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MPIDR WORKING PAPER WP 2015-009
NOVEMBER 2015

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Advanced Maternal Age and Offspring Outcomes: Causal Effects and Countervailing Period Trends

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ABSTRACT

Women are having children later in the developed world. The mean age at first birth has increased in each of the 23 OECD countries since 1970, now averaging 28, and advanced-age fertility has also been increasing. Advanced maternal age is associated with increased risk of poor perinatal outcomes, as well as an increased risk of mortality and cancer in adulthood. The research documenting these negative outcomes, however, neglects the potential benefits of being born at a later date. For a prospective parent, delaying parenthood means that the child is born in a later birth cohort. This is beneficial, as for many important outcomes from health to educational attainment, secular trends are positive. We illustrate this general principle using data from Sweden, and show that the macro level contextual trends outweigh the individual risk factors. As a result, fertility postponement even beyond age 40 is positively associated with long-term offspring outcomes.

INTRODUCTION

Women and men are having children later in the developed world. Since 1970 the mean age at first birth has increased in each of the 23 OECD countries for which data is available, at a rate of 0.08 years per calendar year, and now averages 28 years. More recently, in 1995-2011, postponement has been increasing even faster, at 0.10 years per calendar year. In Germany and the UK, the mean age at first birth exceeds 30 years (OECD 2014). Advanced-age fertility has also been increasing: in Sweden in 2013, a quarter of all births were to mothers aged 35 or older. The potential consequences of postponement are numerous, including decreasing period fertility (Bongaarts and Feeney 1998) and negative health outcomes for the children due to reproductive ageing (Jacobsson et al. 2004). Although parental socioeconomic resources typically increase with age (Powell, Steelman and Carini 2006), advanced maternal age is associated with increased risks of Down syndrome, childhood cancer, and autism (Durkin et al. 2008; Johnson et al. 2009; Yip, Pawitan and Czene 2006). The research documenting these negative child outcomes, however, neglects the potential benefits of being born at a later date. For a prospective parent, delaying parenthood means that the child is born into a later birth cohort. For many important outcomes from health to educational attainment, secular trends across the OECD countries are positive, so it is beneficial to be born into a later birth cohort. We illustrate this general principle using administrative register data from Sweden and a sibling-comparison design to minimize residual confounding, and show that the macro level contextual trends outweigh the individual-level risk factors and as a result, fertility postponement even up to ages beyond 40 is associated with positive long-term outcomes for the children. These

results are likely to generalize to other contexts in which health has been improving, and educational access has been expanding, such as the United States and much of Europe.

Figure 1 illustrates the changing patterns in fertility timing in Sweden. In 1968, approximately 75% of all births were to a mother who was aged less than 30, and less than 10% of births were to mothers aged 35 or above. Over a 45 year period childbearing at later ages at all parities has been growing more common, and by 2013 approximately 60% of births were to mothers aged 30 or older, and 5 % of all births were to mothers who were 40 or older. There are many reasons for the increase in the mean of maternal age at birth over the past 40 to 45 years. Much of this fertility postponement has been attributed to the contraceptive pill, the expansion of career opportunities for women, and increasing economic uncertainty (Kohler, Billari and Ortega 2002; Schmidt et al. 2011; Sobotka 2004). In the United States the women's liberation movement of the late 1960s and 1970s increased opportunities for women in education and the labour market, as did technological developments such as the introduction of oral contraception (Goldin and Katz 2002), leading to improvements in gender equality.

***** Figure 1 – Approximately Here *****

While Sweden did not have a strong women's liberation movement (Gelb 1989), the high relative level of gender equality in Sweden[1] can largely be attributed

to the fact that achieving greater equality has been an explicit goal of successive governments since the 1960s (Hoem 1995). Women in Sweden today have greater educational attainment than men (OECD 2013), and the tendency to delay childbearing until after completing one's educational career is likely to be part of the explanation for the increase in maternal age over time, as are increased career opportunities and financial resources (Blossfeld and Huinink 1991). Since the 1960s in Sweden there have been a number of notable shifts in fertility and family formation behaviour, collectively labelled as a 'second demographic transition' (Van de Kaa 1987; Lesthaeghe 2010). One of these shifts has been an increase in the prevalence of less committed relationships, which is likely to be part of the explanation for why more women delay childbearing to older ages. Furthermore, Sweden's political and social system has been described as one of 'statist individualism' (Berggren and Trägårdh 2006; Eklund et al. 2011).[2] The tax and welfare systems in Sweden are designed to minimize dependence upon the family and liberate individuals to pursue their own goals (Trägårdh 1990), making the timing of childbearing a choice that is likely to be relatively independent of familial pressures.

Delayed childbearing may be desirable from a woman's own life-course perspective, and beneficial for the child especially among younger mothers for whom socioeconomic position and resources may be increasing rapidly (Powell, Steelman and Carini 2006). However, fertility postponement is increasingly meaning an increase in advanced age motherhood and less so a decline in young age motherhood. This is potentially alarming as there are important risks associated with childbearing at older ages, and it has been suggested that mothers may not fully appreciate these risks (Benzies 2008). Advanced maternal age is associated with a

gradual deterioration of the intrauterine environment, and decreased viability of embryos due to an age-dependent decrease in oocyte quality (Abdalla et al. 1993).[3] These changes mean that older mothers are at a higher risk of pregnancy complications. The risks of miscarriage, preterm birth, low birth weight, stillbirth, and trisomy 21 increase exponentially with age (Jacobsson et al. 2004; Yoon et al. 1996; Andersen et al. 2000). Danish register data for the period 1978 to 1992 showed that of pregnancies intended to full term, 9% of those to mothers aged 20-24 ended in spontaneous abortion, while the corresponding figure was 20% for ages 35-39 and 41% for ages 40-44 (Andersen et al. 2000). Advanced maternal age is also associated with increased risks of childhood cancer, and autism (Durkin et al. 2008; Johnson et al. 2009; Yip, Pawitan and Czene 2006). Further research has also shown that the disadvantages for the offspring of older mothers can extend throughout adulthood. Those born to older mothers are at greater risk of Alzheimer's disease (Rocca et al. 1991), hypertension (Brion et al. 2008), diabetes (Gale et al. 2010), cancer (Hemminki and Kyyrönen 1999), mortality (Kemkes-Grottenthaler 2004), and those born to the oldest mothers also have lower self-rated health and are more likely to be obese (Myrskylä and Fenelon 2012).

Whether these negative long-term outcomes are a direct consequence of low birth weight or pre-term birth is not always clear, as not all studies have been able to adjust for those mediating factors. Research suggests that a lower birth weight has a negative causal impact on height, as well as cognitive ability in adulthood, educational attainment, and earnings (Conley and Bennett 2000; Black et al. 2007). Past research has also shown that lower than average birth weight is associated with increased mortality risk in adulthood (Osler et al. 2003). While there are well-defined

physiological mechanisms to account for the relationship between advanced maternal age and poor peri-natal and infant outcomes, the answer to the question of whether the long-term negative impacts of being born to an older mother are causal in nature is less clear. Recent studies suggest that the increased mortality of the offspring of older mothers in adulthood is at least partially explained by the loss of the parents to mortality when the offspring are younger (Myrskylä and Fenelon 2012; Myrskylä et al. 2014).

An important factor that has yet to receive much attention in the literature is the fact that when a woman has a child, the age at which she chooses to have that child is systematically related to period conditions. By that we mean that a woman born in 1960 who chose to have a child at the age of 20 would have given birth in 1980. If that same woman had chosen to have a child at 40, or had a second child at age 40, that child would be born in 2000. This makes a huge difference to the expected health and educational outcomes of the average child as the second half of the twentieth century has been defined by a number of secular improvements. These include improving public health conditions, indicated by lower age-specific mortality and an increasing life expectancy (Oeppen et al. 2002), as well increases in the average height of the population across the developed world (Komlos and Lauderdale 2007), which is a useful indicator of improvements to early life conditions. The second half of the twentieth century and the beginning of the twenty-first century has also been characterized by a steady expansion of the educational system across Western Europe and the United States (Breen and Jonsson 2007; Breen et al. 2009; Breen 2010). Today more people than ever before stay in education beyond the legally defined minimal age, and the expansion of access to

tertiary education has been particularly striking given the fact that in the 1940s and 1950s, only a small fraction of the population ever obtained a Bachelor's degree. While we should not ignore other secular trends such as increasing socioeconomic inequality (Piketty 2014), or the growing obesity crisis (Ebbeling et al. 2002), the positive progress that has been made with public health conditions and educational opportunities has extended the opportunity for longer lives and advanced learning to more people than ever before.

Longer lives and more educational opportunities present a greater chance for more fulfilling and satisfying lives, which is a development that must be welcomed. In this study we examine to what extent these secular improvements outweigh the disadvantages that have been shown to be associated with being born to an older mother. There is one existing study that uses a comparable research design. Myrskylä et al. (2013) analysed IQ at age 18 by maternal age and found that secular positive trends outweigh any potential individual ageing related outcomes so that IQ increased monotonically with maternal age. Myrskylä et al. (2013), however, analysed only men and focused on a measure of cognitive ability that has been claimed to be increasing over cohorts without any real increases in intelligence (Flynn 1987; Emanuelsson and Svensson 1990). It is unclear whether the same pattern would be observed for women and for outcomes for which measurement is reliably consistent over birth cohorts.

In this study we analyze Swedish men and women born between 1960 and 1991 and show that individuals born to older mothers, including those of the most advanced ages, are taller, spend longer in the educational system, are more likely to

go to university, and perform better on standardized tests than their siblings who were born when their mother was younger. Analyzing these multiple outcomes requires us to use several data sets; each of these are based on Swedish administrative register data which are known to be of high quality. Our results show that in a regime characterized by improving social conditions, postponing parenthood is beneficial for child outcomes even when the individual maternal ageing related effects might be negative. These results that are based on Swedish data are likely to generalize to other countries and contexts in which health is improving and education is expanding. Before we present our data and results in more detail, we detail the changes that have been taking place in Sweden in terms of education, height, and physical fitness.

EDUCATION, HEIGHT AND PHYSICAL FITNESS IN SWEDEN

Education. Education in Sweden is state funded at all levels, and tertiary education is free for Swedish and European Union citizens (Högskoleverket 2012). 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). While these structural conditions mean that individual decisions about tertiary education attendance are not dependent upon family savings or private loans, socioeconomic differences in educational attainment in Sweden do persist (Breen and Jonsson 2005). These differences are due to both primary and secondary effects (Rudolphi 2013), meaning differences in educational performance as well as educational choices (Boudon 1974). The cohorts for whom we focus on

educational attainment in this study were born 1960 to 1982. This means that they will have been 16 and in secondary school in Sweden between approximately 1976 and 1998. This was a period of substantial change in the Swedish educational system (Halldén 2008). In 1965 and 1971 upper secondary school (gymnasium) was reorganized into three tracks. The first of these prepared students for university, the second was a two-year continuation program, and the third was two years of vocational training (Erikson and Jonsson 1996). While the first track was the most direct route to a typical university education, it was also possible to apply to university from either of the latter two tracks (Halldén 2008).

A major motivation for upper secondary education reform in Sweden was to increase social fluidity and to reduce the strength of the relationship between the class of origin and destination (Erikson and Jonsson 1996). The expansion of access within the Swedish educational system has been a consistent goal since the 1950s, and it has led to an increase in the proportion of individuals who make the transition to upper secondary education (Erikson and Jonsson 1996; Rudolphi 2013), as well as an expansion of adult education. The tertiary education system has also been subject to reform, the most notable changes being the incorporation of post-secondary non-tertiary education for nurses and teachers, the establishment of new universities in Stockholm and Gothenburg, as well as the establishment of regional university colleges (Erikson and Jonsson 1996; Halldén 2008). Between the 1960s and 2000s tertiary education enrollment has increased substantially (Breen et al. 2009). In 2012 approximately 33% of the Swedish population had undergone post-secondary education, which was slightly higher than the OECD average (Högskoleverket 2012). This educational expansion has clearly benefited individuals

born into later birth cohorts, which has implications for patterns of educational attainment by maternal age at the time of birth.

Height. Research consistently indicates that greater height is associated with positive outcomes. Research suggests that taller individuals have lower mortality (Davey Smith, Hart, Upton, Hole, Gillis, Watt and Hawthorne 2000), greater health-related quality of life (Christensen et al. 2007), as well as greater cognitive ability (Case and Paxson 2008). Height in adulthood is strongly related with both birth length (Sørensen et al., 1999), and height in childhood, with a correlation of approximately 0.7 (Power et al. 1997). The mothers of infants with greater birth weight also have lower all-cause and cause-specific mortality (Davey Smith, Whitley, Gissler and Hemminki 2000).

The overall pattern suggests that healthier mothers give birth to longer infants, who retain a height advantage into adulthood, and also have greater relative health themselves. Swedes have been growing taller since at least the early half of the 19th century, and gained approximately 10cm between 1900 and 2000 (Gustafsson et al. 2007). This historical increase in height, attributable to improvements in nutrition and public health conditions (Hatton 2013), is widely documented across a wide range of different contexts (Komlos and Lauderdale 2007), and greater stature in historical populations is also associated with lower premature mortality (Gunnell et al. 2001). According to this body of research, it seems clear that greater height is a useful marker of relative advantage in terms of health.

Physical Fitness. Physical fitness is a component of overall health, but is not synonymous with that concept. By physical fitness we mean aerobic fitness. Aerobic fitness can be described as the ability of the body to deliver oxygen to the muscles and use it to generate energy for physical activity, and the most common measure of that capacity is maximal oxygen uptake $V0_2max$ (Armstrong and Welsman 2007). We use a closely correlated measure called maximal working capacity (MWC), explained in detail in the data section.

While physical fitness is not the same thing as health, greater physical fitness is associated with lower mortality risk at all ages (Blair et al. 1996), as well as greater self-rated health (Shirom et al. 2008). Unlike height, it is far less clear that the physical fitness of the Swedish population has improved over the past decades. One study found that the aerobic fitness of adolescents in Sweden decreased between 1974 and 1995 (Westerstahl et al. 2003), but it was not clear whether this was due to an increase in BMI, or less daily physical activity. Other research has found that while the functional fitness of the healthiest group of adolescents was approximately the same in 2001 as it was in 1987, the fitness of the least healthy group of adolescents has fallen substantially (Ekblom et al. 2004). Taking a global perspective, Tomkinson and Olds (2007) present data that indicates that for 6-19 year olds, aerobic fitness was improving from the 1958 to the 1970s, but since the 1970s it has been in steady decline worldwide, and since the early 1990s fitness has been lower than in the late 1950s.

DATA

This study uses Swedish administrative register data. Because of different data availability for different outcome variables, we will be studying several different cohort groups, which we describe in more detail below. The details on reaching the final analytical sample for each set of analyses can be seen in the appendix in table S1. The total range of birth cohorts that we study is 1960-1991. In Sweden each individual has a unique personal identification number (PIN). This PIN makes it possible to link the records of an individual across the various administrative registers. This study draws heavily upon the Swedish multi-generational register. The multi-generational register contains information on the PIN of each individual, as well as that individual's parents. This allows us to identify the biological mother and father of each individual, and in turn to identify any other biological kin relation. The main family members of interest in this study are the mother, father, and siblings. We use information on the biological mother and father to identify the sibling group. We use information on the biological mother to calculate maternal age at the time of birth.

