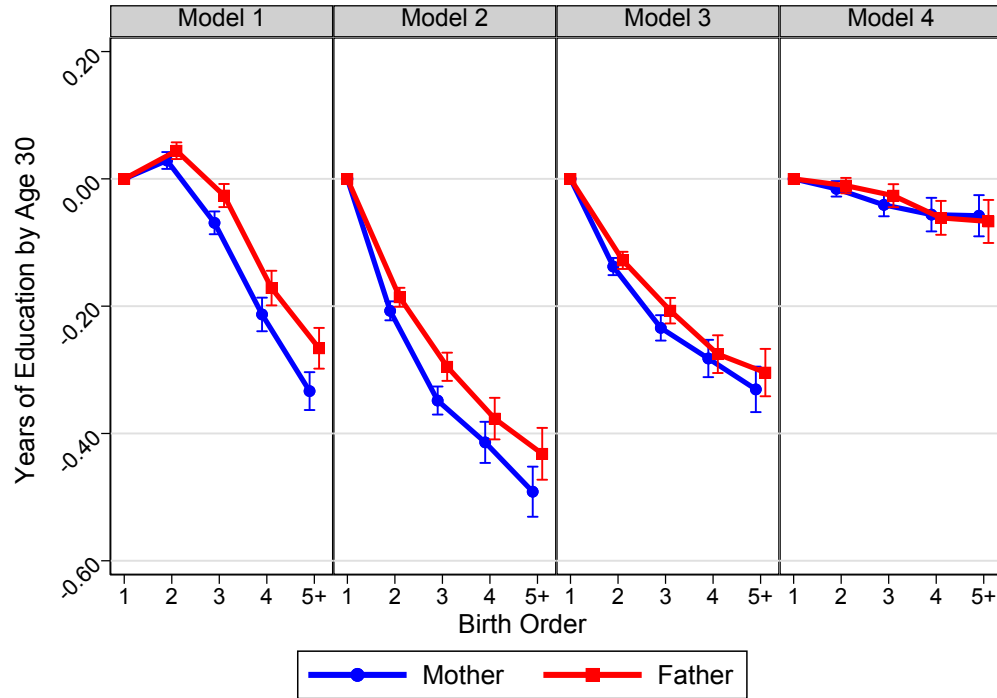


FIGURE 2. Educational attainment at age 30 amongst Swedish men and women born 1960 to 1982. Linear regression model, using maternal cousin sample. Error bars are 95% confidence intervals.

multigenerational effects above and beyond the two-generation dyad. To examine whether the association between grandparental fertility and grandchild educational attainment is a consequence of parental birth order, in Model 4 we also introduce additional covariates for the highest level of educational attainment of both the mother and father, as well as their attained social class position, measured between ages 40 and 50. As Figure 2 shows, when we control for parental educational and social class attainment, the association between parental birth order and offspring educational attainment is significantly attenuated. Relative to having a first-born mother or father, having a mother or father who is second-born is associated with having 0.01 years less education by age 30, and having a mother or father who is fifth-born or later is associated with having over 0.06 years less education by age 30. Although these are very small differences, the differences are statistically significant. Nevertheless, since these models only control for observed confounding factors, there may be residual confounding. We now turn to our estimates using the cousin fixed effects approach that should help us to capture unobserved confounding from factors shared within the extended family.

Figures 3 and 4 show the results from models where we implement a cousin fixed effects design, comparing cousins from generation 3 who share grandparents. Using this approach we attempt to control for background factors that are related to both the fertility outcomes of the grandparents as well as the attainment of the grandchildren many years later. Such background factors could include socioeconomic resources, as well as unobserved underlying health conditions within the family. Figure 3 shows the results from Models 5, 6, and 7, which are based on the maternal cousin group sample. Here we focus on the point estimates for maternal birth order, since it is unobserved maternal background characteristics that are being effectively controlled for by comparing maternal cousins to one another.

Model 5 in Figure 3, controlling for factors fixed at the time of the parents birth, illustrates that the relationship between maternal birth order and offspring educational attainment is somewhat mixed, but the differences are generally not statistically significant. The only exception is that having a fourth-born mother is positively associated with offspring educational attainment. In Model 6, we introduce additional covariates for mediating factors measured at the level of the index person (G3), or the grandchild generation. After controlling for G3 characteristics, most importantly birth year, we see that having a second-born mother relative to a first-born mother is associated with having 0.09 years less education at age 30. Furthermore, having a fifth- or later-born mother relative to a first-born mother is associated with having 0.18 years less education at age 30. In Model 7 we again control for the attained educational and social class of the mother in order to examine whether effects of grandparental fertility flow only through their effects on parental educational and socioeconomic attainment. Here we find that the effects of maternal birth order are attenuated more severely, and the estimated effects for maternal birth order are also no longer statistically significant.

The reason for the difference in the estimates for maternal birth order between Models 5 and Models 6 and 7 is related to educational expansion as well as the cousin fixed effects approach. In the cousin fixed effects modeling approach we create a mechanical relationship between birth order and birth year, where later borns are almost always going to be born into a later birth year (this is completely deterministic in sibling FE model, but there is more potential for covariance in a cousin FE model focusing on parental birth order). When we control for G3 birth year, as

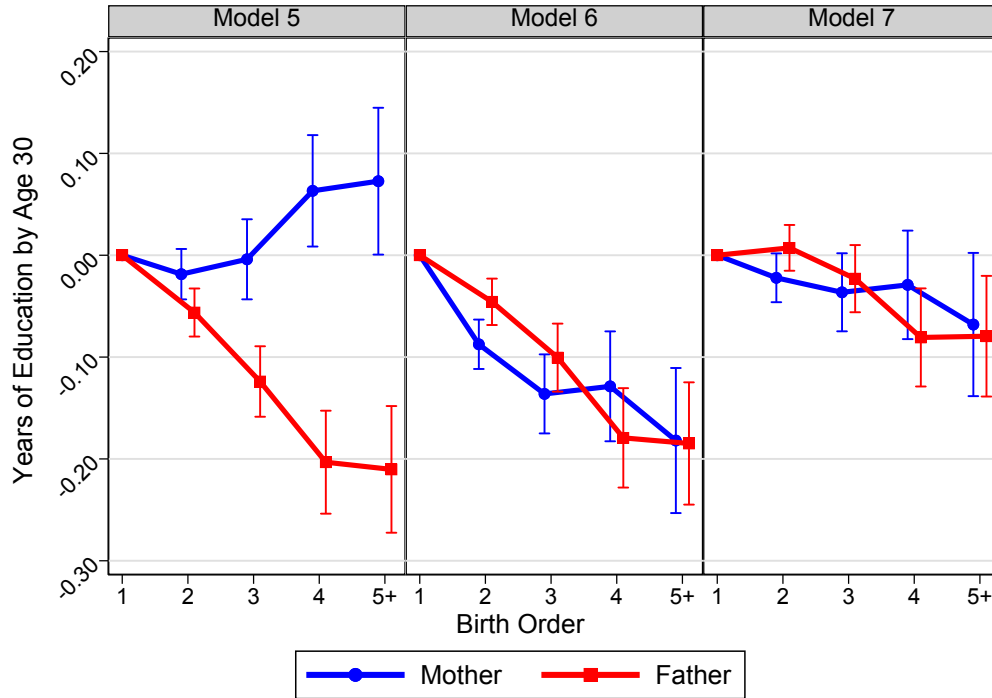


FIGURE 3. Educational attainment at age 30 amongst Swedish men and women born 1960 to 1982. Fixed effects linear regression model, using maternal cousin sample. Error bars are 95% confidence intervals.

we do in Model 6, we completely control away the benefits of educational expansion because G3 is the generation whose educational attainment we are actually measuring and who benefit directly from being born into a later birth year. By excluding a control for the birth year of G3 in Model 5 parental birth order unwittingly captures important intermediary processes, including secular trends in educational enrollment. As a result, the estimates from Model 5 indicate that later parental birth order tends to be associated with increasing educational attainment, but this is only because later-born parents are also more likely to give birth in a later calendar year than their older siblings, which then captures the increasing educational enrollment in Sweden in this period.

The results shown in Figure 4 repeat these analyses on the sample of paternal cousins, and here we focus on the association between the birth order of the father and offspring educational attainment. The results for paternal birth order from Models 8, 9, and 10 correspond relatively closely to the results for maternal birth order from Models 5, 6, and 7. In Model 8 we observe a positive, though non statistically significant, association between paternal birth order and offspring educational attainment. As explained above, this is primarily due to educational expansion and

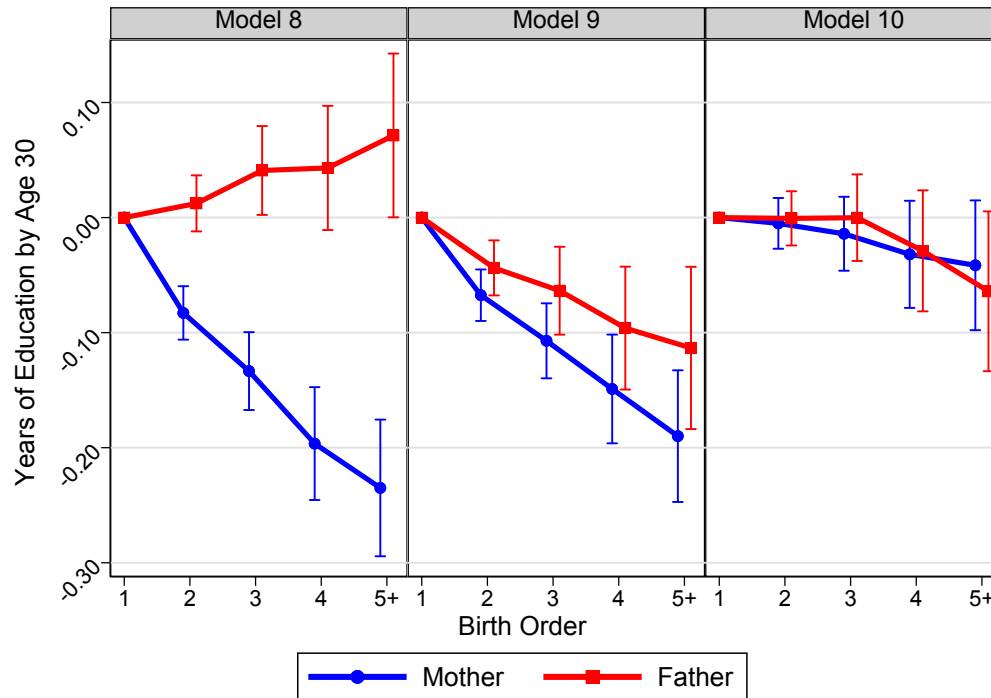


FIGURE 4. Educational attainment at age 30 amongst Swedish men and women born 1960 to 1982. Fixed effects linear regression model, using paternal cousin sample. Error bars are 95% confidence intervals.

the lack of a control for offspring birth year (G3). In Model 9 we find that having a second-born father relative to a first-born father is associated with having 0.04 years less education at age 30, and having a fifth- or later-born father relative to a first-born father is associated with having 0.11 years less education at age 30. In Model 10 we introduce additional controls for the father's educational and social class attainment, and find that the effects of paternal birth order on offspring educational attainment are reduced almost to zero, and are no longer statistically significant. These results strongly suggest that the effects of grandparental fertility outcomes on grandchild attainment largely, if not completely, flow through the intermediary generation.

We have also conducted a number of robustness checks to examine the sensitivity of our results to our statistical modeling choices. We have checked whether coding birth order according to being first-, middle-, or last-born leads to meaningfully different results, and it does not. We have also recoded birth order according to a first- versus later-born dichotomy, and this does not affect the conclusions that we would draw either. We have also estimated models using a more detailed control for parental birth year, using individual-year dummy variables rather than the

TABLE 3. The relationship between parent-child birth order homophily on offspring educational attainment at age 30, Swedish men and women born 1960-1982.

Sample	Model	Birth Order Homophily	Gender Homophily	Parent	b	se	p	N	
Maternal Cousin	7	Ordinal	No	Mother	0.015	0.007	0.029	509,739	
	7	Ordinal	No	Father	0.014	0.006	0.028	509,739	
	7	First-Middle-Last	No	Mother	0.009	0.007	0.157	509,739	
	7	First-Middle-Last	No	Father	0.015	0.006	0.022	509,739	
	7	First-Later	No	Mother	0.010	0.006	0.087	509,739	
	7	First-Later	No	Father	0.019	0.006	0.001	509,739	
	7	Ordinal	Yes	Mother	-0.003	0.010	0.721	509,739	
	7	Ordinal	Yes	Father	0.040	0.009	0.000	509,739	
	7	First-Middle-Last	Yes	Mother	0.000	0.010	0.973	509,739	
	7	First-Middle-Last	Yes	Father	0.031	0.009	0.001	509,739	
	7	First-Later	Yes	Mother	0.025	0.009	0.004	509,739	
	7	First-Later	Yes	Father	0.020	0.008	0.017	509,739	
	Paternal Cousin	10	Ordinal	No	Mother	0.017	0.006	0.007	514,222
		10	Ordinal	No	Father	0.011	0.007	0.108	514,222
10		First-Middle-Last	No	Mother	0.011	0.006	0.084	514,222	
10		First-Middle-Last	No	Father	0.016	0.007	0.017	514,222	
10		First-Later	No	Mother	0.018	0.006	0.001	514,222	
10		First-Later	No	Father	0.015	0.006	0.008	514,222	
10		Ordinal	Yes	Mother	0.010	0.009	0.304	514,222	
10		Ordinal	Yes	Father	0.046	0.009	0.000	514,222	
10		First-Middle-Last	Yes	Mother	0.011	0.009	0.246	514,222	
10		First-Middle-Last	Yes	Father	0.045	0.009	0.000	514,222	
10		First-Later	Yes	Mother	0.033	0.009	0.000	514,222	
10		First-Later	Yes	Father	0.016	0.008	0.062	514,222	

cohort groupings used in the main models above. Those models also produce extremely similar results to those presented above. The detailed output of all these additional analyses are available upon request from the authors.

Parent-Child Birth Order Interactions. The results from models examining whether there is an effect of parent-child birth order homophily on offspring educational attainment net of the main effects of parental birth order and child birth order are shown in Table 3. The results shown in Table 3 are based upon cousin fixed effects models applied to the same maternal cousin and paternal cousin group samples used in the analyses presented above in Figures 3 and 4. These models include the same set of control variables as Models 7 and 10 for the maternal and paternal cousin group analyses respectively, along with an additional term for whether the parent and child shared the same birth order position.

We focus on displaying the point estimates for parent-child homophily, because the additional regression output is extremely large. These results are available in full upon request. Table 3 shows

that we do observe an independent effect of parent-child birth order homophily, and that in most cases this independent effect is positive and statistically significant. However, we also observe that this effect is substantively negligible. A child who has the same birth order as the parent, whether that is defined as the same ordinal position, also being first-, middle- or last-born, or also being a first- versus a later-born, has 0.01 to 0.02 more years of education by age 30 relatively to his or her cousins who were not birth order homophilous with the parents.

Table 3 also shows the results from analyses where we examine whether there is an effect of parent-child birth order and gender homophily. Again, these models use the same samples and set of covariates, but include an additional term for whether the parent and child shared the same birth order position and gender (e.g. the first-born son of a first-born father). The results in Table 3 show that parent-child homophily on both birth order and gender is associated with a more meaningful increase in educational attainment for the child than if there is homophily on birth order alone. Nevertheless, even when parents and children share birth order position, however operationalised, as well as the same gender, the net increase in educational attainment is at most 0.05 years of education, and typically closer to 0.03 or 0.04 years of education by age 30. It may be worth noting that parent-child birth order and gender homophily seems to be more beneficial for sons than it is for daughters, but these differences are extremely small in the context of educational attainment by age 30.

We have also run additional analyses examining whether parental educational level interacts with parent-child birth order and gender homophily to influence educational attainment. For example, does a first-born son of a first-born father have a greater correlation in education than a second-born son with a first-born father. Tables 4 and 5 examine this question using the maternal cousin and paternal cousin samples, respectively. We will focus on the results examining the interaction between parent-child homophily and maternal educational level in Table 4, as residual confounding in the maternal cousin group is most effectively controlled for in those analyses. Table 4 shows that when examining parent-child birth order homophily alone, we do not find that there is any statistically significant shift in the degree of parent-child educational similarity. However, when we examine parent-child homophily on both birth order and gender (i.e. a first-born mother and a first-born daughter rather than, say, a first-born mother and first-born son), then we do find a

statistically significant interaction. In this case we find that the positive effect for the child of sharing the same birth order and gender position as the parent increases the higher the level of education of the mother. That is to say, sharing the same birth order and gender position as the mother is more beneficial for the child when the mother has higher levels of education. This is true whether we operationalise birth order according to ordinal position, first-middle-last, or a first- or later-born distinction. The pattern of results that we observe amongst the maternal cousin sample is also seen in Table 5, showing the results from the paternal cousin group analyses. Here we also see that parent-child birth order homophily alone does not interact significantly with paternal educational level, but when there is parent-child birth order and gender homophily, those whose fathers have higher levels of education benefit disproportionately. It seems that parent-child birth order and gender homophily shifts the slope of intergenerational transmission, where parents who share the same gender and birth order position are more similar in educational levels than the children who do not share those characteristics with the parents. Furthermore, we find that parent-child birth order and gender homophily is most beneficial when the parents have higher levels of human capital resources to transmit to their children.

In this study, we conduct a large number of statistical tests, which raises the multiple comparison problem. Overall we would emphasise that, since we use population data and the standard errors are generally very small, we should largely focus on the direction and substantive magnitude of the point estimates. Nevertheless, statistical testing can still be informative even when applied to population data because it tells us about the variance underlying the estimates: indeed, when an estimate does not reach even the conventional 5% significance threshold with a very large N , that tells us something important about how noisy the underlying pattern is. In these analyses of the interaction between parent-child birth order homophily and parental education level, we perform a number of different tests, but find that the point estimates are relatively similar across comparable models, and we also find consistency in the patterns of statistical significance (e.g. across the different operationalisations of birth order when examining parent-child birth order and gender homophily). This suggests that we are not simply obtaining significant p -values at random as a result of running multiple different significance tests.

Table 4: Interaction between parent-child birth order and gender homophily and parental education level, maternal cousin sample, Swedish men and women born 1960-1982.

		Birth Order Homophily			Birth Order and Gender Homophily		
		Ordinal	FML	First-Later	Ordinal	FML	First-Later
		Model 7	Model 7	Model 7	Model 7	Model 7	Model 7
		b	b	b	b	b	b
Mother-Child Homophily	Yes	0.001	0.004	-0.018	-0.073**	-0.058*	-0.050*
	No (ref)	0.000	0.000	0.000	0.000	0.000	0.000
Maternal Education	Primary <9 years	-0.161***	-0.151***	-0.167***	-0.154***	-0.148***	-0.149***
	Primary - 9 years (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	Secondary - 10-11 years	0.113***	0.115***	0.101***	0.107***	0.107***	0.098***
	Secondary - 12 years	0.356***	0.360***	0.356***	0.353***	0.356***	0.349***
	Tertiary - 13-15 years	0.543***	0.539***	0.528***	0.534***	0.531***	0.517***
	Tertiary - 15+ years	0.749***	0.754***	0.738***	0.737***	0.741***	0.728***
	Post-graduate	1.046***	1.040***	1.051***	1.010***	1.016***	1.008***
	Missing	0.212	0.159	0.238	0.139	0.138	0.157
Mother-Child Homophily Maternal Education Interaction	Yes * Primary <9 years	0.011	-0.023	0.021	-0.014	-0.062	-0.030
	Yes * Primary - 9 years (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	Yes * Secondary - 10-11 years	0.002	-0.003	0.028	0.058*	0.056*	0.077**
	Yes * Secondary - 12 years	0.050	0.035	0.032	0.131**	0.100**	0.100**
	Yes * Tertiary - 13-15 years	0.027	0.038	0.051*	0.123***	0.141***	0.157***
	Yes * Tertiary - 15+ years	0.026	0.010	0.041	0.141***	0.110**	0.135***
	Yes * Post-graduate	-0.009	0.006	-0.021	0.227	0.180	0.162
	Yes * Missing	-0.222	-0.039	-0.230	0.110	0.114	-0.020
Father-Child Homophily	Yes	0.018	0.021	0.021	-0.041	-0.041	-0.065**
	No (ref)	0.000	0.000	0.000	0.000	0.000	0.000
Paternal Education	Primary <9 years	-0.135***	-0.138***	-0.137***	-0.152***	-0.153***	-0.154***
	Primary - 9 years (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	Secondary - 10-11 years	0.062***	0.066***	0.061***	0.051**	0.054**	0.047**
	Secondary - 12 years	0.422***	0.421***	0.429***	0.392***	0.395***	0.388***
	Tertiary - 13-15 years	0.619***	0.628***	0.614***	0.592***	0.600***	0.584***
	Tertiary - 15+ years	0.965***	0.967***	0.965***	0.938***	0.943***	0.928***
	Post-graduate	1.332***	1.310***	1.328***	1.267***	1.262***	1.249***
	Missing	-0.095	-0.135	-0.079	-0.075	-0.096	-0.069
Father-Child Homophily Paternal Education	Yes * Primary <9 years	-0.012	-0.004	-0.005	0.062*	0.068*	0.060*
	Yes * Primary - 9 years (ref)	0.000	0.000	0.000	0.000	0.000	0.000

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

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		Birth Order Homophily			Birth Order and Gender Homophily		
		Ordinal	FML	First-Later	Ordinal	FML	First-Later
		Model 7	Model 7	Model 7	Model 7	Model 7	Model 7
		b	b	b	b	b	b
Interaction	Yes * Secondary - 10-11 years	0.004	-0.007	0.004	0.061*	0.050	0.068**
	Yes * Secondary - 12 years	-0.012	-0.009	-0.022	0.120***	0.110***	0.117***
	Yes * Tertiary - 13-15 years	-0.009	-0.030	0.003	0.111**	0.075*	0.123***
	Yes * Tertiary - 15+ years	0.010	0.007	0.010	0.152***	0.130***	0.166***
	Yes * Post-graduate	-0.063	-0.013	-0.046	0.171*	0.196**	0.213**
	Yes * Missing	0.146	0.230	0.106	0.227	0.313*	0.184
Paternal Sibling Group Size (G2)	1	-0.063***	-0.062***	-0.063***	-0.062***	-0.062***	-0.062***
	2 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	3	0.001	0.002	0.001	0.001	0.002	0.001
	4	-0.020	-0.018	-0.020	-0.019	-0.018	-0.019
	5+	-0.026	-0.024	-0.026	-0.026	-0.025	-0.026
Maternal Grandmother's Age at Birth (G2)	15-19	0.108**	0.108**	0.108**	0.110**	0.110**	0.108**
	20-24	0.066***	0.066***	0.066***	0.067***	0.066***	0.066***
	25-29 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	30-34	-0.074***	-0.074***	-0.074***	-0.074***	-0.074***	-0.074***
	35-39	-0.143***	-0.143***	-0.144***	-0.143***	-0.143***	-0.143***
	40+	-0.238***	-0.239***	-0.239***	-0.237***	-0.238***	-0.238***
Paternal Grandmother's Age at Birth (G2)	15-19	-0.157***	-0.157***	-0.157***	-0.154***	-0.155***	-0.155***
	20-24	-0.097***	-0.097***	-0.097***	-0.096***	-0.096***	-0.096***
	25-29 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	30-34	0.039**	0.039**	0.039**	0.040**	0.039**	0.039**
	35-39	0.033*	0.033*	0.033*	0.034*	0.033*	0.034*
	40+	0.046*	0.046*	0.046*	0.047*	0.046*	0.046*
Maternal Birth Year (G2)	1938-1945	0.082**	0.083**	0.082**	0.083**	0.083**	0.083**
	1946-1949	0.051**	0.051**	0.051**	0.051**	0.051**	0.051**
	1950-1954 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	1955-1959	-0.089***	-0.089***	-0.089***	-0.090***	-0.090***	-0.088***
	1960-1964	-0.155**	-0.153**	-0.153**	-0.157**	-0.155**	-0.152**
	1965-1969	-0.184	-0.178	-0.181	-0.186	-0.182	-0.179
Paternal Birth Year (G2)	1938-1945	0.093***	0.093***	0.093***	0.093***	0.093***	0.093***
	1946-1949	0.062***	0.062***	0.062***	0.062***	0.062***	0.061***
	1950-1954 (ref)	0.000	0.000	0.000	0.000	0.000	0.000

