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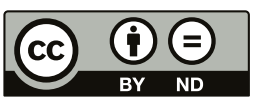

Parenting Skills and Selection into Fatherhood*

Lina Aldén+ and Anne Boschini*

As women's earnings have risen and parental leave policies expanded, expectations for paternal involvement have grown, potentially shifting the basis of fatherhood from economic provision toward men's parenting skills. Using Swedish administrative data and a sibling fixed-effects design, we find that non-cognitive ability, key dimension of parenting skills, has become a stronger predictor of fatherhood over time among men with comparable earnings and marital histories. Exploiting a 2002 reform that expanded reserved paternity leave, we further demonstrate that heightened expectations for paternal involvement amplified this selection even when accounting for marriage and earnings. Taken together, the results suggest that societal shifts have altered the traits that shape men's entry into fatherhood.

Keywords: Men; fertility; ability; parenting skills; earnings; marriage; parental leave
JEL: J13; J24

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1. Introduction

Fatherhood has changed. Rising female economic independence (Blau & Kahn, 2017; Goldin, 2021), a narrowing gender gap in the opportunity cost of child-rearing (Kleven et al., 2023; Lundberg et al., 2016; Ruggles, 2016), and paternity leave quotas (Canaan et al., 2022) have contributed to a new fatherhood ideal that emphasizes active parenting, household contributions, and co-parenting. These shifts suggest that the traits relevant to fatherhood may have changed as well. Yet despite growing recognition that non-economic characteristics matter for family formation (e.g., Oppenheimer & Lew, 1995; Sweeney, 2002; Van Bavel, 2017), research on fatherhood continues to place primary emphasis on men's economic prerequisites.[2]

This paper examines the characteristics of men who become fathers when paternal involvement, not just provision, is expected. We argue that parenting skills have become an increasingly important determinant of selection into fatherhood, alongside traditional provider roles. We use *parenting skills* to denote the constellation of social–emotional traits, behavioral self-regulation, and interpersonal competencies that enable men to provide responsive, consistent, and stimulating care to children. These traits are well-established as predictors of children's cognitive and socio-emotional development (Attanasio et al., 2022; Jones & Prinz, 2005; Prinzie et al., 2009), yet their role in shaping men's entry into fatherhood has received limited attention.

To formalize this idea, we develop a formal model of fatherhood selection inspired by Becker's (1993) quantity-quality tradeoff framework, adapted to incorporate variation in men's parenting skills.[3] In the model, parenting skills are latent capacities that raise the utility of childcare time by improving child quality, implying that selection into fatherhood increasingly depends on these skills as expectations of paternal involvement rise.

We then provide new empirical evidence on this mechanism using Swedish administrative data covering all men born between 1951 and 1972. These data cover complete fertility, marriage, and earnings histories, linked to cognitive and non-cognitive ability measures collected at military enlistment. The Swedish context is particularly informative, as Sweden has long been a forerunner in gender equality and family policy, making it an early

[2] Previous literature shows that there is a positive correlation between earnings and male fertility (e.g., Kearney & Wilson, 2018; Kravdal & Rindfuss, 2008; Nisén et al., 2018), and that this relationship is a result of men with high earnings potential being selected into fatherhood (Kunze, 2020; Mari, 2019).

[3] Traditional models emphasize men's economic capacity and human capital as prerequisites for family formation (e.g., Becker, 1993), while more recent work highlights relational and behavioral dimensions (Doepke et al., 2023; Oppenheimer, 2003; Sweeney, 2002). More broadly, Lundberg (2023) calls for a richer economics of gender that incorporates social and behavioral traits into models of family behavior.

case where parenting skills are likely to matter for fatherhood decisions. Our empirical strategy exploits comparisons between brothers to account for shared family background and other time-invariant family characteristics. We estimate how non-cognitive ability predicts fatherhood by age 45, conditioning on earnings and partnership history in order to isolate differences among men with comparable economic and family circumstances. Drawing on psychological evidence linking non-cognitive traits to nurturing, responsive, and growth-oriented parenting (Jones & Prinz, 2005; Prinzie et al., 2009), we interpret non-cognitive ability as a proxy for parenting skills. Because these measures are collected before labor market entry and family formation, they are predetermined with respect to fatherhood outcomes. Cognitive ability is included as a complementary dimension, reflecting the basic intellectual demands of daily parenting (Wieland & Zitman, 2016). Conditioning on cognitive ability, earnings, and shared family characteristics allows us to separate parenting-relevant traits from the human-capital components of ability that primarily determine productivity and income.

We show that parenting skills have become an increasingly strong predictor of fatherhood. By age 45, the probability of becoming a father rises steeply with non-cognitive ability, and this gradient has strengthened substantially across cohorts. A one–standard-deviation increase in non-cognitive ability raises the likelihood of fatherhood by 3.7 percentage points among men born in the early 1950s, compared to 7.7 percentage points for those born around 1970. To put these magnitudes in perspective, the effect is comparable to moving roughly 35–40 percentiles up the earnings distribution in the early cohort and 40–45 percentiles in the later cohort. Relative to marriage, the association corresponds to about one-tenth of the marriage–fatherhood gradient initially, rising to roughly one-third over time. Importantly, the relationship persists among partnered men with similar earnings, suggesting that parenting skills matter beyond assortative matching.

We test the model's mechanism that rising childcare demands increase the importance of parenting skills by exploiting quasi-experimental variation from the 2002 expansion of Sweden's reserved paternity leave. By doubling the amount of leave reserved for fathers from one to two months, the reform raised expectations of paternal involvement in childcare. Drawing on the peer effects literature (e.g., Dahl et al., 2014), we leverage sibling spillovers to examine whether this expansion strengthened selection on parenting skills into fatherhood. Comparing childless men whose brothers became fathers before versus after the reform, we find that the expansion amplified selection on parenting skills: men indirectly exposed to heightened leave expectations were more likely to become fathers if they had higher non-cognitive ability. Placebo tests using alternative reform years yield no comparable effects.

Finally, we complement the Swedish analysis with evidence from the United States, using NLSY79 data. Although the smaller sample size does not permit the study of trends and identification is less sharp, we find similar patterns despite the different institutional context. These results underscore that the importance of parenting skills for fatherhood is not confined to Nordic settings.

Our paper contributes to the literature on the economics of fertility and family formation. A large body of work emphasizes men's economic prerequisites, such as earnings capacity, employment stability, and human capital, as central determinants of family formation and fatherhood (e.g., Becker 1993; Anelli et al. 2024; Bratsberg et al. 2021; Kearney and Wilson 2018). Although research increasingly acknowledges the role of non-economic characteristics (Goldscheider and Waite 1991; Sweeney 2002; Oppenheimer 2003; Doepke et al. 2023; Lundberg, 2023), analyses of fatherhood continue to focus primarily on men's provider role. We extend this literature by introducing parenting skills as a distinct determinant of selection into fatherhood. We show that traits relevant for caregiving have become increasingly important for men's transitions into fatherhood, alongside traditional economic factors.

Second, our paper adds to recent work on how individual abilities shape fertility and family outcomes. Existing studies link cognitive and non-cognitive abilities to parenthood, typically interpreting these traits as proxies for human capital and earnings potential (e.g., Kolk and Barclay 2019; Kramarz et al. 2023).[4] Using pre-market measures of ability and conditioning on earnings, partnership histories, and shared family background, we isolate variation in non-cognitive ability that is weakly related to economic capacity but predictive of fatherhood within economic and marital strata. This reframes individual ability from a proxy for market success to a determinant of parenting-related selection.

Third, our results contribute to the literature on family policy and gender roles. A growing body of work documents how policies such as parental leave reforms affect parental behavior and intra-household allocation conditional on parenthood (e.g., Ekberg et al. 2013; Cools et al. 2015; Canaan et al. 2022). We show that such policies may also influence selection into fatherhood itself. Exploiting the expansion of reserved paternity leave in Sweden, we provide

[4] There are several studies on the raw relationship between intelligence and fertility, with ambiguous results for men. While there is a small negative association between intelligence and completed fertility (Chen et al., 2013; Meisenberg, 2010; Wang et al., 2016) the results for childlessness are more mixed. While Woodley & Meisenberg (2013) find that childlessness is positively related to intelligence, Kanazawa (2014) does not find any relationship. A small strand of literature in psychology and sociology has studied the association of personality traits with fertility (e.g., Jokela, 2012; Skirbekk & Blekesaune, 2014).

evidence that increases in expected paternal involvement strengthen selection on parenting skills into fatherhood.

The paper proceeds as follows. Section 2 presents the theoretical framework that incorporates parenting skills into a standard model of fatherhood. Section 3 describes the data and empirical strategy. Section 4 presents the main results on selection into fatherhood based on parenting skills. Section 5 provides complementary evidence on the role of partner preferences. In Section 6, we exploit the 2002 expansion of Sweden's reserved parental leave to test the model's mechanism. Section 7 extends the analysis to the United States. Section 8 concludes.

2. A simple model with parenting skills

To illustrate how the emergence of a new fatherhood ideal, emphasizing active paternal involvement in parenting, affects men's decision to become fathers, we embed parenting skills into a standard Beckerian quantity-quality tradeoff model. Specifically, we adapt Doepke et al. (2023), focusing on the extensive margin, i.e., the decision to have a first child, rather than fertility levels.[5]

In this model, men derive utility from consumption (c) and from the child's human capital (h), such that utility is given by $u(c, h)$. Whereas the standard model assumes that child quality depends only on parental investments in formal education[6], we also allow it to depend on the father's parenting skills, s.[7] We conceptualize parenting skills as latent capacities that shape a father's potential for engaged and responsive caregiving. These skills may affect child development through time-intensive activities such as reading, providing emotional support, consistent discipline, or creating a nurturing and cognitively stimulating home environment. This assumption reflects growing evidence that parenting behavior strongly influences children's cognitive and socioemotional development (e.g., Attanasio et al., 2022; Carneiro et al., 2019; Collins et al., 2002; Cunha & Heckman, 2008; Heckman & Mosso, 2014; Prinzie et al., 2009; Walker et al., 2011). For simplicity, we assume that educational investments are

[5] We focus on men's choice of parenthood; an equivalent model applies to women.
[6] Doepke et al. (2023) use the following human capital production function for children, $h = (\theta + e)^{\gamma}$, where θ is the innate endowment and γ is the return to human capital.
[7] We proxy parenting skills with cognitive and non-cognitive ability measured in late adolescence, prior to family formation. While some aspects of parenting capacity may evolve with life experience, we focus on early-life traits to isolate selection into fatherhood rather than responses to it. This is consistent with prior work linking early-life personality and socioemotional traits to long-run behavioral outcomes (e.g., Heckman et al., 2006). We interpret these traits as reflecting parenting potential, recognizing that actual parenting behavior is shaped by both endowments and later socialization. See Section 3.1 for definition and measurement of parenting skills.

homogeneous across parents and abstract from them in the human capital production function.[8] Normalizing the return to parenting skill to one, child human capital is given by $h(s) = s$.

Men earn a labor income, w. If a man becomes a father, he dedicates a fraction of this time, ϕ, to childcare. He receives a fraction, $\sigma < 1$, of his income during this period, reflecting partial compensation via paid parental leave. The father's budget constraint is thus $c \leq (1-\phi)w + \sigma\phi w$. In contrast, a man who remains childless allocates his full income to consumption: $c \leq w$. The utility of a father's (P) is:

$$u_P(c, s) = \log(c) + \delta \log(s)$$

subject to

$$c \leq (1-\phi)w + \sigma\phi w$$

where $\delta > 0$ denotes the weight placed on child quality relative to consumption. The utility of a non-father (N) is:

$$u_N(c) = \log(c)$$

subject to

$$c \leq w$$

To study the selection into fatherhood based on parenting skills, we derive a threshold value of parenting skills, s^*, such that men with $s > s^*$ choose to become fathers. Solving the inequality $u_P(c, s) > u_N(c)$ yields:

$$s^* = \frac{1}{(1-\phi+\sigma\phi)^{\frac{1}{\delta}}}$$

This formulation gives three key predictions. First, men with stronger parenting skills, s, are more likely to become fathers, all else equal. Second, men who place greater value on children relative to consumption (higher δ) have a lower threshold ($\partial s^*/\partial\delta < 0$). That is, parenting

[8] With parenting skills included in the child's human capital production function, *e* captures investments in formal education. In a Swedish context, where education is publicly funded, assuming homogenous *e* across parents is reasonable. Allowing for variation in formal educational investment or in children's innate endowments does not qualitatively change the model's main predictions.

skills matter less for men who derive more utility from parenthood. Finally, the threshold s^* increases with the time cost of parenting ($\partial s^*/\partial \phi > 0$), as long as $\sigma < 1$. In other words, as parental involvement increases, men need higher parenting skills to make fatherhood utility-enhancing. When $\sigma = 1$ (full income compensation), the time cost vanishes, and the threshold is unaffected by ϕ. Thus, this simple model illustrates how rising expectations of paternal involvement increase the parenting-skill threshold for fatherhood, shifting selection toward men with stronger parenting-relevant traits.

3. Empirical framework

3.1 Data

3.1.1 Defining parenting skills

We define parenting skills as a composite of traits that influence the quality of parenting, including both behavioral competencies and self-efficacy.[9] Parenting behavior refers to how parents interact with and respond to their children's needs. Core dimensions include warmth, behavioral control, and autonomy support, which together foster a nurturing, structured, and growth-oriented environment (versus an inadequate one) (Skinner et al., 2005). Warmth reflects responsiveness to children's emotional needs; behavioral control involves consistent rule-setting and monitoring; and autonomy support encourages exploration and independent decision-making (Baumrind, 1991).[10]

Parenting skills also rely on parental self-efficacy, i.e., a parent's belief in their own capacity to be effective in the parenting role. High self-efficacy is associated with greater parental involvement, better emotional regulation, and improved child outcomes (e.g., Jones & Prinz, 2005). Among fathers, lower self-efficacy is strongly linked to traits such as neuroticism, which impairs engagement in caregiving (Donithen & Schoppe-Sullivan, 2022). Finally, research shows that a baseline level of cognitive ability is necessary to effectively manage daily tasks related to parenthood, such as planning, finances, and relationships, (Wieland & Zitman,

[9] Doepke and Zilibotti (2017) and Doepke et al. (2019) study the economics of parenting, and how different parenting styles impact child development. We focus on the antecedent step: how parenting skills affect the decision to become a parent.