Our main analyses use fixed effects specified at the level of the sibling group, so the regressions identify the parameters of interest from within-siblings comparison. Due to the use of sibling fixed effects, we drop individuals in one-child sibling groups, or 'only children'. The reason for this is that the fixed effects estimator relies upon variance within the sibling group to generate estimates for the relationship between the outcome variable and the explanatory variables, and there is no variance in a group with one observation. We also drop sibling groups with

twins and other multiple birth individuals as those individuals have no variance on the variable for maternal age at the time of birth. The term ‘cohort cut’ in table S1 refers to those individuals that are lost when restricting the sample to specific birth cohorts. For our analyses on educational attainment at age 30, if a last born is born shortly after 1960, or a first born is born shortly before 1982, for example, then they would be the only children in the sibling group available for analysis, meaning that there would be no variance within that group for the within-family comparison. All of the descriptive statistics and results presented below are based upon the final sample that is detailed in table S1.

Previous research has indicated that children born to older parents may benefit from the accumulation of parental socioeconomic resources (Powell, Steelman and Carini 2006). Therefore we have also conducted additional analyses where we adjust for the time-varying occupational status of the parents, as well as time-varying household income. Data on occupational status is only available from the censuses prior to the 1990s, and so we draw data from the 1960, 1970, 1975, 1980, 1985, and 1990 censuses. Using data on the mother and father we declare the household SES as the highest occupational status of either parent. A reliable measure for parental income is only available from 1970 due to changes to how individuals and households were taxed. Our measure for parental income combines the earnings of the mother and father in the year before the index person was born, to account for the fact that parental income typically decreases immediately after the birth of a child due to lower levels of labour market participation. The 1970s was a period of high inflation in Sweden (Edvinsson and Söderberg 2011), and so we

adjust our measure of combined parental income for a consumer price index-based measure of inflation, provided by Statistics Sweden.

Educational Attainment.

To examine educational attainment we will use data on cohorts born 1960 to 1982. The reason for this is that the highest quality data on education is available from 1990 to 2012. We choose to examine educational attainment in the year that individuals turn 30 using two different measures. The first is the number of years of educational attainment achieved by age 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 the actual number of years that an individual spent in the educational system. The second measure used is a binary variable indicating whether or not individuals had entered tertiary education by age 30. The motivation for using this second measure is that not all individuals in Sweden have finished their educational careers by age 30, but the vast majority of people who will go on to complete a bachelor's degree would have started that degree before age 30 (Högskoleverket 2012).

The Swedish education system today is divided into three sections: grundskolan, which is 9 years of compulsory schooling, gymnasium, which is three additional years of upper secondary education, and finally, tertiary education (Halldén 2008). Tertiary education in Sweden today consists of two parts. The first is a traditional university education, consistent with the Bologna accords, 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). The variable for highest educational level and the corresponding years of education required to reach that level come from the Swedish education registers and Statistics Sweden (Halldén, 2008; Statistics Sweden 2000). In the analyses of educational attainment we also adjust for birth order, as research consistently demonstrates that later borns have lower educational attainment than first borns (Black et al. 2005; Barclay 2015).

Grade Point Average at Age 16.

The data on GPA is taken from grades from the final year of grundskolan (Årskurs 9), which are the nine years of compulsory education. Students are typically 16 years old in ninth grade. The system for assigning grades in the Swedish high school system has changed several times over the past decades, and so we limit our analyses to a period, 1998 to 2007, where the grade system stayed constant. This means studying cohorts born 1982 to 1991, who were aged 16 between 1998 and 2007. During this period in the Swedish compulsory school system, grades could range from pass with special distinction, to pass with distinction, pass, or fail. To construct an overall score, each of these grades was assigned a numerical score, where pass with special distinction was equal to 20, pass with distinction equal to 15, pass equal to 10, and fail equal to 0 (Skolverket 2010). The overall GPA score for each child was calculated by summing up his or her grades based on the best grades in 16 subjects, and so the scores ranged from 0 to 320 (Skolverket 2010; Turunen 2014). A score between 0 and 159 is equivalent to a mean mark of fail, and a score between 160 and 239 is equivalent to a mean mark of pass. In these

analyses of GPA we also adjust for birth order, as research has shown that later borns have lower educational performance than first borns even in high school (Kantarevic and Mechoulan 2006; Härkönen 2014).

Physical Fitness and Height.

To examine physical fitness and height we use data from the Swedish military conscription register on cohorts born between 1965 and 1977. Only men were required to attend conscription tests. The outcome measure that we use to examine physical fitness in this study is maximal working capacity, measured in watts (fysisk arbetsförmåga i watt). Maximal working capacity (MWC) is measured as the maximum resistance attained in watts when riding on a stationary bike during a time period of 5 to 10 minutes, and is closely related to maximal oxygen uptake ($V0_2max$), also known as maximal aerobic capacity. The correlation between these two variables has been reported in the literature as approximately 0.9 (Patton et al. 1982). The variable for MWC has been found to be an important predictor of mortality amongst men (Sandvik et al. 1993). The cycle ergometer is one of the most effective ways of measuring aerobic fitness, and is considered an advantageous measure of physical fitness to use because the exertion involved in riding a stationary bike is generally not related to body weight, unlike the exertion involved in using a treadmill ergometer. Nevertheless, the correlations between the results for aerobic capacity based upon a cycle ergometer and a treadmill ergometer are typically very high, at 0.9 (Armstrong and Welsman 2007). Height, meanwhile, is measured in centimetres.

In the analyses of physical fitness and height we also adjust for birth order, as research demonstrates that later borns have lower physical fitness (Barclay and Myrskylä 2014), and are shorter (Myrskylä, Silventoinen, Jelenkovic, Tynelius and Rasmussen 2013), than first borns. We also include a covariate for the age at which individuals took the conscription test, ranging from 17 to 20, to adjust for any potential differences in physical fitness or height by age. A small number of individuals took the conscription test outside of the ages of 17 to 20, but we excluded these individuals to keep the sample age homogeneous.

STATISTICAL ANALYSES

In the following section we present results based upon several different cohort groups, and different outcomes. While there are some small variations, described below, we pursue the following general strategy: Model 1 is a standard regression model (OLS or logistic) estimating a between-family comparison for the bivariate relationship between maternal age at the time of birth and the outcome variable in question. Model 2 is a fixed effects regression model (OLS or logistic) comparing siblings within the same family to one another to estimate the relationship between maternal age at the time of birth and the outcome variable. In these models we also adjust for birth order. In the case of the analyses using the military conscription register, we also adjust for age at the time of the conscription tests; for the vast majority (99.9%) of individuals eligible under our criteria (see table S1) this is

between 17 and 20. Model 3 is a fixed effects regression model (OLS or logistic) that is the same as Model 2 except for the inclusion of a categorical variable for year of birth, in individual years.

Model 2 captures the total effect of maternal age on child outcomes. Importantly, this total effect includes not only the potential individual level factors such as reproductive ageing and accumulation of social resources, but also the impact of changing period conditions. For an individual the period conditions systematically change with maternal age, thus Model 2 describes how child outcomes change with changing maternal age for an individual mother. Model 3 removes the influence of changing period conditions, and provides an estimate of the net effect of maternal age.

The use of fixed effects in Models 2 and 3 means that we perform a within-family comparison, comparing siblings within the same family to one another. This estimator minimises residual confounding by inherently adjusting for all factors that are shared by the siblings and remain constant, such as parental height, parental cognitive skills, and the eventual size of the sibling group. We demonstrate the hierarchy of our models based upon the approach for studying educational attainment measured in years by age 30:

(1) $$y_{ij} = \alpha + \beta_1 \mathrm{MAB} + \beta_2 \mathrm{SEX} + \varepsilon_{ij}$$

(2) $$y_{ij} = \alpha_j + \beta_1 \mathrm{MAB} + \beta_2 \mathrm{SEX} + \beta_3 \mathrm{BIRTHORDER} + \varepsilon_{ij}$$

$$(3) \quad y_{ij} = \alpha_j + \beta_1 \mathrm{MAB} + \beta_2 \mathrm{SEX} + \beta_3 \mathrm{BIRTHORDER} + \beta_4 \mathrm{BIRTHYEAR} + \varepsilon_{ij}$$

where y_{ij} is the measure on each of the various outcome variables for individual *i* in sibling group *j*. Model 1 does not use fixed effects and is a standard OLS model performing a between-family comparison. In models 2 and 3 α_j is introduced as the sibling fixed effect. MAB_{ij} is age of the mother at the time of birth for individual *i* in sibling group *j* in five-year categories, $BIRTHORDER_{ij}$ is the birth order of individual *i* in sibling group *j*, and $BIRTHYEAR_{ij}$ is the year of birth of individual *i* in sibling group *j*. In the analyses of educational outcomes we adjust for SEX_{ij}, the gender of individual *i* in sibling group *j*, though it should be noted that the sex ratio at birth does not meaningfully vary by maternal age (James 1987). The key coefficient of interest is β_1 as that is the estimate for maternal age at the time of birth.

RESULTS

Summary Statistics.

Table 1 provides summary statistics for the analytical sample for each of the cohort groups. For each of the outcomes the descriptive statistics suggest an inverse U-shaped association by maternal age so that the those born to youngest and oldest mothers score lowest. In addition, the summary statistics suggest an improvement in the outcomes over time.

For the number of years of education the highest mean was among individuals born to mothers who were aged 30 to 34, with 13.1 years. As the age of the mother increases, or decreases, the mean years of education decreases. Compared to an individual born to a mother aged 30 to 34, an individual born to a mother aged 15 to 19 had spent 70% of a standard deviation less time in education by the time they had reached age 30, and the equivalent figure for an individual born to a mother aged >44 was 35% of a standard deviation.

For GPA at age 16 (range 0-320) those born to mothers aged 35 to 39 had the highest mean scores, at 218.7. Those born to mothers aged 44 or older had a mean score of 206.0, which is 20% of standard deviation lower, which was less than those born to mothers aged 25 to 29, but better than those born to teenage mothers or those aged 20 to 24. The lowest mean scores were for those born to mothers aged 15 to 19, at 165.9, which is 84% of a standard deviation lower than the scores for those born to mothers aged 35 to 39, and only slightly above a mean mark of failure (159 points). For those born to teenage mothers in cohorts 1990-1991, the mean GPA is actually below the failure threshold.

The summary statistics for maximal working capacity measured in watts show that the highest mean MWC, at 304W was among those born to mothers who were aged 25 to 29 at the time of birth. The mean MWC decreases for both younger maternal ages, and older maternal ages. Men born to teenage mothers had an MWC of 290W, or 29% of a standard deviation lower than those born to mothers aged 25 to 29, while men born to mothers aged 40 to 44 had an MWC of 294W, which is 21% of a standard deviation lower than those born to mothers aged 25 to 29. Given that

the measure for MWC is expressed in watts, it is somewhat difficult to interpret what these scores infer about the physical fitness of these individuals. Previous research examining how MWC varies by age in Sweden has shown that the mean value for men aged 20 to 29 is 303W (Wohlfart and Farazdaghi 2003), which is slightly below the mean score for men born to women aged 25 to 29. This same study found that the mean MWC score for men aged 30 to 39 was 288W (Wohlfart and Farazdaghi 2003), which implies that men born to teenage mothers have a level of physical fitness approximately equivalent to being at least ten years older than they were at the time of taking these conscription tests. The pattern by birth year shows that the mean MWC generally increased between those born in 1965-1969 and 1970-1974, but then generally decreased for those born 1975-1977. The only groups where the mean level of physical fitness increases across all three cohort groups are those born to women aged 40 or older.

The summary descriptives for height show that the mean height in this analytical sample group was 179.5cm. The tallest individuals were those born to mothers aged 30 to 34 at the time of birth, at 180.0cm. Those born to teenage mothers had a mean height of 178.5cm, which is 23% of a standard deviation lower than those born to mothers aged 30 to 34. Those born to the oldest mothers, aged 44 or older, had a mean height of 179.4cm, which is 9% of a standard deviation lower than those born to mothers aged 30 to 34. The pattern by year of birth generally shows a small increase in mean height between those born in 1965 and 1977.

***** Table 2 – Approximately Here *****

Regression Analyses - Educational Outcomes.

Figure 2 shows the regression results for years of education achieved by age 30. The full results including the estimates for control variables are in appendix table S2. Model 1, the descriptive plot, shows the relationship between maternal age at the time of birth after adjusting for gender using a standard OLS model. This descriptive model replicates the inverse U-shape result shown in Table 1: relative to individuals born to a mother aged 25 to 29, individuals born to a mother aged 15 to 19 have 1.4 years less education by age 30. Individuals born to mothers aged 30 to 34 have the highest educational attainment, spending almost a quarter of a year longer in the educational system by age 30 than those born to mothers aged 25-29. At maternal age above 35 educational attainment starts to decrease. Maternal age 40 to 44 is associated with almost a third of a year less and a maternal age of 45 or older with 0.6 years less education than maternal age 25-29

***** Figure 2 – Approximately Here *****

Model 2 introduces controls for sibling-group fixed effects and birth order. After accounting for these factors, the results show a very clear positive gradient by

maternal age at the time of birth, with those born to teenage mothers performing the worst, and those born to mothers aged 45 or older performing the best, with an overall difference of more than 1.5 years between those two groups, which is 67% of a standard deviation in this analytical population.

Model 3 is the same as Model 2, except it additionally adjusts for birth year. This removes the positive gradient in educational attainment by maternal age at the time of birth. The results from Model 3, the fully adjusted model, show that there is no clear substantive difference in educational attainment by maternal age at the time of birth, and those born to the oldest or youngest mothers do not have any clear disadvantage. Comparison of Models 2 and 3 tell a clear story. Increasing maternal age is strongly associated with increased educational outcomes (Model 2). This positive association however disappears when time trend is controlled for (Model 3). Thus delaying motherhood improves the child's educational outcomes solely because delay means that the child is born to a later birth cohort.

***** Figure 3 – Approximately Here *****

The pattern that we observe for number of years of education is consistent in the other education-related outcome measures. We have also conducted analyses to investigate whether the likelihood of entering tertiary education by age 30 follows the same pattern as the results for educational attainment measured in years at age 30. The reason for checking this was that it is possible that the results for increasing

educational attainment could be driven by an increase in the proportion of individuals entering upper secondary education (*gymnasium*). The results from these additional analyses for entering tertiary education, shown in figure 3, are very similar to those seen in figure 2 for years of educational attainment. The full results can be seen in the appendices, in table S3. In these additional analyses we use logistic regression, where the outcome is a binary variable for whether they entered tertiary education by age 30 or not. These analyses were conducted on the same population as the analyses for educational attainment measured in years at age 30, which were men and women in cohorts born 1960 to 1982. It may be noted that the *N* reported in table S3 is substantially lower than the *N* reported in table S2. The reason for this is that sibling groups that do not have variance on the outcome variable, which is a binary variable for entering tertiary education by age 30, are excluded from the model by the fixed effects estimator. Sibling groups where all individuals went to university by age 30, or none, are therefore not included in the analysis.