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

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		Birth Order Homophily			Birth Order and Gender Homophily		
		Ordinal	FML	First-Later	Ordinal	FML	First-Later
		Model 7	Model 7	Model 7	Model 7	Model 7	Model 7
		b	b	b	b	b	b
Index Birth Order (G3)	1955-1959	-0.085***	-0.085***	-0.085***	-0.086***	-0.085***	-0.084***
	1960-1964	-0.230**	-0.229**	-0.229**	-0.232**	-0.230**	-0.229**
	1965-1969	-0.357	-0.353	-0.356	-0.358	-0.355	-0.354
	1 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	2	-0.294***	-0.294***	-0.301***	-0.293***	-0.293***	-0.298***
	3	-0.462***	-0.466***	-0.473***	-0.462***	-0.465***	-0.470***
Mother Birth Order (G2)	4	-0.554***	-0.558***	-0.567***	-0.556***	-0.560***	-0.563***
	5	-0.657***	-0.662***	-0.670***	-0.661***	-0.664***	-0.664***
	1 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	2	-0.022	-0.022	-0.025*	-0.026*	-0.025*	-0.024
	3	-0.036	-0.040*	-0.042*	-0.044*	-0.043*	-0.041*
	4	-0.028	-0.033	-0.034	-0.037	-0.035	-0.033
Father Birth Order (G2)	5	-0.070	-0.074*	-0.076*	-0.079*	-0.076*	-0.076*
	1 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.007	0.008	0.007	0.008	0.008	0.004
	3	-0.023	-0.025	-0.026	-0.021	-0.026	-0.030
	4	-0.077**	-0.080**	-0.081**	-0.076**	-0.081**	-0.085**
	5	-0.077*	-0.081**	-0.081**	-0.077*	-0.081**	-0.085**
Sex (G3)	Male (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	Female	0.529***	0.529***	0.528***	0.545***	0.540***	0.527***
Sibling Group Size (G3)	1	-0.222***	-0.222***	-0.222***	-0.222***	-0.221***	-0.222***
	2 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	3	0.018	0.018	0.018	0.018	0.019	0.018
	4	-0.027	-0.028	-0.027	-0.026	-0.025	-0.026
	5+	-0.173***	-0.174***	-0.172***	-0.173***	-0.170***	-0.172***
Birth Year (G3)	1960	-0.841***	-0.841***	-0.845***	-0.838***	-0.839***	-0.844***
	1961	-0.724***	-0.725***	-0.727***	-0.721***	-0.721***	-0.726***
	1962	-0.717***	-0.718***	-0.720***	-0.715***	-0.715***	-0.719***
	1963	-0.634***	-0.634***	-0.636***	-0.633***	-0.633***	-0.636***
	1964	-0.573***	-0.574***	-0.575***	-0.573***	-0.573***	-0.575***
	1965	-0.517***	-0.517***	-0.518***	-0.517***	-0.517***	-0.519***
	1966	-0.421***	-0.421***	-0.422***	-0.421***	-0.421***	-0.422***

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

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	Birth Order Homophily			Birth Order and Gender Homophily		
	Ordinal	FML	First-Later	Ordinal	FML	First-Later
	Model 7	Model 7	Model 7	Model 7	Model 7	Model 7
	b	b	b	b	b	b
1967	-0.381***	-0.381***	-0.382***	-0.381***	-0.381***	-0.382***
1968	-0.317***	-0.317***	-0.317***	-0.317***	-0.317***	-0.317***
1969	-0.276***	-0.276***	-0.276***	-0.276***	-0.276***	-0.276***
1970 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
1971	0.115***	0.115***	0.115***	0.115***	0.115***	0.115***
1972	0.269***	0.269***	0.269***	0.269***	0.269***	0.269***
1973	0.447***	0.447***	0.447***	0.447***	0.448***	0.448***
1974	0.642***	0.643***	0.642***	0.643***	0.643***	0.643***
1975	0.838***	0.838***	0.838***	0.839***	0.839***	0.839***
1976	0.949***	0.949***	0.949***	0.950***	0.950***	0.949***
1977	1.001***	1.001***	1.000***	1.001***	1.001***	1.001***
1978	0.902***	0.902***	0.902***	0.903***	0.903***	0.902***
1979	0.972***	0.972***	0.972***	0.973***	0.973***	0.972***
1980	1.079***	1.079***	1.078***	1.080***	1.080***	1.079***
1981	1.126***	1.126***	1.125***	1.128***	1.127***	1.126***
1982	1.129***	1.128***	1.128***	1.130***	1.130***	1.128***
Maternal Age at Birth (G3)						
15-19	-0.056*	-0.056**	-0.056*	-0.054*	-0.055*	-0.055*
20-24	-0.031*	-0.031*	-0.031*	-0.030*	-0.030*	-0.030*
25-29 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
30-34	-0.016	-0.016	-0.016	-0.016	-0.016	-0.017
35-39	-0.085**	-0.085**	-0.085**	-0.084**	-0.085**	-0.086**
40+	0.032	0.032	0.032	0.031	0.030	0.029
Paternal Age at Birth (G3)						
15-19	-0.072*	-0.071*	-0.071*	-0.070*	-0.070*	-0.072**
20-24	-0.055***	-0.055***	-0.055***	-0.055***	-0.055***	-0.056***
25-29 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
30-34	0.019	0.019	0.019	0.020	0.019	0.019
35-39	0.031	0.032	0.032	0.032	0.032	0.031
40+	0.000	0.001	0.001	0.001	0.001	0.000
N	509,739	509,739	509,739	509,739	509,739	509,739

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Table 5: Interaction between parent-child birth order and gender homophily and parental education level, paternal cousin sample, Swedish men and women born 1960-1982.

		Birth Order Homophily			Birth Order and Gender Homophily		
		Ordinal	FML	First-Later	Ordinal	FML	First-Later
		Model 10	Model 10	Model 10	Model 10	Model 10	Model 10
		b	b	b	b	b	b
Mother-Child Homophily	Yes	0.016	0.001	-0.008	-0.046*	-0.041	-0.032
	No (ref)	0.000	0.000	0.000	0.000	0.000	0.000
Maternal Education	Primary <9 years	-0.217***	-0.218***	-0.223***	-0.218***	-0.215***	-0.214***
	Primary - 9 years (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	Secondary - 10-11 years	0.196***	0.189***	0.178***	0.184***	0.183***	0.176***
	Secondary - 12 years	0.460***	0.462***	0.451***	0.452***	0.457***	0.449***
	Tertiary - 13-15 years	0.733***	0.723***	0.718***	0.714***	0.712***	0.705***
	Tertiary - 15+ years	0.983***	0.986***	0.973***	0.970***	0.973***	0.965***
	Post-graduate	1.152***	1.157***	1.156***	1.171***	1.167***	1.177***
	Missing	0.340*	0.235	0.252	0.300*	0.298*	0.290*
Mother-Child Homophily Maternal Education Interaction	Yes * Primary <9 years	-0.009	-0.007	0.007	-0.013	-0.028	-0.021
	Yes * Primary - 9 years (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	Yes * Secondary - 10-11 years	-0.009	0.007	0.028	0.045	0.049	0.069**
	Yes * Secondary - 12 years	0.026	0.023	0.042	0.097**	0.073*	0.093**
	Yes * Tertiary - 13-15 years	-0.001	0.023	0.030	0.100**	0.108**	0.117***
	Yes * Tertiary - 15+ years	0.024	0.019	0.041	0.118***	0.101**	0.119***
	Yes * Post-graduate	0.055	0.045	0.038	0.025	0.045	0.000
	Yes * Missing	-0.216	0.009	-0.025	-0.269	-0.254	-0.211
Father-Child Homophily	Yes	-0.005	0.013	0.005	-0.028	-0.009	-0.058**
	No (ref)	0.000	0.000	0.000	0.000	0.000	0.000
Paternal Education	Primary <9 years	-0.110***	-0.107***	-0.117***	-0.112***	-0.112***	-0.117***
	Primary - 9 years (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	Secondary - 10-11 years	0.037*	0.040*	0.034	0.036*	0.038*	0.030
	Secondary - 12 years	0.362***	0.362***	0.369***	0.352***	0.351***	0.343***
	Tertiary - 13-15 years	0.511***	0.521***	0.510***	0.505***	0.510***	0.494***
	Tertiary - 15+ years	0.810***	0.814***	0.815***	0.795***	0.799***	0.781***
	Post-graduate	1.103***	1.111***	1.117***	1.068***	1.074***	1.054***
	Missing	-0.134	-0.139	-0.145	-0.108	-0.112	-0.107
Father-Child Homophily Paternal Education	Yes * Primary <9 years	0.011	0.000	0.021	0.052	0.034	0.048
	Yes * Primary - 9 years (ref)	0.000	0.000	0.000	0.000	0.000	0.000

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

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		Birth Order Homophily			Birth Order and Gender Homophily		
		Ordinal	FML	First-Later	Ordinal	FML	First-Later
		Model 10	Model 10	Model 10	Model 10	Model 10	Model 10
		b	b	b	b	b	b
Interaction	Yes * Secondary - 10-11 years	0.018	0.006	0.018	0.054	0.030	0.055*
	Yes * Secondary - 12 years	0.015	0.011	-0.006	0.102**	0.097**	0.103***
	Yes * Tertiary - 13-15 years	0.026	-0.011	0.017	0.098**	0.056	0.107***
	Yes * Tertiary - 15+ years	0.021	0.005	0.002	0.143***	0.109**	0.152***
	Yes * Post-graduate	0.009	-0.018	-0.025	0.224**	0.192**	0.213**
	Yes * Missing	0.177	0.186	0.161	0.201	0.215	0.148
Paternal Sibling Group Size (G2)	1	-0.070***	-0.070***	-0.071***	-0.070***	-0.070***	-0.071***
	2 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	3	-0.024*	-0.024*	-0.024*	-0.024*	-0.024*	-0.024*
	4	-0.071***	-0.070***	-0.071***	-0.071***	-0.071***	-0.071***
	5+	-0.079***	-0.078***	-0.079***	-0.079***	-0.079***	-0.079***
Maternal Grandmother's Age at Birth (G2)	15-19	-0.163***	-0.163***	-0.163***	-0.162***	-0.162***	-0.163***
	20-24	-0.068***	-0.068***	-0.068***	-0.068***	-0.068***	-0.068***
	25-29 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	30-34	0.058***	0.058***	0.058***	0.058***	0.058***	0.058***
	35-39	0.072***	0.072***	0.072***	0.072***	0.072***	0.072***
	40+	0.119***	0.119***	0.119***	0.120***	0.119***	0.120***
Paternal Grandmother's Age at Birth (G2)	15-19	0.050	0.050	0.050	0.053	0.052	0.052
	20-24	0.001	0.001	0.001	0.001	0.001	0.001
	25-29 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	30-34	-0.038*	-0.038*	-0.038*	-0.037*	-0.037*	-0.038*
	35-39	-0.059*	-0.060*	-0.060*	-0.058*	-0.059*	-0.059*
	40+	-0.155***	-0.156***	-0.156***	-0.153***	-0.155***	-0.154***
Maternal Birth Year (G2)	1938-1945	0.223***	0.224***	0.224***	0.223***	0.224***	0.223***
	1946-1949	0.143***	0.143***	0.143***	0.143***	0.143***	0.143***
	1950-1954 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	1955-1959	-0.173***	-0.173***	-0.173***	-0.174***	-0.173***	-0.173***
	1960-1964	-0.367***	-0.365***	-0.364***	-0.368***	-0.366***	-0.368***
	1965-1969	-0.853**	-0.850**	-0.850**	-0.854**	-0.851**	-0.854**
Paternal Birth Year (G2)	1938-1945	0.024	0.024	0.023	0.024	0.024	0.024
	1946-1949	0.025	0.025	0.025	0.025	0.025	0.025
	1950-1954 (ref)	0.000	0.000	0.000	0.000	0.000	0.000

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

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		Birth Order Homophily			Birth Order and Gender Homophily		
		Ordinal	FML	First-Later	Ordinal	FML	First-Later
		Model 10	Model 10	Model 10	Model 10	Model 10	Model 10
		b	b	b	b	b	b
Index Birth Order (G3)	1955-1959	-0.036	-0.035	-0.035	-0.037	-0.035	-0.037
	1960-1964	-0.221**	-0.217**	-0.216**	-0.222**	-0.219**	-0.222**
	1965-1969	-0.568	-0.565	-0.567	-0.574	-0.564	-0.560
	1 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	2	-0.314***	-0.314***	-0.322***	-0.314***	-0.313***	-0.318***
	3	-0.484***	-0.488***	-0.497***	-0.485***	-0.487***	-0.493***
Mother Birth Order (G2)	4	-0.614***	-0.618***	-0.628***	-0.615***	-0.617***	-0.623***
	5	-0.665***	-0.669***	-0.680***	-0.667***	-0.669***	-0.673***
	1 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	2	-0.004	-0.004	-0.005	-0.008	-0.007	-0.005
	3	-0.011	-0.016	-0.016	-0.018	-0.018	-0.017
	4	-0.028	-0.034	-0.034	-0.036	-0.036	-0.035
Father Birth Order (G2)	5	-0.044	-0.049	-0.049	-0.053	-0.051	-0.050
	1 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	2	-0.001	0.002	-0.002	0.002	0.005	-0.003
	3	0.003	0.003	0.000	0.009	0.005	-0.002
	4	-0.021	-0.022	-0.025	-0.015	-0.020	-0.027
	5	-0.049	-0.050	-0.053	-0.044	-0.048	-0.055
Sex (G3)	Male (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	Female	0.528***	0.528***	0.528***	0.539***	0.539***	0.519***
Sibling Group Size (G3)	1	-0.244***	-0.244***	-0.244***	-0.243***	-0.244***	-0.244***
	2 (ref)	0.000	0.000	0.000	0.000	0.000	0.000
	3	-0.005	-0.006	-0.005	-0.005	-0.006	-0.005
	4	-0.058**	-0.060**	-0.059**	-0.059**	-0.061**	-0.058**
	5+	-0.163***	-0.165***	-0.163***	-0.164***	-0.166***	-0.163***
Birth Year (G3)	1960	-0.752***	-0.755***	-0.757***	-0.751***	-0.753***	-0.753***
	1961	-0.690***	-0.692***	-0.694***	-0.689***	-0.690***	-0.690***
	1962	-0.595***	-0.597***	-0.598***	-0.594***	-0.595***	-0.595***
	1963	-0.609***	-0.610***	-0.611***	-0.609***	-0.610***	-0.610***
	1964	-0.539***	-0.540***	-0.540***	-0.539***	-0.539***	-0.540***
	1965	-0.470***	-0.471***	-0.471***	-0.471***	-0.471***	-0.472***
	1966	-0.422***	-0.423***	-0.423***	-0.422***	-0.422***	-0.423***

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

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	Birth Order Homophily			Birth Order and Gender Homophily		
	Ordinal	FML	First-Later	Ordinal	FML	First-Later
	Model 10	Model 10	Model 10	Model 10	Model 10	Model 10
	b	b	b	b	b	b
	1967	-0.364***	-0.365***	-0.365***	-0.365***	-0.365***
	1968	-0.341***	-0.342***	-0.342***	-0.341***	-0.342***
	1969	-0.276***	-0.276***	-0.276***	-0.276***	-0.276***
	1970 (ref)	0.000	0.000	0.000	0.000	0.000
	1971	0.114***	0.114***	0.114***	0.114***	0.114***
	1972	0.284***	0.284***	0.283***	0.284***	0.284***
	1973	0.453***	0.453***	0.453***	0.454***	0.454***
	1974	0.612***	0.612***	0.612***	0.613***	0.613***
	1975	0.826***	0.826***	0.826***	0.827***	0.826***
	1976	0.922***	0.922***	0.922***	0.923***	0.923***
	1977	0.971***	0.971***	0.970***	0.971***	0.971***
	1978	0.890***	0.890***	0.889***	0.891***	0.891***
	1979	0.930***	0.930***	0.930***	0.931***	0.930***
	1980	1.072***	1.071***	1.071***	1.073***	1.072***
	1981	1.115***	1.114***	1.114***	1.116***	1.115***
	1982	1.119***	1.118***	1.118***	1.120***	1.119***
Maternal Age at Birth (G3)	15-19	-0.170***	-0.170***	-0.170***	-0.169***	-0.170***
	20-24	-0.080***	-0.080***	-0.080***	-0.079***	-0.080***
	25-29 (ref)	0.000	0.000	0.000	0.000	0.000
	30-34	0.024	0.024	0.025	0.025	0.024
	35-39	-0.009	-0.010	-0.009	-0.008	-0.010
	40+	-0.172	-0.172	-0.172	-0.172	-0.175*
Paternal Age at Birth (G3)	15-19	-0.050	-0.049	-0.050	-0.049	-0.051
	20-24	-0.042**	-0.042**	-0.042**	-0.041**	-0.042**
	25-29 (ref)	0.000	0.000	0.000	0.000	0.000
	30-34	0.005	0.005	0.005	0.005	0.005
	35-39	-0.027	-0.026	-0.027	-0.027	-0.027
	40+	-0.092	-0.090	-0.092	-0.092	-0.093
N		514,222	514,222	514,222	514,222	514,222

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

TABLE 6. Effect of parental sibling group size on offspring educational attainment at age 30, using twin births as a measure of an exogenous increase in parental family size for Swedish men and women born 1960-1982. Controls for maternal age at birth and birth year (single-year categories) included in models.

Sample	Estimation	beta	se	95% CI	N
First-born mothers	First Stage	0.771	0.014	0.743, 0.799	404,554
	Second Stage	0.007	0.046	-0.083, 0.098	404,554
First-born fathers	First Stage	0.769	0.015	0.740, 0.799	366,574
	Second Stage	-0.052	0.050	-0.150, 0.046	366,574
First- and second-born mothers	First Stage	0.768	0.014	0.740, 0.797	372,580
	Second Stage	-0.018	0.046	-0.109, 0.072	372,580
First- and second-born fathers	First Stage	0.761	0.014	0.734, 0.788	341,091
	Second Stage	-0.041	0.047	-0.133, 0.051	341,091
First-, second- and third-born mothers	First Stage	0.770	0.018	0.735, 0.806	226,649
	Second Stage	0.005	0.056	-0.105, 0.116	226,649
First-, second- and third-born fathers	First Stage	0.759	0.019	0.721, 0.796	207,898
	Second Stage	-0.178	0.060	-0.296, -0.059	207,898

Parental Sibling Group Size. In further analyses we examine in detail the relationship between sibling group size in the parents generation and whether that has any effect on offspring educational attainment. More specifically, we examine whether an exogenous shock to the sibling group size experienced by the parents through a twin birth has any consequence for the educational attainment of their own children. The results from those analyses are shown in Table 6. We estimate these models for six different samples. The first two samples are first-born mothers, and first-born fathers, whose parents may or may not have given birth to twins at parity two. The second two samples are first- and second-born mothers and fathers, whose parents may or may not have given birth to twins at parity three. The third two samples are first-, second-, and third-born mothers and fathers, whose parents may or may not have given birth to twins at parity four.

Table 6 shows the estimates resulting from both the first and second stages of the 2SLS estimation procedure. The first stage estimates in each case show that there is a very strong correlation between a twin birth and eventual family size, which is consistent with previous research using twins as an instrument for family size in the Nordic context (e.g. see Black et al., 2005a; Baranowska-Rataj et al., 2017). The results from the second stage estimates, however, show that there is no statistically significant, nor substantively meaningful, association between sibling group size in the parental generation and offspring educational attainment, with one exception; the children of first-, second-, and third-born fathers who experienced a twin birth at parity 4 have significantly lower educational attainment. The estimate suggests that this exogenous shock to the sibling group

size of the father leads to 0.18 years lower education at age 30 amongst the children. Although this may reflect a true negative effect, it is somewhat surprising that this is the only association that is significant or with a substantively meaningful effect size, suggesting that it should be interpreted with caution and in the context of the other negligible effects.

Overall we find that these results suggest that grandparental fertility outcomes, and its subsequent effect on resource dilution in the parental sibling group, has no multigenerational effect on grandchild educational attainment.

Additional Analyses of High School GPA and Long-term Earnings. In addition to the analyses presented above, we have conducted additional analyses examining high school grade point average, measured at age 16, as well as inflation-adjusted logged earnings averaged over ages 29 to 31 as outcome variables. The results from those analyses lead to same conclusions as those that we draw from our analyses of educational attainment. The results from these additional analyses of GPA and long-term earnings are shown in the Supplementary Information section of this article, in Tables S6 to S14.

DISCUSSION

In this study we have used a remarkable multigenerational population dataset in order to examine whether family demographic factors related to grandparental fertility, specifically birth order and family size, have any effect on the educational attainment of subsequent generations. In doing so, we are some of the first to explore the multigenerational effects of demographic processes and the complimentary processes of demographic and socioeconomic reproduction that have been underappreciated in the previous literature (Mare, 2011). We find that grandparental fertility behavior is indeed associated with grandchild educational attainment, but that this effect flows almost completely through the educational and socioeconomic attainment of the parents in the middle generation of the three generations that we study. That is to say, grandparental fertility influences the educational and socioeconomic attainment of the parents through the family size and birth order that they experience, but grandparental fertility has little to no effect on the grandchildren once we adjust for the educational and socioeconomic attainment of the parents. Indeed, to this end our

study suggests that parental birth order could even be employed as an instrument for parental educational and socioeconomic attainment, since its effects on the subsequent generation flow clearly through that attainment channel.

While our study speaks directly to the multigenerational importance of demographic factors for the socioeconomic attainment of subsequent generations, it also offers an insight into the findings of the much larger literature that has sprung up in recent years examining social stratification and mobility from a multigenerational perspective. This body of research has grappled with the question of whether social reproduction follows a Markovian process, where the attainment of any generation is influenced only by the attainment of the directly preceding generation, or whether there is a residual effect of grandparental, and even great-grandparental, status and resources net of the socioeconomic status of the parents. Increasingly research in this tradition has drawn the conclusion that grandparents *do* matter above and beyond the parents (e.g. see Warren and Hauser, 1997; Chan and Boliver, 2013; Zeng and Xie, 2014; Anderson et al., 2018). However, measurement of socioeconomic status is typically subject to measurement error as educational level and occupational status have many sub-dimensions. For example, educational level subsumes subject specialisation as well as quality of the training institution and the training itself. Occupational status, and even specific occupation, subsumes information like status within the workplace, how many people an individual is supervising, and the nature of the organisation and industry in which an individual is employed. All of those factors, and others, mean that measuring the importance of grandparental socioeconomic status for grandchild attainment is complicated and error-prone.

Although the measurement of grandparental socioeconomic status is often subject to measurement error, the measurement of grandparental fertility is far less vulnerable to this criticism. Family size and birth order in the parents generation in our population register data are measured with great accuracy, and as we have described in detail earlier, both birth order and family size are related to educational and socioeconomic attainment. Since birth order can be considered a quasi-random assignment to parental investment, and a twin-birth in the parental generation can be seen as an exogenous shock to the sibling group size and therefore resource levels within the sibling group, our study is able to get at the causal effect of resource distribution in the parental generation and how this may or may not influence the subsequent generation. We do find that parental birth order,

though not parental family size, is associated with the educational attainment of the grandchild generation, but that this association is wiped out after accounting for the attained education and socioeconomic status of the parents measured in later adulthood. In short, this study suggests that multigenerational demographic effects follow a Markovian process, and given that our measures are much less vulnerable to measurement error, and benefit from exogeneity, our findings suggest that if multigenerational social stratification and mobility studies were able to measure grandparental social status to the same high standard as we measure grandparental fertility, grandparental socioeconomic status would not be associated with grandchild outcomes either. Although our analyses of parent-child birth order and gender homophily do indicate that there are also non-Markovian processes operating, these effects on offspring educational attainment are relatively small.

It is also worth noting that our findings present themselves in Sweden, which has comparably speaking, low levels of inequality, a strong welfare state that supports the most needy, and a free educational system, including tertiary education. Thus, we expect that the intergenerational birth order effect that we observe in this study would be at least as likely to present itself in other countries whose social and political architecture exacerbates intergenerational inequality to a greater extent than in Sweden, and where rates of social mobility may be lower. However, it is worth also mentioning the specificity of the macro-demographic conditions in the period over which we study these multigenerational effects. Many of the grandparents whose fertility we examine in this study were born during the fertility transition in Sweden. Although total fertility was declining during this period, it was higher than today, attributable to lower levels of fertility control. Even though birth order was clearly a notable determinant of educational attainment within each generation, it is possible that birth order effects will become stronger over time as parents spend more time with children, focus even greater attention on quality over quantity, and practice longer birth spacing, as parental investment during the earliest years of life seems to be an important factor driving the birth order effect.

A noteworthy finding in our study is that we observe that parent-child birth order and gender homophily exerts only a small positive influence on the educational attainment of the child, but that this influence is stronger when parental education levels are higher. It seems that parents

with higher levels of human capital reserve a certain degree of favoritism for the child whose position within the family corresponds most closely to their own in childhood. That is, it seems that first-born fathers favor first-born sons, middle-born mothers favor middle-born daughters, and so on. That this favoritism should be observed at all is somewhat surprising, and even more so that it should be observed amongst parents with higher levels of education. It may be that a closer identification between parents and the child whose position in the family is reminiscent of their own is widespread, but that parents who have greater levels of education simply have more skills to pass on to them, hence the greater educational performance of the homophilous child in the long-run. Given that first-borns are the most common birth order in the general population, and increasingly so given declining fertility, this kind of parental favoritism may be a small part of the explanation for why first-borns are generally found to outperform later-born siblings; parent-child matches on being the first-born child are likely the most common pairings.