[10] There is plenty of psychological research showing that high scores on these personality dimensions of parents are key for the cognitive and non-cognitive (socioemotional) development of children (see e.g., Doepke et al., 2019, for an overview). Additionally, economic research also put the home environment and parental skills at the center of the development children's cognitive and non-cognitive skills (e.g., Cunha & Heckman, 2008; Carneiro et al., 2019), with a particular emphasis on parental skills (Walker et al., 2011; Heckman & Mosso, 2014; Attanasio et al., 2022).

2016).[11] As such, a certain level of cognitive ability is a prerequisite for fatherhood, but does not capture parenting quality, at least not beyound the baseline level.

3.1.2 Measuring parenting skills

We use non-cognitive ability as our primary measure of parenting skills, based on its conceptual alignment with parenting behavior and parental efficacy. Non-cognitive traits, such as emotional stability, social maturity, and conscientiousness, are closely related to the parenting dimensions emphasized in psychological research, including warmth, behavioral control, autonomy support, and parental self-efficacy (Jones & Prinz, 2005; Prinzie et al., 2009). These traits are critical for fostering a nurturing and growth-oriented parenting environment, aligning well with the new fatherhood ideal that emphasizes emotional involvement and shared caregiving.

Our data come from the Swedish Military Enlistment Register, which covers over 90 percent of men in our cohorts. Most men, 97 percent, enlisted at age 18 or 19.[12] Because ability was measured at enlistment, typically before labor market entry, union formation, or parenthood, it can be viewed as predetermined with respect to subsequent fatherhood outcomes. Enlistment involved tests of physical fitness, medical status, cognitive ability, and a structured interview with a psychologist. Non-cognitive ability is based on the psychologist's evaluation of the conscript's personality traits during a 20–25-minute interview. The psychologist had access to information about the conscript's test results in cognitive ability, physical endurance, muscular strength, school grades, and answers to questions about friends, family, and hobbies prior to the interview (Lindqvist & Vestman, 2011). The purpose of the interview was to evaluate the conscript's social maturity (degree of extroversion, responsibility, and independence), psychological energy (perseverance and ability to focus), intensity (activation without external pressure), and emotional stability (tolerance to stress) to predict his suitability for military leadership. Each part was graded on a 9-point scale. We use a variable that combines scores on each subtest into a general cognitive ability, ranging from 1 to 9 on a stanine scale, with a mean of 5 and a standard deviation of 2. A high score showed willingness to

[11] Individuals with an Intelligence Quotient (IQ) below 85—approximately one standard deviation below the population mean—face higher risks of poor life outcomes, including difficulties with daily functioning, lower educational attainment, higher poverty risk, and greater social vulnerability (Gigi et al., 2014; Snell et al., 2009). These factors are also linked to reduced capacity to manage the practical and relational demands of parenthood.
[12] In our sample, 0.25 percent enlisted at age 17, 77.72 percent at age 18, 19.55 percent at age 19, 1.8 percent at age 20, and 0.67 percent at age 21–24.

assume responsibility, independence, an outgoing character, persistence, emotional stability, and strong initiative, as well as social skills (Lindqvist & Vestman, 2011).

Although originally designed for military leadership assessment, our measure of non-cognitive ability captures traits that closely align with those identified as central to effective, growth-oriented parenting. The core dimensions of parenting—warmth, behavioral control, autonomy support, and parental self-efficacy (see Section 3.1)—map onto the Big Five personality taxonomy, especially emotional stability, conscientiousness, and extraversion (e.g., Prinzie et al. 2009). Prior research confirms that the components of our non-cognitive ability measure correspond closely to these Big Five traits (Nilsson, 2017): social maturity overlaps with extraversion, openness, and conscientiousness; psychological energy reflects conscientiousness; intensity captures aspects of both conscientiousness and openness; and emotional stability corresponds to low neuroticism that is closely linked to responsive and confident parenting.[13] Together, this evidence justifies the interpretation of our non-cognitive ability measure as a valid measure for parenting skills.

While non-cognitive ability serves as our primary proxy for parenting skills, cognitive ability is included to account for general baseline functioning and to ensure that the distinct contribution of non-cognitive traits to parenting quality can be identified separately. As discussed above, a minimum level of cognitive competence is needed to manage parenting tasks such as financial planning and daily logistics (Wieland & Zitman, 2016). In this sense, cognitive ability serves as a prerequisite rather than a differentiator in our framework, capturing general functioning required for parenthood, while non-cognitive traits capture the quality and style of parenting behavior.

The cognitive ability measure was assessed through a standardized test battery designed to capture multiple dimensions of intellectual aptitude. The battery included subtests measuring logical reasoning, verbal comprehension, spatial visualization, and technical knowledge. Each component was scored on a 1–9 scale. We use a summary measure that combines these subscores into an overall cognitive ability measure, which, like the non-cognitive measure, follows a stanine distribution with a mean of 5 and a standard deviation of 2.

3.1.3 Population data

[13] Appendix Table 1 presents how the non-cognitive ability measure is related to the personality dimensions of parenting and Big Five personality traits.

Our main data source is population-wide administrative records from Swedish registers. We focus on men born between 1951 and 1972 who are alive and residing in Sweden at age 45. Using the Multi Generation Register maintained by Statistics Sweden, we link all men to their biological siblings and construct a sample of full brothers (on the mother's side). This sibling sample allows us to implement a sibling fixed effects design, controlling for unobserved family background and improving the credibility of causal inference. Fatherhood is defined as having at least one biological child by age 45.[14] Fertility data are drawn from the Multi-Generation Register, which provides near-complete coverage and is especially reliable for measuring fatherhood. It outperforms survey data, which often suffer from underreporting and recall bias.[15]

We link this data to several additional administrative data sources, including annual records on marital status, educational attainment, and annual earnings (measured each November) from Statistics Sweden. These variables allow us to control for pathways through which ability may affect fatherhood, such as partnership formation and economic stability. For example, cognitive and non-cognitive abilities influence partner selection, as traits like emotional stability and intelligence are highly valued in long-term relationships (e.g., Buss et al., 2001).[16] Additionally, men with higher ability levels tend to have higher earnings (e.g., Heckman et al., 2006; Lindqvist & Vestman, 2011), which may increase their attractiveness as partners and potential fathers (Becker, 1993; Oppenheimer, 2003).[17]

We define a man as "ever married" if he was legally married at any time between ages 20 and 45. Educational attainment is measured in years of schooling, recorded around age 35, depending on availability. Our primary measure of earnings is the individual's percentile rank in the distribution of annual earnings (as of November) within their birth cohort at age 45.[18] We

[14] Very few men become first-time fathers after the age of 45, so it is customary to measure men's extensive fertility at age 45 (Jalovaara et al., 2019). Our data does not allow us to distinguish between voluntary and involuntary childlessness; we can only observe the total share of men with at least one child at age 45. Data on time-varying reproductive preferences is scarce, but indicate a mismatch between men's fertility intentions and their realized fertility (Hammarberg et al., 2017; Kessler et al., 2013; Schytt et al., 2014).

[15] The share of children without any registered father is exceedingly small in our data and shrinking over time. For instance, for the cohort born in 1975, the share of children without fathers is 1.02 percent.

[16] Although gender differences in preferences for mate characteristics have decreased, women still value good financial prospects more than men, while men continue to put place greater emphasis on physical attractiveness than women (Bech-Sørensen & Pollet, 2016; Buss et al., 2001; Fisman et al., 2006; Stewart et al., 2000).

[17] Even though women have experienced increased earnings in recent decades, having a partner with a high income and education is still important, as it allows for greater investment in children, regardless of one's own income (Chudnovskaya & Kashyap, 2020; Kalil & Ryan, 2020; Mare, 1991).

[18] Ideally one would like to measure earnings before a man becomes a father. However, a problem with the latter approach is that mean age at first birth varies both across cohorts and by educational level. We therefore use earnings measures at age 45. Moreover, by measuring earnings late, we, if anything, overestimate the importance of earnings for fatherhood.

also construct variables for the spouse from the man's first marriage, including age at marriage and years of schooling, to account for partner characteristics that may affect selection into fatherhood.

3.1.4 Descriptive statistics

Table 1 presents descriptive statistics for our main sample of brothers, as well as for the full population of men for comparison. On average, the brothers in our sample are highly similar to the general male population in terms of both individual and partner characteristics. Brothers have a slightly higher likelihood of becoming fathers, around 80 percent, but the difference is negligible. Their average earnings rank is above the median, suggesting that men excluded from our sample due to missing ability data (i.e., non-enlisted men) are disproportionately drawn from the low end of the earnings distribution.

Table 1: Descriptive statistics

	(1)	(2)	(3)	(4)	(5)	(6)
		Brothers			All	
	Brothers	1951–55	1967–72	All	1951–55	1967–72
Outcome variables						
Father at age 45	0.800	0.807	0.802	0.792	0.798	0.793
	(0.400)	(0.395)	(0.399)	(0.406)	(0.401)	(0.405)
Father at age 45 if ever married	0.931	0.932	0.932	0.926	0.925	0.927
	(0.254)	(0.251)	(0.251)	(0.262)	(0.263)	(0.260)
Other characteristics						
Ever married at 45	0.633	0.691	0.610	0.629	0.706	0.595
	(0.482)	(0.462)	(0.488)	(0.483)	(0.456)	(0.491)
Earnings rank at 45 (percentile)	59.02	58.91	59.78	59.40	59.92	59.05
	(28.68)	(29.44)	(28.27)	(29.33)	(29.94)	(28.86)
Years of schooling	11.6	11.2	12.1	11.7	11.4	12.1
	(2.1)	(2.4)	(2.0)	(2.1)	(2.4)	(3.8)
Spouse's characteristics in first marriage						
Years of schooling	12.0	11.5	12.8	12.1	11.6	12.7
	(2.1)	(2.2)	(2.1)	(2.1)	(2.3)	(2.1)
Age at first marriage	28.5	27.2	30.6	28.9	27.2	31.0
	(5.9)	(5.4)	(6.1)	(6.0)	(5.4)	(6.1)
Observations	492,314	60,994	44,384	987,184	219,238	286,105

Note: The table presents descriptive statistics for the brother (column 1–3) sample and the total population of men (columns 4–6). A man is classified as *Ever married* if he was married at any point between the ages of 20 and 45. *Earnings* refer to the individual's percentile rank within their birth cohort's annual earnings distribution at age 45. Years of schooling are measured around age 35, depending on data availability. Standard deviations are shown within parentheses.

Across cohorts, we observe clear trends: the share of men ever married declines from the 1951–55 to the 1967–72 cohort, while average earnings rank increases modestly. Partner

characteristics also reflect broader societal changes. Spouses in the later cohorts are older at marriage, more highly educated, and earn more than spouses in earlier cohorts, mirroring trends observed in the female population.

Figure 1, Panel A, shows the non-linear relationship between ability and the probability of fatherhood by age 45, controlling for sibling fixed effects and birth year. We find a strong and continuous gradient for non-cognitive ability: each increase in non-cognitive ability is associated with a higher likelihood of fatherhood. In contrast, there is a threshold effect for cognitive ability: men below stanine 5 are substantially less likely to become fathers, but above this level, additional cognitive ability has little marginal effect. This supports our interpretation of cognitive ability as a baseline requirement for managing basic parenting tasks, whereas non-cognitive ability is the key differentiator that enables growth-oriented parenting and therefore serves as our primary measure of parenting skills.

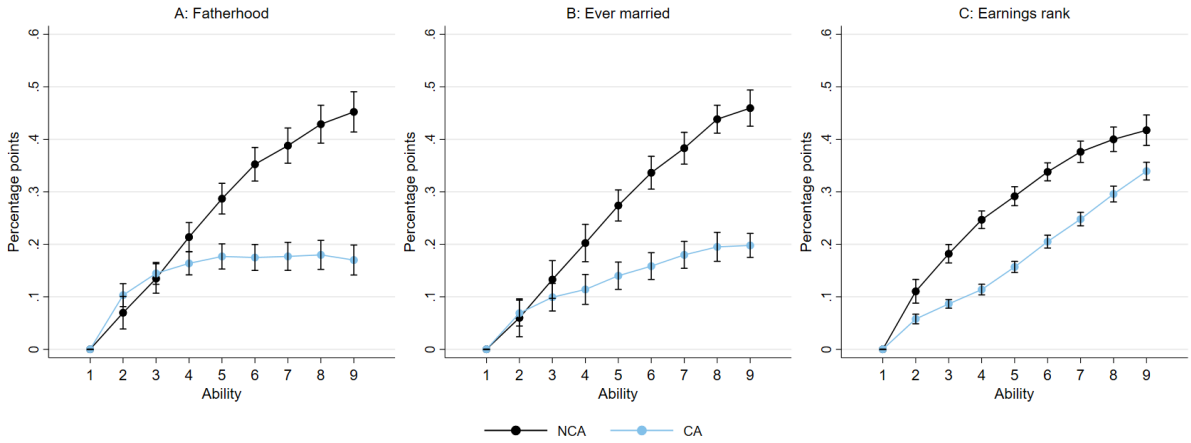

Figure 1: Non-linear estimates of the relationship between abilities and fatherhood, marriage, and earnings at age 45

Note: The figure presents estimates of cognitive ability (CA) and non-cognitive ability (NCA), as well as the probability of being a father, having ever been married, and earnings at age 45. We use dummy variables for each value of cognitive and non-cognitive ability, with skill level 1 normalized to zero. To correct for measurement error, we adjust the estimated effects of cognitive and non-cognitive ability using reliability ratios from Grönqvist et al. (2017). A man is classified as *Ever married* if he was married at any point between the ages of 20 and 45. *Earnings* refer to the individual's percentile rank within their birth year cohort's annual earnings distribution at age 45. To facilitate interpretation, the earnings rank is divided by 100. The regressions include sibling and birth year fixed effects, and robust standard errors are clustered at enlistment year. The lines with caps represent the 95% confidence interval.