The results for the third education-related outcome measure, GPA at age 16, can be seen in figure 4, and the full results table can be seen in the appendix table S4. Descriptive Model 1 shows the results from a standard OLS model, adjusting for gender. The results from Model 1 show that men and women born to teenage mothers have the lowest GPA score, over 40 points lower than individuals born to mothers aged 25 to 29. GPA peaks at maternal age 30-39, and declines slowly at higher maternal ages.

***** Figure 4 – Approximately Here *****

The results from Model 2 are based upon a fixed effects OLS model, adjusting for birth order and gender. The results from Model 2 show that there is a statistically significant but substantively small disadvantage in GPA for those born to mothers aged under 25 in comparison to those born to mothers aged 25 to 29. However, there is a clear advantage for those born to mothers aged 30 or older, and the highest GPA is found for those born to mothers aged 45 or older. The total difference in GPA score between those born to teenage mothers and those born to mothers aged 45 or older is 17 points, or 27% of a standard deviation. Another way of interpreting that GPA difference is that it is roughly the difference in score between failing in any one class, and obtaining a grade of pass with distinction in that class. Model 3, which introduces a control variable for birth year, shows that there are no clear substantive differences by maternal age at the time of birth once the beneficial effect of being born to a later birth cohort is removed.

Regression Analyses - Physical Fitness and Height.

The results for height can be seen in figure 5, the full results table is in the appendix table S5. The results from the descriptive Model 1 shows the inverse U-shaped pattern. Those born to teenage mothers are 1.3cm shorter than those born to mothers aged 25 to 29, and those born to mothers aged 40 to 44 are 0.4cm shorter.

***** Figure 5 – Approximately Here *****

The results from the fixed effects model without a control variable for birth year, Model 2, show a positive monotonic relationship between maternal age at the time of birth and height, up until maternal age 40 to 44. The total difference in height between those born to teenage mothers and those born to mothers aged 40 to 44 is 1.0cm, which is 15% of a standard deviation. Those born to mothers aged 45 or older do not have a statistically significant advantage over those born to mothers aged 25 to 29. Model 3 removes the beneficial effect of being born to a later birth cohort among those with higher maternal age, and shows a fairly flat gradient in height by maternal age at time of birth, and no statistically significant differences. Thus also for height improving macro conditions imply that delaying motherhood increases the height of the children, but net of the macro conditions the associations are weak.

Figure 6 shows the results for maximal working capacity, a measure of physical fitness. The full results table is in the appendix table S6. The descriptive Model 1 shows a similar non-linear pattern to that seen for the educational attainment outcomes, where men born to the youngest and oldest mothers have the lowest score for maximal working capacity. Those born to teenage mothers have an MWC almost 15W lower than those born to mothers aged 25 to 29, while those born to mothers aged 40 to 44 have an MWC over 10W lower than those born to mothers aged 25 to 29.

***** Figure 6 – Approximately Here *****

Model 2 estimates the total effect of parental age and shows a similar pattern that has been observed for educational attainment. Increasing maternal age is positively associated with physical fitness, though the gradient is not very steep. After introducing the control variable for year of birth in Model 3 there are no statistically significant differences by maternal age at the time of birth.

As described in the data section, we also conducted additional analyses to check the robustness of our results to controls for time-varying parental occupational status and income. Adjusting for these additional variables did not have any meaningful impact on the net or the total effect of maternal age on the various outcomes that we study. The full estimates from those models can be found in the appendices, in tables S7-S16.

For all of the models and outcome variables presented above, we also conducted additional analyses to test how sensitive the results were to the inclusion of a variable for the age of the father at the time of birth.[4] Those results were fully consistent with the patterns presented here, and are available upon request.

DISCUSSION

Women are having children later in the developed world. The mean age at first birth has increased in each of the 23 OECD countries since 1970, is now averaging 28, and advanced-age fertility has also been increasing. Advanced maternal age is associated with increased risk of poor perinatal outcomes, as well as an increased risk of mortality and cancer in adulthood. The research documenting these negative outcomes, however, neglects the potential benefits of being born at a later date. For a prospective parent, delaying parenthood means that the child is born in a later birth cohort. This is beneficial, as for many important outcomes from health to educational attainment, secular trends are positive. We used Swedish population register and examined multiple educational and health related outcomes with several birth cohort groups to illustrate this general principle. We find that the total effect of increasing maternal age – which includes individual level factors such as reproductive ageing and changing social resources, as well as the positive impact of improving macro level period conditions – is consistently positive. This is true even in cases where the individual level effect is negative, as the macro level positive trends are strong enough to more than offset the negative effect.

The distinction between the results that allow the positive macro trends to influence the total effect, and results that control away the macro trend, is important. In fully adjusted models that remove the influence of positive time trend, we found that there was no substantively or statistically significant disadvantage for outcomes in adulthood for those born to older mothers, and not even those born to mothers aged 45 or older. Overall, we found that the gradient for the point estimates for the

relationship between maternal age at the time of birth and the educational and health related outcomes that we studied was flat, with a small standard error and narrow confidence intervals indicating that our results are a precise estimate of no substantive relationship, rather than being inconclusively imprecise. While other studies show clear physiological evidence for a disadvantage for the offspring of the oldest mothers in terms of peri-natal outcomes, our results suggest that those who survive until adulthood do not suffer from any disadvantage.

Indeed, to the contrary, when we do not control for period changes most of our analyses show an advantage for individuals who are born to older mothers in comparison to their older siblings.[5] Regression coefficients are typically interpreted as the effect of x on y, holding the other covariates entered into the model constant. However, in reality, the world does not remain constant simply because we include a control variable for birth cohort in our statistical models, and when any given woman has a child at a later age, she by definition gives birth to that child in a later birth year. For the results for years of education by age 30, the likelihood of entering tertiary education, high school GPA at age 16, and height in early adulthood, individuals born to older mothers clearly fare better. This pattern is explained by secular improvements to public health conditions, as well as educational expansion. These secular improvements mean that when a woman decides to delay her childbearing, her children are actually likely to fare better in absolute terms in adulthood. This finding is in sharp contrast to much of the rhetoric surrounding public discussion of this topic. While we do not find a similar advantage for the offspring of older mothers in terms of physical fitness, that is not surprising given that secular improvements have not been observed in that domain (Westerstahl et al. 2003).

Are the results relevant beyond the specific Swedish cohorts analysed in this study? For at least the past 60 years, secular changes in educational access and public health conditions have been positive in Sweden. More and more individuals have spent longer in the educational system, and rates of morbidity and mortality have decreased. If these secular changes were to plateau, or to reverse, the advantage of delayed childbearing for the offspring of older mothers would no longer exist, or would turn into a disadvantage. While that point is important to bear in mind, gradual secular improvements in educational access and public health conditions appear set to continue not only in Sweden but also across the developed world (Oeppen and Vaupel 2002). What then, do the advantages enjoyed by the offspring of older mothers, such as spending longer in the educational system, and greater height, actually mean? While it would appear that improvements to health are rather unambiguously positive, the advantages of general improvements in educational performance and attainment may be less clear depending upon the national context. In one sense the expansion of educational access is clearly a positive development. At its best education develops an individual's ability to think critically, to engage pro-actively with his or her environment, to develop ambitions, and to pursue self-actualization. Furthermore, research has indicated that educational expansion may be beneficial for social mobility, as the correlation between class origin and class destination is weaker amongst those with higher levels of educational qualifications in countries such as the United States (Hout 1988), France (Vallet 2004), and Sweden (Erikson and Jonsson 1996). In Sweden it has been shown that educational expansion has increased social fluidity (Breen and Jonsson 2007). On the other hand, educational expansion is less unambiguously a positive development if the

labour market is unable to accommodate all of these new graduates due to structural labour market conditions. For example, the number of graduate-level jobs may not increase at the same pace as the number of university graduates.[6]

There are also other dimensions to consider when evaluating improvements in educational performance, both in terms of rising tests scores as well as increasing educational attainment. One of these factors concerns whether improvements in GPA are attributable to grade inflation. The Swedish National Agency for Education reports that the mean GPA of pupils in compulsory education in Sweden was rising between 1998 and 2004, but was relatively constant between 2004 and 2007 (Skolverket 2010, page 23). If grade inflation is the explanation behind the increase in GPA scores by maternal age at the time of birth within the family, then the improvement is rather meaningless. Furthermore, since peers are typically competing against their contemporaneous peers in the labour market and for university admission, relative differences in performance within each cohort are more important than absolute improvements by cohort, even if those improvements are real rather than an artefact of the testing procedure. Another aspect to consider is whether increasing attendance and graduation rates at university lead to measurable changes in abstract and critical thinking abilities. Recent research in the United States has shown that a large percentage of undergraduate students do not demonstrate any measurable improvement in tests designed to measure critical thinking and complex reasoning (Arum and Roksa 2011).[7] Unfortunately comparable assessments of the cognitive gains of students in Sweden are not available.

While we do not observe any negative causal effect of advanced maternal age on long-term outcomes, it is possible that the lack of a difference in outcomes might be attributable to the accumulation of socioeconomic resources by parents counteracting the negative effect of maternal physiological decline, such as lower oocyte quality (Abdalla et al. 1993). However, for all women there is an exponential increase in risk of poor peri-natal outcomes and genetic problems like Down Syndrome with increasing maternal age (Yoon et al. 1996). The average pattern of financial resource accumulation certainly does not follow an exponential curve, instead increasing gradually after entry into the labour market before plateauing in the late 30s and early 40s (Statistics Sweden 2003). This means that we would expect that the exponential physiological decline would lead the offspring of the mothers aged 40 or older to fare much worse than the offspring of mothers who are in their early 30s in the fully adjusted model, but we do not observe any substantive or statistically significant difference between these two groups of offspring. It is also worth considering the fact that the parents of older mothers are more likely to be retired, and so may be more able to provide care support for the grandchildren. On the other hand, the parents of older mothers are also more likely to be frail, adding an additional time responsibility to older mothers, or dead. Furthermore, in Sweden the heavily subsidized childcare system and parental leave system means that the support of grandparents is likely to be less significant than in other contexts.

We have thus far proceeded on the assumption that our results and conclusions will generalize beyond Sweden. The key driver of our results is secular improvements in height, physical fitness and educational attainment. Educational expansion has been documented across the United States and Western Europe

(Breen and Jonsson 2007; Breen et al. 2009; Breen 2010), and life expectancy has also been increasing in these societies (Rossi, Rousson, and Paccaud 2013).[8] Thus the key driver behind our results is also operating in other contexts. For our results to generalize to these other contexts it is not necessary for the maternal age at birth distribution to be comparable to Sweden, or for the causes of onset of fertility postponement to be similar to those that have been proposed to explain these developments in the Nordic region. If secular changes are positive in terms of educational access and continuation, and life expectancy, then the choice to delay childbearing by any individual mother would mean that her child would be born into a more favourable contextual environment.

Part of the explanation for our results may be selection issues into our analytical population. There are at least two dimensions to this. The first is that the individuals who were born to older mothers were born to women who were able to conceive at older ages, which previous research shows is a positive marker concerning their physical health (Smith et al. 2002; Grundy and Kravdal 2008). Secondly, the children conceived by these older mothers survived to adulthood, meaning that they survived to term, and did not have unduly adverse peri-natal or infant outcomes. This means that the individuals that we observe in adulthood who were born to older mothers were relatively robust babies from strong mothers, and this may explain why there is no negative causal effect of being born to an older mother. As a consequence of this consideration, we cannot make the policy recommendation that it is better for women to delay childbearing to an advanced age. For one, difficulties with conceiving increase with age. Secondly, empirical studies consistently demonstrate a higher risk of miscarriage (Andersen et al. 2000),

as well as negative peri-natal outcomes for children born to older mothers (Jacobsson et al. 2004). As described earlier, of pregnancies intended to full term, 12.0% of those to mothers aged 30 to 34, 19.7% to mothers aged 35 to 39, 40.8% to mothers aged 40 to 44, and 74.7% to mothers aged 45 or older ended in spontaneous abortion. Clearly it is important for potential mothers to carefully consider these facts. Nevertheless, in absolute terms, those who are born to an older mother in contemporary Sweden and survive to adulthood do better than their older siblings who were born when their mother was at her peak level of reproductive health.

NOTES

1 In 2013 Sweden was ranked 4th in the United Nations United Nations Development Program's Gender Inequality Index (GII) (UNDP 2014). The GII is a composite measure based upon labour market participation, empowerment, and reproductive health indicators.

2 Lars Trägårdh and Henrik Berggren have argued that the foundation of the Nordic version of capitalism is a combination of radical individualism and a strong state, which they have described as `statist individualism' (Berggren and Trägårdh 2006; Eklund, Trägårdh and Berggren 2011). The theory of statist individualism relies on at least two central characteristics. One is that there is strong trust in the State, meaning that individuals believe that levels of corruption are low, and that they can rely upon the State to fulfil its duties and obligations. A second central characteristic of statist individualism is a tradition of strong individualism, and a desire to exercise that preference. The combination of these two conditions has over time led to the development of social policies that liberate the individual from a reliance on his or her family to pursue whatever ambitions that individual holds in life (Berggren and Trägårdh 2006; Davos 2011). This can be seen in a wide range of social policies which include the free provision of education at all levels, separate taxation policies for spouses, the provision of heavily subsidised child day care, as well as other family policies.

3 Research that has examined the interaction between the age of oocyte donors and the age of donor recipients suggests that it is primarily the decline in the quality of the oocyte with age that explains the increasing difficulty of conception with maternal age, and the increased risk of miscarriage (Abdalla et al. 1993).

4 Studies have shown that advanced paternal age at the time of birth is associated with an increased risk of birth defects such as Down syndrome as well as other chromosomal mutations, though the reported association is relatively weak (Yang *et al*. 2007).

5 Although we cannot empirically assess whether our results are being driven by cohort or period improvements, that distinction is not important for the overall conclusions drawn from our analyses.

6 Recent research using data from the UK shows that there has recently been an increase in downward social mobility (Bukodi et al. 2015). The reason for this is that while there was an increase in the number of professional and managerial jobs in the 1950s, 60s, and 70s (Goldthorpe and Mills 2004), this expansion has not continued, meaning that many of the children raised in these high socioeconomic status families have been unable to find occupations that allow them to maintain their socioeconomic position of origin (Bukodi et al. 2015). This is not to suggest that they had an inherent right to such positions, but to point out that expanding tertiary education when there is no longer a concurrent expansion of jobs suitable for higher skill levels may

not lead to greater long-term levels of satisfaction for those graduates. This example indicates the importance of considering structural labour market conditions when evaluating the benefits of educational expansion. In relation to the decision by a potential mother to delay childbearing or not, the results of this study show that due to secular improvements the outcomes of the children of delayed childbearing are likely to be better in absolute terms, but not in relative terms.

7 Although many undergraduates do not demonstrate improvements in their critical or abstract thinking abilities, the situation is not entirely hopeless. Arum and Roska find that those who actually read what they are assigned, complete assignments, attend class, and spend a substantial number of hours working independently, as they are expected to do, *do* demonstrate improvements.

8 It should be noted that not all groups within these societies have been experiencing a similar increase in life expectancy. The black-white life expectancy gap persists in the United States (Crimmins and Saito, 2001) and life expectancy improvements vary significantly by socioeconomic status across all contexts.

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TABLES AND FIGURES

TABLE 1. Descriptive Statistics for Years of Educational Attainment by Age 30, Grade Point Average (GPA) at Age 16, and Physical Fitness (watts) and Height (cm) at Ages 17 to 20, by Maternal Age at the Time of Birth.