More generally, our study also has the potential to shed light on the literature on the intergenerational effects of parental education on offspring educational attainment. Studies have generally used one of three different study designs to estimate the causal impact of parental education on offspring education: twin studies, adoption studies, and instrumental variables. Twin studies on this topic exploit differences in educational attainment between identical (monozygotic) twins, and examine educational attainment amongst their children. These studies, using data from the United States, Denmark, and Norway, have consistently shown a positive effect of paternal education on offspring educational attainment, but rarely a positive effect of maternal education (Behrman and Rosenzweig, 2002; Antonovics and Goldberger, 2005; Bingley et al., 2009; Hægeland et al., 2010; Pronzato, 2012). Research examining how parental educational level influences the educational attainment of adopted children, using data from the United States, Norway, and Sweden, typically shows that both maternal and paternal levels of education matter for adoptee attainment (Dearden et al., 1997; Plug, 2004; Björklund et al., 2006; Sacerdote, 2007; Hægeland et al., 2010). Studies using compulsory school reforms as an instrument to investigate whether parental educational attainment effects offspring educational have shown that in the UK and Norway greater maternal education increases education amongst the offspring, while greater paternal education does not have a significant effect (Chevalier, 2004; Black et al., 2005b). However, a study using data

on compulsory school reforms from the United States has shown that both maternal and paternal education matter for offspring attainment (Oreopoulos et al., 2006). While these studies do consistently find that parental educational level does exert a small effect on the educational attainment of their children, there are inconsistencies in whether it is the mother's or the father's education that matters the more. If, as we argue, parental birth order can be seen as an instrument for parental educational attainment, our study suggests that both maternal and paternal educational levels matters for offspring educational attainment, but that maternal educational level matters slightly more. This is consistent with a broader literature that demonstrates the importance of parental educational levels, but particularly maternal educational level, for the developmental trajectories of children (e.g. Kalil et al., 2012).

In conclusion, we do not find that family size in the parental generation matters for the subsequent generation, but we do find that parental birth order matters, albeit indirectly, for offspring educational and labor market attainment net of the child's own birth order. This intergenerational birth order pattern suggests that differences in grandparental investment between siblings in the parental generation matters not only for their own educational attainment, but that this also has spillover effects into the subsequent generation due to the effects on parental educational and socioeconomic attainment. Thus, we observe the production of inequalities within families and across generations, an all the more remarkable finding since we are able to adjust for unmeasured confounding by comparing full cousins who share the same biological grandparents. Differences in parental investment (or grandparental investment) within a family are naturally much smaller than the differences in parental investment that are observed between different families, and our study therefore highlights just how important parental investment is for offspring attainment, and how this has the potential to accumulate over subsequent generations. However, as we have detailed, these multigenerational patterns seem to be entirely, or almost entirely, explained by the effect that grandparental investment has on parental educational and labor market attainment. When we take account of the level of education and labor market success that parents have attained by age 40 or 50, the differences in parental investment exercised by the grandparents no longer matter for the grandchildren; the effects of grandparental investment appear to flow entirely through the parental generation, and this process of multigenerational stratification thereby seems to approximate a

memoryless Markovian process. Given these findings, we can speculate that multigenerational effects of grandparental socioeconomic resources on grandchildren may need to be re-evaluated.

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SUPPLEMENTARY INFORMATION

Table S1: Descriptive statistics for birth order and educational attainment at age 30 for generation 3 (G3), based upon maternal cousin sample, Swedish men and women born 1960-1982.

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
N		300,257	162,985	39,219	5,746	1,532	202,317	160,275	81,438	35,953	29,756	245,376	155,266	65,549	25,432	18,116
Years of Education	Mean	12.7	12.8	12.8	12.5	12.1	12.7	12.8	12.8	12.7	12.5	12.7	12.8	12.7	12.6	12.5
	SD	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2
Mother Birth Order	Mean	2.1	2.2	2.2	2.2	2.1	1.0	2.0	3.0	4.0	5.9	2.1	2.1	2.2	2.3	2.4
	SD	1.3	1.3	1.4	1.4	1.4	0.0	0.0	0.0	0.0	1.2	1.3	1.3	1.4	1.5	1.6
Father Birth Order	Mean	1.9	1.9	1.9	2.0	2.0	1.8	1.9	1.9	2.0	2.1	1.0	2.0	3.0	4.0	5.8
	SD	1.2	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.2	1.3	0.0	0.0	0.0	0.0	1.2
Index Birth Order	Mean	1.0	2.0	3.0	4.0	5.5	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.5	1.5	1.5
	SD	0.0	0.0	0.0	0.0	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Index Sibling Group Size	Mean	2.0	2.5	3.4	4.6	6.4	2.2	2.3	2.3	2.4	2.4	2.2	2.3	2.4	2.4	2.4
	SD	0.9	0.8	0.8	1.0	1.7	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.1	1.1	1.1
Index Birth Year	Mean	1973.3	1974.7	1975.9	1976.4	1977.1	1973.7	1974.1	1974.4	1974.4	1974.5	1973.7	1974.2	1974.4	1974.5	1975.0
	SD	5.6	5.0	4.7	4.6	4.4	5.6	5.4	5.3	5.3	5.1	5.5	5.4	5.3	5.3	5.0
Index Mother Age	Mean	23.5	26.2	28.8	30.4	32.2	25.1	24.9	24.7	24.4	24.1	25.0	24.9	24.7	24.4	23.9
	SD	4.2	3.8	3.8	4.0	4.1	4.6	4.4	4.4	4.3	4.2	4.5	4.4	4.4	4.4	4.3
Index Father Age	Mean	25.7	28.4	31.0	32.6	34.3	27.0	27.2	27.1	27.1	26.9	27.3	27.1	26.9	26.6	26.2
	SD	4.2	3.8	3.9	4.0	4.3	4.5	4.4	4.4	4.4	4.4	4.5	4.4	4.4	4.4	4.2
Mother Sibling Group Size	Mean	3.4	3.5	3.8	4.0	3.9	2.7	3.1	4.0	5.0	7.0	3.4	3.5	3.6	3.7	3.8
	SD	1.7	1.7	1.8	2.0	2.2	1.3	1.2	1.3	1.3	1.9	1.7	1.7	1.8	1.9	2.0
Father Sibling Group Size	Mean	2.9	2.9	3.1	3.4	3.7	2.9	2.9	3.0	3.1	3.2	2.2	2.9	3.9	5.0	6.9
	SD	1.6	1.7	1.8	1.9	2.2	1.6	1.6	1.7	1.8	1.9	1.2	1.2	1.3	1.4	1.9
Mother Birth Year	Mean	1949.8	1948.5	1947.2	1946.0	1944.9	1948.6	1949.2	1949.7	1949.9	1950.3	1948.7	1949.2	1949.7	1950.1	1951.1
	SD	5.5	4.9	4.4	4.1	3.8	5.4	5.2	5.1	5.1	4.8	5.3	5.2	5.2	5.1	5.0
Father Birth Year	Mean	1947.6	1946.3	1944.9	1943.8	1942.8	1946.6	1946.9	1947.2	1947.3	1947.6	1946.4	1947.1	1947.5	1947.8	1948.8
	SD	5.3	4.7	4.2	3.9	3.6	5.2	5.0	5.0	5.0	4.8	5.1	5.1	5.1	5.0	4.6
Maternal Grandmother Age at Birth	Mean	27.7	27.9	27.8	27.7	28.0	24.6	28.0	30.6	32.4	34.9	27.7	27.8	27.8	27.9	27.8
	SD	6.0	5.9	5.8	5.9	6.3	4.9	5.1	5.2	5.1	4.9	5.9	5.9	6.0	6.1	6.3
Paternal Grandmother Age at Birth	Mean	28.2	28.5	28.7	28.7	28.3	28.3	28.3	28.4	28.3	28.4	26.1	29.1	31.3	32.9	34.9
	SD	6.1	6.1	6.1	6.2	6.3	6.1	6.1	6.1	6.2	6.2	5.7	5.5	5.3	5.2	4.9
Mother Education (%)	Primary (<9 years)	9.9	11.4	15.7	22.6	33.8	9.8	10.7	12.2	13.5	15.1	11.1	10.8	11.2	11.6	10.9
	Primary (9 years)	13.1	12.0	11.3	11.8	11.0	11.6	12.5	13.3	14.0	15.7	12.1	12.3	13.4	14.3	15.2
	Secondary (10-11 years)	42.6	41.8	41.2	39.5	34.5	41.1	41.9	42.8	44.9	46.0	41.5	42.2	42.6	45.1	47.1
	Secondary (12 years)	8.9	8.5	7.3	5.7	5.4	9.2	8.6	8.1	7.8	7.1	8.7	8.4	8.7	7.9	8.9
	Tertiary (13-15 years)	11.8	11.9	10.4	7.9	6.7	12.5	11.9	11.1	9.6	8.5	12.0	12.0	11.2	9.6	8.8
	Tertiary (15+ years)	13.3	13.9	13.7	12.2	7.8	15.3	13.9	12.1	9.7	7.3	14.1	13.8	12.6	11.2	9.0
	Graduate school	0.4	0.4	0.4	0.4	0.3	0.5	0.4	0.4	0.3	0.1	0.5	0.4	0.3	0.3	0.1
Missing	0.1	0.1	0.0	0.1	0.5	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	

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Table S1 – Continued from previous page

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
Mother EGP (%)	I	0.9	0.8	0.7	0.6	0.9	0.9	0.9	0.8	0.7	0.5	0.9	0.9	0.7	0.6	0.4
	II	31.6	34.7	32.9	27.7	23.4	35.6	33.5	29.8	26.1	22.9	35.2	32.6	28.8	25.6	20.8
	III	10.0	8.1	6.3	5.8	5.9	8.8	9.2	9.4	10.0	8.6	8.9	9.2	9.4	8.9	8.8
	IV	2.4	3.0	4.5	6.6	6.8	2.7	2.9	3.1	2.7	2.9	2.7	2.9	3.0	3.3	3.1
	VI-VII	29.8	28.2	29.6	35.2	42.7	27.6	28.7	30.8	33.8	36.2	28.1	29.1	31.9	33.2	35.2
	Unknown	25.2	25.2	26.0	24.1	20.4	24.5	24.8	26.1	26.8	29.0	24.2	25.3	26.2	28.5	31.8
Father Education (%)	Primary (<9 years)	18.5	21.1	26.5	33.2	38.9	19.6	19.4	20.8	22.0	24.4	18.2	20.3	22.9	26.4	27.8
	Primary (9 years)	13.6	11.4	9.3	7.9	7.8	12.0	12.4	12.8	13.6	14.1	11.6	12.4	13.8	14.8	16.8
	Secondary (10-11 years)	30.9	28.3	27.0	28.0	28.8	28.9	29.3	30.4	31.3	32.8	29.0	29.6	30.7	31.6	33.2
	Secondary (12 years)	15.3	16.5	15.3	12.2	10.1	16.0	16.0	15.1	14.8	13.6	17.0	15.7	13.4	11.8	10.2
	Tertiary (13-15 years)	9.8	10.0	8.6	6.4	4.2	10.0	10.0	9.6	8.8	8.1	10.5	9.7	8.8	7.5	6.5
	Tertiary (15+ years)	10.4	11.3	11.5	10.4	8.0	11.8	11.3	9.9	8.3	6.3	12.0	10.8	9.3	7.2	4.8
	Graduate school	1.0	1.2	1.7	1.8	2.0	1.4	1.2	1.0	0.9	0.5	1.4	1.1	1.0	0.5	0.3
Missing	0.4	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.2	0.4	0.3	0.3	0.3	0.3	
Father EGP (%)	I	1.7	1.4	1.0	0.9	1.0	1.6	1.6	1.5	1.2	1.1	1.6	1.6	1.3	1.0	0.9
	II	19.1	21.3	20.5	17.2	15.1	21.1	20.7	18.5	16.7	14.8	22.3	19.7	16.2	13.4	10.1
	III	3.2	2.4	1.4	1.1	1.2	2.7	2.8	2.9	2.7	2.6	2.7	2.8	2.8	2.7	2.5
	IV	5.2	5.6	6.7	8.7	7.1	5.3	5.4	5.9	5.7	6.0	5.0	5.8	6.0	6.5	6.3
	VI-VII	49.8	48.9	50.0	53.0	55.0	47.8	48.4	51.1	54.0	58.3	46.8	49.4	53.8	57.3	62.9
	Unknown	21.2	20.4	20.3	19.2	20.6	21.6	21.2	20.1	19.8	17.2	21.6	20.7	19.9	19.0	17.3

Table S2: Descriptive statistics for birth order and educational attainment at age 30 for generation 3 (G3), based upon paternal cousin sample, Swedish men and women born 1960-1982.

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
N		301,480	165,810	39,570	5,829	1,533	#####	156,373	67,726	27,265	20,763	212,282	162,831	79,943	33,649	25,517
Years of Education	Mean	12.7	12.9	12.8	12.5	12.2	12.8	12.8	12.7	12.6	12.5	12.7	12.8	12.8	12.7	12.6
	SD	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2
Mother Birth Order	Mean	1.9	1.9	2.0	2.0	2.1	1.0	2.0	3.0	4.0	5.9	1.9	1.9	2.0	2.0	2.1
	SD	1.2	1.2	1.3	1.3	1.3	0.0	0.0	0.0	0.0	1.2	1.2	1.2	1.2	1.3	1.4
Father Birth Order	Mean	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.3	1.0	2.0	3.0	4.0	5.8
	SD	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.3	1.4	1.5	0.0	0.0	0.0	0.0	1.2
Index Birth Order	Mean	1.0	2.0	3.0	4.0	5.5	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.5	1.5	1.5
	SD	0.0	0.0	0.0	0.0	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7
Index Sibling Group Size	Mean	2.0	2.5	3.4	4.5	6.4	2.3	2.3	2.3	2.4	2.4	2.2	2.3	2.4	2.4	2.5
	SD	0.9	0.8	0.8	1.0	1.7	1.0	1.0	1.0	1.1	1.2	1.0	1.0	1.0	1.0	1.1
Index Birth Year	Mean	1973.3	1974.7	1975.9	1976.4	1976.9	1973.8	1974.1	1974.2	1974.2	1974.4	1973.4	1974.1	1974.5	1974.6	1975.1
	SD	5.7	5.0	4.7	4.6	4.5	5.5	5.4	5.4	5.3	5.2	5.6	5.4	5.3	5.2	4.9
Index Mother Age	Mean	23.5	26.2	28.8	30.5	32.2	25.0	24.9	24.6	24.3	24.0	25.0	25.0	24.8	24.5	24.1
	SD	4.2	3.8	3.8	3.9	4.2	4.5	4.4	4.4	4.3	4.2	4.5	4.4	4.4	4.4	4.2
Index Father Age	Mean	25.7	28.4	31.0	32.6	34.3	27.1	27.2	27.1	26.9	26.8	27.3	27.1	26.9	26.7	26.3
	SD	4.3	3.9	3.8	3.9	4.2	4.5	4.5	4.5	4.5	4.5	4.7	4.5	4.4	4.4	4.1
Mother Sibling Group Size	Mean	2.9	2.9	3.1	3.4	3.7	2.2	2.8	3.8	4.9	6.9	2.8	2.9	3.0	3.1	3.2
	SD	1.6	1.6	1.8	2.0	2.2	1.2	1.1	1.2	1.3	1.9	1.6	1.6	1.7	1.8	1.9
Father Sibling Group Size	Mean	3.4	3.5	3.8	4.0	3.9	3.4	3.4	3.5	3.6	3.8	2.7	3.2	4.1	5.1	7.0
	SD	1.7	1.7	1.8	2.0	2.2	1.7	1.7	1.7	1.8	2.0	1.3	1.3	1.3	1.4	1.9
Mother Birth Year	Mean	1949.8	1948.5	1947.1	1946.0	1944.7	1948.8	1949.1	1949.6	1949.9	1950.4	1948.4	1949.2	1949.7	1950.1	1951.1
	SD	5.5	4.9	4.4	4.1	3.7	5.3	5.2	5.2	5.1	4.9	5.4	5.1	5.1	5.1	4.9
Father Birth Year	Mean	1947.5	1946.3	1944.9	1943.8	1942.7	1946.7	1946.9	1947.1	1947.3	1947.6	1946.1	1947.0	1947.6	1947.9	1948.8
	SD	5.3	4.7	4.2	3.9	3.6	5.1	5.0	5.0	5.0	4.9	5.2	5.0	5.0	4.9	4.6
Maternal Grandmother Age at Birth	Mean	28.0	28.3	28.4	28.3	28.1	25.7	28.8	31.2	32.9	35.1	28.1	28.1	28.1	28.1	28.0
	SD	6.1	6.1	6.1	6.3	6.5	5.7	5.4	5.4	5.2	4.9	6.1	6.1	6.2	6.2	6.4
Paternal Grandmother Age at Birth	Mean	27.9	28.0	28.0	28.0	28.0	27.9	27.9	28.0	28.0	28.0	25.0	28.3	30.7	32.5	34.7
	SD	5.9	5.8	5.8	5.9	6.2	5.8	5.8	5.9	6.0	6.0	5.0	5.2	5.1	5.0	4.8
Mother Education (%)	Primary (<9 years)	9.2	10.5	14.7	21.0	32.5	9.0	10.1	11.9	13.8	15.1	10.6	9.8	10.1	10.9	9.9
	Primary (9 years)	12.7	11.8	11.2	11.7	11.4	11.6	12.3	13.0	14.0	16.1	11.8	12.0	12.7	13.6	14.8
	Secondary (10-11 years)	42.2	41.6	40.9	39.6	34.9	41.0	41.7	43.2	44.0	45.8	40.8	41.5	42.7	44.8	47.1
	Secondary (12 years)	9.4	9.0	7.5	5.9	5.0	9.6	9.0	8.2	8.0	7.2	9.0	9.1	9.2	8.6	9.3
	Tertiary (13-15 years)	12.2	12.1	10.9	8.6	7.2	12.7	12.1	11.0	9.9	8.4	12.2	12.6	11.6	10.4	9.5
	Tertiary (15+ years)	13.9	14.4	14.3	12.9	8.4	15.5	14.2	12.2	9.8	7.2	15.0	14.6	13.3	11.4	9.2
	Graduate school	0.4	0.5	0.4	0.3	0.3	0.5	0.5	0.4	0.3	0.1	0.5	0.5	0.4	0.3	0.2
Missing	0.2	0.1	0.1	0.1	0.5	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	

Continued on next page

Table S2 – Continued from previous page

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
Mother EGP (%)	I	0.9	0.8	0.7	0.6	0.9	1.0	0.8	0.7	0.7	0.4	1.0	0.9	0.7	0.7	0.5
	II	32.4	35.4	33.8	29.5	23.7	36.0	33.6	29.8	26.5	22.3	36.5	33.9	30.4	26.9	22.4
	III	10.1	8.1	5.9	5.4	5.9	9.0	9.1	9.2	9.7	8.6	8.8	9.3	9.4	9.3	9.1
	IV	2.4	2.9	4.3	5.7	6.4	2.6	2.9	3.1	2.7	2.6	2.7	2.8	2.7	2.9	2.9
	VI-VII	29.0	27.5	29.4	34.2	43.3	27.0	28.4	30.8	33.4	36.3	27.0	27.9	30.7	32.5	34.6
	Unknown	25.2	25.3	26.1	24.6	19.8	24.4	25.2	26.4	27.0	29.8	24.0	25.3	26.0	27.6	30.5
Father Education (%)	Primary (<9 years)	18.8	21.4	26.6	33.3	39.7	19.6	20.2	21.5	22.8	25.5	18.6	19.8	22.3	26.2	27.3
	Primary (9 years)	13.6	11.4	9.2	8.0	7.5	12.1	12.3	12.8	14.0	14.4	11.3	12.3	13.7	14.4	17.0
	Secondary (10-11 years)	30.3	27.7	26.5	27.3	27.8	28.5	28.9	30.1	31.3	32.7	28.1	29.1	30.1	31.2	33.0
	Secondary (12 years)	15.0	16.1	15.0	11.9	9.5	15.8	15.4	14.5	14.2	12.8	16.7	15.7	13.8	12.2	10.1
	Tertiary (13-15 years)	9.9	10.0	8.7	6.6	4.4	10.1	10.0	9.5	8.5	7.9	10.6	9.9	9.1	7.7	7.1
	Tertiary (15+ years)	10.9	11.8	12.1	10.8	8.9	12.2	11.6	10.2	7.9	6.1	12.9	11.7	9.7	7.6	5.0
	Graduate school	1.2	1.4	1.8	1.9	2.0	1.4	1.4	1.1	0.9	0.5	1.6	1.3	1.1	0.6	0.4
Missing	0.4	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.4	0.3	0.2	0.2	0.2	
Father EGP (%)	I	1.7	1.4	1.1	0.8	1.0	1.6	1.6	1.4	1.2	1.0	1.7	1.7	1.4	1.1	1.0
	II	19.3	21.5	20.7	17.7	15.1	21.4	20.4	18.3	16.3	13.8	22.9	20.7	17.2	13.9	10.4
	III	3.2	2.4	1.5	1.0	1.0	2.8	2.8	2.9	2.7	2.6	2.6	2.9	2.9	2.9	2.7
	IV	5.2	5.5	6.5	8.2	6.9	5.3	5.3	6.1	5.9	6.1	5.0	5.4	5.9	6.5	6.4
	VI-VII	49.4	48.5	49.6	52.1	55.1	47.6	48.6	51.0	54.3	58.9	45.6	48.3	52.8	57.0	62.1
	Unknown	21.3	20.6	20.7	20.2	20.9	21.4	21.3	20.3	19.6	17.7	22.3	21.0	19.8	18.6	17.4

Table S3: Parental Birth Order and Offspring Educational Attainment at Age 30, Linear Regression Model on Full Population of Swedish Men and Women Born 1960-1982.