Panels B and C show that both cognitive and non-cognitive abilities are positively associated with marriage and earnings, but these relationships are more linear and similar in shape across ability types. This contrast supports our interpretation that non-cognitive ability plays a uniquely important role in determining fatherhood. At the same time, because it is also strongly associated with marriage and earnings, our empirical analyses control for both to isolate the

role of parenting skills from effects operating through human capital or partner selection. Moreover, by comparing brothers, we account for shared family background and early environmental factors that might jointly influence ability, earnings, and family formation, further strengthening the interpretation of the conditional estimates.

3.2 Empirical specification

To estimate how the relationship between parenting skills and the probability of fatherhood has evolved over time, we estimate linear probability models with sibling fixed effects of the following form:

$$y_{ij} = \alpha_1 NCA_{ij} + \alpha_2 (NCA_{ij} \times C_k) + \gamma_1 CA_{ij} + \gamma_2 (CA_{ij} \times C_k) + \boldsymbol{X}'_{ij}\beta + \theta_{b(i)} + \delta_j + \varepsilon_{ij} \quad (1).$$

where y_{ij} is an indicator equal to one if individual *i* in sibling pair *j* has at least one child at age 45, and zero otherwise. Our main variable of interest is non-cognitive ability, NCA_{ij}, which we use as a proxy for parenting skills (see Section 3.1.2). Cognitive ability, CA_{ij}, is included as a control, reflecting its role as a basic prerequisite for managing daily parenting tasks. This allows us to isolate the component of non-cognitive ability that reflects growth-oriented parenting skills rather than general cognitive functioning. The vector $\boldsymbol{X}_{ij}$ includes controls for marital history (an indicator for ever married by age 45) and earnings rank at age 45 to ensure that the estimated relationship between non-cognitive ability and fatherhood is not driven by human-capital or partnership channels. Earnings rank at age 45 capture cumulative economic success, which reflects education, occupational sorting, and labor-market attachment. Marital history summarizes men's success in forming stable unions. We deliberately measure these outcomes well after most fertility decisions have been made, both to summarize long-run achievements and to avoid conditioning on short-run fluctuations in early earnings. Although these variables are themselves partly endogenous to ability and family choices, conditioning on them yields a controlled direct association of non-cognitive ability with fatherhood, i.e., the component not operating through economic or marriage-market pathways. This makes our specification conservative: if parenting skills still predict fatherhood conditional on earnings and marital history, the remaining association is unlikely to reflect human-capital or matching effects, but rather the social and emotional capacities relevant for parenting.

All models include birth-year fixed effects, $\theta_{b(i)}$, and sibling fixed effects, δ_j, which account for shared, time-invariant family characteristics such as genetic, socio-economic background, and other environmental factors. We use robust standard errors, clustered at enlistment year.

To study whether the predictive power of parenting skills has changed over time, we interact non-cognitive ability with a cohort indicator, C_k, which equals one if the *older* brother in the pair was born in 1967–1972, and zero if born in 1951–1955. Thus, we restrict the analysis to early and late cohorts. To ensure that both brothers are born early or late in our study period, we limit the sample to sibling pairs with an age gap of no more than three years and extend the final cohort to 1967 to retain sample size. We also interact C_k with all variables in X_{ij} to account for cohort-specific differences in how marriage and earnings relate to fatherhood.

The main parameter of interest, α_2, captures the change in the predictive power of non-cognitive ability for fatherhood between cohorts. A positive α_2 indicates that parenting skills have become a more important determinant of fatherhood over time. By conditioning on cognitive ability, earnings, and marriage, and by comparing brothers within families, this design isolates the social and emotional dimensions of non-cognitive ability relevant for parenting, distinct from the human-capital components that drive productivity and income. As detailed in Section 4.4 and Online Appendix B, a comprehensive set of robustness checks confirms that these results are unlikely to be driven by economic or partnership mechanisms, reinforcing our interpretation of non-cognitive ability as capturing parenting-relevant traits rather than broader human capital.

4. Main results

4.1 Trends in parenting skills and fatherhood

We begin by examining trends in the relationship between non-cognitive ability and fatherhood, the central mechanism highlighted by our model. Panels A of Table 2 shows that non-cognitive ability is a strong and increasing predictor of fatherhood. For men born between 1951–1955, a one standard deviation increase in non-cognitive ability is associated with a 3.7 percentage point higher probability of being a father at age 45 (approximately 4.6 percent). For the 1967–1972 cohort, this effect increases by an additional 4.0 percentage points, resulting in a total effect of 7.7 percentage points (9.6 percent), which is more than a twofold increase. These results suggest that traits associated with growth-oriented parenting have become increasingly salient for fatherhood over time.

In contrast, the relationship between cognitive ability and fatherhood weakens across

cohorts. For the earliest cohort, cognitive ability predicts a modest increase in fatherhood (2.2 percentage points), but this association turns negative for men born in 1967–1972, with a total effect of –1.1 percentage points.[19]

Table 2: Change in the relationship between parenting skills and fatherhood at age 45

	(1)	(2)	(3)	(4)	(5)
		Fatherhood		Ever married	Earnings
	Baseline	Never married	Married at some point		
Non-cognitive ability (NCA)					
NCA (std)	0.037***	-0.021***	-0.002	0.104***	0.076***
	(0.004)	(0.007)	(0.001)	(0.004)	(0.004)
NCA x Cohort 1967–1972	0.040***	0.118***	0.020***	0.002	0.014**
	(0.009)	(0.007)	(0.003)	(0.010)	(0.006)
Cognitive ability (CA)					
CA (std)	0.022***	-0.031***	-0.003	0.043***	0.078***
	(0.006)	(0.010)	(0.003)	(0.003)	(0.003)
CA x Cohort 1967–1972	-0.033***	0.060***	0.031***	-0.003	0.011***
	(0.008)	(0.012)	(0.004)	(0.005)	(0.004)
Observations	105,378	36,196	69,182	105,378	105,378
Mean of dependent variable	0.804	0.560	0.932		
R-squared	0.637	0.025	0.005	0.581	0.641
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	No	No	Yes	Yes
Control for marriage	Yes	No	No	No	Yes
Control for earnings	Yes	Yes	Yes	Yes	No

Note: Columns 1–3 show how the relationship between parenting skills, proxied with non-cognitive ability, and fatherhood at age 45 has changed across cohorts, comparing men born in 1951–1955 (reference) and 1967–1972. Cognitive ability is included as a control. Column 1 reports estimates for all brothers. Columns 2 and 3 split the sample by marital history at age 45 (sibling fixed effects cannot be included because brothers may differ in marital status). Columns 4 and 5 use indicators for ever married and percentile rank in cohort earnings at age 45 (divided by 100), respectively, as outcomes. A man is classified as *Ever married* if he was married at any point between the ages of 20 and 45. *Earnings* refer to the individual's percentile rank within their birth year cohort's annual earnings distribution at age 45. To correct for measurement error in abilities, we adjust the estimated effects using reliability ratios from Grönqvist et al. (2017). Robust standard errors clustered by enlistment year are in parentheses. ***p<0.01, **p<0.05, *p<0.1

Figure 2 presents non-linear patterns across the ability distribution. In the 1951–1955 cohort, cognitive ability increased the probability of fatherhood mainly among men at the lower end of the distribution, consistent with a threshold effect (see Panel A). By the 1967–1972 cohort this threshold pattern is even more pronounced, with cognitive ability contributing little or even negatively above the median, necessary for parenthood but not decisive in distinguishing who

[19] Appendix Figure 1 presents estimates of the trend using all birth cohorts. To ensure sufficient statistical power, we group cohorts into two-year bins and estimate equation (1) for each bin.

becomes a father in recent cohorts (see Panel B).[20] In contrast, non-cognitive ability exhibits a positive gradient across the entire distribution in both cohorts, and this gradient has steepened over time (see Panel C). Thus, the growing importance of non-cognitive ability reflects not only average effects but a strengthening association across the distribution of skills.

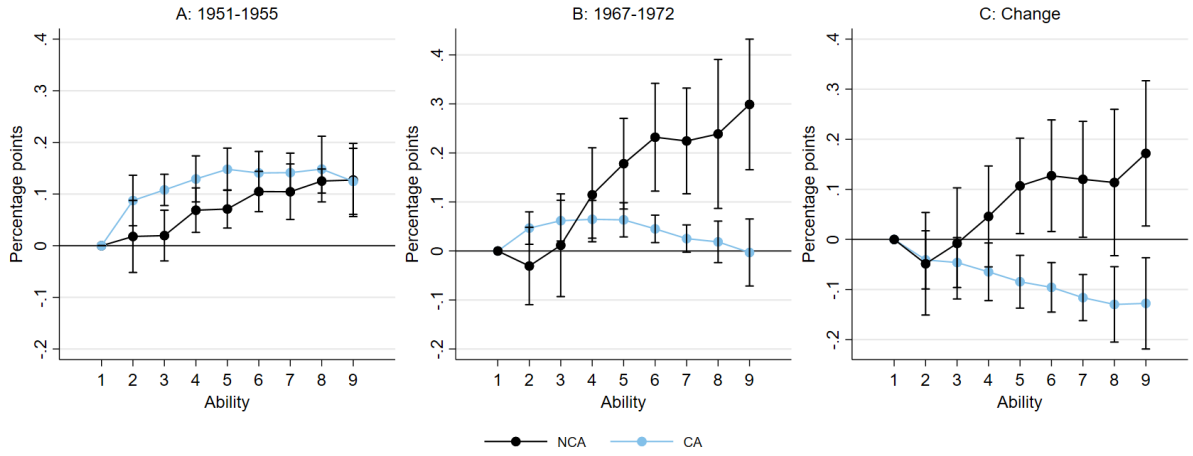

Figure 2: Parenting skill gradient in fatherhood at age 45
Note: The figure presents how the non-linear relationship between parenting skills, proxied by non-cognitive ability, and fatherhood by age 45 has changed across cohorts, comparing men born in 1951–1955 (panel A) and 1967–1972 (panel B). Panel C shows the estimated change across cohorts. We include dummy variables for each value of non-cognitive and cognitive ability, with skill level 1 normalized to zero. Cognitive ability is included as a control To correct for measurement error, we adjust the estimated effects using reliability ratios from Grönqvist et al. (2017). The regressions control for sibling and birth year fixed effects, an indicator for ever being married, and earnings rank at age 45. A man is classified as *Ever married* if he was married at any point between the ages of 20 and 45. *Earnings* refer to the individual's percentile rank within their birth year cohort's annual earnings distribution at age 45. Robust standard errors are clustered at enlistment year. The lines with caps represent the 95% confidence interval.

Importantly, the growing predictive power of non-cognitive ability is not driven by changes in marriage patterns or earnings rank at 45. Column 4 of Table 2 shows that non-cognitive ability is positively associated with the likelihood of ever being married, but notably this association has remained stable over time. Column 5 shows a stronger link between non-cognitive ability and earnings, consistent with earlier findings (Lindqvist & Vestman, 2011), but this accounts for only about one-fifth of the increased unconditional importance of non-cognitive ability for fatherhood (see Online Appendix B, Table B1). In magnitude, a one–standard-deviation increase in non-cognitive ability predicts roughly the same increase in fatherhood as moving 35–40 percentiles up the earnings distribution and about one-tenth of the marriage–fatherhood association in the early cohort. By the late cohort, the non-cognitive ability effect nearly doubles

[20] Consistent with this interpretation, an interaction between cognitive and non-cognitive ability indicates partial substitutability, indicating that higher non-cognitive ability partly offsets lower cognitive ability. We find no evidence that this relationship varies across cohorts (see Online Appendix Table A1).

to about the equivalent of a 40–45 percentile earnings increase and one-third of the marriage effect, highlighting that parenting-related traits have grown markedly in relative importance alongside traditional provider roles. Results are similar when using alternative measures of partnership status and earnings (see Online Appendix B).

To probe further, we stratify the sample by marital status. Columns 2 and 3 of Table 2 show that non-cognitive ability has become more predictive of fatherhood for both married and unmarried men. While the effect is especially strong among unmarried men, it also rises significantly among men who have ever been married. This pattern suggests that non-cognitive ability reflects traits directly relevant to parenting. If the selection operated primarily through marriage or earnings potential, we would not expect to see a stronger gradient over time among partnered men. The fact that we do strengthens our interpretation that non-cognitive traits themselves have become increasingly important in determining who becomes a father.

Our main results remain robust to a series of additional checks. First, we show that non-cognitive ability does not merely reflect cognitive ability, despite their positive correlation, and our conclusions hold when adjusting for shifts in ability distributions across cohorts or for potential improvements in the measurement of non-cognitive traits over time (see Online Appendix A). Second, we assess the robustness of our sibling fixed-effects approach by examining the representativeness of families with multiple sons, the assumption of random birth order, and the influence of family size (see Online Appendix A). Third, the results are robust to using alternative measures of marriage and earnings, as well as to a semi-parametric approach that accounts for endogeneity in these channels (see Online Appendix B).