			Maternal Age							
			15-19	20-24	25-29	30-34	35-39	40-44	>44	All
Educational Attainment		N	87,160	489,445	597,801	306,903	93,687	15,823	794	1,591,613
at Age 30		%	5.5	30.8	37.6	19.3	5.9	1.0	0.0	100.0
	Female	%	48.9	48.6	48.5	48.6	48.3	49.4	46.9	48.5
	Birth Order	Mean	1.1	1.5	1.8	2.3	2.8	3.5	4.3	1.9
	Birth Year	Mean	1967.6	1969.5	1971.1	1972.2	1972.0	1971.1	1971.1	1970.7
	Education by	All	11.5	12.2	12.9	13.1	13.0	12.6	12.3	12.6
	Birth Year	1960-1964	11.2	11.7	12.2	12.2	12.0	11.7	11.4	11.9
		1965-1969	11.4	11.8	12.4	12.4	12.2	12.0	11.6	12.1
		1970-1974	11.8	12.4	13.1	13.1	12.9	12.7	12.3	12.8
		1975-1979	12.2	12.9	13.6	13.8	13.7	13.5	13.5	13.4
		1980-1982	11.9	12.6	13.4	13.8	13.9	13.8	13.3	13.4
GPA at Age 16		N	8,558	127,390	236,545	154,746	48,460	6,709	183	582,591
		%	1.5	21.9	40.6	26.6	8.3	1.2	0.0	100.0
	Female	%	48.5	49.1	48.6	48.6	48.4	48.7	48.1	48.7
	Birth Order	Mean	1.1	1.4	1.8	2.1	2.5	2.8	3.4	1.8
	Birth Year	Mean	1985.2	1986.1	1986.7	1987.3	1987.8	1988.2	1988.3	1986.8
	Education by	All	165.9	189.9	207.9	217.2	218.7	214.8	206.0	206.8
	Birth Year	1982-1984	166.4	191.0	211.7	218.6	216.3	207.5	185.9	205.7
		1985-1989	166.3	190.6	208.7	218.5	218.9	215.8	206.8	207.7
		1990-1991	155.3	182.2	200.3	213.2	219.1	215.0	208.0	205.1
Military Conscription		N	11,991	71,340	85,522	37,103	9,233	1,379	65	216,633
Data		%	5.5	32.9	39.5	17.1	4.3	0.6	0.0	100.0
	Conscription Age	Mean	17.7	17.8	17.8	17.8	17.8	17.8	17.8	17.8
	Birth Order	Mean	1.1	1.5	1.9	2.4	2.9	3.6	4.1	1.8
	Birth Year	Mean	1968.5	1969.7	1971.0	1971.9	1971.9	1971.7	1972.6	1970.7
	Physical Fitness by	All	289.5	298.1	304.2	303.3	299.2	293.7	297.8	300.9
	Birth Year	1965-1969	285.9	294.0	300.3	299.2	293.3	291.7	286.0	296.0
		1970-1974	297.2	303.4	307.7	306.4	302.0	293.3	298.9	305.4
		1975-1977	289.0	295.0	301.5	301.3	299.8	296.8	300.9	300.0
	Height by	All	178.5	179.1	179.7	180.0	179.9	179.5	179.4	179.5
	Birth Year	1965-1969	178.4	179.0	179.6	179.8	179.4	178.9	179.6	179.2
		1970-1974	178.6	179.2	179.9	180.1	180.2	179.6	179.7	179.7
		1975-1977	178.4	179.0	179.7	180.1	180.1	180.0	178.5	179.7

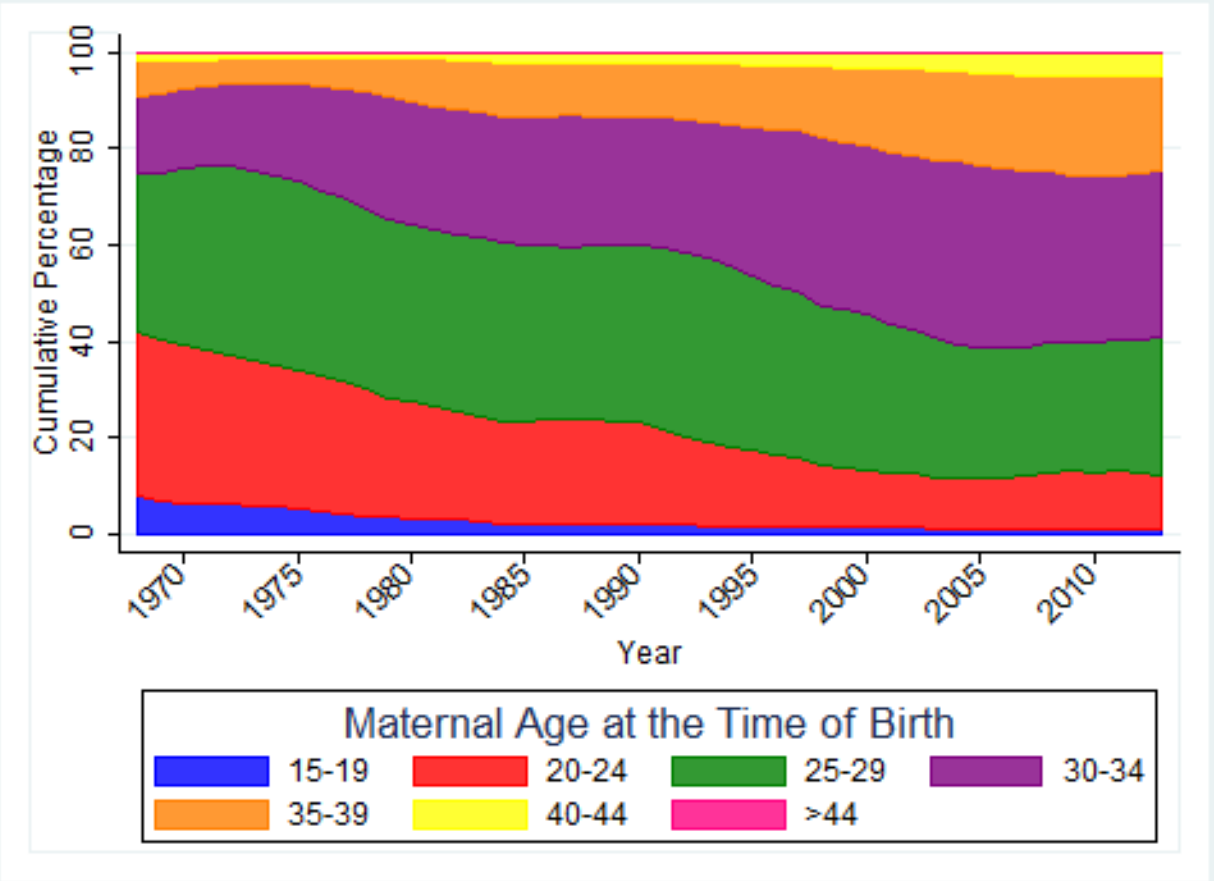

FIGURE 1. Percentage of Births Each Year by Age of Mother at the Time of Birth, 1968-2013. Compiled by the authors.

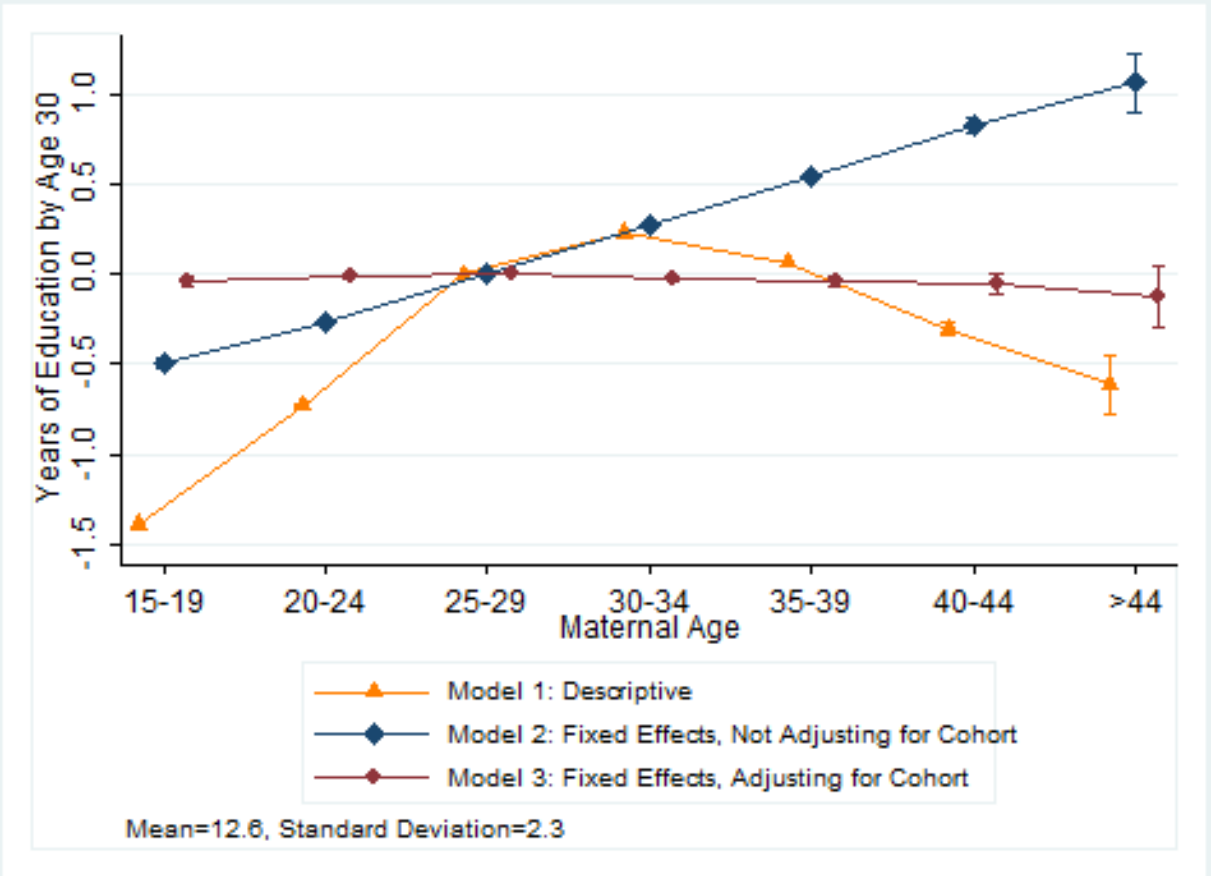

FIGURE 2. Men and Women Born in Sweden 1960-1982: Educational Attainment Measured by Years of Education at Age 30 by Maternal Age at the Time of Birth. The vertical bars show 95% confidence intervals.

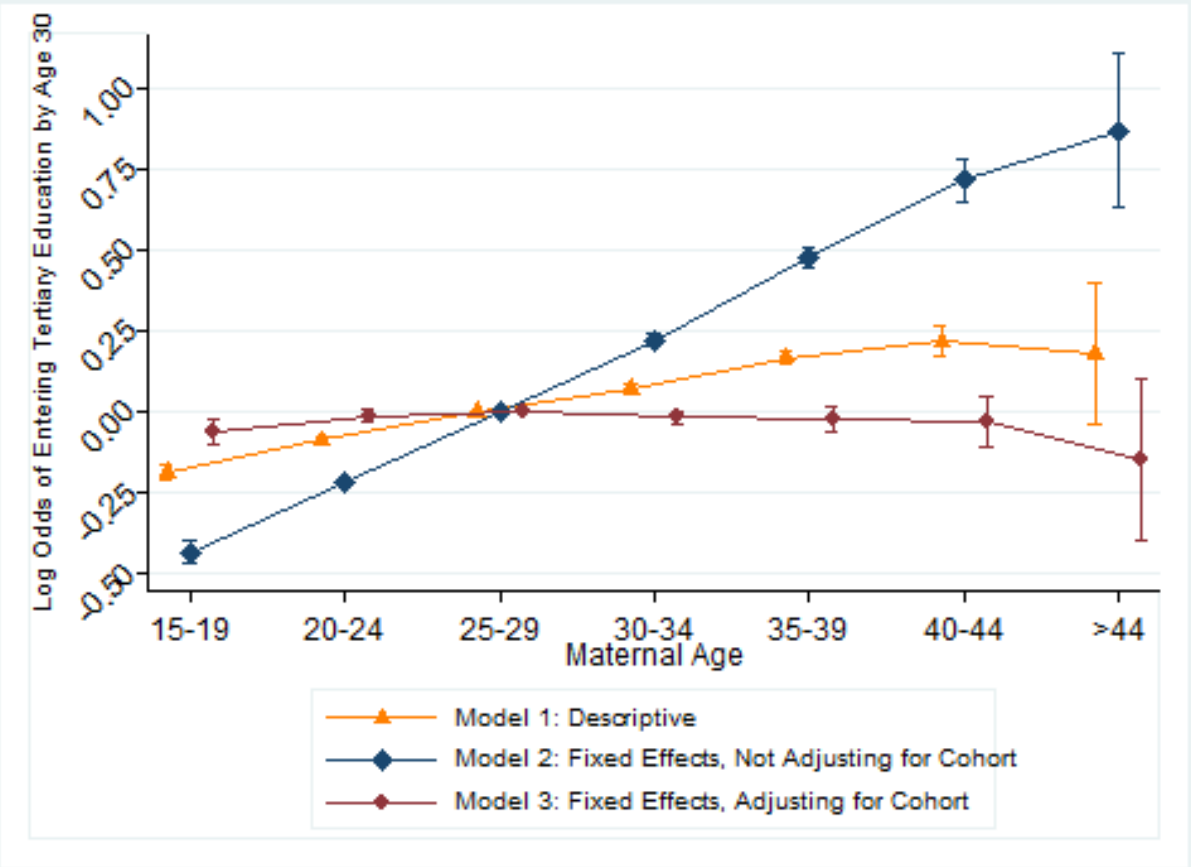

FIGURE 3. Men and Women Born in Sweden 1960-1982: Log Odds for Entering Tertiary Education by Age 30 by Maternal Age at the Time of Birth.