		Model 1			Model 2			Model 3			Model 4		
		b	se	95% CI	b	se	95% CI	b	se	95% CI	b	se	95% CI
Mother Birth Order (G2)	1	0.00			0.00			0.00			0.00		
	2	0.03	0.01	0.02, 0.04	-0.21	0.01	-0.22, -0.19	-0.14	0.01	-0.15, -0.12	-0.02	0.01	-0.03, 0.00
	3	-0.07	0.01	-0.09, -0.05	-0.35	0.01	-0.37, -0.33	-0.23	0.01	-0.25, -0.21	-0.04	0.01	-0.06, -0.02
	4	-0.21	0.01	-0.24, -0.19	-0.41	0.02	-0.45, -0.38	-0.28	0.01	-0.31, -0.25	-0.06	0.01	-0.08, -0.03
	5+	-0.33	0.02	-0.36, -0.30	-0.49	0.02	-0.53, -0.45	-0.33	0.02	-0.37, -0.30	-0.06	0.02	-0.09, -0.03
Father Birth Order (G2)	1	0.00			0.00		0.00, 0.00	0.00			0.00		
	2	0.04	0.01	0.03, 0.06	-0.19	0.01	-0.20, -0.17	-0.13	0.01	-0.14, -0.11	-0.01	0.01	-0.02, 0.00
	3	-0.03	0.01	-0.04, -0.01	-0.30	0.01	-0.32, -0.27	-0.21	0.01	-0.23, -0.19	-0.03	0.01	-0.04, -0.01
	4	-0.17	0.01	-0.20, -0.14	-0.38	0.02	-0.41, -0.34	-0.28	0.02	-0.30, -0.25	-0.06	0.01	-0.09, -0.03
	5+	-0.27	0.02	-0.30, -0.23	-0.43	0.02	-0.47, -0.39	-0.30	0.02	-0.34, -0.27	-0.07	0.02	-0.10, -0.03
Maternal Sibling Group Size (G2)	1				-0.24	0.01	-0.26, -0.22	-0.16	0.01	-0.18, -0.15	-0.07	0.01	-0.09, -0.06
	2				0.00			0.00			0.00		
	3				0.01	0.01	-0.01, 0.03	0.02	0.01	0.01, 0.04	0.01	0.01	0.00, 0.02
	4				-0.10	0.01	-0.12, -0.08	-0.06	0.01	-0.08, -0.04	-0.01	0.01	-0.03, 0.00
	5+				-0.29	0.01	-0.32, -0.27	-0.18	0.01	-0.20, -0.16	-0.05	0.01	-0.07, -0.03
Paternal Sibling Group Size (G2)	1				-0.24	0.01	-0.26, -0.23	-0.17	0.01	-0.19, -0.16	-0.09	0.01	-0.10, -0.08
	2				0.00			0.00			0.00		
	3				0.02	0.01	0.01, 0.04	0.03	0.01	0.02, 0.05	0.03	0.01	0.02, 0.04
	4				-0.08	0.01	-0.10, -0.06	-0.02	0.01	-0.04, 0.00	0.03	0.01	0.02, 0.05
	5+				-0.27	0.01	-0.29, -0.24	-0.14	0.01	-0.16, -0.12	0.02	0.01	0.00, 0.04
Maternal Grandmother's Age at Birth (G2)	15-19				-0.72	0.01	-0.74, -0.69	-0.47	0.01	-0.49, -0.45	-0.23	0.01	-0.25, -0.20
	20-24				-0.37	0.01	-0.39, -0.36	-0.24	0.01	-0.26, -0.23	-0.11	0.01	-0.12, -0.10
	25-29				0.00			0.00			0.00		
	30-34				0.17	0.01	0.16, 0.19	0.11	0.01	0.09, 0.12	0.05	0.01	0.04, 0.06
	35-39				0.21	0.01	0.19, 0.23	0.12	0.01	0.10, 0.14	0.08	0.01	0.06, 0.09
Paternal Grandmother's Age at Birth (G2)	15-19				0.20	0.01	0.17, 0.23	0.11	0.01	0.09, 0.14	0.11	0.01	0.09, 0.14
	20-24				-0.67	0.01	-0.70, -0.65	-0.43	0.01	-0.46, -0.41	-0.19	0.01	-0.21, -0.16
	25-29				-0.36	0.01	-0.37, -0.34	-0.24	0.01	-0.25, -0.23	-0.11	0.01	-0.12, -0.10
	30-34				0.00			0.00			0.00		
	35-39				0.16	0.01	0.14, 0.17	0.10	0.01	0.08, 0.11	0.05	0.01	0.04, 0.07
Maternal Birth Year (G2)	1938-1945				0.19	0.01	0.17, 0.21	0.11	0.01	0.10, 0.13	0.08	0.01	0.07, 0.10
	1946-1949				0.14	0.01	0.11, 0.17	0.07	0.01	0.04, 0.09	0.09	0.01	0.07, 0.12
	1950-1954				-0.19	0.01	-0.21, -0.17	0.45	0.01	0.42, 0.48	0.19	0.01	0.16, 0.21
	1955-1959				-0.02	0.01	-0.04, -0.01	0.25	0.01	0.23, 0.27	0.08	0.01	0.06, 0.09
	1960-1964				-0.24	0.01	-0.26, -0.22	-0.34	0.01	-0.36, -0.32	-0.16	0.01	-0.18, -0.14
Paternal Birth Year (G2)	1965-1969				-0.61	0.02	-0.65, -0.57	-0.69	0.02	-0.73, -0.64	-0.40	0.02	-0.44, -0.36
	1938-1945				-1.10	0.12	-1.32, -0.87	-0.95	0.12	-1.18, -0.72	-0.66	0.11	-0.88, -0.45
	1946-1949				-0.52	0.01	-0.54, -0.50	0.09	0.01	0.06, 0.11	0.04	0.01	0.02, 0.07
	1950-1954				-0.17	0.01	-0.19, -0.15	0.06	0.01	0.04, 0.07	0.02	0.01	0.00, 0.04
	1955-1959				0.00			0.00			0.00		
Index Birth Order (G3)	1960-1964				-0.08	0.01	-0.11, -0.05	-0.14	0.01	-0.16, -0.11	-0.04	0.01	-0.07, -0.02
	1965-1969				-0.41	0.03	-0.48, -0.34	-0.39	0.03	-0.46, -0.32	-0.25	0.03	-0.32, -0.19
	1				-0.74	0.24	-1.22, -0.26	-0.44	0.25	-0.93, 0.05	-0.33	0.24	-0.81, 0.15
	2				0.00			0.00			0.00		
	3							-0.63	0.00	-0.64, -0.62	-0.40	0.00	-0.41, -0.39
Sex (G3)	4							-1.16	0.01	-1.18, -1.14	-0.67	0.01	-0.69, -0.65
	5+							-1.52	0.02	-1.56, -1.47	-0.84	0.02	-0.89, -0.80
	Male							-1.84	0.05	-1.94, -1.73	-0.98	0.05	-1.08, -0.89
	Female							0.00			0.00		
	0.54	0.00	0.53, 0.54	0.54	0.00	0.53, 0.55							
Sibling Group Size (G3)	1							-0.58	0.01	-0.59, -0.56	-0.42	0.01	-0.43, -0.41
	2							0.00			0.00		
	3							0.20	0.01	0.19, 0.21	0.07	0.01	0.06, 0.08
	4							0.15	0.01	0.13, 0.18	0.00	0.01	-0.02, 0.02
	5+							-0.01	0.02	-0.06, 0.03	-0.13	0.02	-0.17, -0.09
Birth Year (G3)	1960							-1.09	0.04	-1.16, -1.02	-0.63	0.03	-0.69, -0.56
	1961							-1.01	0.03	-1.06, -0.95	-0.60	0.03	-0.66, -0.55
	1962							-0.87	0.03	-0.92, -0.82	-0.52	0.02	-0.56, -0.47
	1963							-0.84	0.02	-0.88, -0.80	-0.53	0.02	-0.57, -0.49
	1964							-0.76	0.02	-0.79, -0.72	-0.50	0.02	-0.54, -0.47
	1965							-0.64	0.02	-0.68, -0.61	-0.43	0.02	-0.46, -0.40
	1966							-0.52	0.02	-0.56, -0.49	-0.35	0.01	-0.38, -0.32
1967							-0.44	0.01	-0.47, -0.41	-0.31	0.01	-0.34, -0.29	

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Table S3 – Continued from previous page

	Model 1			Model 2			Model 3			Model 4		
	b	se	95% CI	b	se	95% CI	b	se	95% CI	b	se	95% CI
							-0.37	0.01	-0.40, -0.34	-0.29	0.01	-0.31, -0.26
							-0.29	0.01	-0.32, -0.26	-0.25	0.01	-0.28, -0.23
							0.00			0.00		
							0.19	0.01	0.16, 0.22	0.09	0.01	0.07, 0.12
							0.39	0.01	0.36, 0.41	0.25	0.01	0.23, 0.28
							0.59	0.01	0.56, 0.61	0.42	0.01	0.40, 0.45
							0.79	0.01	0.76, 0.82	0.59	0.01	0.57, 0.62
							1.02	0.02	0.99, 1.05	0.79	0.01	0.77, 0.82
							1.16	0.02	1.13, 1.19	0.90	0.02	0.87, 0.93
							1.23	0.02	1.20, 1.26	0.93	0.02	0.90, 0.96
							1.17	0.02	1.13, 1.21	0.83	0.02	0.80, 0.87
							1.26	0.02	1.22, 1.30	0.88	0.02	0.84, 0.91
							1.44	0.02	1.40, 1.48	1.00	0.02	0.97, 1.04
							1.48	0.02	1.44, 1.53	1.00	0.02	0.96, 1.04
							1.52	0.02	1.47, 1.56	1.00	0.02	0.96, 1.04
Maternal Age at Birth (G3)							-0.67	0.01	-0.69, -0.64	-0.40	0.01	-0.43, -0.38
							-0.41	0.01	-0.42, -0.39	-0.19	0.01	-0.21, -0.18
							0.00			0.00		
							0.14	0.01	0.12, 0.15	0.04	0.01	0.03, 0.06
							0.06	0.02	0.02, 0.10	0.01	0.02	-0.03, 0.05
							0.04	0.06	-0.08, 0.17	0.07	0.06	-0.05, 0.19
Paternal Age at Birth (G3)							-0.24	0.02	-0.27, -0.20	-0.27	0.02	-0.30, -0.24
							-0.21	0.01	-0.23, -0.20	-0.18	0.01	-0.19, -0.16
							0.00			0.00		
							0.03	0.01	0.01, 0.05	0.07	0.01	0.05, 0.08
							-0.08	0.02	-0.11, -0.05	0.05	0.01	0.02, 0.08
							-0.22	0.03	-0.29, -0.16	0.02	0.03	-0.04, 0.08
Maternal Educational Attainment (G2)	Primary <9 years									-0.15	0.01	-0.17, -0.13
	Primary - 9 years									0.00		
	Secondary - 10-11 years									0.25	0.01	0.23, 0.26
	Secondary - 12 years									0.60	0.01	0.58, 0.62
	Tertiary - 13-15 years									0.84	0.01	0.82, 0.86
	Tertiary - 15+ years									1.17	0.01	1.15, 1.18
	Post-graduate									1.44	0.03	1.37, 1.50
	Missing									0.23	0.09	0.06, 0.40
Maternal Social Class (EGP) (G2)	I									0.00	0.02	-0.04, 0.05
	II									0.00		
	III									-0.14	0.01	-0.16, -0.13
	IV									-0.22	0.02	-0.25, -0.19
	VI-VII									-0.29	0.01	-0.30, -0.28
	Unknown									-0.29	0.01	-0.30, -0.28
Paternal Educational Attainment (G2)	Primary <9 years									-0.06	0.01	-0.07, -0.04
	Primary - 9 years									0.00		
	Secondary - 10-11 years									0.15	0.01	0.14, 0.17
	Secondary - 12 years									0.52	0.01	0.50, 0.54
	Tertiary - 13-15 years									0.73	0.01	0.71, 0.75
	Tertiary - 15+ years									1.16	0.01	1.14, 1.18
	Post-graduate									1.54	0.02	1.50, 1.58
	Missing									-0.13	0.05	-0.22, -0.03
Paternal Social Class (EGP) (G2)	I									0.05	0.02	0.02, 0.09
	II									0.00		
	III									-0.16	0.02	-0.19, -0.13
	IV									-0.17	0.01	-0.19, -0.15
	VI-VII									-0.26	0.01	-0.27, -0.25
	Unknown									-0.15	0.01	-0.17, -0.14
N			907,908			907,908			907,908			907,908

Table S4: Parental Birth Order and Offspring Educational Attainment at Age 30, Fixed Effects Linear Regression on Maternal Cousin Sample of Swedish Men and Women Born 1960-1982.

		Model 5			Model 6			Model 7		
		b	se	95% CI	b	se	95% CI	b	se	95% CI
Mother Birth Order (G2)	1	0.00			0.00			0.00		
	2	-0.02	0.01	-0.04, 0.01	-0.09	0.01	-0.11, -0.06	-0.02	0.01	-0.05, 0.00
	3	0.00	0.02	-0.04, 0.04	-0.14	0.02	-0.17, -0.10	-0.04	0.02	-0.07, 0.00
	4	0.06	0.03	0.01, 0.12	-0.13	0.03	-0.18, -0.07	-0.03	0.03	-0.08, 0.02
	5+	0.07	0.04	0.00, 0.14	-0.18	0.04	-0.25, -0.11	-0.07	0.04	-0.14, 0.00
Father Birth Order (G2)	1	0.00		0.00, 0.00	0.00			0.00		
	2	-0.06	0.01	-0.08, -0.03	-0.05	0.01	-0.07, -0.02	0.01	0.01	-0.02, 0.03
	3	-0.12	0.02	-0.16, -0.09	-0.10	0.02	-0.13, -0.07	-0.02	0.02	-0.06, 0.01
	4	-0.20	0.03	-0.25, -0.15	-0.18	0.02	-0.23, -0.13	-0.08	0.02	-0.13, -0.03
	5+	-0.21	0.03	-0.27, -0.15	-0.18	0.03	-0.24, -0.12	-0.08	0.03	-0.14, -0.02
Maternal Sibling Group Size (G2)	1									
	2									
	3									
	4									
	5+									
Paternal Sibling Group Size (G2)	1	-0.12	0.01	-0.15, -0.09	-0.10	0.01	-0.12, -0.07	-0.06	0.01	-0.09, -0.03
	2	0.00			0.00			0.00		
	3	-0.01	0.01	-0.04, 0.01	0.00	0.01	-0.03, 0.02	0.00	0.01	-0.02, 0.03
	4	-0.06	0.02	-0.09, -0.03	-0.04	0.02	-0.07, -0.01	-0.02	0.02	-0.05, 0.01
	5+	-0.13	0.02	-0.16, -0.09	-0.07	0.02	-0.11, -0.04	-0.02	0.02	-0.05, 0.02
Maternal Grandmother's Age at Birth (G2)	15-19	-0.11	0.04	-0.18, -0.04	0.09	0.04	0.02, 0.15	0.10	0.03	0.03, 0.16
	20-24	-0.05	0.02	-0.08, -0.01	0.06	0.02	0.03, 0.10	0.06	0.02	0.02, 0.09
	25-29	0.00			0.00			0.00		
	30-34	0.05	0.02	0.02, 0.09	-0.09	0.02	-0.12, -0.05	-0.07	0.02	-0.10, -0.03
	35-39	0.11	0.03	0.05, 0.17	-0.17	0.03	-0.23, -0.11	-0.13	0.03	-0.18, -0.07
Paternal Grandmother's Age at Birth (G2)	40+	0.16	0.05	0.07, 0.25	-0.27	0.05	-0.36, -0.18	-0.21	0.05	-0.30, -0.13
	15-19	-0.31	0.02	-0.36, -0.27	-0.23	0.02	-0.27, -0.19	-0.15	0.02	-0.19, -0.10
	20-24	-0.17	0.01	-0.20, -0.15	-0.13	0.01	-0.16, -0.11	-0.09	0.01	-0.12, -0.07
	25-29	0.00			0.00			0.00		
	30-34	0.08	0.01	0.06, 0.11	0.06	0.01	0.03, 0.08	0.04	0.01	0.01, 0.06
Maternal Birth Year (G2)	35-39	0.08	0.02	0.05, 0.11	0.05	0.01	0.02, 0.08	0.03	0.01	0.00, 0.06
	40+	0.09	0.02	0.05, 0.14	0.04	0.02	0.00, 0.08	0.05	0.02	0.00, 0.09
	1938-1945	-0.24	0.03	-0.29, -0.19	0.04	0.03	-0.01, 0.09	0.04	0.03	-0.01, 0.09
	1946-1949	-0.08	0.02	-0.11, -0.05	0.03	0.02	0.00, 0.07	0.02	0.02	-0.02, 0.05
	1950-1954	0.00			0.00			0.00		
Paternal Birth Year (G2)	1955-1959	-0.09	0.02	-0.13, -0.05	-0.12	0.02	-0.16, -0.08	-0.08	0.02	-0.12, -0.04
	1960-1964	-0.21	0.05	-0.31, -0.12	-0.19	0.05	-0.28, -0.10	-0.15	0.05	-0.24, -0.06
	1965-1969	-0.42	0.35	-1.11, 0.26	-0.19	0.34	-0.85, 0.47	-0.22	0.33	-0.87, 0.43
	1938-1945	-0.44	0.02	-0.47, -0.40	0.05	0.02	0.00, 0.09	0.06	0.02	0.02, 0.11
	1946-1949	-0.15	0.01	-0.18, -0.12	0.06	0.02	0.03, 0.09	0.05	0.02	0.02, 0.08
Index Birth Order (G3)	1950-1954	0.00			0.00			0.00		
	1955-1959	0.00	0.02	-0.04, 0.05	-0.12	0.02	-0.16, -0.07	-0.08	0.02	-0.12, -0.04
	1960-1964	-0.13	0.07	-0.27, 0.01	-0.30	0.07	-0.43, -0.16	-0.23	0.07	-0.36, -0.09
	1965-1969	-0.23	0.59	-1.39, 0.93	-0.42	0.57	-1.54, 0.70	-0.40	0.56	-1.50, 0.70
	1				0.00			0.00		
Sex (G3)	2				-0.34	0.01	-0.36, -0.33	-0.29	0.01	-0.31, -0.28
	3				-0.56	0.01	-0.59, -0.54	-0.46	0.01	-0.48, -0.43
	4				-0.69	0.03	-0.75, -0.64	-0.54	0.03	-0.60, -0.49
	5+				-0.83	0.06	-0.94, -0.72	-0.64	0.06	-0.75, -0.53
	Male				0.00			0.00		
Sibling Group Size (G3)	Female				0.53	0.01	0.51, 0.54	0.53	0.01	0.52, 0.54
	1				-0.26	0.01	-0.28, -0.23	-0.22	0.01	-0.25, -0.20
	2				0.00			0.00		
	3				0.04	0.01	0.01, 0.06	0.03	0.01	0.00, 0.05
	4				-0.01	0.02	-0.05, 0.03	-0.01	0.02	-0.05, 0.03
Birth Year (G3)	5+				-0.19	0.04	-0.26, -0.12	-0.16	0.03	-0.23, -0.09
	1960				-1.00	0.06	-1.12, -0.88	-0.82	0.06	-0.93, -0.70
	1961				-0.88	0.05	-0.98, -0.79	-0.71	0.05	-0.81, -0.62
	1962				-0.85	0.04	-0.93, -0.77	-0.71	0.04	-0.79, -0.63
	1963				-0.75	0.04	-0.82, -0.68	-0.62	0.03	-0.69, -0.55
1964				-0.67	0.03	-0.73, -0.61	-0.56	0.03	-0.62, -0.50	

Continued on next page

Table S4 – Continued from previous page

	Model 5			Model 6			Model 7			
	b	se	95% CI	b	se	95% CI	b	se	95% CI	
	1965			-0.60	0.03	-0.65, -0.55	-0.51	0.03	-0.56, -0.46	
	1966			-0.49	0.02	-0.54, -0.44	-0.41	0.02	-0.46, -0.37	
	1967			-0.43	0.02	-0.47, -0.39	-0.38	0.02	-0.42, -0.33	
	1968			-0.35	0.02	-0.39, -0.31	-0.32	0.02	-0.36, -0.27	
	1969			-0.29	0.02	-0.33, -0.25	-0.28	0.02	-0.32, -0.24	
	1970			0.00			0.00			
	1971			0.13	0.02	0.09, 0.17	0.10	0.02	0.06, 0.14	
	1972			0.30	0.02	0.26, 0.34	0.26	0.02	0.22, 0.30	
	1973			0.49	0.02	0.45, 0.53	0.44	0.02	0.40, 0.48	
	1974			0.70	0.02	0.66, 0.74	0.63	0.02	0.59, 0.67	
	1975			0.91	0.02	0.87, 0.96	0.83	0.02	0.78, 0.87	
	1976			1.04	0.03	0.99, 1.09	0.94	0.02	0.89, 0.99	
	1977			1.10	0.03	1.05, 1.16	0.99	0.03	0.94, 1.04	
	1978			1.02	0.03	0.96, 1.08	0.89	0.03	0.83, 0.95	
	1979			1.11	0.03	1.05, 1.17	0.96	0.03	0.90, 1.02	
	1980			1.23	0.03	1.17, 1.30	1.06	0.03	1.00, 1.13	
	1981			1.30	0.04	1.23, 1.37	1.11	0.04	1.04, 1.18	
	1982			1.32	0.04	1.24, 1.40	1.11	0.04	1.03, 1.18	
Maternal Age at Birth (G3)	15-19			-0.06	0.02	-0.10, -0.01	-0.05	0.02	-0.09, -0.01	
	20-24			-0.04	0.01	-0.07, -0.02	-0.02	0.01	-0.05, 0.00	
	25-29			0.00			0.00			
	30-34			-0.02	0.01	-0.05, 0.01	-0.02	0.01	-0.05, 0.01	
	35-39			-0.12	0.03	-0.18, -0.06	-0.08	0.03	-0.14, -0.02	
	40+			-0.02	0.09	-0.20, 0.16	0.04	0.09	-0.14, 0.23	
Paternal Age at Birth (G3)	15-19			-0.04	0.03	-0.09, 0.02	-0.08	0.03	-0.13, -0.03	
	20-24			-0.05	0.01	-0.07, -0.02	-0.06	0.01	-0.08, -0.03	
	25-29			0.00			0.00			
	30-34			0.00	0.01	-0.02, 0.03	0.02	0.01	0.00, 0.04	
	35-39			-0.02	0.02	-0.06, 0.03	0.03	0.02	-0.01, 0.08	
	40+			-0.08	0.05	-0.18, 0.02	0.01	0.05	-0.08, 0.11	
Maternal Educational Attainment (G2)	Primary <9 years						-0.14	0.02	-0.18, -0.10	
	Primary - 9 years						0.00			
	Secondary - 10-11 years						0.11	0.02	0.08, 0.14	
	Secondary - 12 years						0.36	0.02	0.32, 0.41	
	Tertiary - 13-15 years						0.53	0.02	0.48, 0.57	
	Tertiary - 15+ years						0.74	0.02	0.70, 0.78	
	Post-graduate						1.02	0.08	0.86, 1.18	
	Missing						0.18	0.16	-0.13, 0.49	
Maternal Social Class (EGP) (G2)	I						-0.04	0.06	-0.15, 0.07	
	II						0.00			
	III						-0.07	0.02	-0.11, -0.04	
	IV						-0.18	0.03	-0.24, -0.12	
	VI-VII						-0.18	0.01	-0.20, -0.15	
	Unknown						-0.18	0.01	-0.21, -0.16	
Paternal Educational Attainment (G2)	Primary <9 years						-0.11	0.02	-0.14, -0.08	
	Primary - 9 years						0.00			
	Secondary - 10-11 years						0.07	0.01	0.04, 0.10	
	Secondary - 12 years						0.38	0.02	0.34, 0.41	
	Tertiary - 13-15 years						0.55	0.02	0.51, 0.59	
	Tertiary - 15+ years						0.91	0.02	0.87, 0.95	
	Post-graduate						1.24	0.05	1.15, 1.33	
	Missing						-0.03	0.08	-0.18, 0.12	
Paternal Social Class (EGP) (G2)	I						0.08	0.04	0.00, 0.16	
	II						0.00			
	III						-0.16	0.03	-0.22, -0.11	
	IV						-0.17	0.02	-0.21, -0.13	
	VI-VII						-0.21	0.01	-0.23, -0.18	
	Unknown						-0.11	0.01	-0.13, -0.08	
N					509,739			509,739		509,739

Table S5: Parental Birth Order and Offspring Educational Attainment at Age 30, Fixed Effects Linear Regression on Paternal Cousin Sample of Swedish Men and Women Born 1960-1982.

		Model 8			Model 9			Model 10		
		b	se	95% CI	b	se	95% CI	b	se	95% CI
Mother Birth Order (G2)	1	0.00			0.00			0.00		
	2	-0.08	0.01	-0.11, -0.06	-0.07	0.01	-0.09, -0.05	-0.01	0.01	-0.03, 0.02
	3	-0.13	0.02	-0.17, -0.10	-0.11	0.02	-0.14, -0.07	-0.01	0.02	-0.05, 0.02
	4	-0.20	0.03	-0.25, -0.15	-0.15	0.02	-0.20, -0.10	-0.03	0.02	-0.08, 0.01
	5+	-0.23	0.03	-0.29, -0.18	-0.19	0.03	-0.25, -0.13	-0.04	0.03	-0.10, 0.01
Father Birth Order (G2)	1	0.00		0.00, 0.00	0.00			0.00		
	2	0.01	0.01	-0.01, 0.04	-0.04	0.01	-0.07, -0.02	0.00	0.01	-0.02, 0.02
	3	0.04	0.02	0.00, 0.08	-0.06	0.02	-0.10, -0.03	0.00	0.02	-0.04, 0.04
	4	0.04	0.03	-0.01, 0.10	-0.10	0.03	-0.15, -0.04	-0.03	0.03	-0.08, 0.02
	5+	0.07	0.04	0.00, 0.14	-0.11	0.04	-0.18, -0.04	-0.06	0.04	-0.13, 0.01
Maternal Sibling Group Size (G2)	1	-0.13	0.01	-0.16, -0.11	-0.11	0.01	-0.14, -0.08	-0.07	0.01	-0.10, -0.04
	2	0.00			0.00			0.00		
	3	-0.04	0.01	-0.06, -0.01	-0.02	0.01	-0.05, 0.00	-0.02	0.01	-0.05, 0.00
	4	-0.09	0.02	-0.12, -0.06	-0.08	0.02	-0.11, -0.05	-0.06	0.02	-0.09, -0.03
	5+	-0.15	0.02	-0.19, -0.12	-0.10	0.02	-0.14, -0.07	-0.07	0.02	-0.11, -0.04
Paternal Sibling Group Size (G2)	1									
	2									
	3									
	4									
	5+									
Maternal Grandmother's Age at Birth (G2)	15-19	-0.35	0.02	-0.39, -0.31	-0.25	0.02	-0.29, -0.21	-0.16	0.02	-0.19, -0.12
	20-24	-0.16	0.01	-0.18, -0.14	-0.11	0.01	-0.14, -0.09	-0.06	0.01	-0.08, -0.04
	25-29	0.00			0.00			0.00		
	30-34	0.11	0.01	0.08, 0.13	0.08	0.01	0.05, 0.10	0.06	0.01	0.03, 0.08
	35-39	0.13	0.02	0.10, 0.16	0.09	0.01	0.06, 0.12	0.07	0.01	0.04, 0.10
Paternal Grandmother's Age at Birth (G2)	40+	0.16	0.02	0.11, 0.20	0.13	0.02	0.08, 0.17	0.12	0.02	0.07, 0.16
	15-19	-0.18	0.04	-0.26, -0.11	-0.01	0.04	-0.08, 0.06	0.05	0.03	-0.02, 0.12
	20-24	-0.12	0.02	-0.15, -0.08	-0.03	0.02	-0.06, 0.01	0.00	0.02	-0.04, 0.03
	25-29	0.00			0.00			0.00		
	30-34	0.10	0.02	0.06, 0.13	-0.01	0.02	-0.05, 0.02	-0.04	0.02	-0.07, 0.00
Maternal Birth Year (G2)	35-39	0.22	0.03	0.16, 0.27	-0.02	0.03	-0.07, 0.04	-0.06	0.03	-0.11, 0.00
	40+	0.28	0.04	0.20, 0.37	-0.08	0.04	-0.17, 0.01	-0.15	0.04	-0.24, -0.07
	1938-1945	-0.44	0.02	-0.47, -0.41	0.22	0.02	0.18, 0.27	0.16	0.02	0.11, 0.20
	1946-1949	-0.20	0.01	-0.22, -0.17	0.15	0.01	0.12, 0.18	0.09	0.01	0.06, 0.12
	1950-1954	0.00			0.00			0.00		
Paternal Birth Year (G2)	1955-1959	0.04	0.02	0.01, 0.07	-0.22	0.02	-0.26, -0.18	-0.16	0.02	-0.19, -0.12
	1960-1964	-0.05	0.04	-0.13, 0.02	-0.44	0.04	-0.52, -0.37	-0.34	0.04	-0.42, -0.27
	1965-1969	-0.50	0.27	-1.04, 0.04	-0.92	0.27	-1.44, -0.40	-0.84	0.26	-1.35, -0.33
	1938-1945	-0.09	0.03	-0.14, -0.04	0.01	0.03	-0.04, 0.06	-0.01	0.02	-0.06, 0.04
	1946-1949	0.02	0.02	-0.02, 0.05	0.02	0.02	-0.01, 0.06	0.01	0.02	-0.03, 0.04
Index Birth Order (G3)	1950-1954	0.00			0.00			0.00		
	1955-1959	-0.16	0.03	-0.21, -0.11	-0.08	0.03	-0.13, -0.03	-0.03	0.03	-0.08, 0.02
	1960-1964	-0.50	0.09	-0.67, -0.33	-0.31	0.08	-0.47, -0.14	-0.21	0.08	-0.37, -0.05
	1965-1969	-1.24	1.10	-3.38, 0.91	-0.53	1.06	-2.60, 1.54	-0.33	1.04	-2.37, 1.70
	1				0.00			0.00		
Sex (G3)	2				-0.37	0.01	-0.38, -0.36	-0.31	0.01	-0.32, -0.29
	3				-0.61	0.01	-0.63, -0.58	-0.47	0.01	-0.50, -0.45
	4				-0.78	0.03	-0.84, -0.72	-0.59	0.03	-0.65, -0.54
	5+				-0.88	0.06	-0.99, -0.77	-0.64	0.06	-0.75, -0.53
	Male				0.00			0.00		
Sibling Group Size (G3)	Female				0.53	0.01	0.51, 0.54	0.53	0.01	0.52, 0.54
	1				-0.29	0.01	-0.31, -0.26	-0.25	0.01	-0.27, -0.22
	2				0.00			0.00		
	3				0.03	0.01	0.01, 0.05	0.00	0.01	-0.02, 0.03
	4				-0.01	0.02	-0.05, 0.03	-0.04	0.02	-0.08, 0.00
Birth Year (G3)	5+				-0.17	0.03	-0.23, -0.10	-0.14	0.03	-0.21, -0.07
	1960				-0.92	0.06	-1.04, -0.81	-0.74	0.06	-0.85, -0.62
	1961				-0.84	0.05	-0.94, -0.75	-0.69	0.05	-0.78, -0.60
	1962				-0.73	0.04	-0.81, -0.65	-0.59	0.04	-0.67, -0.51
	1963				-0.72	0.03	-0.79, -0.65	-0.61	0.03	-0.67, -0.54
1964				-0.63	0.03	-0.69, -0.57	-0.54	0.03	-0.59, -0.48	