Together, these results provide robust evidence that parenting skills have become a key predictor of fatherhood. While cognitive ability remains relevant as a baseline requirement for managing daily parenting tasks, it is men's non-cognitive traits that increasingly determine who becomes a father.[21]

4.2 Sub-components of non-cognitive parenting skills

Our main proxy for parenting skills is a composite measure of non-cognitive ability, which encompasses four dimensions: social maturity (degree of extroversion, responsibility, and independence), psychological energy (perseverance and ability to focus), intensity (activation without external pressure), and emotional stability (tolerance to stress). From a policy perspective, a key question is whether certain traits are more predictive of fatherhood than

[21] Notably, the results for all men, i.e., including singletons, are remarkably similar (see Online Appendix Table A4, column 2).

others, or whether it is the combination of traits that matters most. While previous parenting research has often focused on individual traits, Prinzie et al. (2009) emphasize that the collective effect of multiple characteristics may be greater than the sum of their parts.

To evaluate this, we re-estimate equation (1) using a trait-by-trait specification (see Appendix Table 2). We find that each sub-trait is positively associated with fatherhood for men in the 1967–1972 cohort, with effect sizes ranging from 3 to 7 percentage points (see columns 1–4). Only social maturity and intensity show increasing predictive power over time. In contrast, the composite measure shows a stronger relationship with fatherhood—an increase of 7.7 percentage points for the 1967–1972 cohort (see column 1, Table 2)—suggesting that the interaction of traits carry greater predictive power than any single component. A joint estimation confirms this (column 5): the individual effects of each sub-trait weaken once included together, reflecting shared variance and overlapping predictive power.

We further test if a balanced combination of traits, rather than any single dimension, increasingly predict fatherhood. For this purpose, we construct a measure of intra-individual trait balance, calculated as the negative standard deviation of the four sub-trait scores, so that higher values correspond to a more balanced ability profile:

$$Balance_{ij}^{NCA} = -std_{ij}(social\_maturity_{ij}, psychological\_energy_{ij}, intensity_{ij}, emotional\_stability_{ij}).$$

We re-estimate equation (1), including both the balance measure and total non-cognitive ability (i.e., the sum of the sub-traits) as predictors. Results in Appendix Table 3 show that trait balance was not predictive of fatherhood for men in the earliest cohort, but had a substantial and statistically significant effect for men in the 1967–1972 cohort: a one-standard-deviation increase in balance is associated with an 11-percentage point increase in the probability of being a father (columns 1 and 2), independent of overall ability level.

Overall, these findings show that no single non-cognitive trait uniquely drives selection into fatherhood. Instead, it is the combined influence, and increasingly, the balanced profile, of these traits that best captures the parenting skills valued in contemporary fatherhood.

4.3 Composite measures of parenting skills

As outlined in Section 3.1.2, we proxy parenting skills using men's non-cognitive ability, which has been consistently linked to nurturing, responsive, and growth-oriented parenting (Jones & Prinz 2005; Prinzie et al. 2009). Cognitive ability is included as a control, reflecting its role as

a baseline requirement for managing daily parenting tasks. This setup isolates the unique contribution of socio-emotional traits to fatherhood decisions.

To assess whether our results depend on modeling cognitive and non-cognitive abilities separately, we construct two composite measures that combine both dimensions into an overall ability bundle. The first combines cognitive and non-cognitive ability while allowing cognitive ability to contribute only up to a threshold (stanines 1–3). This approach reflects the idea that cognitive skills are essential for meeting basic parenting demands but provide little marginal benefit beyond a sufficient level.

Formally, we define:

$$Composite\ PS_i = \begin{cases} CA_i + NCA_i & \text{if } CA_i \leq 3 \\ 4 + NCA_i & \text{if } CA_i \geq 4 \end{cases}$$

The second measure captures the relative share of non-cognitive ability in a man's overall skill profile, defined as:

$$Relative\ PS_i = \frac{NCA_i}{NCA_i + CA_i}$$

This measure indicates whether a man's skill composition is more socio-emotional (parenting-oriented) or cognitive (productivity-oriented). In this specification, we control total ability.

Both composites yield patterns consistent with our main findings. The composite parenting-skill index predicts a higher likelihood of fatherhood, and its association strengthens across cohorts (see Appendix Table 4, column 1). Moreover, conditional on total ability, a higher non-cognitive share is associated with a greater likelihood of fatherhood, and this association strengthens in later cohorts (see Appendix Table 4, column 2). In contrast, total ability modestly predicts fatherhood and remains stable over time. These results confirm that the rising importance of non-cognitive ability for fatherhood is not driven by how abilities are modeled.

4.4 Distinguishing parenting skills from human capital

As shown in Section 4.1, the growing predictive power of non-cognitive ability for fatherhood does not appear to be driven by changes in marriage or earnings channels. As a further empirical validation, we directly compare the patterns observed for fatherhood and earnings using the alternative specifications of parenting skills introduced in Sections 4.2 and 4.3. If non-cognitive

ability primarily reflected productivity-related traits, its association with fatherhood should mirror its association with labor-market outcomes. Instead, we find that the patterns diverge. We first replicate the analysis with composite measures from section 4.3 with earnings as the outcome. The composite parenting-skill index is associated with higher earnings, and its association strengthens across cohorts (see Appendix Table 4, column 3). Notably, the association is larger for earnings than for fatherhood, likely because the composite index captures both cognitive and non-cognitive components, each of which is strongly correlated with earnings (see Table 2, column 5). A similar pattern appears for total ability (see Appendix Table 4, column 4), consistent with rising labor-market returns to both skill dimensions. In contrast, the relative non-cognitive share behaves very differently. For earnings, this measure is slightly negative and stable across cohorts, whereas for fatherhood it is positive and increasingly predictive.

Next, we decompose non-cognitive ability into its underlying sub-traits, as in Section 4.2, to identify which dimensions matter for economic outcomes (Appendix Table 2, panel B). Only intensity (reflecting persistence and drive), consistent with Izadi and Tuhkuri (2024), shows a growing economic return over time. For the other traits, the trend estimates are close to zero and statistically insignificant. This pattern contrasts sharply with fatherhood, where the predictive power of all sub-traits rises across cohorts (though only social maturity and intensity increase significantly. Moreover, whereas balanced socio-emotional profiles increasingly predict fatherhood, balance across sub-traits is unrelated to earnings (see Appendix Table 3, columns 3 and 4).

Taken together, these divergence patterns show that the traits associated with fatherhood differ meaningfully from those rewarded in the labor market. This supports our interpretation that the estimated relationship reflects parenting-relevant aspects of non-cognitive ability rather than productivity-related human capital.

5. The role of partner preferences in selection into fatherhood

Our theoretical model emphasizes men's self-selection into fatherhood: men decide to become fathers when the expected utility from parenthood, given their parenting skills and opportunity costs, exceeds that of remaining childless. However, in practice, whether partnered men become fathers can also depend on their partners' characteristics and preferences. Women's fertility intentions, parenting attitudes, and perceptions of their partner's suitability as a parent all influence whether couples transition to parenthood. In this sense, selection into fatherhood may not only reflect men's own skills and resources but also their partners' assessments of these

attributes.

This implies that the increasing predictive power of non-cognitive ability for fatherhood could partly reflect changes in partner characteristics or matching patterns. To examine this possibility, we estimate equation (1) for the subsample of men who have ever been married by age 45 and control for partner characteristics, such as age and education, that have shifted over time (e.g., Blau & Kahn, 2017), and could confound our estimates. Table 3, columns 2 and 3, show that controlling for spousal age at marriage and years of schooling, each interacted with the cohort indicator, does not attenuate the rising importance of non-cognitive ability.[22] This suggests that compositional changes in partner characteristics are not driving the results.

We also assess whether the strengthening parenting skills-fatherhood link reflect shifts in partner preferences. As women have gained greater control over fertility and achieved higher economic independence, they may increasingly prioritize non-economic traits in potential fathers. Specifically, parenting skills may enhance men's attractiveness as co-parents, given the well-documented importance of parental time for children's skill development (e.g., Brilli, 2022; Del Boca et al., 2014; Guryan et al., 2008; Hsin & Felfe, 2014). This would imply a growing premium on men's parenting skills in the fertility market.

To test this, we estimate equation (1) separately by the education level of a man's first spouse. While highly educated women have long been more selective in their partner choices and may have always valued traits associated with parenting involvement, preferences among women with lower education levels may have shifted more in response to rising female labor force participation and changing societal norms. Consistent with this, Table 3 (columns 4–7) shows that the steepest increase in the non-cognitive ability–fatherhood gradient occurs among men whose spouse had only compulsory schooling (≤ 9 years). This suggests that preferences for strong parenting skills have intensified beyond highly educated groups.

Finally, we investigate whether parenting skills also contribute to marital stability, which could serve as an indirect signal of a man's suitability as a parent. We focus on first marriages and define marital stability as the average share of years within the first ten years of marriage during which the man remains married. Table 3, columns 8–10, shows that higher non-cognitive ability is associated with more stable marriages and that this association has grown stronger over time, but only among men who become fathers. Among childless men, the relationship between non-cognitive ability and marital stability remains flat.

[22] Note that because brothers may not have the same partner history, we cannot include sibling fixed effects in these regressions.

Table 3: The role of partner characteristics, partner education, and marital stability in the relationship between parenting skills and fatherhood

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Cond. on partner characteristics			By partner's years of schooling				Outcome: Marital stability		
VARIABLES	Baseline			≤ 9	10–12	13–15	> 15	Ever married men	Ever married childless men	Ever married fathers
Non-cognitive ability (NCA)										
NCA (std)	0.011***	0.009***	0.009***	0.010*	0.008***	0.009	0.010	0.027***	0.035**	0.026***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.002)	(0.007)	(0.014)	(0.003)	(0.015)	(0.003)
NCA x Cohort 1967–1972	0.018**	0.018**	0.017**	0.058***	0.010	0.019**	0.017	0.017**	-0.006	0.019**
	(0.007)	(0.007)	(0.007)	(0.014)	(0.010)	(0.008)	(0.018)	(0.007)	(0.026)	(0.007)
Cognitive ability (CA, control)										
CA (std)	-0.003**	-0.001	-0.002	-0.001	-0.001	-0.003	-0.005	0.005*	0.011*	0.004*
	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)	(0.004)	(0.012)	(0.003)	(0.005)	(0.003)
CA x Cohort 1967–1972	-0.004	-0.006*	-0.009**	0.003	-0.009**	-0.009	0.006	0.018***	-0.012	0.021***
	(0.003)	(0.003)	(0.003)	(0.010)	(0.004)	(0.005)	(0.017)	(0.005)	(0.017)	(0.005)
Observations	58,013	58,013	58,013	9,375	27,959	16,811	3,868	57,995	3,324	54,686
Mean of dependent variable	0.943	0.943	0.943	0.932	0.944	0.946	0.949	0.787	0.678	0.787
R-squared	0.006	0.042	0.042	0.076	0.041	0.030	0.044	0.404	0.386	0.408
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	No	No	No	No	No	No	No	No	No	No
Earnings	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Partner's age at marriage	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Partner's years of schooling	No	No	Yes	No	No	No	No	Yes	Yes	Yes

Note: The analysis is restricted to men who were ever married by age 45, using information on their first spouse. Columns 1–7 show how the relationship between parenting skills and the probability of being a father by age 45. Column 1 replicates the baseline specification from Table 2 for this sample. Columns 2 and 3 add controls for the spouse's age at marriage and years of schooling. Columns 4–7 stratify the sample by the first spouse's years of schooling: ≤9, 10–12, 13–15, and >15 years. Columns 8–10 examine how parenting skills affect marital stability, measured as the average share of years a man was married during the ten years following first marriage, with subsamples defined by fatherhood status. Cognitive ability is included as a control. Sibling fixed effects are not included, as not all brothers form unions. As in Table 2, we compare men from the 1951–1955 cohort (reference group) with those from the 1967–1972 cohort. All ability measures are standardized at enlistment (mean 0, SD 1), and estimates are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). Earnings refer to the individual's percentile rank within their birth cohort's earnings distribution at age 45. Robust standard errors, clustered by enlistment year, are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1

This pattern suggests that parenting skills may be increasingly salient not only for selection into fatherhood, but also for sustaining unions once children are involved. Overall, the findings are consistent with partner preferences also playing a role in the rising importance of parenting skills for fatherhood.

6. Father quotas and the importance of parenting skills

Our theoretical framework predicts that when the time cost of parenting rises, selection into fatherhood favors men with stronger parenting skills, i.e., those who derive higher utility from investing in children. Having shown that non-cognitive ability has become a stronger predictor of fatherhood over time, we now test this mechanism more directly by exploiting a policy reform that increased expectations for paternal involvement.

In 2002, Sweden expanded its daddy quota, increasing the share of parental leave reserved for each parent from one (introduced in 1995) to two months. Since all reserved days were non-transferable, the reform further raised the cost of allocating all leave to the mother by expanding the portion that could not be transferred. This policy effectively raised the minimum expected level of paternal involvement in childcare. According to our model, such a shift should strengthen selection into fatherhood based on parenting skills.

To test this, we adapt the peer effects literature and sibling spillovers (e.g., Dahl et al., 2014). Specifically, we exploit variation in the timing of fatherhood across brothers and identify men (peer brothers) who had not yet become fathers when their brother (the focal brother) had his first child. We then compare childless peer brothers whose focal brother became a father before (1996–2001) or after (2002–2007) the reform. This design captures the effect of indirect exposure to the new parental leave expectations through a sibling's experience, allowing us to assess whether parenting skills became a stronger determinant of fatherhood under increased expectations for paternal involvement.[23,24]

The sample is restricted to childless peer brothers who were aged 40 or younger at the time of the focal brother's first child and whose age differed from the focal brother by no more than five years. We also exclude pairs where the focal brother became a father after age 45. The key explanatory variable is an interaction between non-cognitive ability and an indicator for

[23] The 2002 reform is the only policy change we can analyze using data on cognitive and non-cognitive abilities for all relevant cohorts of men. For the 1995 reform, we lack data on older men for comparison. For the 2016 reform, which extended reserved paid parental leave to three months, many younger men lack ability data, as military enlistment became less universal during the 1990s and onward (see Data Section 3).