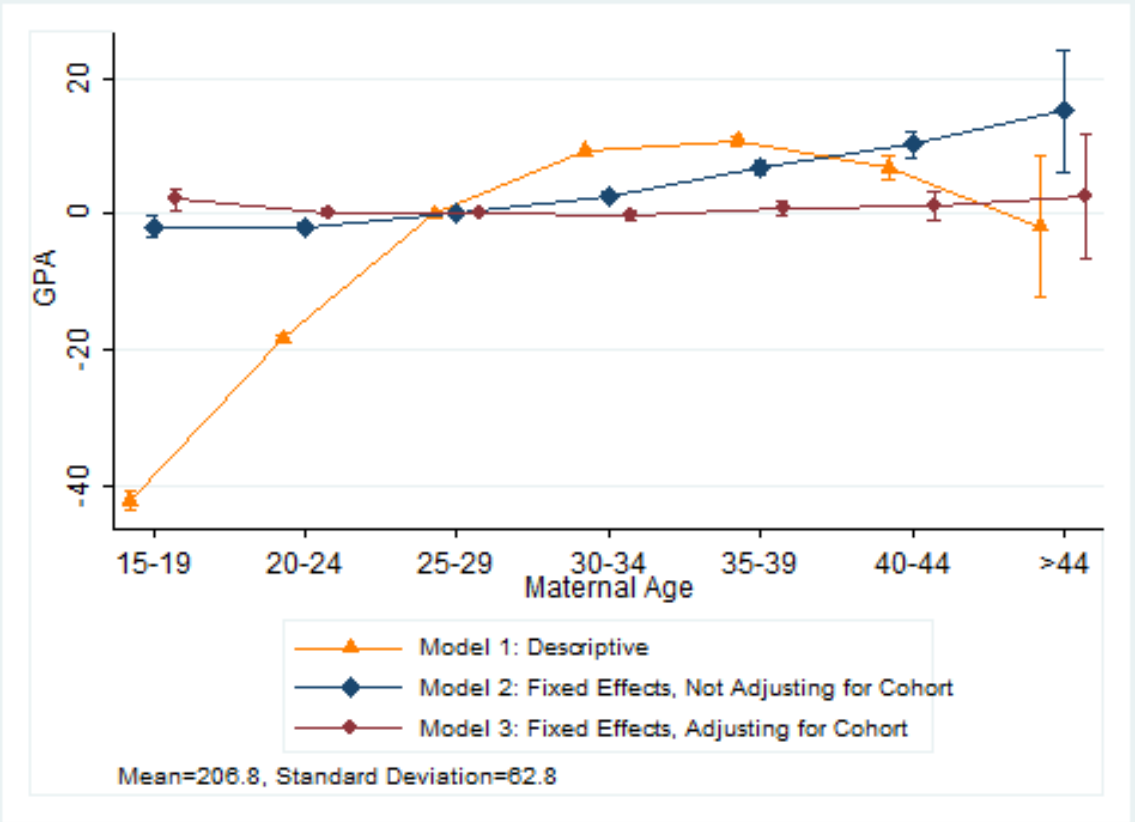

FIGURE 4. Men and Women Born in Sweden 1982-1991: High School GPA at Age 16 by Maternal Age at the Time of Birth. The vertical bars show 95% confidence intervals.

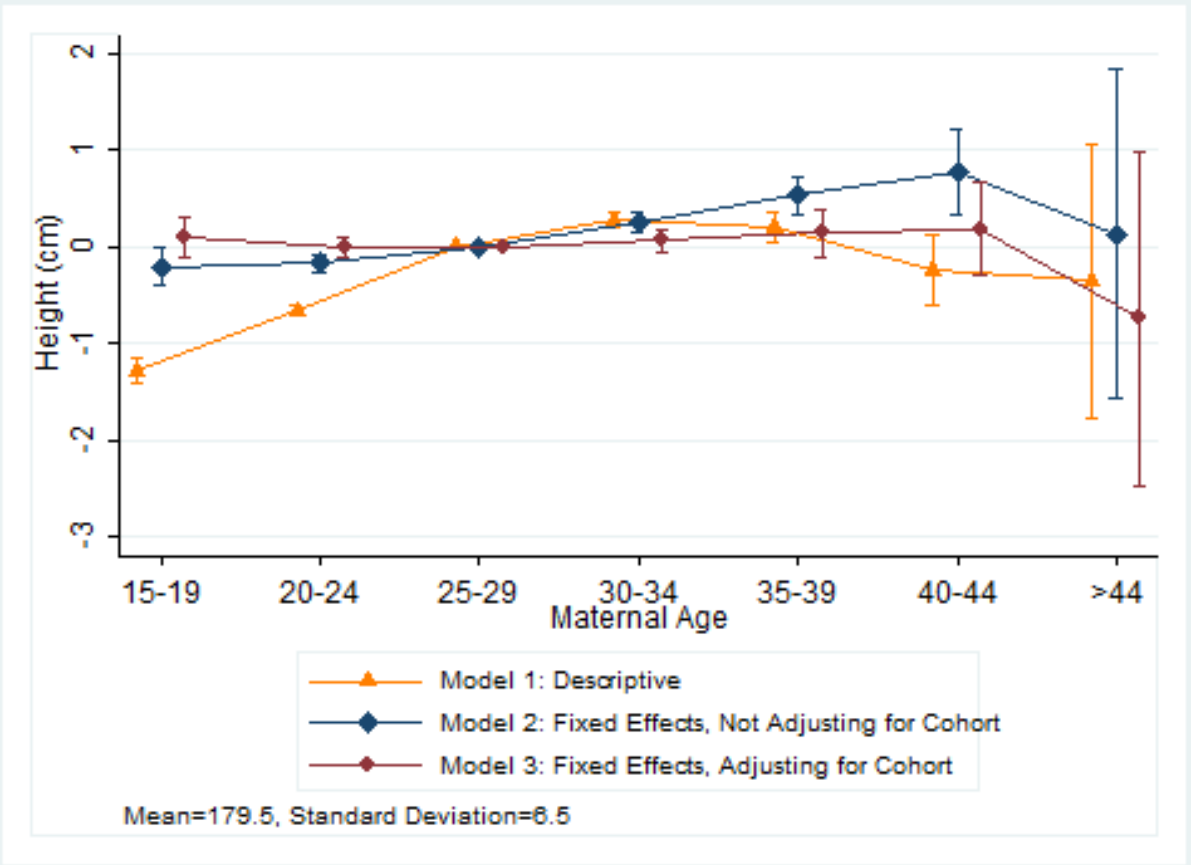

FIGURE 5. Men Born in Sweden 1965-1977: Height by Maternal Age at the Time of Birth. The vertical bars show 95% confidence intervals.

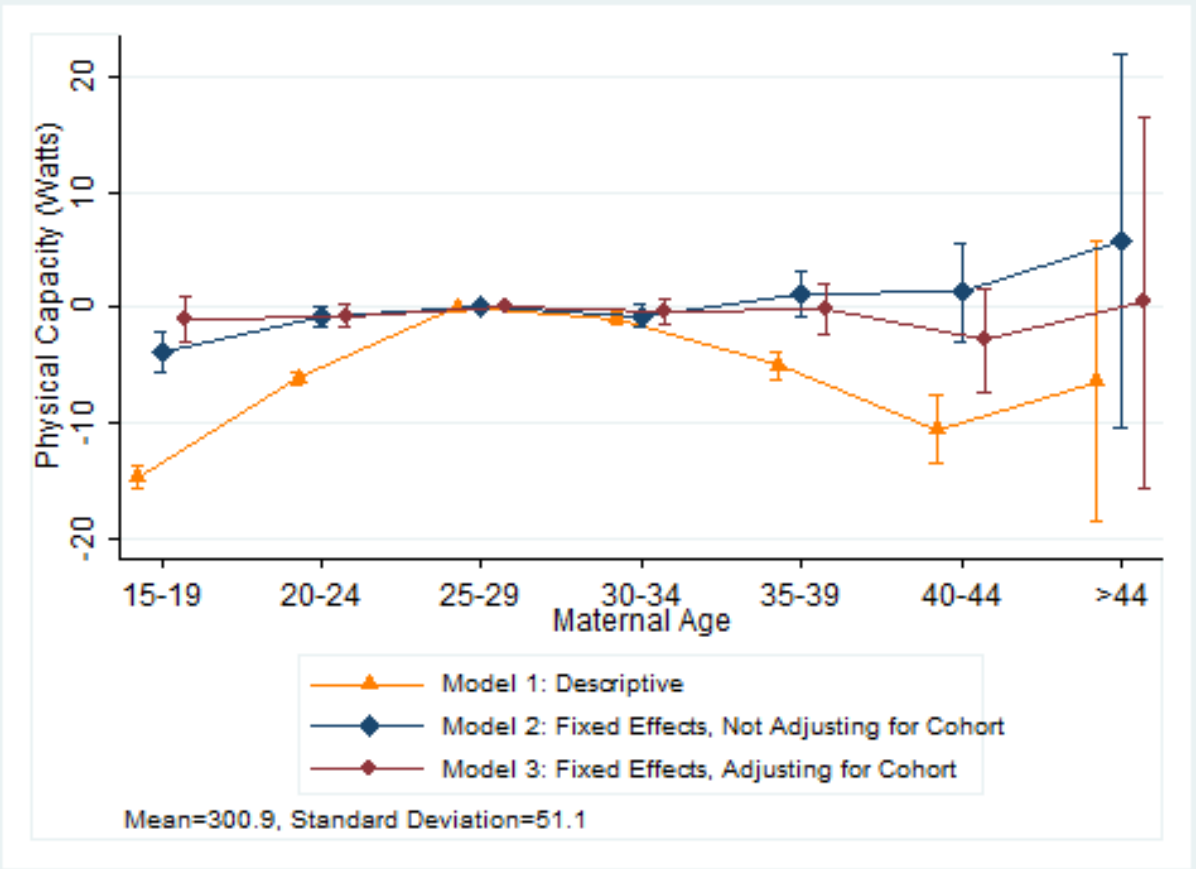

FIGURE 6. Men Born in Sweden 1965-1977: Physical Fitness by Maternal Age at the Time of Birth. The vertical bars show 95% confidence intervals.

APPENDIX

TABLE S1. Sample Exclusion Process.

Cohorts	Outcome	Exclusion Criteria	N	N Excluded
1960-1982	Years of Education by Age 30	Total Born in Sweden 1960-1982	2,435,773	
		ID for both parents	2,405,610	30,163
		All siblings born in Sweden	2,364,749	40,861
		No multiple births	2,304,319	60,430
		No only children	1,928,268	376,051
		Cohort cut	1,677,142	251,126
		No missing values on any variables	1,591,613	85,529
		Final	1,591,613	
1982-1991	GPA at Age 16	Total Born in Sweden 1982-1991	1,055,744	
		ID for both parents	1,046,777	8,967
		All siblings born in Sweden	1,028,280	18,497
		No multiple births	996,256	32,024
		No only children	846,151	150,105
		Cohort cut	608,928	237,223
		No missing values on any variables	582,591	26,337
		Final	582,591	
1965-1977	Height and Physical Fitness	Total Born in Sweden 1965-1977	1,426,689	
		ID for both parents	1,411,005	15,684
		All siblings born in Sweden	1,385,197	25,471
		No multiple births	1,352,158	33,039
		No only children	1,125,699	226,459
		No women	579,103	546,596
		Cohort cut	249,338	329,765
		No missing values on any variables	216,633	32,705
		Final	216,633	

Table S2. Men and Women Born in Sweden 1960-1982: Educational Attainment Measured by Years of Education at Age 30 by Maternal Age at the Time of Birth

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother Age	15-19	-1.38	0.01	-1.40, -1.37	-0.49	0.01	-0.51, -0.47	-0.04	0.01	-0.07, -0.01
	20-24	-0.73	0.00	-0.74, -0.72	-0.27	0.01	-0.28, -0.26	-0.01	0.01	-0.02, 0.00
	25-29	0.00			0.00			0.00		
	30-34	0.23	0.01	0.22, 0.24	0.27	0.01	0.25, 0.28	-0.02	0.01	-0.04, -0.01
	35-39	0.06	0.01	0.05, 0.08	0.55	0.01	0.52, 0.57	-0.04	0.01	-0.07, -0.02
	40-44	-0.31	0.02	-0.34, -0.27	0.82	0.02	0.78, 0.87	-0.05	0.03	-0.11, 0.00
	>44	-0.61	0.08	-0.77, -0.45	1.06	0.08	0.90, 1.22	-0.13	0.08	-0.29, 0.04
Gender	Men	0.00			0.00			0.00		
	Women	0.40	0.00	0.40, 0.41	0.41	0.00	0.40, 0.42	0.41	0.00	0.40, 0.42
Birth Order	1				0.00			0.00		
	2				-0.14	0.00	-0.15, -0.13	-0.29	0.01	-0.30, -0.28
	3				-0.12	0.01	-0.13, -0.10	-0.44	0.01	-0.46, -0.42
	4				-0.08	0.01	-0.11, -0.06	-0.52	0.02	-0.55, -0.49
	5				-0.07	0.02	-0.12, -0.03	-0.61	0.02	-0.66, -0.56
	6				0.00	0.03	-0.07, 0.07	-0.62	0.04	-0.69, -0.55
	7+				0.02	0.05	-0.07, 0.11	-0.70	0.05	-0.80, -0.60
Birth Year	1960							-0.72	0.02	-0.77, -0.68
	1961							-0.68	0.02	-0.72, -0.64
	1962							-0.64	0.02	-0.68, -0.61
	1963							-0.60	0.02	-0.63, -0.56
	1964							-0.53	0.01	-0.56, -0.50
	1965							-0.49	0.01	-0.51, -0.46
	1966							-0.43	0.01	-0.46, -0.41
	1967							-0.38	0.01	-0.40, -0.36
	1968							-0.33	0.01	-0.35, -0.31
	1969							-0.26	0.01	-0.29, -0.24
	1970							0.00		
	1971							0.13	0.01	0.11, 0.15
	1972							0.30	0.01	0.28, 0.32
	1973							0.46	0.01	0.44, 0.49
	1974							0.64	0.01	0.62, 0.67
	1975							0.86	0.01	0.83, 0.88
	1976							0.97	0.02	0.94, 1.00
	1977							0.99	0.02	0.96, 1.03
	1978							0.94	0.02	0.90, 0.97
	1979							1.00	0.02	0.96, 1.04
	1980							1.14	0.02	1.10, 1.18
	1981							1.15	0.02	1.10, 1.19
	1982							1.18	0.02	1.13, 1.22
N			1,591,613			1,591,613			1,591,613	

Table S3. Men and Women Born in Sweden 1960-1982: Log Odds for Entering Tertiary Education by Age 30 by Maternal Age at the Time of Birth.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother	15-19	-0.19	0.01	0.00, -0.21	-0.44	-4.48	-0.47, -0.40	-0.06	-3.95	-0.10, -0.02
Age	20-24	-0.09	0.01	0.00, -0.10	-0.22	-4.98	-0.24, -0.20	-0.01	-4.60	-0.03, 0.01
	25-29	0.00			0.00			0.00		
	30-34	0.07	0.01	0.00, 0.05	0.22	-4.49	0.20, 0.24	-0.02	-4.51	-0.04, 0.00
	35-39	0.17	0.01	0.00, 0.14	0.47	-3.64	0.44, 0.50	-0.03	-3.85	-0.07, 0.02
	40-44	0.21	0.02	0.00, 0.17	0.71	-2.69	0.65, 0.78	-0.03	-3.25	-0.11, 0.04
	>44	0.18	0.11	0.11, -0.04	0.87	-1.23	0.63, 1.11	-0.15	-2.21	-0.40, 0.10
Sex	Men	0.00			0.00			0.00		
	Women	0.43	0.01	0.00, 0.42	0.43	-4.82	0.42, 0.44	0.43	-4.82	0.42, 0.44
Birth Order	1				0.00			0.00		
	2				-0.20	-5.29	-0.21, -0.19	-0.34	-5.20	-0.36, -0.33
	3				-0.24	-4.68	-0.26, -0.21	-0.53	-4.71	-0.56, -0.50
	4				-0.21	-4.11	-0.25, -0.17	-0.63	-4.32	-0.68, -0.58
	5				-0.18	-3.54	-0.25, -0.11	-0.69	-3.93	-0.77, -0.61
	6				-0.19	-3.08	-0.30, -0.08	-0.78	-3.60	-0.90, -0.67
	7+				-0.06	-2.60	-0.22, 0.09	-0.76	-3.24	-0.92, -0.59
Birth Year	1960							-0.64	-4.06	-0.70, -0.58
	1961							-0.63	-4.13	-0.69, -0.57
	1962							-0.58	-4.17	-0.63, -0.53
	1963							-0.52	-4.21	-0.57, -0.47
	1964							-0.47	-4.26	-0.51, -0.42
	1965							-0.41	-4.29	-0.45, -0.37
	1966							-0.36	-4.34	-0.40, -0.33
	1967							-0.29	-4.35	-0.33, -0.26
	1968							-0.22	-4.32	-0.26, -0.19
	1969							-0.15	-4.24	-0.18, -0.12
	1970							0.00		
	1971							0.12	-3.99	0.09, 0.15
	1972							0.27	-3.83	0.24, 0.30
	1973							0.37	-3.68	0.34, 0.41
	1974							0.46	-3.52	0.42, 0.50
	1975							0.60	-3.29	0.56, 0.64
	1976							0.72	-3.08	0.67, 0.76
	1977							0.70	-3.01	0.66, 0.75
	1978							0.76	-2.88	0.70, 0.81
	1979							0.87	-2.69	0.82, 0.93
	1980							0.99	-2.48	0.93, 1.05
	1981							1.01	-2.38	0.94, 1.08
	1982							1.08	-2.24	1.01, 1.15
N			626,207			626,207			626,207	