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Table S5 – Continued from previous page

	Model 8			Model 9			Model 10			
	b	se	95% CI	b	se	95% CI	b	se	95% CI	
	1965			-0.55	0.03	-0.61, -0.50	-0.47	0.03	-0.52, -0.42	
	1966			-0.49	0.02	-0.54, -0.44	-0.42	0.02	-0.47, -0.37	
	1967			-0.41	0.02	-0.46, -0.37	-0.37	0.02	-0.41, -0.32	
	1968			-0.38	0.02	-0.42, -0.33	-0.34	0.02	-0.39, -0.30	
	1969			-0.29	0.02	-0.33, -0.25	-0.28	0.02	-0.32, -0.24	
	1970			0.00			0.00			
	1971			0.13	0.02	0.09, 0.17	0.09	0.02	0.06, 0.13	
	1972			0.32	0.02	0.28, 0.36	0.27	0.02	0.23, 0.31	
	1973			0.50	0.02	0.46, 0.54	0.44	0.02	0.40, 0.48	
	1974			0.68	0.02	0.63, 0.72	0.60	0.02	0.56, 0.64	
	1975			0.91	0.02	0.86, 0.95	0.81	0.02	0.77, 0.86	
	1976			1.02	0.03	0.97, 1.07	0.91	0.02	0.86, 0.96	
	1977			1.08	0.03	1.03, 1.13	0.96	0.03	0.91, 1.01	
	1978			1.01	0.03	0.96, 1.07	0.88	0.03	0.82, 0.94	
	1979			1.07	0.03	1.01, 1.13	0.92	0.03	0.86, 0.98	
	1980			1.24	0.03	1.17, 1.30	1.06	0.03	0.99, 1.12	
	1981			1.29	0.04	1.22, 1.36	1.10	0.04	1.03, 1.17	
	1982			1.31	0.04	1.24, 1.39	1.10	0.04	1.03, 1.18	
Maternal Age at Birth (G3)	15-19			-0.17	0.02	-0.21, -0.13	-0.15	0.02	-0.19, -0.11	
	20-24			-0.10	0.01	-0.12, -0.07	-0.07	0.01	-0.09, -0.04	
	25-29			0.00			0.00			
	30-34			0.03	0.01	0.00, 0.06	0.02	0.01	-0.01, 0.04	
	35-39			-0.04	0.03	-0.09, 0.02	-0.02	0.03	-0.08, 0.04	
	40+			-0.22	0.09	-0.40, -0.04	-0.17	0.09	-0.35, 0.00	
Paternal Age at Birth (G3)	15-19			-0.03	0.03	-0.09, 0.02	-0.05	0.03	-0.11, 0.00	
	20-24			-0.04	0.01	-0.07, -0.02	-0.04	0.01	-0.06, -0.02	
	25-29			0.00			0.00			
	30-34			-0.01	0.01	-0.03, 0.02	0.01	0.01	-0.02, 0.03	
	35-39			-0.06	0.03	-0.11, -0.01	-0.02	0.02	-0.07, 0.03	
	40+			-0.17	0.05	-0.26, -0.07	-0.08	0.05	-0.18, 0.02	
Maternal Educational Attainment (G2)	Primary <9 years						-0.19	0.02	-0.23, -0.16	
	Primary - 9 years						0.00			
	Secondary - 10-11 years						0.19	0.01	0.16, 0.21	
	Secondary - 12 years						0.46	0.02	0.42, 0.50	
	Tertiary - 13-15 years						0.70	0.02	0.66, 0.73	
	Tertiary - 15+ years						0.97	0.02	0.94, 1.01	
	Post-graduate						1.17	0.07	1.03, 1.30	
	Missing						0.29	0.12	0.04, 0.53	
Maternal Social Class (EGP) (G2)	I						-0.05	0.05	-0.15, 0.05	
	II						0.00			
	III						-0.10	0.02	-0.14, -0.07	
	IV						-0.22	0.03	-0.28, -0.17	
	VI-VII						-0.24	0.01	-0.27, -0.22	
	Unknown						-0.23	0.01	-0.25, -0.21	
Paternal Educational Attainment (G2)	Primary <9 years						-0.08	0.02	-0.12, -0.05	
	Primary - 9 years						0.00			
	Secondary - 10-11 years						0.05	0.02	0.01, 0.08	
	Secondary - 12 years						0.32	0.02	0.29, 0.36	
	Tertiary - 13-15 years						0.45	0.02	0.41, 0.49	
	Tertiary - 15+ years						0.77	0.02	0.72, 0.81	
	Post-graduate						1.06	0.05	0.96, 1.15	
	Missing						-0.08	0.09	-0.25, 0.10	
Paternal Social Class (EGP) (G2)	I						-0.06	0.04	-0.14, 0.03	
	II						0.00			
	III						-0.10	0.03	-0.16, -0.03	
	IV						-0.20	0.03	-0.25, -0.15	
	VI-VII						-0.20	0.01	-0.23, -0.17	
	Unknown						-0.10	0.02	-0.13, -0.07	
N					514,222			514,222		514,222

Table S6: Descriptive statistics for birth order and offspring inflation-adjusted (CPI) log earnings averaged over ages 29-30 for generation 3 (G3), Swedish men and women born 1960-1982.

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
N		471,411	279,431	63,209	8,234	1,574	395,010	251,371	105,575	41,655	30,248	406,732	251,624	101,708	38,122	25,673
Income (,000s)	Mean	133.0	137.4	136.1	131.5	124.4	135.2	135.6	133.6	131.7	129.7	134.9	135.7	134.0	131.7	130.5
	SD	74.4	71.8	69.8	68.9	67.8	74.6	73.4	70.3	69.9	66.2	75.1	72.5	70.2	68.4	67.1
Mother Birth Order	Mean	1.9	1.9	1.9	2.0	2.0	1.0	2.0	3.0	4.0	5.8	1.8	1.9	2.0	2.0	2.1
	SD	1.2	1.2	1.2	1.3	1.3	0.0	0.0	0.0	0.0	1.2	1.1	1.2	1.2	1.3	1.4
Father Birth Order	Mean	1.8	1.8	1.9	1.9	1.9	1.8	1.8	1.9	1.9	2.1	1.0	2.0	3.0	4.0	5.7
	SD	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.2	1.2	1.3	0.0	0.0	0.0	0.0	1.1
Index Birth Order	Mean	1.0	2.0	3.0	4.0	5.3	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.5	1.5	1.5
	SD	0.0	0.0	0.0	0.0	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Index Sibling Group Size	Mean	2.0	2.4	3.3	4.4	6.1	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.4
	SD	0.9	0.7	0.7	0.9	1.5	0.9	0.9	0.9	1.0	1.0	0.9	0.9	1.0	1.0	1.0
Index Birth Year	Mean	1972.6	1974.1	1975.2	1975.8	1976.3	1973.1	1973.4	1973.6	1973.7	1973.8	1973.0	1973.5	1973.7	1973.9	1974.4
	SD	5.4	4.7	4.4	4.3	4.2	5.2	5.1	5.1	5.1	4.9	5.2	5.1	5.1	5.0	4.7
Index Mother Age	Mean	23.7	26.5	29.0	30.7	32.1	25.3	25.1	24.8	24.5	24.1	25.3	25.1	24.9	24.5	24.0
	SD	4.0	3.7	3.7	3.9	4.0	4.4	4.3	4.3	4.2	4.1	4.3	4.3	4.3	4.3	4.1
Index Father Age	Mean	25.8	28.6	31.1	32.8	34.1	27.3	27.3	27.2	27.0	26.8	27.4	27.2	27.0	26.7	26.3
	SD	4.0	3.7	3.7	3.8	4.1	4.3	4.3	4.3	4.3	4.3	4.4	4.3	4.3	4.2	4.0
Mother Sibling Group Size	Mean	2.8	2.9	3.1	3.3	3.6	2.2	2.8	3.8	4.9	6.9	2.8	2.9	3.0	3.1	3.2
	SD	1.6	1.6	1.7	1.9	2.1	1.2	1.1	1.2	1.2	1.8	1.6	1.6	1.7	1.8	1.9
Father Sibling Group Size	Mean	2.8	2.9	3.1	3.3	3.6	2.8	2.9	2.9	3.0	3.2	2.2	2.9	3.9	5.0	6.9
	SD	1.6	1.6	1.7	1.9	2.1	1.6	1.6	1.7	1.7	1.9	1.2	1.2	1.2	1.4	1.8
Mother Birth Year	Mean	1948.9	1947.6	1946.2	1945.1	1944.1	1947.8	1948.3	1948.8	1949.2	1949.7	1947.7	1948.3	1948.9	1949.4	1950.4
	SD	5.2	4.6	4.1	3.8	3.5	5.1	4.9	4.9	4.9	4.6	5.0	5.0	5.0	4.9	4.7
Father Birth Year	Mean	1946.8	1945.5	1944.2	1943.0	1942.1	1945.9	1946.1	1946.4	1946.6	1947.0	1945.6	1946.3	1946.8	1947.2	1948.2
	SD	5.0	4.4	3.9	3.6	3.3	4.9	4.8	4.8	4.8	4.6	4.8	4.8	4.8	4.7	4.4
Maternal Grandmother Age at Birth	Mean	28.2	28.5	28.5	28.4	28.2	26.0	29.1	31.4	33.0	35.1	28.4	28.3	28.3	28.3	28.1
	SD	6.1	6.1	6.1	6.2	6.4	5.7	5.4	5.3	5.2	4.9	6.1	6.1	6.2	6.2	6.4
Paternal Grandmother Age at Birth	Mean	28.4	28.6	28.7	28.8	28.5	28.5	28.5	28.5	28.4	28.5	26.4	29.3	31.4	33.0	34.9
	SD	6.0	6.0	6.1	6.2	6.3	6.0	6.0	6.1	6.2	6.2	5.7	5.4	5.3	5.1	4.8
Mother Education (%)	Primary (<9 years)	9.8	11.3	15.5	22.3	33.6	9.6	10.9	12.7	14.6	16.0	10.9	10.7	11.0	11.7	10.9
	Primary (9 years)	11.9	11.1	10.4	10.5	10.7	11.0	11.5	12.3	13.2	14.6	11.3	11.3	12.1	12.9	14.1
	Secondary (10-11 years)	41.2	40.8	40.2	38.8	35.3	40.0	40.9	42.3	44.2	46.0	40.0	40.9	42.2	44.6	46.9
	Secondary (12 years)	9.3	9.0	7.4	6.1	4.8	9.6	8.9	8.2	7.7	7.0	9.1	9.0	9.0	8.4	9.0
	Tertiary (13-15 years)	12.5	12.3	11.1	9.2	7.2	13.0	12.4	11.3	10.0	8.8	12.6	12.6	11.7	10.3	9.5
	Tertiary (15+ years)	14.7	15.0	15.0	12.8	8.2	16.4	14.8	12.8	10.0	7.4	15.6	15.0	13.5	11.8	9.5
	Graduate school	0.5	0.5	0.5	0.4	0.3	0.5	0.5	0.4	0.3	0.1	0.5	0.5	0.4	0.3	0.2
Missing	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

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Table S6 – Continued from previous page

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
Mother EGP (%)	I	0.9	0.7	0.7	0.7	0.8	0.9	0.8	0.8	0.7	0.5	0.9	0.9	0.7	0.6	0.4
	II	36.6	40.1	37.9	32.0	24.6	40.7	37.9	33.6	29.4	25.2	40.7	37.5	33.2	29.5	24.2
	III	9.5	7.4	5.7	5.5	5.5	8.2	8.5	9.0	9.2	8.6	8.1	8.6	8.9	8.9	8.9
	IV	2.6	3.1	4.8	6.7	7.1	2.8	3.1	3.4	3.0	3.0	2.8	3.1	3.3	3.4	3.2
	VI-VII	26.9	25.7	28.6	35.4	46.6	25.0	26.5	29.0	32.3	35.2	25.3	26.5	29.4	31.5	33.7
	Unknown	23.6	23.1	22.3	19.7	15.5	22.5	23.1	24.3	25.4	27.6	22.2	23.5	24.6	26.1	29.6
Father Education (%)	Primary (<9 years)	18.7	21.1	26.4	33.2	40.8	19.5	20.0	21.5	23.4	25.5	18.2	20.5	23.4	27.6	28.8
	Primary (9 years)	12.1	10.1	8.1	7.1	6.8	10.6	11.0	11.6	12.4	13.2	10.2	11.0	12.4	13.2	15.8
	Secondary (10-11 years)	28.6	26.5	25.4	26.6	27.7	26.8	27.5	28.8	30.2	31.9	26.8	27.6	29.0	30.2	32.0
	Secondary (12 years)	16.6	17.7	16.1	12.4	9.8	17.4	17.0	15.9	15.1	14.1	18.3	16.8	14.5	12.5	10.5
	Tertiary (13-15 years)	10.4	10.3	8.8	6.8	4.5	10.5	10.3	9.8	8.9	8.2	10.9	10.1	9.2	7.8	7.2
	Tertiary (15+ years)	12.0	12.7	13.1	11.6	8.6	13.4	12.5	10.9	8.8	6.4	13.7	12.3	10.3	7.8	5.1
	Graduate school	1.3	1.5	2.0	2.2	1.9	1.6	1.4	1.2	0.9	0.5	1.7	1.3	1.1	0.7	0.5
Missing	0.3	0.2	0.1	0.2	0.0	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	
Father EGP (%)	I	1.7	1.3	1.0	0.8	0.9	1.6	1.5	1.4	1.1	1.0	1.6	1.5	1.2	1.0	0.9
	II	21.9	24.2	23.2	19.1	15.3	24.2	23.0	20.6	18.4	15.7	25.5	22.4	18.5	14.8	11.2
	III	2.9	1.9	1.2	0.9	1.1	2.3	2.4	2.5	2.4	2.3	2.3	2.5	2.5	2.6	2.4
	IV	5.2	5.5	6.7	8.7	8.1	5.2	5.5	6.1	5.9	6.2	4.9	5.7	6.2	6.7	6.5
	VI-VII	47.2	46.3	47.6	51.1	56.2	45.2	46.3	49.4	52.8	57.8	43.9	47.0	51.7	56.4	61.9
	Unknown	21.3	20.8	20.3	19.6	18.5	21.6	21.3	20.1	19.4	16.9	21.9	20.9	19.8	18.5	17.1

Table S7: Parental Birth Order and Offspring Inflation-adjusted (CPI) Log Earnings Averaged Over Ages 29-30, Linear Regression Model on Full Population of Swedish Men and Women Born 1960-1981.

		Model 1			Model 2			Model 3			Model 4		
		b	se	95% CI	b	se	95% CI	b	se	95% CI	b	se	95% CI
Mother Birth Order (G2)	1	0.000			0.000			0.000			0.000		
	2	0.006	0.002	0.001, 0.011	-0.023	0.003	-0.028, -0.018	-0.012	0.003	-0.017, -0.007	-0.007	0.003	-0.012, -0.002
	3	-0.011	0.003	-0.017, -0.005	-0.036	0.004	-0.044, -0.028	-0.020	0.004	-0.027, -0.012	-0.013	0.004	-0.020, -0.005
	4	-0.026	0.005	-0.035, -0.016	-0.036	0.006	-0.047, -0.024	-0.020	0.006	-0.031, -0.008	-0.011	0.006	-0.022, 0.000
	5+	-0.035	0.005	-0.046, -0.025	-0.042	0.007	-0.056, -0.027	-0.018	0.007	-0.031, -0.004	-0.008	0.007	-0.021, 0.006
Father Birth Order (G2)	1	0.000			0.000			0.000			0.000		
	2	0.012	0.002	0.007, 0.016	-0.018	0.003	-0.023, -0.013	-0.010	0.003	-0.015, -0.005	-0.005	0.003	-0.010, 0.000
	3	0.000	0.003	-0.007, 0.006	-0.029	0.004	-0.037, -0.021	-0.015	0.004	-0.023, -0.008	-0.008	0.004	-0.016, -0.001
	4	-0.021	0.005	-0.030, -0.011	-0.037	0.006	-0.049, -0.025	-0.023	0.006	-0.034, -0.011	-0.014	0.006	-0.026, -0.003
	5+	-0.026	0.006	-0.038, -0.015	-0.044	0.008	-0.058, -0.029	-0.027	0.007	-0.041, -0.013	-0.018	0.007	-0.032, -0.003
Maternal Sibling Group Size (G2)	1				-0.038	0.003	-0.045, -0.032	-0.025	0.003	-0.032, -0.019	-0.022	0.003	-0.028, -0.016
	2				0.000			0.000			0.000		
	3				-0.015	0.003	-0.021, -0.009	-0.013	0.003	-0.018, -0.007	-0.012	0.003	-0.017, -0.006
	4				-0.039	0.004	-0.046, -0.032	-0.028	0.004	-0.035, -0.021	-0.023	0.004	-0.030, -0.016
	5+				-0.067	0.004	-0.075, -0.058	-0.044	0.004	-0.052, -0.036	-0.035	0.004	-0.043, -0.027
Paternal Sibling Group Size (G2)	1				-0.032	0.003	-0.038, -0.025	-0.020	0.003	-0.026, -0.014	-0.016	0.003	-0.022, -0.010
	2				0.000			0.000			0.000		
	3				-0.006	0.003	-0.012, -0.001	-0.004	0.003	-0.009, 0.001	-0.002	0.003	-0.008, 0.003
	4				-0.032	0.004	-0.039, -0.025	-0.021	0.003	-0.028, -0.014	-0.016	0.003	-0.022, -0.009
	5+				-0.060	0.004	-0.068, -0.051	-0.036	0.004	-0.044, -0.028	-0.025	0.004	-0.033, -0.017
Maternal Grandmother's Age at Birth (G2)	15-19				-0.081	0.005	-0.091, -0.072	-0.043	0.005	-0.052, -0.033	-0.032	0.005	-0.041, -0.023
	20-24				-0.041	0.003	-0.047, -0.036	-0.020	0.003	-0.025, -0.015	-0.015	0.003	-0.020, -0.010
	25-29				0.000			0.000			0.000		
	30-34				0.017	0.003	0.011, 0.022	0.006	0.003	0.001, 0.011	0.004	0.003	-0.001, 0.009
	35-39				0.023	0.003	0.016, 0.030	0.008	0.003	0.002, 0.015	0.007	0.003	0.000, 0.013
	40+				0.025	0.005	0.015, 0.035	0.013	0.005	0.003, 0.022	0.013	0.005	0.004, 0.023
Paternal Grandmother's Age at Birth (G2)	15-19				-0.087	0.005	-0.097, -0.077	-0.046	0.005	-0.056, -0.036	-0.035	0.005	-0.045, -0.025
	20-24				-0.043	0.003	-0.049, -0.038	-0.024	0.003	-0.030, -0.019	-0.019	0.003	-0.024, -0.014
	25-29				0.000			0.000			0.000		
	30-34				0.014	0.003	0.009, 0.020	0.005	0.003	-0.001, 0.010	0.003	0.003	-0.003, 0.008
	35-39				0.017	0.003	0.010, 0.024	0.006	0.003	-0.001, 0.012	0.005	0.003	-0.002, 0.011
	40+				0.016	0.005	0.006, 0.026	0.006	0.005	-0.003, 0.016	0.008	0.005	-0.001, 0.018
Maternal Birth Year (G2)	1938-1945				-0.084	0.004	-0.091, -0.076	0.047	0.005	0.037, 0.058	0.014	0.005	0.004, 0.025
	1946-1949				-0.034	0.003	-0.040, -0.028	0.019	0.003	0.012, 0.026	-0.004	0.004	-0.011, 0.003
	1950-1954				0.000			0.000			0.000		
	1955-1959				-0.008	0.004	-0.016, 0.000	-0.023	0.004	-0.032, -0.015	-0.015	0.004	-0.024, -0.007

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Table S7 – Continued from previous page

		Model 1			Model 2			Model 3			Model 4		
		b	se	95% CI	b	se	95% CI	b	se	95% CI	b	se	95% CI
Paternal Birth Year (G2)	1960-1964				-0.074	0.011	-0.095, -0.054	-0.071	0.011	-0.092, -0.049	-0.053	0.011	-0.075, -0.032
	1965-1969				-0.065	0.090	-0.242, 0.111	-0.032	0.092	-0.212, 0.149	-0.016	0.092	-0.197, 0.164
	1938-1945				-0.094	0.004	-0.102, -0.086	0.009	0.005	-0.001, 0.020	-0.007	0.005	-0.017, 0.004
	1946-1949				-0.026	0.003	-0.033, -0.020	0.007	0.004	0.000, 0.014	0.004	0.004	-0.003, 0.011
	1950-1954				0.000			0.000			0.000		
	1955-1959				-0.002	0.005	-0.013, 0.009	-0.007	0.006	-0.018, 0.004	-0.001	0.006	-0.012, 0.010
Index Birth Order (G3)	1960-1964				-0.100	0.023	-0.145, -0.056	-0.079	0.023	-0.124, -0.034	-0.064	0.023	-0.109, -0.019
	1965-1969				0.135	0.168	-0.193, 0.463	0.201	0.156	-0.104, 0.506	0.232	0.155	-0.071, 0.536
	1							0.000			0.000		
	2							-0.059	0.002	-0.063, -0.055	-0.048	0.002	-0.052, -0.043
	3							-0.098	0.004	-0.106, -0.090	-0.077	0.004	-0.085, -0.068
	4							-0.116	0.010	-0.136, -0.097	-0.087	0.010	-0.107, -0.068
Sex (G3)	5+							-0.163	0.025	-0.213, -0.113	-0.127	0.025	-0.176, -0.077
	Male							0.000			0.000		
Sibling Group Size (G3)	Female							-0.348	0.002	-0.351, -0.344	-0.348	0.002	-0.351, -0.344
	1							-0.129	0.003	-0.135, -0.123	-0.118	0.003	-0.125, -0.112
	2							0.000			0.000		
	3							-0.002	0.002	-0.007, 0.003	-0.003	0.002	-0.007, 0.002
	4							-0.040	0.005	-0.049, -0.031	-0.038	0.005	-0.047, -0.029
	5+							-0.104	0.008	-0.121, -0.087	-0.097	0.008	-0.114, -0.081
Birth Year (G3)	1960							-0.081	0.013	-0.106, -0.055	-0.047	0.013	-0.072, -0.022
	1961							-0.142	0.012	-0.165, -0.119	-0.116	0.012	-0.139, -0.093
	1962							-0.214	0.011	-0.235, -0.193	-0.190	0.011	-0.211, -0.169
	1963							-0.281	0.010	-0.299, -0.262	-0.258	0.010	-0.277, -0.239
	1964							-0.296	0.009	-0.313, -0.279	-0.277	0.009	-0.294, -0.260
	1965							-0.263	0.008	-0.278, -0.248	-0.247	0.008	-0.262, -0.232
	1966							-0.233	0.007	-0.247, -0.219	-0.221	0.007	-0.235, -0.207
	1967							-0.192	0.007	-0.205, -0.178	-0.183	0.007	-0.196, -0.170
	1968							-0.125	0.006	-0.137, -0.112	-0.120	0.006	-0.132, -0.108
	1969							-0.062	0.006	-0.074, -0.051	-0.061	0.006	-0.073, -0.049
	1970							0.000			0.000		
	1971							0.045	0.005	0.034, 0.055	0.033	0.005	0.023, 0.044
	1972							0.060	0.005	0.049, 0.071	0.049	0.005	0.039, 0.060
	1973							0.066	0.006	0.055, 0.077	0.055	0.006	0.044, 0.066
	1974							0.074	0.006	0.063, 0.086	0.062	0.006	0.051, 0.074
1975							0.101	0.006	0.089, 0.113	0.088	0.006	0.076, 0.100	
1976							0.138	0.006	0.126, 0.151	0.124	0.006	0.111, 0.137	
1977							0.182	0.007	0.169, 0.195	0.166	0.007	0.152, 0.179	
1978							0.197	0.007	0.183, 0.211	0.177	0.007	0.163, 0.192	