[24] Duvander et al. (2020) show that the 2002 reform impacted the likelihood of having an additional child. To the best of our knowledge there are no studies regarding the potential impact of the 2002 reform on the likelihood to have a first child.

whether the focal brother had his first child during the post-reform period (2002–2007) versus the pre-reform period (1996–2001). We estimate the following version of equation (1), controlling for, as before, cognitive ability, marital history, earnings, and birth year:

$$y_i = \alpha_1 NCA_i + \alpha_2 (NCA_i \times Post_{2002,i}) + \gamma_1 CA_i + \gamma_2 \left(CA_i \times Post_{2002,i}\right) + \delta Post_{2002,i} + \boldsymbol{X}_i' \beta + \theta_{b(i)} + \varepsilon_{ij} \qquad (2),$$

where $Post_{2002,i}$ is an indicator equal to one if the focal brother in individual i's family had his first child in 2002–2007, and zero otherwise (1996–2001).

Table 4: The probability of being a father at age 45—reform analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	Full estimation window		Variation in reform window definition			
VARIABLES	1996–2007	1996–2007	2000–2003	1999–2004	1998–2005	1997–2006
Non-cognitive ability (NCA)						
NCA (std)	0.117***	0.102***	0.091***	0.089***	0.094***	0.099***
	(0.007)	(0.008)	(0.013)	(0.011)	(0.009)	(0.008)
NCA x Post-2002		0.030**	0.021	0.031**	0.028*	0.028**
		(0.013)	(0.018)	(0.016)	(0.014)	(0.014)
Cognitive ability (CA, control)						
CA (std)	0.000	0.007	0.003	0.007	0.002	0.007
	(0.004)	(0.005)	(0.009)	(0.007)	(0.006)	(0.006)
CA x Post-2002		-0.001	-0.012	-0.008	-0.006	-0.005
		(0.009)	(0.013)	(0.011)	(0.010)	(0.009)
Observations	30,897	30,897	12,462	17,953	22,754	27,132
R-squared	0.296	0.311	0.312	0.313	0.312	0.312
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	No	No	No	No	No	No
Controls for ever married and earnings	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table shows how the relationship between parenting skills, proxied by non-cognitive ability, and the probability of being a father by age 45 changes around the 2002 parental leave reform. Cognitive ability is included as a control. All ability measures are standardized at enlistment (mean 0, SD 1), and coefficients are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). The analysis is restricted to peer brothers of men who had a first child between 1996 and 2007. Peer brothers are defined as men who (i) had no children at the time of the focal brother's first birth, (ii) were age 40 or younger, and (iii) were born within five years of the focal brother. Columns 1–2 show estimates for the full window (1996–2007), with and without reform interactions. Columns 3–6 test the robustness of the interaction by varying the reform window (2000–2003 to 1997–2006). A man is classified as *Ever married* if he was married at any point between the ages of 20 and 45. *Earnings* refer to the individual's percentile rank within their birth year cohort's annual earnings distribution at age 45. Sibling fixed effects are excluded. Robust standard errors clustered at the family level are in parentheses. ***p<0.01 **p<0.05 *p<0.1.

This time window excludes the earlier 1995 reform (which introduced the first reserved month), ensuring a balanced comparison between pre- and post-reform periods.[25] α_2 captures the

[25] Because we restrict the sample to peer brothers who are 40 years old or younger and who are at most five years younger or older than the focal brother, the included peer brothers were born between 1956 and 1972. They are

change in the predictive power of non-cognitive ability for fatherhood following the 2002 reform.

Table 4 shows that, consistent with the main analysis, non-cognitive ability is strongly associated with fatherhood overall (column 1), and that this association becomes significantly stronger in the post-reform period (column 2). Specifically, the interaction term on non-cognitive ability and the post-reform indicator is positive and statistically significant, suggesting that greater expectations for paternal involvement led to stronger selection into fatherhood based on parenting skills.

Table 5: Father at age 45—reform analysis using placebo years

	(1)	(2)	(3)	(4)
VARIABLES	1996–2001	1996–2001	2002–2007	2002–2007
Non-cognitive ability (NCA)				
NCA (std)	0.106***	0.111***	0.121***	0.114***
	(0.008)	(0.011)	(0.011)	(0.013)
NCA x Post-1999		-0.013		
		(0.014)		
NCA x Post-2005				0.009
				(0.025)
Cognitive ability (CA, control)	0.008	0.010	0.003	-0.000
	(0.005)	(0.007)	(0.008)	(0.009)
CA x Post-1999		-0.001		
		(0.010)		
CA x Post-2005				0.014
				(0.016)
R-squared	0.309	0.314	0.297	0.307
Birth year fixed effects	Yes	Yes	Yes	Yes
Sibling fixed effects	No	No	No	No
Controls for ever married and earnings	Yes	Yes	Yes	Yes

Note: The table presents placebo tests of the relationship between parenting skills, proxied by non-cognitive ability, and the probability of being a father by age 45, using placebo reform years. Cognitive ability is included as a control. All ability measures are standardized at enlistment (mean 0, SD 1), and coefficients are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). The analysis is restricted to peer brothers of men who had a first child between 1996 and 2007. Peer brothers are defined as men who (i) had no children at the time of the focal brother's first birth, (ii) were age 40 or younger, and (iii) were born within five years of the focal brother. Columns 1–2 assign a placebo reform year of 1999, comparing peer brothers whose focal brother had a first child in 1999–2001 (Post = 1) to those whose focal brother had a child in 1996–1998 (Post = 0). Columns 3–4 use a placebo reform year of 2005, comparing 2005–2007 to 2002–2004. A man is classified as *Ever married* if he was married at any point between the ages of 20 and 45. *Earnings* refer to the individual's percentile rank within their birth year cohort's annual earnings distribution at age 45. Sibling fixed effects are excluded. Robust standard errors, clustered at the family level, are shown in parentheses. ***p<0.01 **p<0.05 *p<0.1.

These patterns are consistent across alternative reform windows (columns 3–6), although the estimate is not statistically significant in the narrowest time window (2000–2003), likely due to

therefore between 25 and 40 years old in the period 1996–2001, and between 30 and 40 years old in 2002–2007. Including controls for ever being married and for earnings at age 45 should at least partly account for differences between pre- and post-reform peer brothers that could arise due to differences in age composition. In Appendix Table 5, we additionally control for the peer brother's age at the time the focal brother's child is born. These results reveal a pattern similar to that shown in Table 4.

limited time to realize fertility intentions. Cognitive ability remains statistically insignificant throughout, reinforcing its interpretation as a control rather than a primary mechanism.

To rule out that the observed changes reflect broader secular trends, we conduct placebo tests using 1999 and 2005 as fictitious reform years. Table 5 shows that in both placebo settings, the interaction term on NCA is close to zero and not statistically significant (columns 2 and 4), while the main effect of NCA remains strong and positive. These findings provide further evidence that the increased selection into fatherhood based on non-cognitive ability is uniquely associated with the 2002 reform. These results provide an important external validation of our main argument. When the expected level of paternal time investment increase, men with stronger parenting skills are increasingly selected into fatherhood.

7. The importance of parenting skills in the US

Sweden and the other Nordic countries are forerunners in family policy and evolving norms of fatherhood. Whether the growing importance of non-cognitive parenting skills extends to different contexts is therefore an open question. The United States provides a sharp contrast: family supports are limited, and returns to education and cognitive skills have historically been much higher. Yet research shows that non-cognitive traits have gained value in the US labor market. Deming (2017) documents rising rewards to social skills, while Edin et al. (2022) show that in Sweden the return to non-cognitive ability increased after the 1990s even as the return to cognitive ability stagnated. To assess whether our results extend to a different institutional and cultural setting, we examine whether non-cognitive traits also predict fatherhood in the US, using the US National Longitudinal Survey of Youth 1979 (NLSY79). The sample includes roughly 2,000 men born between 1957 and 1965, observed to age 45. Due to the limited cohort range and sample size, we focus on the average association between fatherhood and parenting skills in the US.[26]

The NLSY79 includes a measure of cognitive ability based on Armed Forces Qualifying Test (AFQT) scores but lacks a direct counterpart to Sweden's enlistment-based non-cognitive ability measure. Following Deming (2017), we construct a composite measure of social skills based on sociability in childhood and adulthood, participation in school clubs, and involvement

[26] The data on US men's fertility suffer from measurement problems. The underrepresentation of fathers, in particular fathers who are not in co-residential unions and fathers with multi-partner fertility, lead to an overestimation of childlessness among US men in available survey data (Monte & Fields, 2020).

in high school sports.[27] While not a direct or complete measure of parenting ability, this index captures prosocial behavior, interpersonal engagement, and cooperation, which are core dimensions of non-cognitive ability that are particularly relevant for responsive and involved parenting. We therefore interpret it as a partial proxy for parenting skills, conceptually consistent with our use of non-cognitive ability in the Swedish analysis.

Table 6: The relationship between ability and fatherhood at age 45—US and Swedish cases

	(1) US NLSY79	(2) Sweden UGU 67 & UGU 72	(3) Sweden Military Enlistment
Social skills (std)	0.022**	0.030***	
	(0.009)	(0.005)	
Non-cognitive ability			0.037***
			(0.005)
Cognitive ability (std)	0.005	-0.023***	-0.034***
	(0.008)	(0.005)	(0.005)
Observations	2,052	6,732	6,732
Mean dep. var.	0.778	0.780	0.780
R-squared	0.213	0.200	0.202
Birth year fixed effects	Yes	Yes	Yes
Race fixed effects	Yes	No	No
Controls for marriage and earnings	Yes	Yes	Yes

Note: The table reports estimates of the relationship between parenting skills and the probability of being a father by age 45, using data from the United States (NLSY79) and Sweden (UGU and military enlistment records). Parenting skills are proxied by social skills in the U.S. and by non-cognitive ability in Sweden. Cognitive ability is included as a control. All ability measures are standardized (mean 0, SD 1). In column 1, cognitive ability is measured using AFQT scores. The social skills measure combines indicators of sociability at age 6 and adulthood, participation in school clubs, and involvement in high school sports (Deming, 2017). In column 2, cognitive ability is based on test performance in inductive, spatial, and verbal reasoning. The social skills measure includes whether respondents liked working with others at age 12, had difficulty speaking in front of others in adolescence, participated in competitive sports at age 16, and were members of clubs at ages 13 and 16. Column 3 uses non-cognitive and cognitive ability scores from Swedish military enlistment data for the same cohorts as the UGU sample (men born in 1967 and 1979). To account for measurement error, we adjust the estimates in column 3 using reliability ratios from Grönqvist et al. (2017). All regressions include birth year fixed effects; U.S. models also control for race. Marriage is defined as ever married between ages 20 and 45. Earnings refer to the individual's percentile rank within their birth cohort's distribution at age 45. Robust standard errors are shown in parentheses. ***p<0.01 **p<0.05 *p<0.1.

Table 6 presents estimates of the relationship between parenting skills and fatherhood at age 45 among US men. Column (1) shows that a one standard deviation increase in social skills is associated with a 2.2-percentage-point higher probability of becoming a father, conditional on marriage and earnings. By contrast, cognitive ability is not statistically related to fatherhood.

[27] The social skill-measure combines respondents' answers on their current sociability, their sociability at age 6, the number of clubs in which the respondent participated in high school, and whether the respondent participated in any high school sports, see Deming (2017) for more details.

These results are consistent with our Swedish findings and demonstrate that the predictive role of non-cognitive traits extend beyond the Nordic welfare-state context.

To assess the comparability of our US proxy for parenting skills to the Swedish measure, we turn to the *Evaluation Through Follow-up* (UGU) dataset. The UGU follows a nationally representative 10% sample of students born in various years, including 1967 and 1972, and collects information on behavior and educational outcomes from age 12 through upper secondary school. While the UGU does not include direct measures of non-cognitive ability, it includes multiple indicators of sociability and participation in social activities, allowing us to construct a composite social skills measure similar to Deming (2017) (see details and robustness checks in Online Appendix C). We cannot include sibling fixed effects in the NLSY79 analysis, as the data do not allow us to link men to their siblings. To ensure consistency, we also exclude sibling fixed effects from the regressions using the UGU-data. Column (2) of Table 6 show a robust, positive relationship between this social skills proxy and fatherhood among Swedish men born in 1967 and 1972. A one standard deviation increase in social skills is associated with a 3.0-percentage-point increase in the likelihood of fatherhood, again conditional on earnings and marital history. This closely mirrors the estimate from the NLSY79, suggesting the external validity of the parenting skills–fatherhood gradient. Finally, column (3) replicates the analysis using the Swedish military enlistment-based measure of non-cognitive ability for the same cohorts and individuals. Despite capturing a broader range of behavioral traits, the results are nearly identical to those based on social skills, lending further support to the interpretation of both measures as capturing key dimensions of parenting skills relevant for fatherhood.

8. Concluding remarks

Fatherhood has changed, and so has the selection of men who become fathers. As expectations for paternal involvement have risen, entry into fatherhood has increasingly shifted away from being determined primarily by men's capacity to provide financially toward being shaped by their capacity to engage in hands-on, responsive parenting. Using population-wide Swedish data and within-family comparisons, we show that non-cognitive ability – a proxy for parenting-related social and emotional skills – has become a substantially stronger predictor of fatherhood over time among men with comparable earnings and partnership histories. This shift is not driven by changes in labor market success or marriage patterns, but reflects a reweighting of the traits that matter for entry into fatherhood.