Table S4. Men and Women Born in Sweden 1960-1982: High School GPA at Age 16 by Maternal Age at the Time of Birth.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother Age	15-19	-42.01	0.74	-43.46, -40.56	-1.86	0.78	-3.39, -0.33	2.10	0.80	0.53, 3.68
	20-24	-18.15	0.22	-18.58, -17.72	-1.87	0.28	-2.43, -1.32	0.26	0.30	-0.33, 0.86
	25-29	0.00			0.00			0.00		
	30-34	9.35	0.20	8.95, 9.75	2.69	0.27	2.16, 3.21	-0.13	0.30	-0.72, 0.46
	35-39	10.82	0.34	10.14, 11.49	6.89	0.50	5.92, 7.86	0.92	0.58	-0.22, 2.06
	40-44	6.91	0.89	5.17, 8.66	10.20	1.01	8.21, 12.18	1.17	1.11	-1.01, 3.35
	>44	-1.80	5.29	-12.18, 8.58	15.15	4.61	6.11, 24.19	2.58	4.65	-6.54, 11.69
Sex	Men	0.00			0.00			0.00		
	Women	22.41	0.16	22.10, 22.73	21.82	0.15	21.52, 22.12	21.81	0.15	21.51, 22.11
Birth Order	1				0.00			0.00		
	2				-6.91	0.16	-7.23, -6.59	-9.92	0.24	-10.39, -9.44
	3				-10.61	0.32	-11.23, -9.98	-17.28	0.49	-18.24, -16.32
	4				-13.28	0.56	-14.38, -12.17	-23.12	0.78	-24.66, -21.58
	5				-17.49	1.03	-19.50, -15.47	-30.15	1.24	-32.59, -27.71
	6				-19.19	1.80	-22.72, -15.66	-34.44	1.99	-38.33, -30.54
	7+				-21.29	2.98	-27.12, -15.45	-39.67	3.14	-45.83, -33.51
Birth Year	1982							-6.52	0.43	-7.36, -5.68
	1983							-3.55	0.38	-4.30, -2.80
	1984							-2.02	0.36	-2.72, -1.32
	1985							0.00		
	1986							2.35	0.33	1.70, 3.00
	1987							4.35	0.34	3.67, 5.03
	1988							6.18	0.39	5.41, 6.96
	1989							7.15	0.46	6.24, 8.05
	1990							7.68	0.55	6.60, 8.76
	1991							9.27	0.64	8.02, 10.52
N				582,591			582,591			582,591

Table S5. Men Born in Sweden, 1965-1977: Height (cm) by Maternal Age at the Time of Birth.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother Age	15-19	-1.29	0.06	-1.41, -1.16	-0.20	0.09	-0.39, -0.02	0.10	0.10	-0.11, 0.30
	20-24	-0.66	0.03	-0.72, -0.60	-0.17	0.05	-0.26, -0.08	0.00	0.05	-0.11, 0.10
	25-29	0.00			0.00			0.00		
	30-34	0.27	0.04	0.19, 0.35	0.24	0.05	0.14, 0.34	0.06	0.06	-0.06, 0.18
	35-39	0.20	0.08	0.05, 0.35	0.53	0.10	0.32, 0.73	0.14	0.12	-0.11, 0.38
	40-44	-0.24	0.19	-0.61, 0.13	0.76	0.23	0.32, 1.20	0.18	0.25	-0.31, 0.67
	>44	-0.36	0.72	-1.78, 1.06	0.13	0.87	-1.58, 1.84	-0.75	0.88	-2.48, 0.98
Conscription Age	17				-0.36	0.03	-0.42, -0.29	-0.35	0.03	-0.42, -0.28
	18				0.00			0.00		
	19				0.51	0.08	0.35, 0.67	0.49	0.08	0.34, 0.65
	20				0.81	0.25	0.32, 1.30	0.82	0.25	0.33, 1.30
Birth Order	1				0.00			0.00		
	2				-0.08	0.03	-0.14, -0.01	-0.23	0.04	-0.31, -0.14
	3				-0.09	0.06	-0.21, 0.04	-0.42	0.09	-0.59, -0.25
	4				-0.11	0.11	-0.32, 0.11	-0.59	0.14	-0.87, -0.32
	5				-0.11	0.19	-0.48, 0.26	-0.74	0.22	-1.17, -0.31
	6				0.10	0.30	-0.49, 0.68	-0.65	0.33	-1.29, -0.01
	7+				0.85	0.43	0.01, 1.69	-0.01	0.46	-0.91, 0.88
Birth Year	1965							-0.34	0.10	-0.54, -0.15
	1966							-0.34	0.09	-0.51, -0.17
	1967							-0.45	0.08	-0.60, -0.30
	1968							-0.22	0.07	-0.36, -0.09
	1969							-0.15	0.07	-0.28, -0.02
	1970							0.00		
	1971							0.25	0.06	0.13, 0.38
	1972							0.28	0.07	0.15, 0.41
	1973							0.24	0.07	0.09, 0.39
	1974							0.40	0.09	0.23, 0.57
	1975							0.36	0.10	0.17, 0.56
	1976							0.57	0.12	0.34, 0.80
	1977							0.38	0.13	0.13, 0.64
N			216,633			216,633			216,633	

Table S6. Men Born in Sweden, 1965-1977: Physical Fitness (watts) by Maternal Age at the Time of Birth.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother Age	15-19	-14.66	0.50	-15.63, -13.68	-3.78	0.89	-5.51, -2.04	-1.02	0.97	-2.92, 0.88
	20-24	-6.12	0.26	-6.63, -5.61	-0.82	0.44	-1.68, 0.04	-0.67	0.49	-1.64, 0.29
	25-29	0.00			0.00			0.00		
	30-34	-0.89	0.32	-1.51, -0.27	-0.70	0.48	-1.65, 0.25	-0.37	0.55	-1.46, 0.72
	35-39	-5.02	0.58	-6.16, -3.88	1.19	0.98	-0.74, 3.12	-0.11	1.14	-2.35, 2.13
	40-44	-10.52	1.48	-13.43, -7.62	1.36	2.16	-2.86, 5.59	-2.79	2.29	-7.29, 1.71
	>44	-6.38	6.16	-18.46, 5.70	5.78	8.28	-10.45, 22.01	0.43	8.18	-15.60, 16.46
Conscription	17				-4.71	0.32	-5.33, -4.08	-2.40	0.31	-3.01, -1.78
Age	18				0.00			0.00		
	19				-0.94	0.77	-2.45, 0.57	-0.01	0.75	-1.48, 1.46
	20				-7.03	2.36	-11.65, -2.41	-6.84	2.30	-11.34, -2.33
Birth Order	1				0.00			0.00		
	2				0.62	0.31	0.02, 1.22	-1.67	0.40	-2.46, -0.88
	3				1.86	0.59	0.71, 3.01	-4.13	0.80	-5.70, -2.57
	4				6.84	1.05	4.79, 8.89	-3.87	1.30	-6.42, -1.33
	5				8.95	1.81	5.41, 12.50	-6.18	2.04	-10.17, -2.19
	6				10.03	2.85	4.45, 15.61	-9.53	3.03	-15.47, -3.59
	7+				15.59	4.08	7.60, 23.58	-6.24	4.22	-14.52, 2.04
Birth Year	1965							-37.79	0.92	-39.60, -35.98
	1966							-17.29	0.81	-18.87, -15.71
	1967							-3.20	0.71	-4.59, -1.81
	1968							-1.89	0.64	-3.15, -0.64
	1969							-4.15	0.60	-5.33, -2.97
	1970							0.00		
	1971							-2.51	0.59	-3.68, -1.35
	1972							-4.93	0.62	-6.15, -3.71
	1973							-6.00	0.69	-7.36, -4.64
	1974							-10.33	0.79	-11.88, -8.77
	1975							-10.46	0.92	-12.27, -8.66
	1976							-12.96	1.07	-15.06, -10.86
	1977							-7.77	1.21	-10.13, -5.40
N				216,633			216,633			216,633

Table S7. Men and Women Born in Sweden 1960-1982: Educational Attainment Measured by Years of Education at Age 30 by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother Age	15-19	-1.38	0.01	-1.40, -1.37	-0.45	0.01	-0.48, -0.43	-0.04	0.01	-0.07, -0.02
	20-24	-0.73	0.00	-0.74, -0.72	-0.25	0.01	-0.27, -0.24	-0.01	0.01	-0.02, 0.00
	25-29	0.00			0.00			0.00		
	30-34	0.23	0.01	0.22, 0.24	0.26	0.01	0.25, 0.27	-0.02	0.01	-0.04, -0.01
	35-39	0.06	0.01	0.05, 0.08	0.54	0.01	0.52, 0.56	-0.05	0.01	-0.07, -0.02
	40-44	-0.31	0.02	-0.34, -0.27	0.82	0.02	0.77, 0.86	-0.06	0.03	-0.11, 0.00
	>44	-0.61	0.08	-0.77, -0.45	1.06	0.08	0.90, 1.22	-0.13	0.08	-0.30, 0.04
Sex	Men	0.00			0.00			0.00		
	Women	0.40	0.00	0.40, 0.41	0.41	0.00	0.40, 0.42	0.41	0.00	0.40, 0.42
Household	Unskilled manual				-0.05	0.01	-0.07, -0.03	0.01	0.01	-0.01, 0.03
SES	Skilled manual				0.00			0.00		
	Lower non-manual				0.02	0.01	-0.01, 0.04	0.01	0.01	-0.01, 0.03
	Intermediate non-manual				0.03	0.01	0.01, 0.05	0.00	0.01	-0.02, 0.02
	Managers and professionals				0.00	0.01	-0.03, 0.02	-0.04	0.01	-0.07, -0.01
	Self-employed professionals				-0.19	0.08	-0.34, -0.03	-0.22	0.08	-0.38, -0.07
	Other self-employed				0.11	0.02	0.08, 0.14	0.03	0.02	-0.01, 0.06
	Farmers				0.15	0.02	0.11, 0.20	0.09	0.02	0.04, 0.13
	Missing				-0.17	0.01	-0.19, -0.15	0.03	0.01	0.01, 0.05
Birth Order	1				0.00			0.00		
	2				-0.15	0.00	-0.16, -0.14	-0.29	0.01	-0.30, -0.28
	3				-0.14	0.01	-0.15, -0.12	-0.43	0.01	-0.45, -0.41
	4				-0.10	0.01	-0.13, -0.08	-0.52	0.02	-0.55, -0.49
	5				-0.09	0.02	-0.14, -0.05	-0.61	0.02	-0.66, -0.56
	6				-0.02	0.03	-0.09, 0.05	-0.62	0.04	-0.69, -0.55
	7+				0.00	0.05	-0.09, 0.09	-0.70	0.05	-0.80, -0.60
Birth Year	1960							-1.59	0.03	-1.64, -1.53
	1961							-1.54	0.03	-1.59, -1.49
	1962							-1.51	0.03	-1.56, -1.46
	1963							-1.46	0.02	-1.51, -1.41
	1964							-1.40	0.02	-1.44, -1.35
	1965							-1.35	0.02	-1.39, -1.31
	1966							-1.30	0.02	-1.34, -1.26
	1967							-1.25	0.02	-1.28, -1.21
	1968							-1.20	0.02	-1.23, -1.17
	1969							-1.13	0.02	-1.16, -1.10
	1970							-0.86	0.01	-0.89, -0.83
	1971							-0.73	0.01	-0.75, -0.70
	1972							-0.56	0.01	-0.58, -0.53
	1973							-0.40	0.01	-0.42, -0.37
	1974							-0.22	0.01	-0.24, -0.19
	1975							0.00		
	1976							0.12	0.01	0.09, 0.14
	1977							0.14	0.01	0.11, 0.16
	1978							0.08	0.01	0.05, 0.10
	1979							0.14	0.01	0.11, 0.17
	1980							0.29	0.02	0.26, 0.32
	1981							0.29	0.02	0.26, 0.32
	1982							0.32	0.02	0.28, 0.35
N			1,591,613			1,591,613			1,591,613	