Continued on next page

Table S7 – Continued from previous page

		Model 1			Model 2			Model 3			Model 4		
		b	se	95% CI	b	se	95% CI	b	se	95% CI	b	se	95% CI
Maternal Age at Birth (G3)	1979							0.197	0.008	0.182, 0.212	0.176	0.008	0.161, 0.191
	1980							0.202	0.008	0.186, 0.218	0.177	0.008	0.161, 0.193
	1981							0.220	0.009	0.203, 0.237	0.187	0.009	0.170, 0.204
	15-19							-0.104	0.006	-0.115, -0.093	-0.089	0.006	-0.100, -0.078
	20-24							-0.038	0.003	-0.044, -0.032	-0.028	0.003	-0.034, -0.022
	25-29							0.000			0.000		
	30-34							-0.009	0.004	-0.016, -0.001	-0.009	0.004	-0.016, -0.001
Paternal Age at Birth (G3)	35-39							-0.029	0.008	-0.046, -0.012	-0.027	0.008	-0.043, -0.010
	40+							-0.032	0.033	-0.097, 0.033	-0.015	0.033	-0.080, 0.049
	15-19							-0.054	0.009	-0.071, -0.037	-0.058	0.009	-0.076, -0.041
	20-24							-0.030	0.003	-0.037, -0.024	-0.030	0.003	-0.037, -0.024
	25-29							0.000			0.000		
	30-34							-0.008	0.003	-0.014, -0.001	-0.001	0.003	-0.007, 0.005
	35-39							-0.035	0.006	-0.047, -0.022	-0.022	0.006	-0.034, -0.009
Maternal Educational Attainment (G2)	40+							-0.070	0.016	-0.103, -0.038	-0.044	0.016	-0.077, -0.012
	Primary <9 years										-0.011	0.004	-0.020, -0.003
	Primary - 9 years										0.000		
	Secondary - 10-11 years										0.005	0.003	-0.001, 0.012
	Secondary - 12 years										0.031	0.004	0.023, 0.039
	Tertiary - 13-15 years										0.026	0.004	0.018, 0.034
	Tertiary - 15+ years										0.031	0.004	0.023, 0.039
Maternal Social Class (EGP) (G2)	Post-graduate										0.024	0.017	-0.010, 0.058
	Missing										-0.145	0.047	-0.236, -0.053
	I										0.001	0.012	-0.022, 0.023
	II										0.000		
	III										-0.028	0.004	-0.036, -0.021
	IV										-0.038	0.006	-0.050, -0.026
	VI-VII										-0.044	0.003	-0.050, -0.039
Paternal Educational Attainment (G2)	Unknown										-0.086	0.003	-0.091, -0.080
	Primary <9 years										0.000	0.004	-0.007, 0.007
	Primary - 9 years										0.000		
	Secondary - 10-11 years										-0.013	0.003	-0.020, -0.007
	Secondary - 12 years										0.036	0.004	0.029, 0.043
	Tertiary - 13-15 years										0.032	0.004	0.024, 0.041
	Tertiary - 15+ years										0.052	0.005	0.043, 0.061
Paternal Social Class (EGP) (G2)	Post-graduate										0.032	0.011	0.011, 0.052
	Missing										-0.092	0.024	-0.140, -0.044
	I										-0.005	0.009	-0.023, 0.013
	II										0.000		

Continued on next page

Table S7 – Continued from previous page

	Model 1			Model 2			Model 3			Model 4		
	b	se	95% CI	b	se	95% CI	b	se	95% CI	b	se	95% CI
III										-0.022	0.007	-0.035, -0.009
IV										-0.017	0.005	-0.026, -0.007
VI-VII										-0.030	0.003	-0.035, -0.024
Unknown										-0.056	0.003	-0.062, -0.050
N		823,859			823,859			823,859			823,859	

Table S8: Parental Birth Order and Offspring Inflation-adjusted (CPI) Log Earnings Averaged Over Ages 29-30, Fixed Effects Linear Regression on Maternal Cousin Sample of Swedish Men and Women Born 1960-1981.

		Model 5			Model 6			Model 7		
		b	se	95% CI	b	se	95% CI	b	se	95% CI
Mother Birth Order (G2)	1	0.000			0.000			0.000		
	2	-0.001	0.006	-0.013, 0.011	-0.016	0.006	-0.027, -0.004	-0.013	0.006	-0.025, -0.002
	3	0.014	0.010	-0.004, 0.033	-0.017	0.009	-0.036, 0.001	-0.013	0.009	-0.032, 0.005
	4	0.014	0.013	-0.012, 0.040	-0.029	0.013	-0.054, -0.003	-0.024	0.013	-0.050, 0.001
	5+	0.040	0.017	0.006, 0.074	-0.016	0.017	-0.050, 0.018	-0.010	0.017	-0.044, 0.024
Father Birth Order (G2)	1	0.000			0.000			0.000		
	2	-0.008	0.006	-0.019, 0.004	-0.005	0.006	-0.016, 0.006	-0.002	0.006	-0.013, 0.009
	3	-0.020	0.008	-0.037, -0.004	-0.018	0.008	-0.034, -0.002	-0.014	0.008	-0.030, 0.002
	4	-0.027	0.012	-0.051, -0.003	-0.025	0.012	-0.049, -0.002	-0.020	0.012	-0.043, 0.003
	5+	-0.014	0.015	-0.043, 0.016	-0.018	0.015	-0.047, 0.011	-0.013	0.015	-0.042, 0.016
Maternal Sibling Group Size (G2)	1									
	2									
	3									
	4									
	5+									
Paternal Sibling Group Size (G2)	1	-0.021	0.007	-0.035, -0.007	-0.016	0.007	-0.029, -0.003	-0.013	0.007	-0.027, 0.000
	2	0.000			0.000			0.000		
	3	-0.010	0.006	-0.022, 0.002	-0.007	0.006	-0.018, 0.005	-0.005	0.006	-0.017, 0.006
	4	-0.022	0.008	-0.037, -0.007	-0.016	0.007	-0.031, -0.002	-0.014	0.007	-0.028, 0.001
	5+	-0.029	0.009	-0.047, -0.012	-0.018	0.009	-0.035, -0.001	-0.013	0.009	-0.030, 0.003
Maternal Grandmother's Age at Birth (G2)	15-19	-0.004	0.017	-0.038, 0.030	0.029	0.017	-0.004, 0.063	0.029	0.017	-0.005, 0.062
	20-24	0.014	0.009	-0.002, 0.031	0.035	0.008	0.018, 0.051	0.034	0.008	0.018, 0.051
	25-29	0.000			0.000			0.000		
	30-34	-0.008	0.008	-0.024, 0.008	-0.038	0.008	-0.055, -0.022	-0.037	0.008	-0.054, -0.021
	35-39	0.000	0.014	-0.027, 0.027	-0.060	0.014	-0.087, -0.032	-0.057	0.014	-0.084, -0.029
Paternal Grandmother's Age at Birth (G2)	40+	0.009	0.021	-0.033, 0.051	-0.083	0.022	-0.126, -0.040	-0.080	0.022	-0.122, -0.037
	15-19	-0.059	0.011	-0.080, -0.039	-0.039	0.010	-0.060, -0.019	-0.035	0.010	-0.055, -0.015
	20-24	-0.035	0.006	-0.047, -0.024	-0.025	0.006	-0.037, -0.014	-0.023	0.006	-0.035, -0.012
	25-29	0.000			0.000			0.000		
	30-34	0.003	0.006	-0.009, 0.015	0.000	0.006	-0.012, 0.011	-0.002	0.006	-0.013, 0.010
Maternal Birth Year (G2)	35-39	0.016	0.007	0.002, 0.030	0.011	0.007	-0.003, 0.025	0.011	0.007	-0.003, 0.025
	40+	0.013	0.011	-0.008, 0.035	0.007	0.011	-0.014, 0.028	0.007	0.011	-0.013, 0.028
	1938-1945	-0.083	0.013	-0.107, -0.058	-0.014	0.013	-0.038, 0.011	-0.031	0.013	-0.056, -0.006
	1946-1949	-0.026	0.008	-0.042, -0.010	0.001	0.008	-0.014, 0.017	-0.013	0.008	-0.029, 0.003
	1950-1954	0.000			0.000			0.000		
Paternal Birth Year (G2)	1955-1959	0.007	0.010	-0.013, 0.027	0.006	0.010	-0.014, 0.026	0.005	0.010	-0.014, 0.025
	1960-1964	0.001	0.027	-0.051, 0.053	0.014	0.026	-0.037, 0.065	0.015	0.026	-0.036, 0.066
	1965-1969	-0.018	0.319	-0.642, 0.607	0.027	0.308	-0.577, 0.631	0.025	0.308	-0.579, 0.629
	1938-1945	-0.113	0.008	-0.129, -0.097	-0.001	0.010	-0.021, 0.020	-0.007	0.010	-0.028, 0.013
	1946-1949	-0.051	0.007	-0.065, -0.037	-0.007	0.008	-0.022, 0.007	-0.008	0.008	-0.023, 0.007
Index Birth Order (G3)	1950-1954	0.000			0.000			0.000		
	1955-1959	0.042	0.012	0.018, 0.065	0.012	0.012	-0.012, 0.035	0.012	0.012	-0.012, 0.036
	1960-1964	-0.018	0.047	-0.110, 0.074	-0.056	0.046	-0.146, 0.034	-0.052	0.046	-0.142, 0.038
	1965-1969	-0.442	0.503	-1.427, 0.543	-0.418	0.486	-1.371, 0.535	-0.417	0.486	-1.370, 0.536
	1				0.000			0.000		
Sex (G3)	2				-0.038	0.003	-0.045, -0.031	-0.035	0.003	-0.042, -0.029
	3				-0.057	0.007	-0.070, -0.044	-0.052	0.007	-0.065, -0.039
	4				-0.073	0.014	-0.101, -0.045	-0.066	0.014	-0.095, -0.038
	5+				-0.091	0.028	-0.147, -0.036	-0.083	0.028	-0.138, -0.027
	Male				0.000		0.000, 0.000	0.000		0.000, 0.000
Sibling Group Size (G3)	Female				-0.365	0.003	-0.371, -0.359	-0.365	0.003	-0.371, -0.359
	1				-0.071	0.006	-0.082, -0.060	-0.068	0.006	-0.079, -0.056
	2				0.000			0.000		
	3				0.002	0.006	-0.009, 0.013	0.004	0.006	-0.007, 0.015
	4				-0.008	0.010	-0.028, 0.011	-0.003	0.010	-0.023, 0.017
Birth Year (G3)	5+				-0.078	0.017	-0.112, -0.045	-0.070	0.017	-0.104, -0.037
	1960				-0.090	0.028	-0.144, -0.035	-0.076	0.028	-0.130, -0.021
	1961				-0.133	0.023	-0.177, -0.089	-0.121	0.023	-0.165, -0.076
	1962				-0.236	0.019	-0.273, -0.198	-0.224	0.019	-0.261, -0.186
	1963				-0.286	0.016	-0.318, -0.253	-0.276	0.016	-0.308, -0.243
	1964				-0.287	0.014	-0.315, -0.260	-0.279	0.014	-0.307, -0.251
	1965				-0.283	0.013	-0.308, -0.259	-0.277	0.013	-0.302, -0.252
	1966				-0.245	0.011	-0.268, -0.223	-0.240	0.011	-0.262, -0.218
	1967				-0.206	0.010	-0.227, -0.186	-0.203	0.010	-0.223, -0.182

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Table S8 – Continued from previous page

	Model 5			Model 6			Model 7		
	b	se	95% CI	b	se	95% CI	b	se	95% CI
				-0.131	0.010	-0.150, -0.111	-0.129	0.010	-0.148, -0.109
				-0.065	0.010	-0.084, -0.046	-0.064	0.010	-0.083, -0.045
				0.000			0.000		
				0.047	0.009	0.029, 0.065	0.043	0.009	0.026, 0.061
				0.063	0.009	0.045, 0.081	0.060	0.009	0.042, 0.078
				0.073	0.010	0.054, 0.091	0.069	0.010	0.050, 0.087
				0.076	0.010	0.057, 0.096	0.072	0.010	0.052, 0.092
				0.115	0.011	0.094, 0.137	0.110	0.011	0.088, 0.131
				0.150	0.012	0.127, 0.173	0.144	0.012	0.121, 0.167
				0.197	0.013	0.172, 0.222	0.190	0.013	0.165, 0.215
				0.209	0.014	0.182, 0.236	0.201	0.014	0.174, 0.228
				0.223	0.015	0.194, 0.252	0.215	0.015	0.185, 0.244
				0.230	0.016	0.199, 0.261	0.219	0.016	0.188, 0.251
				0.245	0.017	0.212, 0.279	0.231	0.017	0.198, 0.265
Maternal Age at Birth (G3)				-0.036	0.010	-0.056, -0.016	-0.035	0.010	-0.055, -0.015
				-0.007	0.006	-0.019, 0.004	-0.006	0.006	-0.018, 0.005
				0.000			0.000		
				-0.026	0.007	-0.040, -0.012	-0.025	0.007	-0.039, -0.011
				-0.032	0.015	-0.062, -0.002	-0.030	0.015	-0.060, 0.001
				-0.046	0.052	-0.149, 0.056	-0.040	0.052	-0.143, 0.062
Paternal Age at Birth (G3)				-0.018	0.013	-0.044, 0.008	-0.022	0.013	-0.048, 0.005
				0.002	0.005	-0.009, 0.012	0.000	0.005	-0.010, 0.011
				0.000			0.000		
				-0.008	0.006	-0.019, 0.003	-0.005	0.006	-0.016, 0.006
				-0.031	0.011	-0.053, -0.008	-0.025	0.011	-0.047, -0.003
				-0.034	0.026	-0.085, 0.018	-0.023	0.027	-0.075, 0.028
Maternal Educational Attainment (G2)							-0.003	0.010	-0.022, 0.016
							0.000		
							0.007	0.007	-0.008, 0.021
							0.019	0.010	-0.002, 0.040
							0.015	0.010	-0.004, 0.035
							0.030	0.011	0.009, 0.051
							-0.004	0.039	-0.081, 0.072
							-0.114	0.079	-0.269, 0.041
Maternal Social Class (EGP) (G2)							-0.063	0.028	-0.118, -0.008
							0.000		
							-0.014	0.009	-0.032, 0.003
							-0.005	0.014	-0.033, 0.023
							-0.025	0.007	-0.038, -0.012
							-0.069	0.007	-0.082, -0.056
Paternal Educational Attainment (G2)							-0.008	0.008	-0.024, 0.007
							0.000		
							-0.017	0.007	-0.031, -0.003
							0.030	0.008	0.014, 0.046
							0.011	0.009	-0.008, 0.029
							0.036	0.010	0.016, 0.056
							0.077	0.023	0.033, 0.122
							-0.026	0.038	-0.100, 0.048
Paternal Social Class (EGP) (G2)							0.005	0.020	-0.034, 0.044
							0.000		
							0.004	0.015	-0.024, 0.033
							-0.027	0.011	-0.048, -0.005
							-0.016	0.006	-0.028, -0.004
							-0.038	0.007	-0.051, -0.025
N			459,368			459,368			459,368

Table S9: Parental Birth Order and Offspring Inflation-adjusted (CPI) Log Earnings Averaged Over Ages 29-30, Fixed Effects Linear Regression on Paternal Cousin Sample of Swedish Men and Women Born 1960-1981.

		Model 8			Model 9			Model 10		
		b	se	95% CI	b	se	95% CI	b	se	95% CI
Mother Birth Order (G2)	1	0.000			0.000			0.000		
	2	-0.013	0.006	-0.024, -0.002	-0.008	0.005	-0.019, 0.002	-0.005	0.005	-0.016, 0.005
	3	-0.024	0.008	-0.040, -0.008	-0.020	0.008	-0.036, -0.005	-0.016	0.008	-0.031, 0.000
	4	-0.029	0.012	-0.052, -0.006	-0.026	0.011	-0.049, -0.004	-0.021	0.011	-0.043, 0.002
	5+	-0.028	0.014	-0.057, 0.000	-0.018	0.014	-0.045, 0.010	-0.009	0.014	-0.037, 0.018
Father Birth Order (G2)	1	0.000			0.000			0.000		
	2	0.011	0.006	-0.001, 0.022	-0.003	0.006	-0.015, 0.008	-0.002	0.006	-0.013, 0.009
	3	0.010	0.009	-0.008, 0.028	-0.013	0.009	-0.031, 0.005	-0.011	0.009	-0.030, 0.007
	4	0.022	0.013	-0.003, 0.048	-0.010	0.013	-0.036, 0.015	-0.009	0.013	-0.034, 0.016
	5+	0.028	0.017	-0.005, 0.062	-0.014	0.017	-0.047, 0.020	-0.014	0.017	-0.048, 0.019
Maternal Sibling Group Size (G2)	1	-0.026	0.007	-0.039, -0.012	-0.020	0.007	-0.033, -0.007	-0.018	0.007	-0.031, -0.005
	2	0.000			0.000			0.000		
	3	-0.009	0.006	-0.021, 0.003	-0.006	0.006	-0.017, 0.005	-0.006	0.006	-0.017, 0.006
	4	-0.020	0.008	-0.034, -0.005	-0.015	0.007	-0.029, 0.000	-0.013	0.007	-0.027, 0.002
	5+	-0.041	0.009	-0.058, -0.024	-0.029	0.009	-0.046, -0.012	-0.027	0.009	-0.044, -0.010
Paternal Sibling Group Size (G2)	1									
	2									
	3									
	4									
	5+									
Maternal Grandmother's Age at Birth (G2)	15-19	-0.056	0.010	-0.075, -0.036	-0.041	0.010	-0.060, -0.022	-0.036	0.010	-0.055, -0.017
	20-24	-0.027	0.006	-0.038, -0.016	-0.016	0.006	-0.027, -0.005	-0.014	0.006	-0.025, -0.003
	25-29	0.000			0.000			0.000		
	30-34	0.010	0.006	-0.002, 0.021	0.004	0.006	-0.007, 0.015	0.003	0.006	-0.009, 0.014
	35-39	0.019	0.007	0.005, 0.034	0.012	0.007	-0.002, 0.026	0.010	0.007	-0.003, 0.024
Paternal Grandmother's Age at Birth (G2)	40+	0.016	0.011	-0.005, 0.037	0.011	0.010	-0.009, 0.031	0.010	0.010	-0.010, 0.030
	15-19	-0.042	0.017	-0.075, -0.008	0.005	0.017	-0.028, 0.038	0.008	0.017	-0.025, 0.041
	20-24	-0.015	0.008	-0.032, 0.002	0.009	0.008	-0.007, 0.025	0.010	0.008	-0.006, 0.027
	25-29	0.000			0.000			0.000		
	30-34	0.015	0.008	-0.001, 0.031	-0.016	0.008	-0.031, 0.000	-0.017	0.008	-0.033, -0.002
Maternal Birth Year (G2)	35-39	0.033	0.013	0.007, 0.059	-0.024	0.014	-0.051, 0.002	-0.027	0.014	-0.053, 0.000
	40+	0.064	0.021	0.024, 0.104	-0.026	0.021	-0.068, 0.015	-0.031	0.021	-0.073, 0.010
	1938-1945	-0.132	0.008	-0.147, -0.117	0.032	0.010	0.012, 0.052	0.012	0.010	-0.008, 0.032
	1946-1949	-0.072	0.006	-0.085, -0.060	0.015	0.007	0.002, 0.029	0.000	0.007	-0.014, 0.014
	1950-1954	0.000			0.000			0.000		
Paternal Birth Year (G2)	1955-1959	0.044	0.008	0.027, 0.060	-0.010	0.009	-0.028, 0.008	-0.007	0.009	-0.025, 0.010
	1960-1964	0.015	0.022	-0.028, 0.057	-0.065	0.022	-0.109, -0.022	-0.058	0.022	-0.101, -0.014
	1965-1969	0.275	0.248	-0.212, 0.762	0.179	0.240	-0.292, 0.650	0.176	0.240	-0.294, 0.647
	1938-1945	-0.014	0.012	-0.037, 0.009	-0.008	0.012	-0.031, 0.016	-0.019	0.012	-0.042, 0.005
	1946-1949	0.001	0.008	-0.015, 0.017	-0.008	0.008	-0.024, 0.008	-0.011	0.008	-0.027, 0.005
Index Birth Order (G3)	1950-1954	0.000			0.000			0.000		
	1955-1959	-0.023	0.014	-0.050, 0.004	-0.001	0.013	-0.027, 0.025	0.002	0.013	-0.024, 0.028
	1960-1964	-0.109	0.057	-0.221, 0.002	-0.046	0.055	-0.154, 0.062	-0.038	0.055	-0.146, 0.070
	1965-1969	0.493	0.758	-0.993, 1.979	0.476	0.733	-0.961, 1.913	0.538	0.733	-0.899, 1.975
	1				0.000			0.000		
Sex (G3)	2				-0.043	0.003	-0.050, -0.037	-0.039	0.003	-0.046, -0.033
	3				-0.061	0.007	-0.074, -0.049	-0.054	0.007	-0.067, -0.041
	4				-0.061	0.014	-0.089, -0.033	-0.051	0.014	-0.079, -0.023
	5+				-0.071	0.028	-0.126, -0.015	-0.058	0.028	-0.114, -0.003
	Male				0.000			0.000		
Sibling Group Size (G3)	Female				-0.365	0.003	-0.371, -0.359	-0.365	0.003	-0.371, -0.359
	1				-0.068	0.006	-0.079, -0.058	-0.066	0.006	-0.077, -0.055
	2				0.000			0.000		
	3				-0.010	0.005	-0.021, 0.001	-0.008	0.005	-0.019, 0.002
	4				-0.025	0.010	-0.044, -0.007	-0.021	0.010	-0.040, -0.002
Birth Year (G3)	5+				-0.074	0.017	-0.106, -0.041	-0.065	0.017	-0.098, -0.033
	1960				-0.073	0.027	-0.125, -0.021	-0.062	0.027	-0.114, -0.010
	1961				-0.136	0.022	-0.179, -0.093	-0.129	0.022	-0.172, -0.086
	1962				-0.196	0.019	-0.233, -0.159	-0.188	0.019	-0.225, -0.151
	1963				-0.273	0.016	-0.305, -0.241	-0.267	0.016	-0.298, -0.235
1964				-0.296	0.014	-0.323, -0.268	-0.290	0.014	-0.318, -0.263	

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Table S9 – Continued from previous page

	Model 8			Model 9			Model 10		
	b	se	95% CI	b	se	95% CI	b	se	95% CI
	1965			-0.248	0.012	-0.273, -0.224	-0.243	0.013	-0.268, -0.219
	1966			-0.235	0.011	-0.257, -0.212	-0.231	0.011	-0.253, -0.209
	1967			-0.195	0.010	-0.216, -0.175	-0.193	0.010	-0.213, -0.172
	1968			-0.122	0.010	-0.141, -0.102	-0.121	0.010	-0.140, -0.101
	1969			-0.072	0.010	-0.091, -0.053	-0.072	0.010	-0.091, -0.053
	1970			0.000			0.000		
	1971			0.050	0.009	0.032, 0.067	0.045	0.009	0.027, 0.063
	1972			0.062	0.009	0.044, 0.080	0.058	0.009	0.040, 0.076
	1973			0.076	0.009	0.058, 0.095	0.072	0.009	0.053, 0.091
	1974			0.082	0.010	0.063, 0.102	0.078	0.010	0.058, 0.097
	1975			0.116	0.011	0.095, 0.137	0.111	0.011	0.089, 0.132
	1976			0.151	0.012	0.128, 0.174	0.146	0.012	0.123, 0.169
	1977			0.204	0.013	0.179, 0.229	0.198	0.013	0.173, 0.222
	1978			0.216	0.014	0.189, 0.243	0.208	0.014	0.181, 0.235
	1979			0.217	0.015	0.188, 0.246	0.210	0.015	0.181, 0.239
	1980			0.224	0.016	0.193, 0.255	0.214	0.016	0.183, 0.246
	1981			0.251	0.017	0.217, 0.284	0.238	0.017	0.205, 0.272
Maternal Age at Birth (G3)	15-19			-0.021	0.009	-0.040, -0.003	-0.019	0.009	-0.037, 0.000
	20-24			0.000	0.005	-0.011, 0.010	0.002	0.005	-0.008, 0.013
	25-29			0.000			0.000		
	30-34			-0.016	0.007	-0.029, -0.003	-0.016	0.007	-0.029, -0.003
	35-39			-0.017	0.015	-0.045, 0.012	-0.016	0.015	-0.044, 0.013
	40+			0.010	0.050	-0.088, 0.108	0.016	0.050	-0.082, 0.114
Paternal Age at Birth (G3)	15-19			-0.045	0.014	-0.072, -0.018	-0.046	0.014	-0.073, -0.019
	20-24			-0.017	0.006	-0.029, -0.006	-0.017	0.006	-0.029, -0.006
	25-29			0.000			0.000		
	30-34			-0.009	0.006	-0.021, 0.004	-0.007	0.006	-0.019, 0.005
	35-39			-0.029	0.012	-0.053, -0.005	-0.026	0.012	-0.050, -0.002
	40+			-0.031	0.027	-0.083, 0.021	-0.024	0.027	-0.076, 0.028
Maternal Educational Attainment (G2)	Primary <9 years						0.000	0.009	-0.017, 0.017
	Primary - 9 years						0.000		
	Secondary - 10-11 years						0.014	0.007	0.001, 0.027
	Secondary - 12 years						0.011	0.009	-0.006, 0.029
	Tertiary - 13-15 years						0.029	0.009	0.012, 0.046
	Tertiary - 15+ years						0.047	0.009	0.030, 0.065
	Post-graduate						0.022	0.034	-0.045, 0.089
	Missing						-0.117	0.061	-0.236, 0.003
Maternal Social Class (EGP) (G2)	I						0.030	0.025	-0.019, 0.079
	II						0.000		
	III						-0.019	0.008	-0.035, -0.003
	IV						-0.057	0.013	-0.083, -0.031
	VI-VII						-0.036	0.006	-0.047, -0.024
	Unknown						-0.072	0.006	-0.083, -0.060
Paternal Educational Attainment (G2)	Primary <9 years						-0.002	0.009	-0.019, 0.016
	Primary - 9 years						0.000		
	Secondary - 10-11 years						-0.021	0.008	-0.036, -0.005
	Secondary - 12 years						0.020	0.009	0.001, 0.038
	Tertiary - 13-15 years						0.014	0.011	-0.006, 0.035
	Tertiary - 15+ years						0.020	0.012	-0.003, 0.042
	Post-graduate						0.015	0.024	-0.032, 0.062
	Missing						-0.019	0.044	-0.105, 0.067
Paternal Social Class (EGP) (G2)	I						-0.004	0.022	-0.047, 0.038
	II						0.000		
	III						0.001	0.016	-0.031, 0.032
	IV						-0.028	0.012	-0.051, -0.004
	VI-VII						-0.020	0.007	-0.034, -0.007
	Unknown						-0.034	0.007	-0.048, -0.019
N				463,678			463,678		463,678

Table S10: Descriptive statistics for birth order and grade point average at age 16 for generation 3 (G3), Swedish men and women born 1982-1990.