Our findings support a selection mechanism in which parenting skills directly affect men's willingness to become fathers when expected childcare demands are high. Predictions from a

simple quantity–quality framework incorporating parenting skills are borne out empirically: men with stronger parenting-relevant traits are increasingly selected into fatherhood as norms and policies emphasize active paternal involvement. Quasi-experimental evidence from the 2002 expansion of Sweden's reserved paternity leave reinforces this interpretation. When expectations for paternal time investment rose exogenously, selection into fatherhood became more strongly related to non-cognitive ability, consistent with self-selection on parenting capacity rather than economic potential.

Selection into fatherhood may also operate through partner-related channels. Parenting skills can enhance men's attractiveness as co-parents, particularly in contexts where women's economic independence allows non-economic traits to play a larger role in fertility decisions. Our evidence on partner characteristics and marital stability is consistent with this view. The association between non-cognitive ability and fatherhood has strengthened most among men partnered with less-educated women, suggesting that preferences for involved fathers have broadened beyond highly educated groups. Moreover, among fathers, higher non-cognitive ability is increasingly associated with marital stability, indicating that parenting-related traits also matter for sustaining partnerships once children are present. These mechanisms appear complementary rather than competing.

Importantly, the growing importance of parenting skills for fatherhood is not confined to the Nordic context. Despite very different family policies and labor market institutions, we find similar associations between non-cognitive traits and fatherhood in the United States. This external evidence suggests that the link between parenting-related skills and selection into fatherhood reflects broader shifts in norms and expectations, rather than features unique to Scandinavian welfare states.

These findings have broader implications for fertility dynamics and inequality in family formation. Men with weaker parenting-related skills face a substantially higher risk of remaining childless: a one–standard-deviation reduction in such skills corresponds to nearly a 40 percent higher probability of childlessness by age 45. As norms increasingly raise the skill and time requirements associated with fatherhood, the effective costs of parenthood may rise disproportionately for men who are less well endowed with these skills or who face lower partnership prospects. In this sense, changing norms surrounding fatherhood may themselves contribute to delayed or foregone fertility, even in countries with generous family policies (Comolli et al., 2021; Goldstein et al., 2013; Kearney et al., 2022).

From a policy perspective, our results highlight the importance of early investments in social and emotional skill development. It is not any single trait, but rather a balanced profile of

emotional regulation, perseverance, and social competence that increasingly predicts entry into fatherhood. Future research should examine how strengthening these skills earlier in life affects men's later family outcomes and whether such investments can mitigate emerging inequalities in fertility and family stability.

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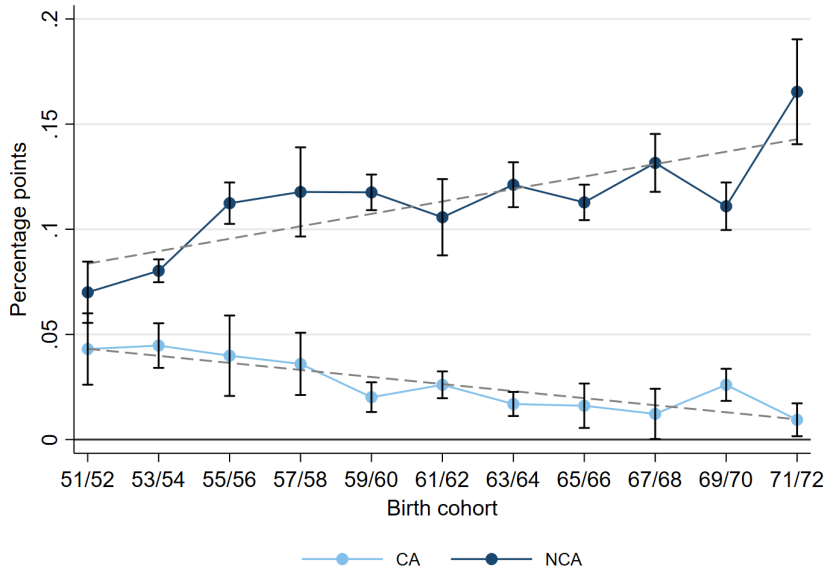
Appendix



Appendix Figure 1: Change in the relationship between parenting skills and fatherhood at age 45
Notes: The figure shows how the relationship between parenting skills and fatherhood by age 45 has changed across birth cohorts. Cohorts are grouped into two-year bins to ensure sufficient statistical power, and equation (1) is estimated separately for each bin. All ability measures are standardized at the year of enlistment (mean = 0, SD = 1). Estimates are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). The grey dashed lines depict the predicted linear trends. Regressions control for sibling and birth-year fixed effects, an indicator for ever being married, and earnings rank at age 45. Robust standard errors are clustered at enlistment year. The lines with caps represent 95% confidence intervals.

Appendix Table 1: Mapping of military enlistment non-cognitive ability to the Big Five personality traits

	Big Five personality traits	Parenting personality dimensions
Social maturity		
Extraversion	Extraversion	Warmth, behavioral control
Having friends	Extraversion	Warmth, behavioral control
Taking responsibility	Conscientiousness	Warmth, behavioral control
Independence	Openness	Warmth, behavioral control, autonomy support
Intensity		
Capacity to activate oneself without external pressure	Conscientiousness	Warmth, behavioral control
Intensity and frequency of free time activities	Openness	Warmth, behavioral control, autonomy support
Psychological energy		
Perseverance	Conscientiousness	Warmth, behavioral control
Ability to fulfil plans	Conscientiousness	Warmth, behavioral control
Ability to remain focused	Conscientiousness	Warmth, behavioral control
Emotional stability		
Disposition to anxiety	Neuroticism	Warmth, behavioral control, autonomy support, parental self-efficacy
Ability to control and channel nervousness	Neuroticism	Warmth, behavioral control, autonomy support, parental self-efficacy
Tolerance to stress	Neuroticism	Warmth, behavioral control, autonomy support, parental self-efficacy

Note: The table shows how the four sub-traits in the measure non-cognitive ability (NCA) from the Swedish military enlistment data relate to the Big Five personality traits. The mapping between NCA and the Big Five personality traits is based on Table D1 in Nilsson (2017). The mapping between the Big Five traits and the personality dimensions of parenting is based on Prinzie et al. (2009) and Donithen & Schoppe-Sullivan (2022).

Appendix Table 2: Trend in the relationship between sub-traits of non-cognitive ability and fatherhood and earnings at age 45

VARIABLES	(1)	(2)	(3)	(4)	(5)
A. Fatherhood					
Social maturity	0.028***				0.018***
	(0.005)				(0.006)
Social maturity x Cohort 1967–1972	0.020***				0.011
	(0.006)				(0.007)
Intensity		0.033***			0.026***
		(0.007)			(0.007)
Intensity x Cohort 1967–1972		0.039***			0.038***
		(0.012)			(0.012)
Psychological energy			0.024***		0.003
			(0.006)		(0.006)
Psychological energy x Cohort 1967–1972			0.010		-0.006
			(0.009)		(0.007)
Emotional stability				0.016***	-0.002
				(0.005)	(0.005)
Emotional stability x Cohort 1967–1972				0.019	0.005
				(0.011)	(0.013)
Observations	101,596	101,596	101,596	101,596	101,596
R-squared	0.696	0.696	0.695	0.695	0.696
Control for cognitive ability	Yes	Yes	Yes	Yes	Yes
Controls for ever married and earnings	Yes	Yes	Yes	Yes	Yes
B. Earnings					
Social maturity	0.054***				0.024***
	(0.005)				(0.005)
Social maturity x Cohort 1967–1972	0.005				0.005
	(0.007)				(0.009)
Intensity		0.037***			0.006
		(0.005)			(0.005)
Intensity x Cohort 1967–1972		0.014**			0.019***
		(0.005)			(0.006)
Psychological energy			0.049***		0.020***
			(0.005)		(0.005)
Psychological energy x Cohort 1967–1972			0.003		-0.001
			(0.005)		(0.006)
Emotional stability				0.055***	0.033***
				(0.005)	(0.006)
Emotional stability x Cohort 1967–1972				0.003	-0.004
				(0.005)	(0.007)
Observations	101,596	101,596	101,596	101,596	101,596
R-squared	0.702	0.701	0.702	0.702	0.704
Control for cognitive ability	Yes	Yes	Yes	Yes	Yes
Controls for ever married and earnings	Yes	Yes	Yes	Yes	Yes

Note: The table shows estimates of the change in relationship between the four sub-traits of non-cognitive ability and fatherhood at age 45, conditional on cognitive ability and using sibling fixed effects. We use standardized values (at enlistment year) for cognitive and the sub-traits of non-cognitive ability with mean 0 and standard deviation 1. To correct for measurement error, we adjust the estimated effects of cognitive and non-cognitive ability using reliability ratios from Grönqvist et al. (2017). A man is classified as *Ever married* if he was married at any point between ages 20 and 45. *Earnings* refer to the individual's percentile rank within their birth cohort's annual earnings distribution at age 45. All specifications include controls for birth year. Because we lack information on complete test scores on all sub-traits, the number of observations is somewhat smaller than in the main analysis. Robust standard errors, clustered at enlistment year, in parentheses. ***p<0.01 **p<0.05 *p<0.1.

Appendix Table 3: The relationship between balance in the sub-traits of non-cognitive ability and fatherhood and earnings at age 45

VARIABLES	(1) Fatherhood	(2) Fatherhood	(3) Earnings	(4) Earnings
Balance in NCA	0.012	0.013	0.000	0.001
	(0.011)	(0.011)	(0.010)	(0.011)
Balance in NCA x Cohort 1967-1972	0.109***	0.105***	0.014	0.007
	(0.030)	(0.031)	(0.021)	(0.022)
Sum NCA-subcomponents		0.035***		0.078***
		(0.007)		(0.005)
Sum NCA-subcomponents x Cohort 1967-1972		0.039***		0.014**
		(0.012)		(0.006)
Cognitive ability (std)	0.033***	0.027***	0.094***	0.079***
	(0.006)	(0.006)	(0.003)	(0.004)
Cognitive ability x Cohort 1967-1972	-0.030***	-0.037***	0.011***	0.007
	(0.007)	(0.008)	(0.004)	(0.004)
Observations	101,596	101,596	101,596	101,596
R-squared	0.695	0.696	0.692	0.697
Birth year fixed effects	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes
Controls for ever married and earnings	Yes	Yes	No	No

Note: The table shows estimates of the change in relationship between the balance in the four sub-traits of non-cognitive ability and fatherhood at age 45, using sibling fixed effects, conditional on cognitive ability. We estimate the change in the relationship between fatherhood and abilities of the 1967–1972 cohort relative to the 1951–1955 cohort. Balance in non-cognitive ability is the intra-individual standard deviation in the test scores on each of the four sub-traits included in non-cognitive ability. We use standardized values (at enlistment year) with mean zero and standard deviation one. A man is classified as *Ever married* if he was married at any point between ages 20 and 45. *Earnings* refer to the individual's percentile rank within their birth cohort's annual earnings distribution at age 45. Because we lack information on complete test scores on all sub-traits, the number of observations is somewhat smaller than in the main analysis. Robust standard errors, clustered at enlistment year, in parentheses. ***p<0.01 **p<0.05 *p<0.1.

Appendix Table 4: Change in the relationship between parenting skills and fatherhood and earnings at age 45 using composite measures

	(1) Fatherhood	(2) Fatherhood	(3) Earnings	(4) Earnings
A. Composite parenting skills (PS)				
NCA + CA (std)	0.028***		0.053***	
	(0.003)		(0.002)	
NCA + CA x Cohort 1967–1972	0.010**		0.012***	
	(0.005)		(0.003)	
B. Relative non-cognitive parenting skills (PS)				
Relative NCA (std)		-0.003		-0.006**
		(0.002)		(0.002)
Relative NCA x Cohort 1967-1972		0.025***		0.001
		(0.004)		(0.003)
Total ability (std)		0.031***		0.076***
		(0.004)		(0.001)
Total ability x Cohort 1967–1972		-0.001		0.009***
		(0.006)		(0.003)
Observations	105,378	105,378	105,378	105,378
R-squared	0.637	0.637	0.649	0.649
Birth year fixed effects	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes
Control for ever married	Yes	Yes	Yes	Yes
Control for earnings	Yes	Yes	No	No

Notes: The table shows how the relationship between composite measures of parenting skills and fatherhood by age 45 has changed across cohorts, comparing men born in 1951–1955 (reference) and 1967–1972. Panel A reports estimates using a composite measure (NCA + CA) with CA ≤ 4, while panel B shows estimates based on a measure of the proportion of a man's overall ability attributed to non-cognitive ability. All measures are standardized at year of enlistment (mean 0, SD 1). Note that we cannot correct estimates of the composite measures of parenting skills using reliability ratios from Grönqvist et al. (2017). A man is classified as *Ever married* if he was married at any point between ages 20 and 45. *Earnings* refer to the individual's percentile rank within their birth cohort's annual earnings distribution at age 45. Robust standard errors clustered by enlistment year are in parentheses. ***p<0.01, **p<0.05, *p<0.1

Appendix Table 5: Robustness of reform analysis: control for age at birth of focal brother's child

	(1)	(2)	(3)	(4)	(5)	(6)
			Variation by reform window			
VARIABLES	1996–2007	1996–2007	2000–2003	1999–2004	1998–2005	1997–2006
Cognitive ability (std)	0.009**	0.010*	0.004	0.008	0.004	0.009*
	(0.004)	(0.005)	(0.009)	(0.007)	(0.006)	(0.006)
Non-cognitive ability (std)	0.109***	0.101***	0.092***	0.090***	0.094***	0.099***
	(0.006)	(0.008)	(0.013)	(0.011)	(0.009)	(0.008)
Cognitive ability x Post 2002		-0.003	-0.011	-0.007	-0.006	-0.006
		(0.009)	(0.013)	(0.011)	(0.010)	(0.009)
Non-cognitive ability x Post 2002		0.024*	0.020	0.029*	0.025*	0.024*
		(0.013)	(0.018)	(0.016)	(0.014)	(0.014)
Observations	30,897	30,897	12,462	17,953	22,754	27,132
R-squared	0.320	0.321	0.314	0.315	0.315	0.318
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	No	No	No	No	No	No
Controls for ever married and earnings	Yes	Yes	Yes	Yes	Yes	Yes
Control for age at birth of focal brother's child	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table shows estimates of the relationship between cognitive ability (CA), non-cognitive ability (NCA), and the probability of being a father by age 45. We use standardized values (at enlistment year) for cognitive and non-cognitive ability with mean 0 and standard deviation 1. To correct for measurement error, we adjust the estimated effects of cognitive and non-cognitive ability using reliability ratios from Grönqvist et al. (2017). The analysis is restricted to peer brothers with a focal brother who had a first child in 1996–2007. Included are peer brothers who were in childbearing ages, i.e., 40 years old or younger, did have not have any children when the child of the focal brother was born, and with at most a five-year age difference to the focal brother. *Post 2002* is an indicator that equals 1 for peer brothers whose focal brother had a first child in 2002–2007 and 0 for peer brothers whose focal brother had a first child in 1996–2001. A man is classified as *Ever married* if he was married at any point between ages 20 and 45. *Earnings* refer to the individual's percentile rank within their birth cohort's annual earnings distribution at age 45. Columns 1 and 2 shows estimates for 1997–2007, while columns 3–6 shows separate estimates for different reform windows. Robust standard errors, clustered at family level, are shown in parentheses. ***p<0.01 **p<0.05 *p<0.1.