Table S8. Men and Women Born in Sweden 1960-1982: Log Odds for Entering Tertiary Education by Age 30 by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother	15-19	-0.19	0.01	-0.21, -0.16	-0.41	0.02	-0.44, -0.37	-0.06	0.02	-0.10, -0.02
Age	20-24	-0.09	0.01	-0.10, -0.08	-0.21	0.01	-0.23, -0.19	-0.01	0.01	-0.03, 0.01
	25-29	0.00			0.00			0.00		
	30-34	0.07	0.01	0.05, 0.08	0.22	0.01	0.20, 0.23	-0.02	0.01	-0.04, 0.00
	35-39	0.17	0.01	0.14, 0.19	0.47	0.02	0.44, 0.50	-0.03	0.02	-0.07, 0.02
	40-44	0.21	0.02	0.17, 0.26	0.71	0.03	0.65, 0.78	-0.03	0.04	-0.11, 0.05
	>44	0.18	0.11	-0.04, 0.40	0.87	0.12	0.63, 1.11	-0.15	0.13	-0.40, 0.10
Sex	Men	0.00			0.00			0.00		
	Women	0.43	0.01	0.42, 0.44	0.43	0.01	0.42, 0.44	0.43	0.01	0.42, 0.44
Household	Unskilled manual				-0.03	0.01	-0.06, -0.01	0.00	0.01	-0.02, 0.03
SES	Skilled manual				0.00			0.00		
	Lower non-manual				0.02	0.02	-0.01, 0.05	0.01	0.02	-0.02, 0.04
	Intermediate non-manual				0.01	0.01	-0.01, 0.04	-0.01	0.01	-0.03, 0.02
	Managers and professionals				0.01	0.02	-0.03, 0.06	-0.02	0.02	-0.06, 0.03
	Self-employed professionals				-0.18	0.12	-0.42, 0.06	-0.22	0.12	-0.46, 0.02
	Other self-employed				0.07	0.02	0.03, 0.12	0.01	0.02	-0.03, 0.06
	Farmers				0.11	0.03	0.04, 0.17	0.07	0.03	0.00, 0.13
	Missing				-0.12	0.01	-0.15, -0.09	0.00	0.02	-0.03, 0.03
Birth	1				0.00			0.00		
Order	2				-0.21	0.01	-0.22, -0.20	-0.34	0.01	-0.36, -0.33
	3				-0.25	0.01	-0.28, -0.23	-0.53	0.02	-0.56, -0.50
	4				-0.23	0.02	-0.27, -0.19	-0.63	0.02	-0.68, -0.58
	5				-0.20	0.04	-0.27, -0.13	-0.69	0.04	-0.77, -0.61
	6				-0.21	0.06	-0.32, -0.10	-0.78	0.06	-0.90, -0.67
	7+				-0.08	0.08	-0.24, 0.07	-0.76	0.08	-0.92, -0.59
Birth Year	1960							-1.24	0.04	-1.32, -1.15
	1961							-1.23	0.04	-1.31, -1.15
	1962							-1.18	0.04	-1.25, -1.10
	1963							-1.11	0.04	-1.18, -1.05
	1964							-1.06	0.03	-1.13, -1.00
	1965							-1.00	0.03	-1.06, -0.94
	1966							-0.96	0.03	-1.02, -0.91
	1967							-0.89	0.03	-0.94, -0.84
	1968							-0.82	0.02	-0.87, -0.77
	1969							-0.74	0.02	-0.79, -0.70
	1970							-0.60	0.02	-0.64, -0.56
	1971							-0.48	0.02	-0.51, -0.44
	1972							-0.32	0.02	-0.36, -0.29
	1973							-0.22	0.02	-0.26, -0.19
	1974							-0.14	0.02	-0.17, -0.11
	1975							0.00		
	1976							0.12	0.02	0.09, 0.15
	1977							0.11	0.02	0.07, 0.14
	1978							0.16	0.02	0.12, 0.20
	1979							0.28	0.02	0.24, 0.32
	1980							0.39	0.02	0.35, 0.44
	1981							0.41	0.02	0.36, 0.46
	1982							0.48	0.03	0.43, 0.53
N			626,207			626,207			626,207	

Table S9. Men and Women Born in Sweden 1960-1982: High School GPA at Age 16 by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother	15-19	-42.01	0.74	-43.46, -40.56	-1.82	0.78	-3.35, -0.28	2.09	0.81	0.52, 3.67
Age	20-24	-18.15	0.22	-18.58, -17.72	-1.85	0.28	-2.41, -1.29	0.27	0.30	-0.33, 0.86
	25-29	0.00			0.00			0.00		
	30-34	9.35	0.20	8.95, 9.75	2.65	0.27	2.13, 3.17	-0.14	0.30	-0.73, 0.45
	35-39	10.82	0.34	10.14, 11.49	6.84	0.50	5.87, 7.81	0.93	0.58	-0.21, 2.07
	40-44	6.91	0.89	5.17, 8.66	10.15	1.01	8.17, 12.14	1.20	1.11	-0.98, 3.38
	>44	-1.80	5.29	-12.18, 8.58	15.10	4.61	6.06, 24.14	2.64	4.65	-6.47, 11.76
Sex	Men	0.00			0.00			0.00		
	Women	22.41	0.16	22.10, 22.73	21.82	0.15	21.52, 22.11	21.81	0.15	21.51, 22.10
Household	Unskilled manual				0.63	0.38	-0.11, 1.37	0.51	0.38	-0.24, 1.25
SES	Skilled manual				0.00			0.00		
	Lower non-manual				1.04	0.47	0.13, 1.96	0.73	0.47	-0.18, 1.65
	Intermediate non-manual				1.09	0.43	0.25, 1.93	0.74	0.43	-0.10, 1.58
	Managers and professionals				1.57	0.57	0.46, 2.68	1.12	0.57	0.00, 2.23
	Self-employed professionals				-3.02	2.55	-8.01, 1.97	-2.83	2.54	-7.82, 2.16
	Other self-employed				0.90	0.62	-0.32, 2.11	0.82	0.62	-0.39, 2.04
	Farmers				0.42	0.92	-1.39, 2.23	1.39	0.93	-0.43, 3.21
	Missing				0.18	0.47	-0.75, 1.10	0.24	0.47	-0.68, 1.17
Birth Order	1				0.00			0.00		
	2				-6.95	0.17	-7.27, -6.62	-9.91	0.24	-10.39, -9.44
	3				-10.67	0.32	-11.30, -10.05	-17.27	0.49	-18.23, -16.31
	4				-13.36	0.57	-14.47, -12.25	-23.10	0.78	-24.63, -21.56
	5				-17.59	1.03	-19.61, -15.58	-30.11	1.24	-32.55, -27.67
	6				-19.30	1.80	-22.83, -15.77	-34.38	1.99	-38.28, -30.48
	7+				-21.38	2.98	-27.21, -15.54	-39.57	3.14	-45.73, -33.41
Birth Year	1982							-6.47	0.43	-7.32, -5.63
	1983							-3.51	0.39	-4.26, -2.75
	1984							-1.97	0.36	-2.68, -1.27
	1985							0.00		
	1986							2.34	0.33	1.69, 2.99
	1987							4.34	0.34	3.66, 5.02
	1988							6.17	0.39	5.40, 6.95
	1989							7.13	0.46	6.22, 8.04
	1990							7.62	0.55	6.54, 8.70
	1991							9.19	0.64	7.94, 10.44
N		582,591			582,591			582,591		

Table S10. Men Born in Sweden, 1965-1977: Height (cm) by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother Age	15-19	-1.29	0.06	-1.41, -1.16	-0.18	0.09	-0.37, 0.00	0.08	0.11	-0.12, 0.29
	20-24	-0.66	0.03	-0.72, -0.60	-0.15	0.05	-0.25, -0.06	0.00	0.05	-0.11, 0.10
	25-29	0.00			0.00			0.00		
	30-34	0.27	0.04	0.19, 0.35	0.23	0.05	0.13, 0.33	0.06	0.06	-0.06, 0.17
	35-39	0.20	0.08	0.05, 0.35	0.51	0.10	0.31, 0.71	0.12	0.12	-0.12, 0.37
	40-44	-0.24	0.19	-0.61, 0.13	0.75	0.23	0.31, 1.20	0.17	0.25	-0.32, 0.65
	>44	-0.36	0.72	-1.78, 1.06	0.12	0.87	-1.59, 1.82	-0.77	0.88	-2.50, 0.96
Age at	17				-0.36	0.03	-0.42, -0.29	-0.35	0.03	-0.41, -0.28
Conscription	18				0.00			0.00		
Test	19				0.51	0.08	0.35, 0.67	0.49	0.08	0.33, 0.65
	20				0.80	0.25	0.31, 1.28	0.80	0.25	0.32, 1.29
Household	Unskilled manual				-0.14	0.06	-0.26, -0.02	-0.09	0.06	-0.21, 0.04
SES	Skilled manual				0.00			0.00		
	Lower non-manual				0.02	0.08	-0.15, 0.18	0.02	0.08	-0.14, 0.19
	Intermediate non-manual				0.04	0.07	-0.10, 0.17	0.00	0.07	-0.13, 0.14
	Managers and professionals				0.03	0.10	-0.17, 0.24	0.02	0.10	-0.19, 0.22
	Self-employed professionals				0.15	0.60	-1.02, 1.33	0.11	0.60	-1.07, 1.28
	Other self-employed				-0.05	0.12	-0.28, 0.17	-0.12	0.12	-0.35, 0.11
	Farmers				0.43	0.16	0.12, 0.74	0.39	0.16	0.08, 0.70
	Missing				-0.11	0.07	-0.24, 0.02	0.02	0.07	-0.12, 0.16
Birth Order	1				0.00			0.00		
	2				-0.09	0.03	-0.16, -0.03	-0.23	0.04	-0.31, -0.14
	3				-0.12	0.06	-0.24, 0.00	-0.42	0.09	-0.59, -0.25
	4				-0.15	0.11	-0.37, 0.07	-0.60	0.14	-0.88, -0.33
	5				-0.16	0.19	-0.54, 0.21	-0.75	0.22	-1.18, -0.32
	6				0.04	0.30	-0.55, 0.63	-0.66	0.33	-1.30, -0.02
	7+				0.78	0.43	-0.07, 1.62	-0.04	0.46	-0.93, 0.86
Birth Year	1965							-0.70	0.16	-1.02, -0.38
	1966							-0.70	0.15	-1.00, -0.41
	1967							-0.80	0.14	-1.07, -0.54
	1968							-0.58	0.12	-0.82, -0.34
	1969							-0.51	0.11	-0.73, -0.29
	1970							-0.36	0.10	-0.56, -0.17
	1971							-0.11	0.09	-0.29, 0.06
	1972							-0.09	0.08	-0.24, 0.07
	1973							-0.12	0.07	-0.27, 0.03
	1974							0.04	0.07	-0.11, 0.19
	1975							0.00		
	1976							0.21	0.09	0.04, 0.38
	1977							0.02	0.09	-0.15, 0.20
N			216,633			216,633			216,633	

Table S11. Men Born in Sweden, 1965-1977: Physical Fitness (watts) by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother Age	15-19	-14.66	0.50	-15.64, -13.69	-4.76	0.90	-6.53, -3.00	-1.05	0.98	-2.96, 0.87
	20-24	-6.12	0.26	-6.63, -5.61	-1.08	0.44	-1.94, -0.22	-0.70	0.49	-1.67, 0.26
	25-29	0.00			0.00			0.00		
	30-34	-0.89	0.32	-1.51, -0.27	-0.66	0.49	-1.62, 0.29	-0.37	0.56	-1.46, 0.72
	35-39	-5.02	0.58	-6.16, -3.88	1.10	0.99	-0.83, 3.04	-0.20	1.15	-2.45, 2.05
	40-44	-10.52	1.48	-13.43, -7.62	1.12	2.16	-3.11, 5.35	-2.96	2.30	-7.47, 1.55
	>44	-6.38	6.16	-18.46, 5.70	5.37	8.28	-10.86, 21.59	0.11	8.18	-15.93, 16.15
Age at	17				-4.70	0.32	-5.32, -4.07	-2.40	0.31	-3.01, -1.78
Conscription	18				0.00			0.00		
Test	19				-0.93	0.77	-2.45, 0.58	-0.02	0.75	-1.50, 1.45
	20				-7.18	2.36	-11.80, -2.56	-6.93	2.30	-11.43, -2.43
Household	Unskilled manual				0.55	0.58	-0.59, 1.69	0.59	0.57	-0.53, 1.71
SES	Skilled manual				0.00			0.00		
	Lower non-manual				0.12	0.81	-1.46, 1.70	0.10	0.78	-1.44, 1.64
	Intermediate non-manual				-0.02	0.65	-1.28, 1.25	-0.90	0.63	-2.14, 0.33
	Managers and professionals				-0.28	0.99	-2.22, 1.65	-0.29	0.96	-2.18, 1.59
	Self-employed professionals				-1.66	5.70	-12.84, 9.51	-1.27	5.56	-12.16, 9.61
	Other self-employed				-0.91	1.11	-3.09, 1.26	-0.79	1.09	-2.92, 1.34
	Farmers				1.52	1.51	-1.43, 4.48	2.16	1.47	-0.73, 5.05
	Missing				3.47	0.63	2.24, 4.71	0.36	0.65	-0.91, 1.63
Birth Order	1				0.00			0.00		
	2				0.99	0.31	0.37, 1.60	-1.64	0.41	-2.44, -0.85
	3				2.53	0.60	1.36, 3.70	-4.12	0.80	-5.69, -2.56
	4				7.62	1.05	5.55, 9.68	-3.91	1.30	-6.46, -1.36
	5				9.72	1.81	6.17, 13.27	-6.32	2.04	-10.32, -2.32
	6				10.75	2.85	5.17, 16.32	-9.80	3.03	-15.74, -3.85
	7+				16.42	4.08	8.42, 24.42	-6.49	4.22	-14.77, 1.79
Birth Year	1965							-27.53	1.52	-30.52, -24.55
	1966							-7.06	1.39	-9.79, -4.34
	1967							7.02	1.26	4.55, 9.50
	1968							8.30	1.15	6.05, 10.55
	1969							6.04	1.04	3.99, 8.08
	1970							10.47	0.92	8.67, 12.27
	1971							7.98	0.82	6.37, 9.59
	1972							5.55	0.74	4.10, 6.99
	1973							4.47	0.69	3.11, 5.83
	1974							0.13	0.69	-1.24, 1.49
	1975							0.00		
	1976							-2.48	0.79	-4.02, -0.93
	1977							2.70	0.83	1.07, 4.34
N				216,633			216,633			216,633

Table S12. Men and Women Born in Sweden 1971-1982: Educational Attainment Measured by Years of Education at Age 30 by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status and Inflation-adjusted Household Income.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother	15-19	-1.49	0.01	-1.52, -1.47	-0.30	0.02	-0.34, -0.25	-0.05	0.02	-0.10, 0.00
Age	20-24	-0.76	0.01	-0.77, -0.74	-0.16	0.01	-0.18, -0.14	-0.01	0.01	-0.03, 0.01
	25-29	0.00			0.00			0.00		
	30-34	0.31	0.01	0.29, 0.32	0.14	0.01	0.11, 0.16	-0.04	0.01	-0.06, -0.01
	35-39	0.28	0.01	0.25, 0.31	0.27	0.02	0.23, 0.31	-0.08	0.02	-0.13, -0.03
	40-44	0.05	0.04	-0.03, 0.13	0.44	0.05	0.34, 0.53	-0.09	0.05	-0.20, 0.02
	>44	0.00	0.23	-0.45, 0.46	0.68	0.25	0.19, 1.16	-0.12	0.25	-0.61, 0.37
Sex	Men	0.00			0.00			0.00		
	Women	0.64	0.01	0.63, 0.65	0.65	0.01	0.63, 0.66	0.65	0.01	0.63, 0.66
HH Income					0.00	0.00	0.00, 0.00	0.00	0.00	0.00, 0.00
Household	Unskilled manual				0.01	0.01	-0.01, 0.04	0.02	0.01	-0.01, 0.04
SES	Skilled manual				0.00			0.00		
	Lower non-manual				0.00	0.02	-0.03, 0.03	0.00	0.02	-0.04, 0.03
	Intermediate non-manual				-0.05	0.02	-0.08, -0.02	-0.02	0.02	-0.05, 0.01
	Managers and professionals				-0.07	0.02	-0.12, -0.03	-0.06	0.02	-0.11, -0.02
	Self-employed professionals				-0.20	0.11	-0.41, 0.02	-0.18	0.11	-0.39, 0.03
	Other self-employed				0.01	0.02	-0.03, 0.06	-0.01	0.02	-0.05, 0.04
	Farmers				0.10	0.04	0.03, 0.18	0.08	0.04	0.00, 0.15
	Missing				0.00	0.02	-0.03, 0.04	0.04	0.02	0.00, 0.07
Birth Order	1				0.00			0.00		
	2				-0.09	0.01	-0.10, -0.08	-0.27	0.01	-0.29, -0.26
	3				-0.04	0.01	-0.07, -0.02	-0.42	0.02	-0.46, -0.38
	4				0.05	0.03	0.00, 0.11	-0.50	0.03	-0.57, -0.44
	5				0.12	0.05	0.02, 0.22	-0.59	0.06	-0.70, -0.48
	6				0.24	0.08	0.07, 0.40	-0.63	0.09	-0.80, -0.46
	7+				0.25	0.12	0.01, 0.49	-0.79	0.13	-1.04, -0.54
Birth Year	1971							-0.71	0.02	-0.75, -0.68
	1972							-0.53	0.02	-0.57, -0.50
	1973							-0.38	0.01	-0.41, -0.35
	1974							-0.21	0.01	-0.24, -0.18
	1975							0.00		
	1976							0.11	0.01	0.09, 0.14
	1977							0.13	0.01	0.11, 0.16
	1978							0.07	0.02	0.04, 0.10
	1979							0.13	0.02	0.10, 0.17
	1980							0.28	0.02	0.24, 0.32
	1981							0.28	0.02	0.23, 0.33
	1982							0.32	0.03	0.26, 0.37
N			652,630			652,630			652,630	