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
N		334,065	237,695	86,033	17,424	4,587	318,741	213,601	90,356	33,647	23,459	313,278	215,210	91,721	34,868	24,727
Grade Point Average	Mean	207.8	207.2	205.5	198.3	190.4	206.5	208.8	207.2	203.9	199.3	206.5	209.0	207.2	203.2	198.5
	SD	62.7	60.4	61.2	65.4	69.6	62.4	61.2	61.5	62.1	61.8	62.4	61.1	61.4	62.3	61.9
Mother Birth Order	Mean	1.9	1.9	2.0	2.0	2.1	1.0	2.0	3.0	4.0	5.9	1.9	1.9	1.9	2.0	2.0
	SD	1.1	1.2	1.2	1.3	1.5	0.0	0.0	0.0	0.0	1.3	1.1	1.2	1.2	1.3	1.3
Father Birth Order	Mean	1.9	1.9	2.0	2.1	2.1	1.9	1.9	1.9	2.0	2.1	1.0	2.0	3.0	4.0	5.9
	SD	1.1	1.2	1.3	1.3	1.4	1.2	1.2	1.2	1.3	1.4	0.0	0.0	0.0	0.0	1.3
Index Birth Order	Mean	1.0	2.0	3.0	4.0	5.4	1.7	1.7	1.7	1.8	1.9	1.7	1.7	1.7	1.8	1.8
	SD	0.0	0.0	0.0	0.0	0.8	0.8	0.8	0.9	0.9	1.0	0.8	0.8	0.9	0.9	0.9
Index Sibling Group Size	Mean	2.0	2.4	3.3	4.3	6.0	2.4	2.4	2.5	2.5	2.6	2.4	2.4	2.5	2.5	2.6
	SD	0.8	0.7	0.6	0.8	1.4	1.0	0.9	1.0	1.0	1.1	1.0	0.9	1.0	1.0	1.1
Index Birth Year	Mean	1986.9	1986.8	1986.8	1987.1	1987.3	1986.9	1986.9	1986.8	1986.7	1986.6	1986.9	1986.9	1986.8	1986.8	1986.6
	SD	2.9	2.9	2.9	2.8	2.8	2.9	2.9	2.9	2.8	2.8	2.9	2.9	2.9	2.9	2.8
Index Mother Age	Mean	26.6	28.9	31.4	33.3	35.2	28.2	28.3	28.2	28.2	28.1	28.3	28.2	28.1	28.0	27.7
	SD	4.8	4.2	4.0	4.1	4.2	4.9	4.8	4.8	4.8	4.8	4.9	4.8	4.8	4.8	4.8
Index Father Age	Mean	29.2	31.4	34.0	35.9	38.0	30.7	30.9	30.9	31.0	31.0	30.9	30.8	30.6	30.6	30.6
	SD	5.4	4.7	4.4	4.4	4.4	5.4	5.3	5.3	5.3	5.4	5.5	5.3	5.2	5.2	5.1
Mother Sibling Group Size	Mean	2.6	2.7	2.9	3.2	3.4	2.1	2.6	3.5	4.5	6.5	2.7	2.7	2.8	2.8	2.9
	SD	1.3	1.4	1.5	1.7	2.0	1.0	0.9	0.9	0.9	1.7	1.3	1.4	1.4	1.5	1.6
Father Sibling Group Size	Mean	2.7	2.8	3.0	3.2	3.5	2.7	2.8	2.8	2.9	3.0	2.1	2.7	3.6	4.6	6.6
	SD	1.4	1.4	1.6	1.7	2.0	1.4	1.4	1.5	1.5	1.7	1.0	0.9	0.9	1.0	1.8
Mother Birth Year	Mean	1960.3	1957.9	1955.4	1953.8	1952.2	1958.6	1958.6	1958.6	1958.5	1958.4	1958.6	1958.6	1958.7	1958.8	1958.9
	SD	5.5	5.0	4.9	4.9	5.0	5.6	5.5	5.5	5.3	5.3	5.7	5.5	5.4	5.4	5.2
Father Birth Year	Mean	1957.7	1955.4	1952.8	1951.1	1949.4	1956.2	1956.0	1955.9	1955.7	1955.6	1955.9	1956.1	1956.2	1956.1	1956.1
	SD	6.0	5.4	5.1	5.1	5.1	6.0	5.9	5.9	5.8	5.8	6.1	5.9	5.8	5.7	5.4
Maternal Grandmother Age at Birth	Mean	27.0	27.5	27.9	27.9	27.9	24.7	28.0	31.0	33.2	35.6	27.3	27.4	27.3	27.3	27.3
	SD	6.0	6.1	6.1	6.2	6.4	5.4	5.2	5.3	5.2	5.0	6.1	6.1	6.1	6.2	6.2
Paternal Grandmother Age at Birth	Mean	27.3	27.8	28.2	28.4	28.5	27.6	27.6	27.7	27.7	27.8	25.0	28.3	31.1	33.2	35.5
	SD	6.1	6.1	6.1	6.2	6.3	6.1	6.0	6.1	6.2	6.3	5.4	5.2	5.2	5.2	5.0
Mother Education (%)	Primary (<9 years)	0.6	0.7	1.5	3.5	8.5	0.7	0.8	1.1	1.4	2.4	0.9	0.8	1.0	1.2	1.2
	Primary (9 years)	8.9	8.8	10.0	13.4	16.8	8.1	9.1	10.4	12.2	15.4	8.9	8.9	9.5	10.7	12.1
	Secondary (10-11 years)	37.2	36.8	36.0	36.7	38.1	35.3	37.1	38.5	40.7	44.2	36.2	36.3	37.5	40.2	43.7
	Secondary (12 years)	15.8	14.2	12.5	11.5	10.1	15.2	14.4	14.0	13.6	12.7	14.8	14.5	14.7	14.3	14.7
	Tertiary (13-15 years)	16.1	16.9	16.1	13.3	10.3	16.9	16.6	15.4	13.8	11.9	16.5	16.8	15.8	14.7	12.9
	Tertiary (15+ years)	20.6	21.9	23.2	21.0	15.7	22.8	21.2	19.9	17.7	13.1	21.9	22.0	20.9	18.4	14.9
	Graduate school	0.7	0.7	0.8	0.7	0.4	0.8	0.7	0.6	0.5	0.3	0.8	0.7	0.6	0.5	0.4
Missing	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	

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Table S10 – Continued from previous page

		Index Birth Order					Mother Birth Order					Father Birth Order				
		1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
Mother EGP (%)	I	3.7	3.5	2.7	1.7	0.8	3.9	3.3	2.9	2.4	1.6	3.7	3.6	3.2	2.6	1.7
	II	16.9	19.3	20.5	19.1	17.8	19.2	18.6	16.9	15.2	12.4	18.8	18.9	17.3	16.0	13.2
	III	16.1	15.7	10.4	6.3	4.6	15.3	15.3	14.1	13.1	11.5	15.1	15.2	14.5	13.9	13.0
	IV	1.4	1.5	1.9	2.9	4.2	1.5	1.5	1.7	1.7	1.6	1.4	1.5	1.8	1.8	1.7
	VI-VII	40.6	37.4	32.1	27.4	22.9	36.6	37.7	40.1	41.6	45.6	37.3	37.3	39.0	41.1	44.4
	Unknown	21.3	22.6	32.5	42.7	49.8	23.5	23.6	24.4	26.0	27.4	23.8	23.6	24.2	24.7	26.0
Father Education (%)	Primary (<9 years)	2.7	3.7	6.6	10.8	16.1	3.6	3.6	4.2	4.8	6.1	3.2	3.6	4.6	6.0	7.7
	Primary (9 years)	15.9	15.9	15.6	15.7	15.1	15.5	15.6	16.2	17.7	18.8	14.4	15.7	17.5	20.0	24.0
	Secondary (10-11 years)	40.9	36.7	32.6	31.8	32.5	37.7	37.8	38.3	39.4	42.2	36.8	38.1	39.5	41.2	42.9
	Secondary (12 years)	11.9	12.6	13.1	12.9	12.1	12.4	12.3	12.2	12.2	11.5	13.1	12.3	11.3	10.1	8.9
	Tertiary (13-15 years)	13.5	14.1	13.2	11.0	8.9	13.8	13.9	13.3	12.2	11.0	14.6	13.7	12.3	10.9	9.0
	Tertiary (15+ years)	13.6	15.3	17.0	15.8	13.7	15.2	15.1	14.1	12.4	9.6	16.0	14.9	13.3	10.7	6.6
	Graduate school	1.3	1.6	1.9	1.9	1.6	1.6	1.6	1.4	1.2	0.7	1.7	1.5	1.3	0.9	0.7
Missing	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Father EGP (%)	I	5.8	6.1	5.1	3.9	3.1	6.0	5.9	5.5	4.6	3.5	6.2	5.9	5.1	4.3	2.5
	II	14.0	15.5	15.7	14.8	13.9	15.2	15.0	14.2	13.0	11.7	16.2	15.0	12.9	10.5	8.3
	III	7.9	7.8	5.9	4.3	3.8	7.6	7.6	7.3	6.8	6.3	7.7	7.7	7.1	6.6	5.6
	IV	4.3	4.9	6.3	7.6	7.7	4.7	4.8	5.2	5.7	5.8	4.4	4.9	5.8	5.9	5.8
	VI-VII	50.8	48.9	46.4	47.3	48.5	48.8	48.8	50.2	53.2	56.6	47.0	49.3	52.0	56.2	62.1
	Unknown	17.3	16.8	20.7	22.2	23.0	17.8	17.9	17.6	16.7	16.1	18.5	17.2	17.0	16.4	15.8

Table S11: Parental Birth Order and Offspring Grade Point Average (GPA) at Age 16, Linear Regression Model on Full Population of Swedish Men and Women Born 1982-1991.

		Model 1			Model 2			Model 3			Model 4		
		b	se	95% CI	b	se	95% CI	b	se	95% CI	b	se	95% CI
Mother Birth Order (G2)	1	0.00			0.00			0.00			0.00		
	2	0.04	0.00	0.03, 0.04	-0.09	0.00	-0.10, -0.08	-0.07	0.00	-0.08, -0.07	-0.01	0.00	-0.02, -0.01
	3	0.01	0.00	0.00, 0.02	-0.16	0.01	-0.17, -0.15	-0.13	0.01	-0.14, -0.12	-0.03	0.00	-0.04, -0.02
	4	-0.04	0.01	-0.05, -0.03	-0.20	0.01	-0.21, -0.18	-0.16	0.01	-0.18, -0.15	-0.04	0.01	-0.06, -0.03
	5+	-0.11	0.01	-0.13, -0.10	-0.24	0.01	-0.26, -0.21	-0.19	0.01	-0.21, -0.17	-0.04	0.01	-0.06, -0.02
Father Birth Order (G2)	1	0.00			0.00			0.00			0.00		
	2	0.04	0.00	0.03, 0.05	-0.07	0.00	-0.08, -0.07	-0.06	0.00	-0.06, -0.05	-0.01	0.00	-0.01, 0.00
	3	0.01	0.00	0.00, 0.02	-0.13	0.01	-0.15, -0.12	-0.11	0.01	-0.12, -0.10	-0.02	0.00	-0.03, -0.02
	4	-0.05	0.01	-0.07, -0.04	-0.17	0.01	-0.19, -0.15	-0.14	0.01	-0.16, -0.13	-0.04	0.01	-0.05, -0.02
	5+	-0.12	0.01	-0.14, -0.11	-0.20	0.01	-0.22, -0.18	-0.16	0.01	-0.18, -0.14	-0.03	0.01	-0.05, -0.02
Maternal Sibling Group Size (G2)	1				-0.15	0.00	-0.16, -0.14	-0.13	0.00	-0.13, -0.12	-0.07	0.00	-0.08, -0.06
	2				0.00			0.00			0.00		
	3				0.00	0.00	0.00, 0.01	0.00	0.00	0.00, 0.01	0.00	0.00	-0.01, 0.01
	4				-0.03	0.01	-0.04, -0.02	-0.02	0.01	-0.03, -0.01	-0.01	0.00	-0.02, 0.00
	5+				-0.10	0.01	-0.12, -0.09	-0.08	0.01	-0.09, -0.06	-0.02	0.01	-0.04, -0.01
Paternal Sibling Group Size (G2)	1				-0.13	0.00	-0.13, -0.12	-0.11	0.00	-0.12, -0.10	-0.06	0.00	-0.07, -0.05
	2				0.00			0.00			0.00		
	3				0.02	0.00	0.01, 0.02	0.02	0.00	0.01, 0.03	0.02	0.00	0.01, 0.02
	4				-0.02	0.01	-0.03, -0.01	-0.01	0.01	-0.02, 0.00	0.01	0.00	0.00, 0.02
	5+				-0.11	0.01	-0.12, -0.09	-0.08	0.01	-0.09, -0.06	-0.01	0.01	-0.02, 0.00
Maternal Grandmother's Age at Birth (G2)	15-19				-0.34	0.01	-0.35, -0.33	-0.27	0.01	-0.28, -0.26	-0.15	0.01	-0.17, -0.14
	20-24				-0.17	0.00	-0.17, -0.16	-0.14	0.00	-0.14, -0.13	-0.07	0.00	-0.08, -0.06
	25-29				0.00			0.00			0.00		
	30-34				0.08	0.00	0.07, 0.08	0.06	0.00	0.05, 0.07	0.03	0.00	0.02, 0.04
	35-39				0.10	0.01	0.09, 0.11	0.08	0.00	0.07, 0.09	0.04	0.00	0.03, 0.05
Paternal Grandmother's Age at Birth (G2)	40+				0.10	0.01	0.08, 0.11	0.08	0.01	0.06, 0.09	0.04	0.01	0.03, 0.06
	15-19				-0.31	0.01	-0.32, -0.30	-0.26	0.01	-0.27, -0.25	-0.14	0.01	-0.15, -0.13
	20-24				-0.15	0.00	-0.15, -0.14	-0.12	0.00	-0.13, -0.11	-0.06	0.00	-0.07, -0.05
	25-29				0.00			0.00			0.00		
	30-34				0.07	0.00	0.06, 0.07	0.05	0.00	0.05, 0.06	0.03	0.00	0.02, 0.04
Maternal Birth Year (G2)	1938-1945				-0.01	0.01	-0.03, 0.02	0.13	0.01	0.10, 0.15	0.06	0.01	0.04, 0.09
	1946-1949				0.03	0.01	0.02, 0.05	0.10	0.01	0.08, 0.11	0.07	0.01	0.06, 0.09
	1950-1954				0.00			0.00			0.00		
	1955-1959				-0.07	0.00	-0.08, -0.06	-0.11	0.01	-0.12, -0.10	-0.05	0.00	-0.06, -0.04
	1960-1964				-0.17	0.01	-0.18, -0.16	-0.21	0.01	-0.23, -0.20	-0.10	0.01	-0.11, -0.08
Paternal Birth Year (G2)	1965-1969				-0.27	0.01	-0.28, -0.25	-0.28	0.01	-0.30, -0.26	-0.13	0.01	-0.15, -0.11
	1970-1974				-0.48	0.01	-0.50, -0.45	-0.39	0.02	-0.42, -0.36	-0.20	0.02	-0.23, -0.17
	1975-1979				-0.93	0.15	-1.22, -0.63	-0.65	0.15	-0.94, -0.35	-0.41	0.15	-0.70, -0.13
	1938-1945				-0.11	0.01	-0.12, -0.09	0.00	0.01	-0.02, 0.02	0.02	0.01	0.00, 0.04
	1946-1949				-0.06	0.01	-0.07, -0.05	-0.01	0.01	-0.02, 0.00	0.03	0.01	0.02, 0.04
Index Birth Order (G3)	1950-1954				0.00			0.00			0.00		
	1955-1959				0.02	0.00	0.01, 0.03	-0.02	0.00	-0.03, -0.01	-0.01	0.00	-0.02, 0.00
	1960-1964				0.00	0.01	-0.01, 0.01	-0.05	0.01	-0.07, -0.04	-0.02	0.01	-0.04, -0.01
	1965-1969				-0.06	0.01	-0.07, -0.04	-0.08	0.01	-0.10, -0.06	-0.04	0.01	-0.06, -0.02
	1970-1974				-0.20	0.02	-0.24, -0.16	-0.11	0.03	-0.16, -0.06	-0.04	0.02	-0.09, 0.01
Sex (G3)	1975-1979				0.28	0.48	-0.67, 1.22	0.55	0.44	-0.32, 1.42	0.55	0.43	-0.29, 1.38
	1							0.00			0.00		
	2							-0.26	0.00	-0.26, -0.25	-0.18	0.00	-0.18, -0.17
	3							-0.44	0.00	-0.45, -0.44	-0.27	0.00	-0.27, -0.26
	4							-0.56	0.01	-0.58, -0.54	-0.32	0.01	-0.34, -0.30
Sibling Group Size (G3)	5+							-0.67	0.02	-0.71, -0.62	-0.37	0.02	-0.40, -0.33
	Male							0.00			0.00		
Birth Year (G3)	Female							0.36	0.00	0.35, 0.36	0.36	0.00	0.35, 0.36
	1							-0.37	0.00	-0.38, -0.36	-0.25	0.00	-0.26, -0.25
	2							0.00			0.00		
	3							0.11	0.00	0.10, 0.12	0.05	0.00	0.04, 0.05
	4							0.08	0.01	0.06, 0.09	0.02	0.01	0.00, 0.03
Birth Year (G3)	5+							0.02	0.01	0.00, 0.05	-0.01	0.01	-0.03, 0.01
	1982							-0.09	0.01	-0.10, -0.08	-0.05	0.01	-0.07, -0.04
	1983							-0.05	0.01	-0.06, -0.04	-0.03	0.01	-0.04, -0.02
	1984							-0.03	0.01	-0.04, -0.01	-0.02	0.00	-0.03, -0.01
	1985							0.00			0.00		

Continued on next page

Table S11 – Continued from previous page

	Model 1			Model 2			Model 3			Model 4		
	b	se	95% CI	b	se	95% CI	b	se	95% CI	b	se	95% CI
							0.05	0.01	0.04, 0.06	0.03	0.00	0.02, 0.04
							0.08	0.01	0.07, 0.09	0.04	0.00	0.03, 0.05
							0.13	0.01	0.12, 0.14	0.08	0.01	0.07, 0.09
							0.14	0.01	0.13, 0.15	0.08	0.01	0.07, 0.09
							0.17	0.01	0.16, 0.18	0.09	0.01	0.08, 0.10
							0.23	0.01	0.22, 0.24	0.13	0.01	0.11, 0.14
Maternal Age at Birth (G3)							-0.34	0.01	-0.36, -0.31	-0.24	0.01	-0.26, -0.22
							-0.15	0.00	-0.16, -0.14	-0.08	0.00	-0.09, -0.07
							0.00			0.00		
							0.06	0.00	0.05, 0.07	0.01	0.00	0.00, 0.02
							0.07	0.01	0.05, 0.08	0.01	0.01	0.00, 0.03
							0.02	0.01	-0.01, 0.05	0.00	0.01	-0.02, 0.03
Paternal Age at Birth (G3)							-0.18	0.02	-0.23, -0.14	-0.16	0.02	-0.21, -0.12
							-0.11	0.01	-0.12, -0.10	-0.08	0.01	-0.09, -0.07
							0.00			0.00		
							0.03	0.00	0.03, 0.04	0.02	0.00	0.01, 0.03
							0.01	0.01	-0.01, 0.02	0.01	0.01	0.00, 0.02
							-0.05	0.01	-0.08, -0.03	-0.03	0.01	-0.05, -0.01
							-0.12	0.02	-0.16, -0.09	-0.07	0.02	-0.11, -0.04
							-0.20	0.05	-0.29, -0.10	-0.12	0.05	-0.21, -0.03
Maternal Educational Attainment (G2)										-0.06	0.01	-0.08, -0.03
										0.00		
										0.20	0.00	0.19, 0.21
										0.34	0.01	0.33, 0.35
										0.43	0.01	0.42, 0.44
										0.53	0.01	0.52, 0.54
										0.66	0.02	0.63, 0.69
										0.13	0.06	0.01, 0.26
Maternal Social Class (EGP) (G2)										0.07	0.01	0.06, 0.09
										0.00		
										0.00	0.00	-0.01, 0.01
										0.00	0.01	-0.02, 0.02
										-0.14	0.00	-0.15, -0.13
										-0.18	0.00	-0.19, -0.17
Paternal Educational Attainment (G2)										-0.01	0.01	-0.03, 0.00
										0.00		
										0.10	0.00	0.09, 0.10
										0.27	0.00	0.26, 0.28
										0.34	0.00	0.33, 0.35
										0.45	0.01	0.44, 0.46
										0.56	0.01	0.54, 0.59
										-0.04	0.03	-0.10, 0.03
Paternal Social Class (EGP) (G2)										0.04	0.01	0.02, 0.05
										0.00		
										-0.01	0.01	-0.03, 0.00
										0.01	0.01	0.00, 0.02
										-0.11	0.00	-0.12, -0.10
										-0.15	0.00	-0.16, -0.15
N			679,804			679,804			679,804			679,804

Table S12: Parental Birth Order and Offspring Grade Point Average (GPA) at Age 16, Fixed Effects Linear Regression on Maternal Cousin Sample of Swedish Men and Women Born 1982-1991.