WEB APPENDIX

Parenting Skills and the Selection into Fatherhood

Lina Aldén and Anne Boschini

Web Appendix A: Robustness analysis

This appendix presents a series of sensitivity analyses to test the robustness of our results. We use non-cognitive ability to reflect parenting skills, while including cognitive ability as a control variable to account for general skills relevant for managing daily parenting tasks. A first issue arises because non-cognitive and cognitive ability are positively correlated. On average, the correlation is 0.41 among all brothers and has remained stable over time, measured at 0.39 for the 1951–1955 cohort and 0.40 for the 1967–1972 cohort. This implies that our estimates of non-cognitive ability could partly reflect the influence of cognitive ability, rather than parenting skills per se. To examine this, and to further validate our interpretation of non-cognitive ability as capturing parenting skills, we estimate equation (1) including non-cognitive and cognitive ability both jointly and separately. Excluding cognitive ability from the model (column 1, Table A1), does not alter our main findings for non-cognitive ability. Thus, the association between non-cognitive ability and fatherhood is not driven by cognitive ability and supports our interpretation of non-cognitive ability as an independent measure of parenting-related skills.

Table A1: Change in the relationship between parenting skills and fatherhood at age 45 – each ability included separately + substitutability between NCA and CA

VARIABLES	(1)	(2)	(3)
Non-cognitive ability (NCA)			
NCA (std)	0.044***	0.037***	0.036***
	(0.004)	(0.004)	(0.004)
NCA x Cohort 1967–1972	0.030***	0.040***	0.042***
	(0.009)	(0.009)	(0.009)
Cognitive ability (CA)			
CA (std)		0.022***	0.020***
		(0.006)	(0.006)
CA x Cohort 1967–1972		-0.033***	-0.032***
		(0.008)	(0.008)
Substitutability			
CA x NCA			-0.027***
			(0.003)
CA x NCA x Cohort 1967–1972			-0.002
			(0.006)
Observations	105,378	105,378	105,378
R-squared	0.637	0.637	0.638
Birth year fixed effects	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes
Control for ever married	Yes	Yes	Yes
Control for earnings	Yes	Yes	Yes

Note: The table shows how the relationship between parenting skills and fatherhood by age 45 has changed across cohorts, comparing men born in 1951–1955 (reference) and 1967–1972. All ability measures are standardized at enlistment (mean 0, SD 1). Estimates of non-cognitive and cognitive ability are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). Robust standard errors, clustered at enlistment year, in parentheses. ***p<0.01 **p<0.05 *p<0.1.

A key concern is that shifts in the underlying distribution of abilities across cohorts could drive the increased importance of parenting skills for fatherhood. Figure A1 shows that, in the 1967–1972 cohort, the distribution of non-cognitive ability is somewhat more skewed to the right, while the cognitive ability distribution is slightly more skewed to the left, compared to the 1951–1955 cohort. If more men in recent cohorts simply have higher non-cognitive ability, this could explain the stronger association between parenting skills and fatherhood without any real change in how parenting skills are valued.

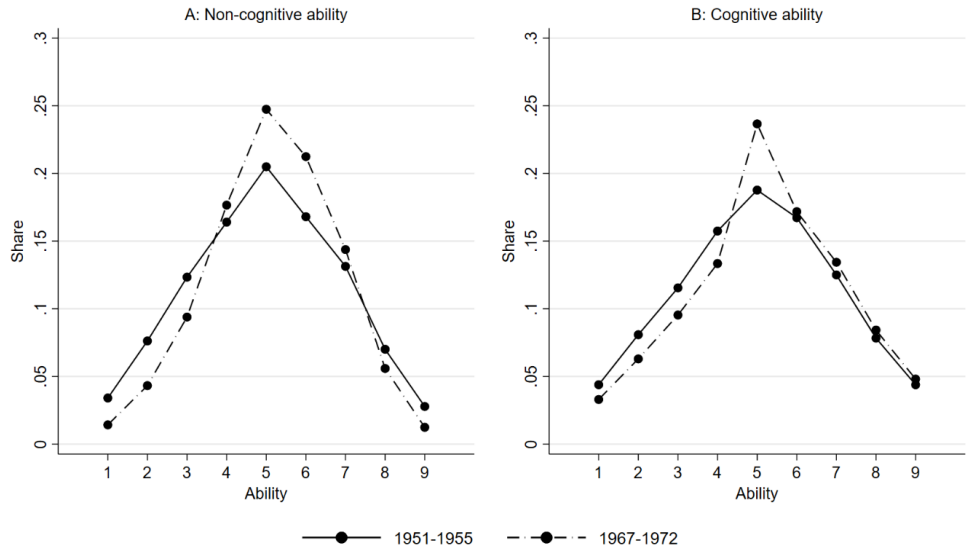


Figure A1: The ability distribution of the 1951–1955 and 1967–1972 cohorts of brothers
Note: The figure shows the distribution cognitive ability (panel A) and non-cognitive ability (B) for brothers born in 1951–1955 and 1967–1972.

To rule this out, we re-estimate our main regressions after holding the ability distribution constant across cohorts. Specifically, we assign the ability distribution of the 1951–1955 cohort to the 1967–1972 cohort and re-run the models from Table 2. As shown in Table A2, the results remain nearly identical to our main estimates, confirming that the trend is not driven by shifts in the underlying distribution of abilities.

Another potential concern is that the quality of the psychologist's assessment of non-cognitive ability may have improved over time, potentially inflating cohort differences in the predictive power of non-cognitive traits. To address this, we include controls for place of enlistment interacted with a cohort indicator in our regressions. As shown in Table A3, this adjustment has virtually no impact on the estimates.

Table A2: Change in the relationship between parenting skills and fatherhood at age 45 – military enlistment checks

VARIABLES	(1)	(2)	(3)
Non-cognitive ability (NCA)			
NCA (std)	0.037***	0.038***	0.037***
	(0.004)	(0.004)	(0.004)
NCA x Cohort 1967–1972	0.040***	0.036***	0.040***
	(0.009)	(0.008)	(0.009)
Cognitive ability (CA)			
CA (std)	0.022***	0.023***	0.022***
	(0.006)	(0.006)	(0.006)
CA x Cohort 1967-1972	-0.033***	-0.028***	-0.032***
	(0.008)	(0.007)	(0.008)
Observations	105,378	100,043	105,378
R-squared	0.637	0.651	0.637
Constant ability distribution over time	No	Yes	No
Control for place of enlistment	No	No	Yes
Birth year fixed effects	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes
Control for ever married	Yes	Yes	Yes
Control for earnings	Yes	Yes	Yes

Note: The table shows how the relationship between parenting skills and fatherhood by age 45 has changed across cohorts, comparing men born in 1951–1955 (reference) and 1967–1972. All ability measures are standardized at enlistment (mean 0, SD 1). Estimates of non-cognitive and cognitive ability corrected for measurement error using reliability ratios from Grönqvist et al. (2017). Column (1) presents the main estimates from Table 2. In column 2, we hold the ability distribution constant across cohorts by applying the ability distribution of the 1951–1955 cohort to the 1967–1972 cohort. In column (3), Additionally, to address potential improvements in the psychologist's assessment of non-cognitive ability over we include controls for place of enlistment interacted with the cohort indicator. Robust standard errors, clustered at enlistment year, in parentheses. ***p<0.01 **p<0.05 *p<0.1.

To ensure that our findings are not driven by unobserved family background factors, we use sibling comparisons in our analysis. A potential concern with this approach is external validity, since families with multiple sons might differ systematically from other families. To assess the generalizability of our results, we follow established methods in the literature and compare between-family estimates of the relationship between fatherhood and abilities in our brother sample to those obtained for the total population of men. Consistent with prior work (Kohler et al., 1999; Kramarz et al., 2023), we find that between-family estimates for families with brothers are similar to those observed for all men, suggesting that our results on parenting skills apply more broadly (see Table A3, column 1 and 2).

Although sibling fixed-effects models effectively control for family factors that are constant over time, there may still be time-varying unobservable influences, such as changes in parenting practices, family resources, or parental career orientation, that differ between siblings and could bias estimates of the link between non-cognitive ability and fatherhood. While birth order is largely random with respect to non-cognitive and cognitive ability, we take additional

steps to address this concern. First, we include a control for birth order in our regressions. Second, we restrict the sample to brothers who are no more than two years apart in age, under the assumption that family environments are more stable for siblings born close together (see column 3 and 4, Table A3). In both cases, our results remain highly consistent with those presented in Table 2, reinforcing the conclusion that non-cognitive parenting skills have become increasingly important for fatherhood decisions.

Finally, in our main sibling fixed-effects models, we include multiple sibling pairs who share the same biological mother. As a further check, we re-estimate our models using a subsample restricted to families where the first- and second-born children are both boys. This alternative specification yields results that are virtually identical to our main findings (see column 5, Table A3), further supporting the robustness of our conclusions regarding the growing role of parenting skills in men's decisions to become fathers.

Table A3: Change in the relationship between parenting skills and fatherhood at age 45 – robustness for sibling fixed effects analysis

VARIABLES	(1) Brothers	(2) All men	(3) Control for birth order	(4) Age difference in brother pair ≤ 2 year	(5) First- and second-born brothers
Non-cognitive ability (NCA)					
NCA (std)	0.043***	0.046***	0.037***	0.031***	0.033***
	(0.002)	(0.001)	(0.004)	(0.005)	(0.004)
NCA x Cohort 1967–1972	0.034***	0.038***	0.040***	0.046***	0.046***
	(0.007)	(0.004)	(0.009)	(0.012)	(0.014)
Cognitive ability (CA)					
CA (std)	-0.015***	-0.015***	0.022***	0.021***	0.025***
	(0.002)	(0.001)	(0.006)	(0.006)	(0.008)
CA x Cohort 1967-1972	-0.024***	-0.031***	-0.033***	-0.030***	-0.044***
	(0.003)	(0.001)	(0.008)	(0.008)	(0.010)
Observations	105,378	505,343	105,378	64,744	37,720
R-squared	0.026	0.029	0.637	0.635	0.633
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	No	No	Yes	Yes	Yes

Note The table shows how the relationship between parenting skills and fatherhood by age 45 has changed across cohorts, comparing men born in 1951–1955 (reference) and 1967–1972. All ability measures are standardized at enlistment (mean 0, SD 1). Estimates of non-cognitive and cognitive ability are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). In column 1, we use the brother sample without including sibling fixed effects. In column, 2, we present estimates for the full population of men. In column 3, we add a control the brothers' birth order. In column 4, we restrict the analysis to brother pairs with at most a two-years age difference. In column 5, we limit the analysis to first- and second-born brothers. Robust standard errors, clustered at enlistment year, in parentheses. ***p<0.01 **p<0.05 *p<0.1.

Web appendix B: Alternative measures of earnings and partnership status

While our main analysis controls for both marriage and earnings, the unconditional relationship between non-cognitive ability and fatherhood may partly reflect pathways operating through men's partnership formation and economic resources, as suggested by Figure 1. To examine how these factors affect the estimates, Table B1 reports results from sequentially adding controls for marriage and earnings to the unconditional specification. Controlling for martial history substantially reduces the estimated effect of non-cognitive ability for the 1951–1955 cohort but has practically no impact on the change across (see columns 1 and 2). In contrast, earnings have a smaller impact on early cohorts but slightly attenuate the estimated change across cohorts (column 3). We also include education as an additional control but this has little effect on the estimates (column 4), suggesting that cognitive ability already captures most of the relevant variation associated with educational attainment. Column 5 confirms that non-cognitive ability remains a significant and growing predictor of fatherhood across cohorts even when accounting for these factors. Overall, the findings indicate that marriage and earnings explain some, but not all, of the link between non-cognitive ability and fatherhood; even after accounting for these channels, non-cognitive ability remains an independent and increasingly important predictor of who becomes a father.