Table S13. Men and Women Born in Sweden 1960-1982: Log Odds for Entering Tertiary Education by Age 30 by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status and Inflation-adjusted Household Income.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother	15-19	-0.11	0.02	-0.15, -0.07	-0.30	0.03	-0.36, -0.24	-0.06	0.03	-0.13, 0.00
Age	20-24	-0.05	0.01	-0.07, -0.03	-0.15	0.01	-0.18, -0.12	-0.01	0.02	-0.04, 0.02
	25-29	0.00			0.00			0.00		
	30-34	0.04	0.01	0.02, 0.07	0.15	0.01	0.12, 0.18	-0.03	0.02	-0.06, 0.01
	35-39	0.11	0.02	0.08, 0.14	0.33	0.03	0.27, 0.38	-0.03	0.04	-0.10, 0.04
	40-44	0.13	0.05	0.03, 0.22	0.49	0.07	0.35, 0.63	-0.05	0.08	-0.20, 0.10
	>44	0.02	0.28	-0.52, 0.56	0.56	0.30	-0.03, 1.15	-0.23	0.31	-0.83, 0.38
Sex	Men	0.00			0.00			0.00		
	Women	0.75	0.01	0.73, 0.76	0.75	0.01	0.73, 0.76	0.75	0.01	0.73, 0.76
HH Income					0.00	0.00	0.00, 0.00	0.00	0.00	0.00, 0.00
Household	Unskilled manual				0.01	0.02	-0.03, 0.05	0.01	0.02	-0.03, 0.05
SES	Skilled manual				0.00			0.00		
	Lower non-manual				0.01	0.02	-0.03, 0.06	0.01	0.02	-0.04, 0.06
	Intermediate non-manual				-0.02	0.02	-0.06, 0.03	-0.01	0.02	-0.05, 0.03
	Managers and professionals				-0.03	0.03	-0.09, 0.04	-0.03	0.03	-0.09, 0.03
	Self-employed professionals				0.02	0.17	-0.32, 0.36	0.00	0.17	-0.34, 0.34
	Other self-employed				0.03	0.03	-0.03, 0.09	0.00	0.03	-0.06, 0.06
	Farmers				0.09	0.05	-0.01, 0.19	0.07	0.05	-0.03, 0.17
	Missing				-0.01	0.02	-0.05, 0.04	0.01	0.02	-0.04, 0.06
Birth Order	1				0.00			0.00		
	2				-0.16	0.01	-0.18, -0.14	-0.34	0.01	-0.36, -0.31
	3				-0.20	0.02	-0.24, -0.16	-0.56	0.03	-0.61, -0.50
	4				-0.18	0.04	-0.25, -0.10	-0.69	0.05	-0.78, -0.60
	5				-0.13	0.07	-0.27, 0.01	-0.78	0.08	-0.93, -0.62
	6				-0.16	0.12	-0.40, 0.08	-0.92	0.13	-1.17, -0.67
	7+				-0.24	0.18	-0.59, 0.12	-1.15	0.19	-1.52, -0.78
Birth Year	1971							-0.47	0.03	-0.52, -0.41
	1972							-0.31	0.02	-0.36, -0.26
	1973							-0.21	0.02	-0.25, -0.17
	1974							-0.13	0.02	-0.17, -0.09
	1975							0.00		
	1976							0.13	0.02	0.09, 0.16
	1977							0.11	0.02	0.07, 0.15
	1978							0.16	0.02	0.11, 0.20
	1979							0.29	0.03	0.24, 0.34
	1980							0.40	0.03	0.35, 0.46
	1981							0.42	0.03	0.36, 0.49
	1982							0.50	0.04	0.43, 0.57
N			251,398			251,398			251,398	

Table S14. Men and Women Born in Sweden 1960-1982: High School GPA at Age 16 by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status and Inflation-adjusted Household Income.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother	15-19	-42.01	0.74	-43.46, -40.56	-1.86	0.79	-3.40, -0.32	1.98	0.81	0.40, 3.57
Age	20-24	-18.15	0.22	-18.58, -17.72	-1.86	0.28	-2.42, -1.30	0.27	0.30	-0.33, 0.86
	25-29	0.00			0.00			0.00		
	30-34	9.35	0.20	8.95, 9.75	2.66	0.27	2.13, 3.18	-0.15	0.30	-0.74, 0.45
	35-39	10.82	0.34	10.14, 11.49	6.86	0.50	5.88, 7.84	0.91	0.58	-0.23, 2.05
	40-44	6.91	0.89	5.17, 8.66	10.18	1.01	8.19, 12.17	1.16	1.11	-1.02, 3.35
	>44	-1.80	5.29	-12.18, 8.58	15.14	4.61	6.10, 24.18	2.58	4.65	-6.53, 11.70
Sex	Men	0.00			0.00			0.00		
	Women	22.41	0.16	22.10, 22.73	21.82	0.15	21.52, 22.11	21.81	0.15	21.51, 22.10
HH Income				0.00, 0.00	0.00	0.00	0.00, 0.00	0.00	0.00	-0.01, 0.00
Household	Unskilled manual				0.63	0.38	-0.11, 1.37	0.49	0.38	-0.25, 1.24
SES	Skilled manual				0.00			0.00		
	Lower non-manual				1.04	0.47	0.13, 1.96	0.72	0.47	-0.19, 1.64
	Intermediate non-manual				1.09	0.43	0.26, 1.93	0.74	0.43	-0.10, 1.58
	Managers and professionals				1.57	0.57	0.46, 2.68	1.13	0.57	0.01, 2.24
	Self-employed professionals				-3.02	2.55	-8.01, 1.97	-2.82	2.54	-7.81, 2.16
	Other self-employed				0.89	0.62	-0.32, 2.11	0.80	0.62	-0.41, 2.02
	Farmers				0.42	0.92	-1.39, 2.22	1.36	0.93	-0.45, 3.18
	Missing				0.16	0.47	-0.77, 1.09	0.18	0.47	-0.74, 1.11
Birth Order	1				0.00			0.00		
	2				-6.94	0.17	-7.26, -6.61	-9.94	0.24	-10.41, -9.46
	3				-10.65	0.32	-11.28, -10.02	-17.29	0.49	-18.25, -16.33
	4				-13.32	0.57	-14.43, -12.20	-23.10	0.78	-24.64, -21.57
	5				-17.53	1.03	-19.55, -15.50	-30.09	1.24	-32.53, -27.65
	6				-19.22	1.81	-22.76, -15.68	-34.32	1.99	-38.22, -30.43
	7+				-21.26	2.98	-27.10, -15.42	-39.45	3.14	-45.61, -33.29
Birth Year	1982							-6.50	0.43	-7.34, -5.66
	1983							-3.53	0.39	-4.28, -2.77
	1984							-1.98	0.36	-2.69, -1.28
	1985									
	1986							2.36	0.33	1.71, 3.02
	1987							4.41	0.35	3.74, 5.09
	1988							6.28	0.40	5.50, 7.06
	1989							7.27	0.47	6.36, 8.19
	1990							7.78	0.56	6.70, 8.87
	1991							9.39	0.64	8.13, 10.65
N				582,591			582,591			582,591

Table S15. Men Born in Sweden, 1965-1977: Height (cm) by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status and Inflation-adjusted Household Income.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother	15-19	-1.24	0.13	-1.49, -0.99	0.33	0.19	-0.05, 0.70	0.31	0.20	-0.08, 0.70
Age	20-24	-0.69	0.06	-0.80, -0.58	-0.05	0.09	-0.22, 0.12	-0.06	0.09	-0.24, 0.12
	25-29	0.00			0.00			0.00		
	30-34	0.25	0.07	0.11, 0.39	0.01	0.10	-0.18, 0.20	0.02	0.11	-0.19, 0.23
	35-39	0.09	0.16	-0.22, 0.39	0.08	0.23	-0.37, 0.54	0.10	0.25	-0.38, 0.59
	40-44	-0.04	0.45	-0.91, 0.84	0.10	0.58	-1.04, 1.24	0.14	0.59	-1.02, 1.31
	>44	1.02	2.04	-2.98, 5.02	-1.00	3.23	-7.33, 5.34	-0.84	3.24	-7.19, 5.50
Age at	17				-0.20	0.06	-0.32, -0.07	-0.20	0.06	-0.32, -0.07
Conscription	18				0.00			0.00		
Test	19				0.49	0.14	0.22, 0.76	0.48	0.14	0.21, 0.76
	20				0.62	0.46	-0.28, 1.52	0.62	0.46	-0.27, 1.52
HH Income					0.00	0.00	0.00, 0.00	0.00	0.00	0.00, 0.00
Household	Unskilled manual				-0.17	0.13	-0.42, 0.08	-0.17	0.13	-0.42, 0.08
SES	Skilled manual				0.00			0.00		
	Lower non-manual				0.03	0.16	-0.28, 0.34	0.03	0.16	-0.28, 0.34
	Intermediate non-manual				-0.02	0.13	-0.28, 0.23	-0.03	0.13	-0.29, 0.23
	Managers and professionals				0.27	0.19	-0.11, 0.65	0.27	0.19	-0.11, 0.65
	Self-employed professionals				-0.38	1.11	-2.54, 1.79	-0.37	1.11	-2.53, 1.80
	Other self-employed				0.20	0.23	-0.25, 0.65	0.20	0.23	-0.25, 0.65
	Farmers				0.29	0.37	-0.43, 1.01	0.29	0.37	-0.43, 1.02
	Missing				-0.02	0.15	-0.32, 0.28	-0.03	0.16	-0.33, 0.28
Birth Order	1				0.00			0.00		
	2				-0.09	0.06	-0.20, 0.02	-0.08	0.10	-0.27, 0.11
	3				-0.06	0.12	-0.30, 0.17	-0.04	0.19	-0.42, 0.34
	4				-0.43	0.25	-0.91, 0.06	-0.39	0.33	-1.04, 0.26
	5				-0.73	0.49	-1.68, 0.22	-0.68	0.56	-1.78, 0.43
	6				-0.86	0.78	-2.40, 0.67	-0.81	0.86	-2.50, 0.87
	7+				-1.18	1.11	-3.35, 1.00	-1.15	1.18	-3.47, 1.17
Birth Year	1971							0.11	0.16	-0.21, 0.43
	1972							0.12	0.13	-0.14, 0.38
	1973							0.06	0.11	-0.16, 0.27
	1974							0.15	0.10	-0.04, 0.34
	1975							0.00		
	1976							0.24	0.10	0.03, 0.44
	1977							-0.05	0.12	-0.27, 0.18
N			70,659			70,659			70,659	

Table S16. Men Born in Sweden, 1965-1977: Physical Fitness (watts) by Maternal Age at the Time of Birth, Adjusting for Parental Socioeconomic Status and Inflation-adjusted Household Income.

		Model 1			Model 2			Model 3		
		Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Mother Age	15-19	-11.06	0.97	-12.97, -9.15	0.77	1.78	-2.72, 4.26	-1.11	1.85	-4.74, 2.51
	20-24	-5.21	0.46	-6.11, -4.32	0.18	0.82	-1.43, 1.78	-0.95	0.88	-2.66, 0.77
	25-29	0.00			0.00			0.00		
	30-34	-1.68	0.56	-2.78, -0.58	-2.87	0.92	-4.68, -1.07	-1.76	0.99	-3.71, 0.19
	35-39	-5.37	1.21	-7.74, -3.00	-3.10	2.17	-7.35, 1.16	-0.87	2.31	-5.40, 3.66
	40-44	-11.75	3.53	-18.67, -4.83	-8.35	5.44	-19.02, 2.32	-5.16	5.56	-16.06, 5.74
	>44	0.78	15.54	-29.68, 31.24	6.34	30.26	-52.97, 65.65	9.42	30.29	-49.94, 68.78
Age at	17				-1.09	0.60	-2.26, 0.08	-1.27	0.60	-2.44, -0.10
Conscription	18				0.00			0.00		
Test	19				-2.10	1.30	-4.64, 0.45	-1.85	1.30	-4.39, 0.69
	20				-4.04	4.29	-12.44, 4.36	-3.11	4.28	-11.51, 5.28
HH Income					-0.01	0.01	-0.03, 0.00	-0.01	0.01	-0.02, 0.01
Household	Unskilled manual				0.25	1.20	-2.10, 2.61	0.45	1.20	-1.90, 2.80
SES	Skilled manual				0.00			0.00		
	Lower non-manual				-0.93	1.48	-3.83, 1.96	-0.91	1.48	-3.80, 1.98
	Intermediate non-manual				-2.00	1.23	-4.41, 0.41	-2.16	1.23	-4.57, 0.25
	Managers and professionals				1.19	1.80	-2.34, 4.72	1.04	1.80	-2.50, 4.57
	Self-employed professionals				-17.73	10.35	-38.02, 2.56	-18.07	10.34	-38.33, 2.20
	Other self-employed				-1.41	2.15	-5.62, 2.80	-1.44	2.15	-5.65, 2.76
	Farmers				3.12	3.45	-3.65, 9.89	2.97	3.45	-3.79, 9.74
	Missing				-3.23	1.44	-6.05, -0.41	-2.50	1.46	-5.35, 0.35
Birth Order	1				0.00			0.00		
	2				-5.15	0.52	-6.18, -4.13	-2.23	0.90	-3.99, -0.47
	3				-11.82	1.11	-14.00, -9.65	-6.09	1.82	-9.65, -2.53
	4				-14.73	2.31	-19.25, -10.21	-6.32	3.11	-12.42, -0.22
	5				-25.13	4.55	-34.06, -16.21	-14.42	5.28	-24.77, -4.06
	6				-33.26	7.34	-47.64, -18.88	-19.52	8.03	-35.26, -3.77
	7+				-40.69	10.38	-61.04, -20.34	-24.73	11.06	-46.42, -3.05
Birth Year	1971							7.26	1.53	4.26, 10.26
	1972							6.08	1.24	3.64, 8.52
	1973							4.67	1.01	2.68, 6.66
	1974							0.59	0.90	-1.18, 2.35
	1975							0.00		
	1976							-0.47	0.96	-2.36, 1.42
	1977							3.54	1.08	1.42, 5.65
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