		Model 5			Model 6			Model 7		
		b	se	95% CI	b	se	95% CI	b	se	95% CI
Mother Birth Order (G2)	1	0.00			0.00			0.00		
	2	0.00	0.01	-0.01, 0.02	-0.01	0.01	-0.02, 0.00	0.02	0.01	0.00, 0.03
	3	0.01	0.01	-0.01, 0.03	-0.02	0.01	-0.04, 0.01	0.03	0.01	0.00, 0.05
	4	0.00	0.02	-0.03, 0.03	-0.03	0.02	-0.07, 0.00	0.01	0.02	-0.02, 0.04
	5+	0.00	0.02	-0.05, 0.04	-0.03	0.02	-0.07, 0.01	0.03	0.02	-0.02, 0.07
Father Birth Order (G2)	1	0.00			0.00			0.00		
	2	-0.03	0.01	-0.05, -0.02	-0.03	0.01	-0.04, -0.01	0.00	0.01	-0.01, 0.01
	3	-0.05	0.01	-0.07, -0.03	-0.04	0.01	-0.06, -0.02	0.01	0.01	-0.01, 0.02
	4	-0.06	0.01	-0.08, -0.03	-0.05	0.01	-0.07, -0.02	0.00	0.01	-0.03, 0.03
	5+	-0.08	0.02	-0.12, -0.04	-0.07	0.02	-0.10, -0.03	0.00	0.02	-0.04, 0.03
Maternal Sibling Group Size (G2)	1									
	2									
	3									
	4									
	5+									
Paternal Sibling Group Size (G2)	1	-0.06	0.01	-0.08, -0.04	-0.05	0.01	-0.07, -0.04	-0.03	0.01	-0.05, -0.02
	2	0.00			0.00			0.00		
	3	0.01	0.01	-0.01, 0.02	0.01	0.01	0.00, 0.02	0.01	0.01	0.00, 0.02
	4	-0.03	0.01	-0.05, -0.01	-0.02	0.01	-0.04, 0.00	-0.01	0.01	-0.02, 0.01
	5+	-0.06	0.01	-0.08, -0.03	-0.04	0.01	-0.06, -0.02	-0.02	0.01	-0.04, 0.01
Maternal Grandmother's Age at Birth (G2)	15-19	0.04	0.02	0.01, 0.08	0.06	0.02	0.02, 0.09	0.06	0.02	0.02, 0.09
	20-24	0.00	0.01	-0.02, 0.02	0.02	0.01	0.00, 0.03	0.01	0.01	-0.01, 0.03
	25-29	0.00			0.00			0.00		
	30-34	-0.01	0.01	-0.03, 0.01	-0.03	0.01	-0.05, -0.02	-0.03	0.01	-0.04, -0.01
	35-39	-0.01	0.02	-0.04, 0.02	-0.06	0.02	-0.09, -0.03	-0.04	0.02	-0.08, -0.01
Paternal Grandmother's Age at Birth (G2)	40+	-0.05	0.03	-0.11, 0.00	-0.13	0.03	-0.18, -0.07	-0.10	0.03	-0.16, -0.05
	15-19	-0.19	0.01	-0.21, -0.16	-0.17	0.01	-0.19, -0.15	-0.11	0.01	-0.13, -0.09
	20-24	-0.08	0.01	-0.10, -0.07	-0.07	0.01	-0.09, -0.06	-0.05	0.01	-0.06, -0.04
	25-29	0.00			0.00			0.00		
	30-34	0.02	0.01	0.01, 0.04	0.02	0.01	0.01, 0.03	0.01	0.01	0.00, 0.03
Maternal Birth Year (G2)	1938-1945	-0.04	0.04	-0.11, 0.04	-0.01	0.04	-0.08, 0.07	0.01	0.04	-0.06, 0.09
	1946-1949	0.01	0.02	-0.02, 0.04	0.02	0.02	-0.01, 0.06	0.04	0.02	0.01, 0.07
	1950-1954	0.00			0.00			0.00		
	1955-1959	-0.02	0.01	-0.04, 0.00	-0.04	0.01	-0.06, -0.02	-0.03	0.01	-0.05, -0.01
	1960-1964	0.00	0.02	-0.04, 0.03	-0.05	0.02	-0.08, -0.02	-0.03	0.02	-0.07, 0.00
Paternal Birth Year (G2)	1965-1969	0.02	0.02	-0.03, 0.06	-0.03	0.02	-0.08, 0.01	-0.02	0.02	-0.07, 0.02
	1970-1974	0.00	0.04	-0.08, 0.07	-0.06	0.04	-0.13, 0.02	-0.05	0.04	-0.12, 0.02
	1975-1979	-0.32	0.36	-1.03, 0.39	-0.35	0.35	-1.03, 0.34	-0.26	0.35	-0.94, 0.42
	1938-1945	-0.07	0.02	-0.10, -0.04	-0.03	0.02	-0.07, 0.01	-0.01	0.02	-0.04, 0.03
	1946-1949	-0.03	0.01	-0.05, -0.01	0.00	0.01	-0.03, 0.02	0.02	0.01	0.00, 0.05
Index Birth Order (G3)	1950-1954	0.00			0.00			0.00		
	1955-1959	0.03	0.01	0.02, 0.05	0.00	0.01	-0.01, 0.02	0.00	0.01	-0.01, 0.02
	1960-1964	0.03	0.01	0.01, 0.05	-0.03	0.01	-0.06, -0.01	-0.03	0.01	-0.05, -0.01
	1965-1969	-0.01	0.01	-0.03, 0.02	-0.11	0.02	-0.14, -0.07	-0.09	0.02	-0.13, -0.05
	1970-1974	-0.07	0.05	-0.16, 0.02	-0.18	0.05	-0.28, -0.09	-0.14	0.05	-0.24, -0.05
Sex (G3)	1975-1979	1.83	1.17	-0.45, 4.12	1.74	1.13	-0.47, 3.95	1.72	1.11	-0.47, 3.90
	1				0.00			0.00		
	2				-0.16	0.00	-0.16, -0.15	-0.14	0.00	-0.14, -0.13
	3				-0.26	0.01	-0.28, -0.25	-0.22	0.01	-0.23, -0.20
	4				-0.33	0.01	-0.36, -0.31	-0.27	0.01	-0.30, -0.25
Sibling Group Size (G3)	5+				-0.42	0.02	-0.46, -0.38	-0.34	0.02	-0.39, -0.30
	Male				0.00			0.00		
Birth Year (G3)	Female				0.35	0.00	0.34, 0.36	0.35	0.00	0.34, 0.36
	1				-0.16	0.01	-0.18, -0.15	-0.14	0.01	-0.15, -0.12
	2				0.00			0.00		
	3				0.04	0.01	0.03, 0.05	0.03	0.01	0.02, 0.04
	4				0.02	0.01	0.00, 0.04	0.02	0.01	-0.01, 0.04
Birth Year (G3)	5+				-0.03	0.02	-0.06, 0.01	-0.02	0.02	-0.05, 0.02
	1982				-0.07	0.01	-0.09, -0.06	-0.06	0.01	-0.08, -0.04

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Table S12 – Continued from previous page

	Model 5			Model 6			Model 7		
	b	se	95% CI	b	se	95% CI	b	se	95% CI
	1983			-0.03	0.01	-0.05, -0.02	-0.02	0.01	-0.04, -0.01
	1984			-0.02	0.01	-0.03, 0.00	-0.01	0.01	-0.03, 0.00
	1985			0.00			0.00		
	1986			0.04	0.01	0.03, 0.06	0.03	0.01	0.02, 0.05
	1987			0.07	0.01	0.06, 0.09	0.05	0.01	0.04, 0.07
	1988			0.10	0.01	0.09, 0.12	0.08	0.01	0.06, 0.10
	1989			0.11	0.01	0.09, 0.13	0.08	0.01	0.06, 0.10
	1990			0.12	0.01	0.10, 0.14	0.08	0.01	0.06, 0.10
	1991			0.15	0.01	0.13, 0.18	0.11	0.01	0.09, 0.13
Maternal Age at Birth (G3)	15-19			-0.02	0.02	-0.05, 0.01	-0.02	0.02	-0.05, 0.01
	20-24			-0.02	0.01	-0.03, -0.01	-0.01	0.01	-0.03, 0.00
	25-29			0.00			0.00		
	30-34			0.01	0.01	0.00, 0.02	0.00	0.01	-0.01, 0.02
	35-39			0.02	0.01	-0.01, 0.04	0.02	0.01	-0.01, 0.04
	40+			-0.01	0.03	-0.06, 0.04	0.01	0.03	-0.04, 0.06
Paternal Age at Birth (G3)	15-19			0.00	0.03	-0.06, 0.06	0.00	0.03	-0.05, 0.06
	20-24			0.00	0.01	-0.02, 0.01	0.00	0.01	-0.01, 0.02
	25-29			0.00			0.00		
	30-34			0.00	0.01	-0.01, 0.01	0.00	0.01	-0.01, 0.01
	35-39			-0.01	0.01	-0.03, 0.01	0.00	0.01	-0.02, 0.02
	40-44			-0.05	0.02	-0.08, -0.01	-0.03	0.02	-0.07, 0.00
	45-49			-0.07	0.03	-0.13, -0.01	-0.05	0.03	-0.10, 0.01
	50+			-0.08	0.07	-0.21, 0.06	-0.07	0.07	-0.20, 0.06
Maternal Educational Attainment (G2)	Primary <9 years						-0.03	0.03	-0.08, 0.03
	Primary - 9 years						0.00		
	Secondary - 10-11 years						0.11	0.01	0.09, 0.13
	Secondary - 12 years						0.21	0.01	0.18, 0.23
	Tertiary - 13-15 years						0.27	0.01	0.25, 0.29
	Tertiary - 15+ years						0.34	0.01	0.32, 0.36
	Post-graduate						0.46	0.03	0.39, 0.52
	Missing						-0.04	0.10	-0.23, 0.15
Maternal Social Class (EGP) (G2)	I						0.06	0.02	0.03, 0.10
	II						0.00		
	III						0.02	0.01	0.00, 0.04
	IV						0.01	0.02	-0.03, 0.05
	VI-VII						-0.07	0.01	-0.08, -0.05
	Unknown						-0.09	0.01	-0.11, -0.08
Paternal Educational Attainment (G2)	Primary <9 years						-0.01	0.01	-0.04, 0.01
	Primary - 9 years						0.00		
	Secondary - 10-11 years						0.09	0.01	0.08, 0.10
	Secondary - 12 years						0.24	0.01	0.22, 0.26
	Tertiary - 13-15 years						0.29	0.01	0.27, 0.31
	Tertiary - 15+ years						0.37	0.01	0.35, 0.40
	Post-graduate						0.45	0.02	0.40, 0.50
	Missing						0.11	0.05	0.02, 0.20
Paternal Social Class (EGP) (G2)	I						0.02	0.01	-0.01, 0.04
	II						0.00		
	III						0.00	0.01	-0.02, 0.02
	IV						-0.02	0.01	-0.04, 0.01
	VI-VII						-0.09	0.01	-0.10, -0.07
	Unknown						-0.12	0.01	-0.13, -0.10
N				399,251			399,251		399,251

Table S13: Parental Birth Order and Offspring Grade Point Average (GPA) at Age 16, Fixed Effects Linear Regression on Paternal Cousin Sample of Swedish Men and Women Born 1982-1991.

		Model 8			Model 9			Model 10		
		b	se	95% CI	b	se	95% CI	b	se	95% CI
Mother Birth Order (G2)	1	0.00			0.00			0.00		
	2	-0.04	0.01	-0.05, -0.03	-0.03	0.01	-0.04, -0.02	0.00	0.01	-0.01, 0.01
	3	-0.07	0.01	-0.09, -0.05	-0.06	0.01	-0.07, -0.04	0.00	0.01	-0.02, 0.02
	4	-0.04	0.02	-0.07, -0.01	-0.03	0.01	-0.06, -0.01	0.03	0.01	0.00, 0.06
	5+	-0.12	0.02	-0.15, -0.08	-0.10	0.02	-0.14, -0.07	-0.02	0.02	-0.06, 0.02
Father Birth Order (G2)	1	0.00			0.00			0.00		
	2	0.00	0.01	-0.01, 0.01	-0.01	0.01	-0.02, 0.00	0.01	0.01	0.00, 0.02
	3	0.00	0.01	-0.02, 0.02	-0.02	0.01	-0.04, 0.00	0.01	0.01	-0.01, 0.03
	4	0.00	0.02	-0.03, 0.04	-0.02	0.02	-0.05, 0.01	0.02	0.02	-0.01, 0.05
	5+	0.00	0.02	-0.05, 0.04	-0.04	0.02	-0.08, 0.01	0.00	0.02	-0.04, 0.04
Maternal Sibling Group Size (G2)	1	-0.09	0.01	-0.11, -0.07	-0.08	0.01	-0.10, -0.07	-0.06	0.01	-0.08, -0.05
	2	0.00						0.00		
	3	-0.01	0.01	-0.03, 0.00	-0.01	0.01	-0.02, 0.01	-0.01	0.01	-0.02, 0.00
	4	-0.04	0.01	-0.05, -0.02	-0.02	0.01	-0.04, -0.01	-0.02	0.01	-0.04, 0.00
	5+	-0.08	0.01	-0.10, -0.05	-0.06	0.01	-0.08, -0.03	-0.04	0.01	-0.07, -0.02
Paternal Sibling Group Size (G2)	1									
	2									
	3									
	4									
	5+									
Maternal Grandmother's Age at Birth (G2)	15-19	-0.21	0.01	-0.23, -0.18	-0.18	0.01	-0.20, -0.16	-0.13	0.01	-0.15, -0.11
	20-24	-0.10	0.01	-0.11, -0.08	-0.09	0.01	-0.10, -0.07	-0.06	0.01	-0.07, -0.05
	25-29	0.00			0.00			0.00		
	30-34	0.04	0.01	0.03, 0.06	0.03	0.01	0.02, 0.05	0.02	0.01	0.00, 0.03
	35-39	0.04	0.01	0.02, 0.06	0.03	0.01	0.02, 0.05	0.02	0.01	0.00, 0.03
Paternal Grandmother's Age at Birth (G2)	40+	0.05	0.01	0.02, 0.08	0.04	0.01	0.01, 0.06	0.01	0.01	-0.01, 0.04
	15-19	0.01	0.02	-0.03, 0.05	0.03	0.02	-0.01, 0.06	0.04	0.02	0.01, 0.08
	20-24	0.02	0.01	0.00, 0.04	0.03	0.01	0.01, 0.05	0.04	0.01	0.02, 0.06
	25-29	0.00			0.00			0.00		
	30-34	0.00	0.01	-0.01, 0.02	-0.02	0.01	-0.03, 0.00	-0.02	0.01	-0.03, 0.00
Maternal Birth Year (G2)	35-39	-0.03	0.02	-0.06, 0.01	-0.07	0.02	-0.10, -0.03	-0.07	0.02	-0.10, -0.04
	40+	-0.03	0.03	-0.08, 0.02	-0.10	0.03	-0.15, -0.04	-0.10	0.03	-0.15, -0.05
	1938-1945	0.01	0.03	-0.05, 0.06	0.08	0.03	0.02, 0.15	0.08	0.03	0.01, 0.14
	1946-1949	0.00	0.01	-0.03, 0.03	0.04	0.02	0.01, 0.07	0.05	0.02	0.02, 0.08
	1950-1954	0.00			0.00			0.00		
Paternal Birth Year (G2)	1955-1959	0.00	0.01	-0.02, 0.01	-0.05	0.01	-0.07, -0.04	-0.03	0.01	-0.05, -0.01
	1960-1964	-0.01	0.01	-0.03, 0.01	-0.11	0.01	-0.13, -0.08	-0.07	0.01	-0.09, -0.04
	1965-1969	0.00	0.01	-0.03, 0.02	-0.14	0.02	-0.18, -0.11	-0.09	0.02	-0.12, -0.05
	1970-1974	-0.08	0.03	-0.14, -0.03	-0.24	0.03	-0.30, -0.18	-0.15	0.03	-0.21, -0.09
	1975-1979	-0.61	0.41	-1.42, 0.20	-0.63	0.40	-1.42, 0.16	-0.53	0.40	-1.31, 0.25
	1938-1945	-0.07	0.02	-0.11, -0.02	-0.05	0.02	-0.10, -0.01	-0.04	0.02	-0.08, 0.01
	1946-1949	-0.02	0.01	-0.04, 0.00	0.00	0.01	-0.03, 0.02	0.02	0.01	0.00, 0.04
	1950-1954	0.00			0.00			0.00		
	1955-1959	0.02	0.01	0.01, 0.04	0.01	0.01	-0.01, 0.03	0.02	0.01	0.00, 0.04
	1960-1964	0.03	0.02	0.00, 0.06	0.01	0.02	-0.03, 0.04	0.01	0.02	-0.02, 0.04
Index Birth Order (G3)	1965-1969	0.01	0.02	-0.04, 0.05	-0.01	0.02	-0.06, 0.03	0.00	0.02	-0.04, 0.05
	1970-1974	-0.01	0.06	-0.13, 0.12	-0.01	0.06	-0.13, 0.12	0.00	0.06	-0.12, 0.12
	1975-1979									
	1				0.00			0.00		
	2				-0.18	0.00	-0.18, -0.17	-0.15	0.00	-0.16, -0.15
Sex (G3)	3				-0.30	0.01	-0.31, -0.28	-0.24	0.01	-0.26, -0.23
	4				-0.38	0.01	-0.41, -0.36	-0.30	0.01	-0.33, -0.28
	5+				-0.51	0.02	-0.55, -0.46	-0.41	0.02	-0.45, -0.36
	Male				0.00			0.00		
	Female				0.35	0.00	0.35, 0.36	0.35	0.00	0.35, 0.36
Sibling Group Size (G3)	1				-0.22	0.01	-0.23, -0.20	-0.18	0.01	-0.19, -0.16
	2				0.00			0.00		
	3				0.03	0.01	0.02, 0.05	0.02	0.01	0.01, 0.04
	4				0.01	0.01	-0.01, 0.03	0.01	0.01	-0.01, 0.03
	5+				-0.03	0.02	-0.06, 0.01	0.01	0.02	-0.03, 0.04
Birth Year (G3)	1982				-0.09	0.01	-0.11, -0.07	-0.07	0.01	-0.09, -0.05

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Table S13 – Continued from previous page

	Model 8			Model 9			Model 10		
	b	se	95% CI	b	se	95% CI	b	se	95% CI
	1983			-0.06	0.01	-0.07, -0.04	-0.04	0.01	-0.06, -0.03
	1984			-0.03	0.01	-0.05, -0.02	-0.03	0.01	-0.04, -0.01
	1985			0.00			0.00		
	1986			0.04	0.01	0.03, 0.06	0.03	0.01	0.02, 0.05
	1987			0.07	0.01	0.05, 0.08	0.05	0.01	0.04, 0.07
	1988			0.11	0.01	0.09, 0.13	0.09	0.01	0.07, 0.11
	1989			0.11	0.01	0.10, 0.13	0.09	0.01	0.07, 0.11
	1990			0.15	0.01	0.12, 0.17	0.11	0.01	0.09, 0.13
	1991			0.17	0.01	0.15, 0.20	0.13	0.01	0.11, 0.15
Maternal Age at Birth (G3)	15-19			-0.09	0.02	-0.12, -0.06	-0.07	0.02	-0.10, -0.04
	20-24			-0.03	0.01	-0.05, -0.02	-0.02	0.01	-0.04, -0.01
	25-29			0.00			0.00		
	30-34			0.01	0.01	-0.01, 0.02	0.00	0.01	-0.01, 0.01
	35-39			0.02	0.01	-0.01, 0.04	0.01	0.01	-0.01, 0.04
	40+			0.00	0.02	-0.05, 0.04	0.00	0.02	-0.04, 0.05
Paternal Age at Birth (G3)	15-19			-0.02	0.03	-0.08, 0.05	-0.02	0.03	-0.08, 0.04
	20-24			-0.01	0.01	-0.03, 0.00	-0.01	0.01	-0.02, 0.01
	25-29			0.00			0.00		
	30-34			0.01	0.01	0.00, 0.02	0.01	0.01	-0.01, 0.02
	35-39			0.00	0.01	-0.03, 0.02	0.00	0.01	-0.02, 0.02
	40-44			-0.04	0.02	-0.07, 0.00	-0.03	0.02	-0.07, 0.00
	45-49			-0.07	0.03	-0.13, -0.01	-0.06	0.03	-0.12, 0.00
	50+			-0.10	0.07	-0.24, 0.03	-0.07	0.07	-0.21, 0.06
Maternal Educational Attainment (G2)	Primary <9 years						-0.09	0.03	-0.15, -0.04
	Primary - 9 years						0.00		
	Secondary - 10-11 years						0.14	0.01	0.13, 0.16
	Secondary - 12 years						0.25	0.01	0.23, 0.27
	Tertiary - 13-15 years						0.33	0.01	0.31, 0.35
	Tertiary - 15+ years						0.44	0.01	0.42, 0.46
	Post-graduate						0.57	0.03	0.50, 0.63
	Missing						0.04	0.08	-0.13, 0.20
Maternal Social Class (EGP) (G2)	I						0.05	0.02	0.02, 0.08
	II						0.00		
	III						-0.02	0.01	-0.04, 0.00
	IV						-0.09	0.02	-0.13, -0.05
	VI-VII						-0.14	0.01	-0.15, -0.12
	Unknown						-0.17	0.01	-0.19, -0.16
Paternal Educational Attainment (G2)	Primary <9 years						-0.01	0.02	-0.04, 0.02
	Primary - 9 years						0.00		
	Secondary - 10-11 years						0.04	0.01	0.03, 0.06
	Secondary - 12 years						0.16	0.01	0.14, 0.18
	Tertiary - 13-15 years						0.19	0.01	0.17, 0.21
	Tertiary - 15+ years						0.28	0.01	0.25, 0.30
	Post-graduate						0.33	0.03	0.28, 0.38
	Missing						-0.03	0.05	-0.13, 0.08
Paternal Social Class (EGP) (G2)	I						0.00	0.01	-0.02, 0.03
	II						0.00		
	III						-0.01	0.01	-0.04, 0.01
	IV						-0.06	0.01	-0.09, -0.03
	VI-VII						-0.08	0.01	-0.10, -0.06
	Unknown						-0.10	0.01	-0.12, -0.08
N			403,921			403,921			403,921

Table S14: Effect of parental sibling group size on offspring attainment, using twin births as a measure of an exogenous increase in parental family size for Swedish men and women. Offspring born 1960-1982 for educational attainment, 1960-1981 for logged income, and 1982-1991 for GPA. Controls for maternal age at birth and birth year (single-year categories) included in model.

Outcome	Sample	Estimation	beta	se	95% CI	N	
Years of Education	First-born mothers	First Stage	0.771	0.014	0.743, 0.799	404,554	
		Second Stage	0.007	0.046	-0.083, 0.098	404,554	
	First-born fathers	First Stage	0.769	0.015	0.740, 0.799	366,574	
		Second Stage	-0.052	0.050	-0.150, 0.046	366,574	
	First- and second-born mothers	First Stage	0.768	0.014	0.740, 0.797	372,580	
		Second Stage	-0.018	0.046	-0.109, 0.072	372,580	
	First- and second-born fathers	First Stage	0.761	0.014	0.734, 0.788	341,091	
		Second Stage	-0.041	0.047	-0.133, 0.051	341,091	
	First-, second- and third-born mothers	First Stage	0.770	0.018	0.735, 0.806	226,649	
		Second Stage	0.005	0.056	-0.105, 0.116	226,649	
	First-, second- and third-born fathers	First Stage	0.759	0.019	0.721, 0.796	207,898	
		Second Stage	-0.178	0.060	-0.296, -0.059	207,898	
	Logged Income	First-born mothers	First Stage	0.770	0.015	0.741, 0.800	369,630
			Second Stage	0.018	0.018	-0.018, 0.053	369,630
First-born fathers		First Stage	0.772	0.016	0.740, 0.803	334,458	
		Second Stage	-0.012	0.020	-0.052, 0.027	334,458	
First- and second-born mothers		First Stage	0.768	0.015	0.738, 0.798	341,014	
		Second Stage	0.015	0.019	-0.022, 0.051	341,014	
First- and second-born fathers		First Stage	0.761	0.015	0.733, 0.790	311,394	
		Second Stage	0.004	0.019	-0.033, 0.040	311,394	
First-, second- and third-born mothers		First Stage	0.765	0.019	0.728, 0.802	208,162	
		Second Stage	-0.078	0.026	-0.129, -0.028	208,162	
First-, second- and third-born fathers		First Stage	0.757	0.020	0.718, 0.796	190,167	
		Second Stage	-0.002	0.025	-0.051, 0.047	190,167	
GPA		First-born mothers	First Stage	0.758	0.049	0.661, 0.854	22,178
			Second Stage	-0.014	0.076	-0.163, 0.136	22,178
	First-born fathers	First Stage	0.787	0.054	0.681, 0.892	20,911	
		Second Stage	0.020	0.075	-0.128, 0.168	20,911	
	First- and second-born mothers	First Stage	0.782	0.053	0.678, 0.886	19,324	
		Second Stage	0.125	0.072	-0.016, 0.266	19,324	
	First- and second-born fathers	First Stage	0.791	0.051	0.690, 0.891	18,972	
		Second Stage	-0.136	0.083	-0.298, 0.026	18,972	
	First-, second- and third-born mothers	First Stage	0.858	0.073	0.714, 1.002	10,470	
		Second Stage	0.083	0.098	-0.109, 0.274	10,470	
	First-, second- and third-born fathers	First Stage	0.789	0.070	0.652, 0.925	10,644	
		Second Stage	-0.019	0.109	-0.233, 0.195	10,644	