Table B1: Change in the relationship between parenting skills and fatherhood at age 45 – sequential addition of controls

	(1)	(2)	(3)	(4)	(5)
		Conditional on:			
VARIABLES	Unconditional	Ever married	Earnings rank	Education	Marriage, earnings, education
Non-cognitive ability (NCA)					
NCA (std)	0.083***	0.044***	0.068***	0.081***	0.038***
	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)
NCA x Cohort 1967–1972	0.042***	0.049***	0.033***	0.045***	0.043***
	(0.009)	(0.010)	(0.008)	(0.008)	(0.010)
Cognitive ability (CA)					
CA (std)	0.046***	0.030***	0.031***	0.043***	0.025***
	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)
CA x Cohort 1967-1972	-0.028***	-0.024***	-0.036***	-0.024***	-0.026***
	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)
Ever married		0.372***			0.363***
		(0.008)			(0.009)
Ever married x Cohort 1967–1972		-0.070***			-0.075***
		(0.009)			(0.010)
Earnings			0.002***		0.001***
			(0.000)		(0.000)
Earnings x Cohort 1967-1972			0.001***		0.001***
			(0.000)		(0.000)
Years of education				0.003*	-0.003**
				(0.002)	(0.001)
Years of education x Cohort 1967-1972				-0.005**	-0.007***
				(0.002)	(0.001)
Observations	105,378	105,378	105,378	105,245	105,245
R-squared	0.563	0.633	0.572	0.563	0.638
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes

Note: The table shows how the relationship between parenting skills and fatherhood by age 45 has changed across cohorts, comparing men born in 1951–1955 (reference) and 1967–1972. All ability measures are standardized at enlistment (mean 0, SD 1). All ability estiamtes are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). A man is classified as *Ever married* if he was married at any point between ages 20 and 45. *Earnings* refer to the individual's percentile rank within their birth cohort's annual earnings distribution at age 45. *Education* refers to a man's years of schooling around age 35. Robust standard errors, clustered by enlistment year, are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1

Because marriage and earnings are themselves potentially endogenous to ability and fertility, we next test whether our conditional estimates are robust to alternative measures and specifications of these factors. First, we examine alternative definitions and predicted measures of both earnings and partnership status to assess robustness to variable definition and residual endogeneity. Using a semi-parametric approach, we predict the probability of ever being married and earnings rank at age 45 using estimates from regressions that include abilities and a standardized measure of height from the military enlistment data. The inclusion of height is

motivated by research showing that height directly affects the likelihood of marriage and earnings, but indirectly influences fatherhood (see e.g., Barclay & Kolk, 2020; Case & Paxson, 2008; Sohn, 2015). The predicted values, interacted with the cohort indicator, are then included as controls in the main regression model (equation 1), isolating variation in marriage and earnings that is plausibly exogenous to unobserved factors related to fatherhood. The results are similar in magnitude, indicating that the association between non-cognitive ability and fatherhood is not driven by endogeneity in these controls (see Table B2).

Table B2: Change in the relationship between parenting skills and fatherhood at age 45 – selection into marriage and the labor market

	(1)	(2)	(3)
		Conditional on:	
VARIABLES	Baseline	Predicted marriage	Predicted earnings
Non-cognitive ability (NCA)			
NCA (std)	0.037***	0.027**	0.027*
	(0.004)	(0.012)	(0.015)
NCA x Cohort 1967–1972	0.040***	0.041**	0.042*
	(0.010)	(0.019)	(0.023)
Cognitive ability (CA)			
CA (std)	0.022***	0.014	0.012
	(0.006)	(0.010)	(0.019)
CA x Cohort 1967–1972	-0.033***	-0.032***	-0.031
	(0.008)	(0.011)	(0.022)
Observations	105,378	105,300	105,300
R-squared	0.633	0.563	0.563
Birth year fixed effects	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes
Control for ever married	Yes	No	Yes
Control for earnings	Yes	Yes	No

Notes: The table shows how the relationship between parenting skills and fatherhood by age 45 has changed across cohorts, comparing men born in 1951–1955 (reference) and 1967–1972. All ability measures are standardized at year of enlistment (mean = 0, SD = 1). Estimates of NCA and CA are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). Column 1 reports the main estimates from Table 2. Columns 2 and 3 present robustness checks that replace the main controls for marriage or earnings with predicted probabilities or predicted earnings ranks, obtained from first-stage regressions including cognitive and non-cognitive abilities and standardized height. All models include birth year and sibling fixed effects. Robust standard errors clustered by enlistment year are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1.

We further show that the main results are robust to using a broader partnership measure that includes cohabitation (see Table B3). While this measure captures the rise in non-marital unions, partnership status may not be fully observed for all men, as Swedish register data on cohabitation are incomplete between 1991 and 2010. During these years, cohabitation is recorded only for couples with common children. For this reason, marriage remains our main measure. Even so, controlling for ever being partnered reduces but does not eliminate the growing association between non-cognitive ability and fatherhood. Moreover, the importance

of non-cognitive ability for cohabitation itself has not changed over time, suggesting that the trend pertains specifically to the transition to fatherhood rather than to partnership formation per se.

Table B3: Change in the relationship between parenting skills and fatherhood at age 45 – control for ever partnered at age 45

VARIABLES	(1) Baseline	(2) Fatherhood, controlling for ever partnered	(3) Outcome: Ever partnered
Non-cognitive ability (NCA)			
NCA (std)	0.037***	0.011***	0.080***
	(0.004)	(0.003)	(0.003)
NCA x Cohort 1967–1972	0.040***	0.026***	0.008
	(0.009)	(0.005)	(0.006)
Cognitive ability (CA)			
CA (std)	0.022***	0.010**	0.029***
	(0.006)	(0.004)	(0.004)
CA x Cohort 1967–1972	-0.033***	-0.016**	-0.029***
	(0.008)	(0.006)	(0.005)
Observations	105,378	105,378	105,378
R-squared	0.786	0.787	0.584
Birth year fixed effects	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes
Control for ever married	Yes	No	No
Control for earnings	Yes	Yes	Yes
Control for ever partnered	Yes	Yes	No

Notes: The table shows how the relationship between parenting skills and fatherhood by age 45 changes across cohorts, comparing men born in 1951–1955 (reference) and 1967–1972, using alternative partnership controls. All ability measures are standardized at year of enlistment (mean = 0, SD = 1), and estimates are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). A man is classified as *ever partnered* if he was married or cohabited at any time between ages 20 and 45. However, partnership status may be incompletely observed for some men, as cohabitation data are only available every five years from 1970 to 1990 and again from 2011 onward; between 1991 and 2010, cohabitation is observable only for men with shared children. Control for ever partnered included in Column 2. In column 3, ever partnered is the outcome variable. Earnings refer to the individual's percentile rank within his birth cohort's annual earnings distribution at age 45. Robust standard errors, clustered by enlistment year, are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1

To further test whether the results reflect economic channels, Table B4 uses alternative earnings measures. By measuring men's economic resources at age 45, well after most fertility decisions have been made, and by using multiple operationalizations of earnings (percentile rank, absolute level, quartile, and expected earnings based on education), we test whether our findings survive even under conditions most likely to attenuate the association. These measures capture long-run economic success rather than income at the time of family formation, which should bias against finding any effect of non-cognitive ability net of earnings if economic resources were the primary channel linking non-cognitive ability to fatherhood. The fact that the non-

cognitive gradient in fatherhood remains stable across all these definitions therefore strengthens our interpretation that parenting skills matter beyond men's economic position.

Table B4: Robustness of the parenting skills–fatherhood relationship to alternative earnings measures

	(1)	(2)	(3)	(4)
	Conditional on:			
VARIABLES	Earnings percentile rank	Earnings level	Earnings quartile	Expected earnings
Non-cognitive ability (NCA)				
NCA (std)	0.037***	0.041***	0.039***	0.045***
	(0.004)	(0.005)	(0.004)	(0.005)
NCA x Cohort 1967–1972	0.040***	0.046***	0.041***	0.049***
	(0.009)	(0.010)	(0.009)	(0.009)
Cognitive ability (CA)				
CA (std)	0.022***	0.026***	0.024***	0.030***
	(0.006)	(0.006)	(0.006)	(0.006)
CA x Cohort 1967–1972	-0.033***	-0.026***	-0.033***	-0.023***
	(0.008)	(0.008)	(0.008)	(0.008)
Earnings measures				
Earning rank at age 45	0.001***			
	(0.000)			
Earning rank at 45 x Cohort 1967–1972	0.001***			
	(0.000)			
Earnings (levels) at 45		0.000***		
		(0.000)		
Earnings (levels) at 45 x Cohort 1967–1972		0.000		
		(0.000)		
Earnings quartile at 45			0.022***	
			(0.002)	
Earnings quartile at 45 x Cohort 1967–1972			0.009***	
			(0.001)	
Expected earnings at 45				-0.000
				(0.000)
Expected earnings at 45 x Cohort 1967–1972				-0.000
				(0.000)
Observations	105,378	105,378	105,378	105,176
R-squared	0.637	0.635	0.636	0.634
Birth year fixed effects	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes
Control for ever married	Yes	Yes	Yes	Yes

Note: The table shows how the relationship between parenting skills and fatherhood by age 45 has changed across cohorts, comparing men born in 1951–1955 (reference group) and 1967–1972. All ability measures are standardized at enlistment (mean = 0, SD = 1), and estimates are corrected for measurement error using reliability ratios from Grönqvist et al. (2017). Earnings rank, the measure used in Table 2, refers to a man's percentile rank within his birth cohort's annual earnings distribution at age 45. Earnings level is the actual annual earnings at age 45. Earnings quartile indicates which quartile of the earnings distribution a man belongs to at age 45. Expected earnings are predicted from highest educational attainment (field and level) at age 45. Fewer observations in Column (4) reflect missing data on educational attainment. Robust standard errors, clustered by enlistment year, are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1

Online Appendix C: The Evaluation Through Follow-up (UGU) study

The Evaluation Through Follow-up (UGU) study is a representative sample comprising ten percent of all children born in several different cohorts between 1948 and 2010 in Sweden. Children in the sample are followed longitudinally from 6th grade through the last year of high school. Every three years, individuals are surveyed via questionnaires covering topics related to health, interests, and schooling.[28]

Although there is no direct measure of non-cognitive or social skills in UGU, the data include several variables on social behavior across different ages that allow us to construct a proxy similar to the social skills measure in Deming (2017). Deming's measure combines self-reports of current sociability, sociability at age 6, participation in clubs during high school, and participation in high school sports. To construct a comparable measure in the UGU data, we use questionnaire responses collected at ages 12 and 16 for individuals born in 1967 and 1972. Specifically, we draw on five recurring questions across the two survey waves:

A. "Do you like to work together with other kids" (yes=1 / no=0) at age 12;
B. "How many clubs are you a member of?" ("none"=0" / one"=1 / "two or more"=2) at age 13;
C. "Did you have problems with friends in final years of compulsory school" ("very big problems"=1 / "big problems"=2 / "some problems"=3 / "no problems"=4);
D. "How often do you train competition sports" ("rarely or never"=1 / "a few times per month"=2 / "a few times per week"=3 / "every or almost every day"=4) at age 16; and
E. "How many clubs are you a member of?" ("none"=0" / one"=1 / "two or more"=2) at age 16.

Each question is standardized for each cohort to get mean 0 and a standard deviation of 1. The average of the five measures is then standardized again and used as a measure of social skills following the same approach as in Deming (2017).

In our main analysis reported in Table 6, we use the composite social skills index based on all five questions, while controlling for cognitive ability. To test robustness, Table C1 presents results using alternative specifications of the social skills index, constructed from questions (C), (D), and (E), which all focus on social interactions and activities during high school (see column 1). These alternative measures yield results similar to those in our main

[28] See more on UGU's website at https://doi.org/10.48339/9k8m-ae74.

analysis (see column 2). Furthermore, columns 3 and 4 show that the results for Swedish and US, respectively, men remain unchanged when additionally controlling for years of schooling, as in Deming (2017).

Table C1: The relationship between parenting skills and fatherhood at age 45 – Swedish case using UGU1967 &UGU72 and different social skills measures

	(1)	(2)	(3)	(4)
	UGU	UGU	UGU	NLSY79
	Alternative definitions of social skills			
VARIABLES	CDE	ABCDE		
Social skills (std)	0.022***	0.030***	0.030***	0.033***
	(0.005)	(0.005)	(0.005)	(0.010)
Cognitive ability (std)	-0.023***	-0.023***	-0.011**	0.005
	(0.005)	(0.005)	(0.005)	(0.008)
Observations	6,732	6,732	6,732	2,052
R-squared	0.198	0.200	0.204	0.219
Birth year fixed effects	Yes	Yes	Yes	Yes
Sibling fixed effects	No	No	No	No
Controls for ever married and earnings	Yes	Yes	Yes	Yes
Control for education	No	No	Yes	Yes

Note: The table shows estimates of the relationship between parenting skills and fatherhood by age 45, using social skills as a proxy for parenting skills. Cognitive ability, included as a control, is measured using evaluations of respondents' inductive (number sequences), spatial (plate folding), and verbal (synonyms and opposites) skills. Social skills are constructed from UGU67 and UGU72 survey questions on sociability and activities at ages 12–16. Column 1 uses questions (C), (D), and (E), while column 2 includes all five questions (A–E). All ability measures are standardized and combined into an unweighted sum. An individual is classified as *Ever married* if he/she was married at any point between ages 20 and 45. *Earnings* refer to the individual's percentile rank within their birth cohort's annual earnings distribution at age 45. *Education* is an individual's years of schooling around age 35. Robust standard errors are shown in parentheses. Robust standard errors in parentheses. ***p<0.01 **p<0.05 *p<0.1.

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